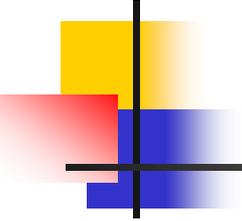


# Traditional Foods in Alaska:

## Potential Threats from Contaminants and Climate Change



State of Alaska  
Division of Public Health  
Lori Verbrugge, Ph.D.



# Overview of Talk

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- n Why are traditional foods important in Alaska?
- n Threats to traditional food safety
  - n Traditional focus on contaminants
  - n Nexus with climate change
- n Conclusions

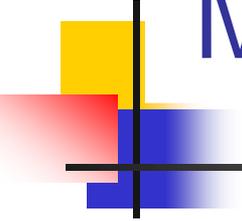
# Why are Traditional Foods Important?



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# Health Benefits of Seafood, Marine and Terrestrial Mammals



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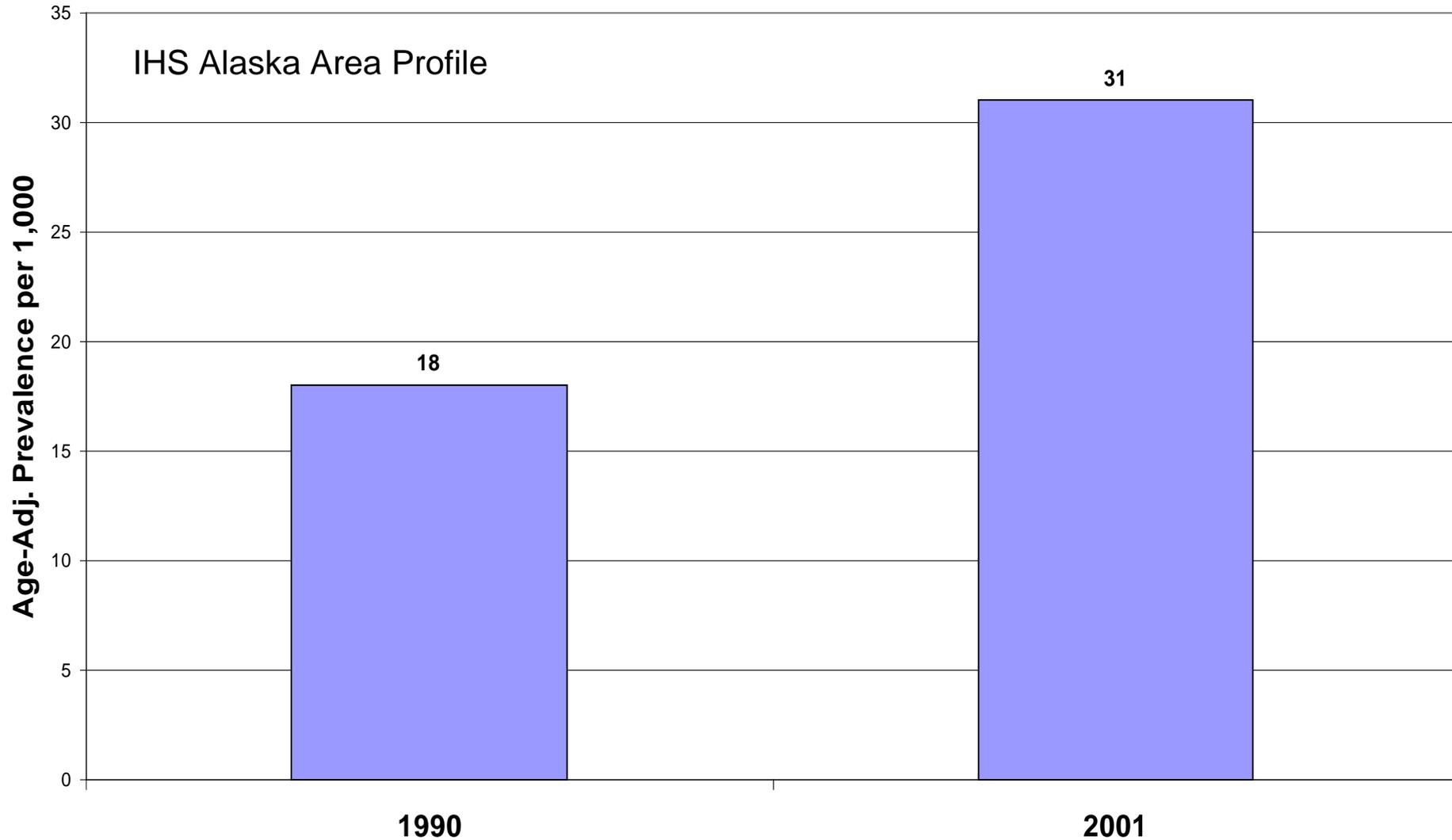
- High nutritional value
- Vitamins A, E, C
- Protein
- Energy
- Omega - 3 - fatty acids
- Monolipids
- Iron, zinc

# Prenatal & Infant Development

- n Omega-3 fatty acids important for neurodevelopment. Used during third trimester for:
  - n brain and retinal development
  - n maturation of the visual cortex
- n motor skills development in infants



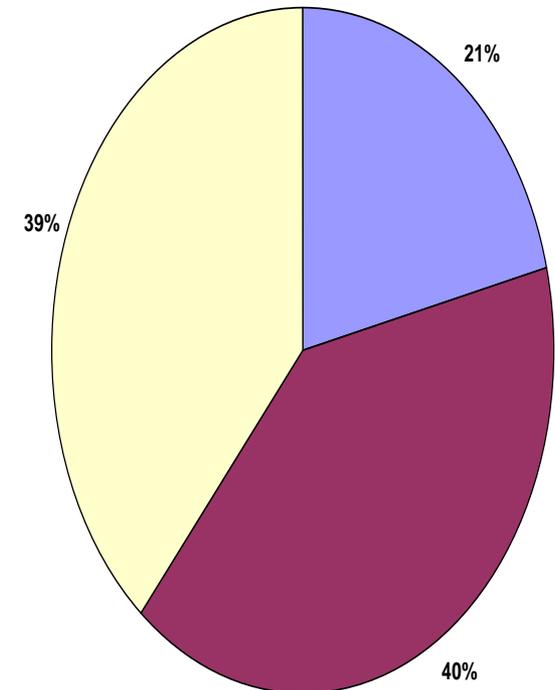
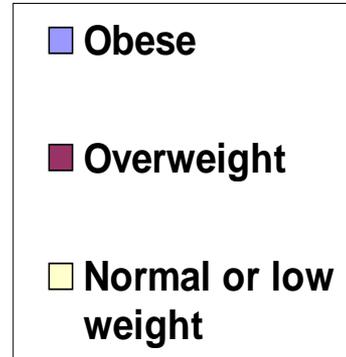
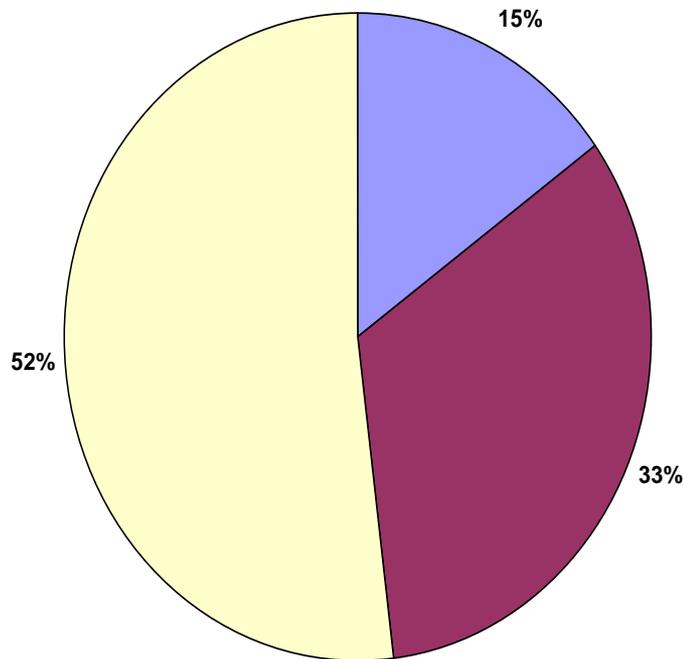
# Diabetes Prevalence in Alaska Natives: 72% increase from 1990 to 2001

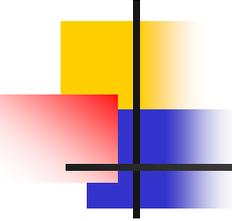


# Percent of Alaskan Adults who are Overweight or Obese

1991-1993: 48%

1999-2001: 61%



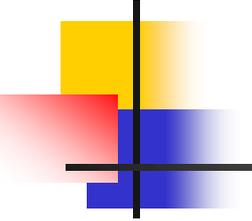


# Chronic Health Problems Associated with Obesity

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- n Premature Death
- n Heart Disease
- n Diabetes
- n Arthritis
- n Cancer
- n Breathing Problems
- n Reproductive Complications
- n And More.....

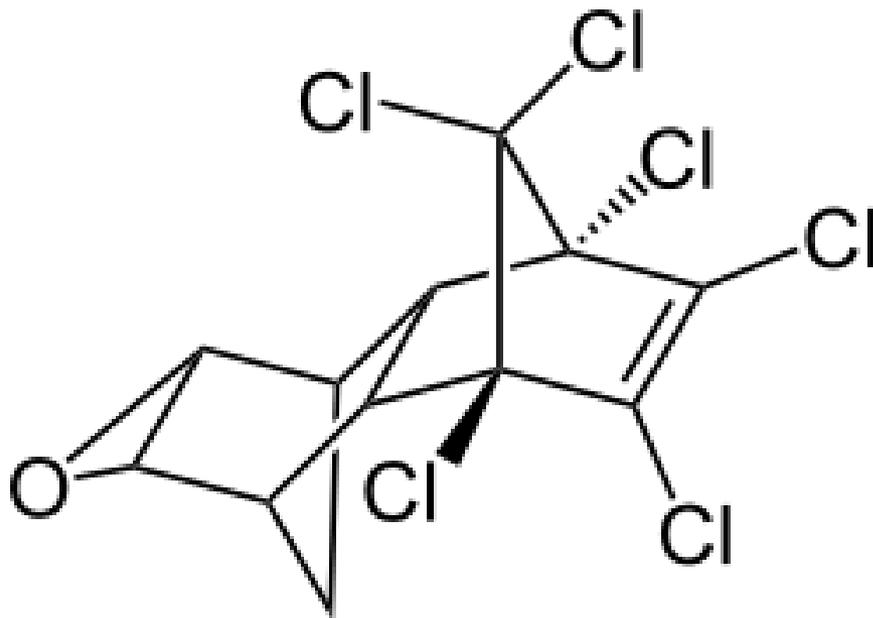
# Drawbacks of Restricted Consumption of Traditional Foods

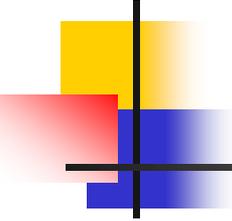


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- n Health risks associated with alternative foods
  - n - saturated fat: cardiovascular disease
  - n - carbohydrates: diabetes
- n Loss of nutritional and health benefits
- n Overall negative health impact of dietary and lifestyle changes
- n High cost of replacement foods
- n Social, economic and health consequences from the breakdown of subsistence

# Potential Threats to Traditional Food: Contaminants





# Toxic effects of Mercury

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- n High doses: Personality changes, tremors, changes in vision or hearing, loss of sensation, memory difficulties
- n Most sensitive endpoint:
  - n fetal brain development
- n Low doses through fish/marine mammal consumption: Epi studies inconsistent

# What are the Potential Effects of PCB-like chemicals?

- **Immunotoxicity:**

Decreased ability to fight disease

- **Neurodevelopment:**

Learning and behavior

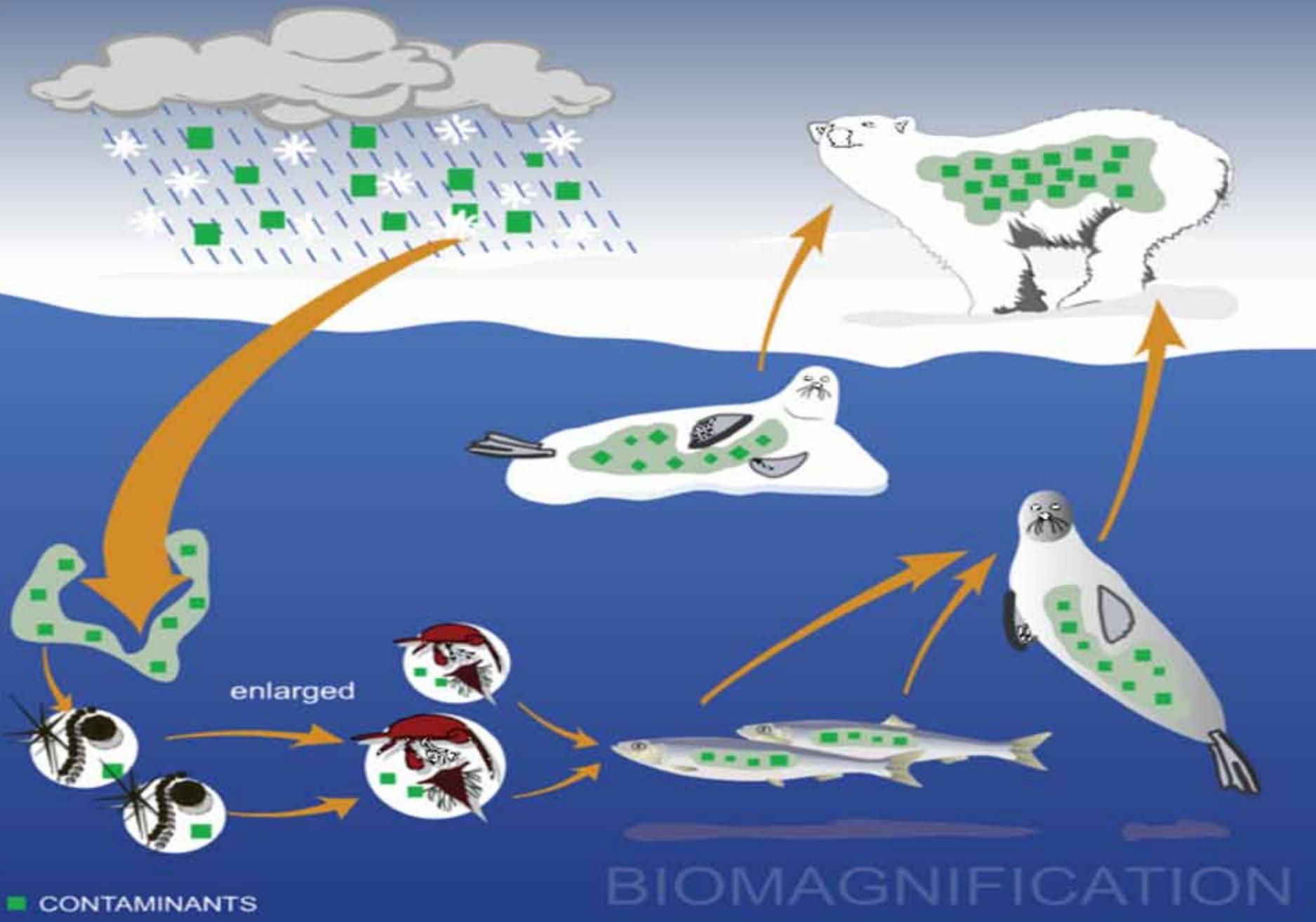
- **Endocrine disruption:**

Interactions with thyroid and sex hormone receptors

- **Cancer**

Fiercely debated whether these effects could occur at the low doses encountered through subsistence food consumption!



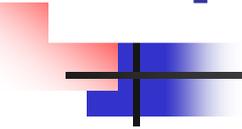


■ CONTAMINANTS

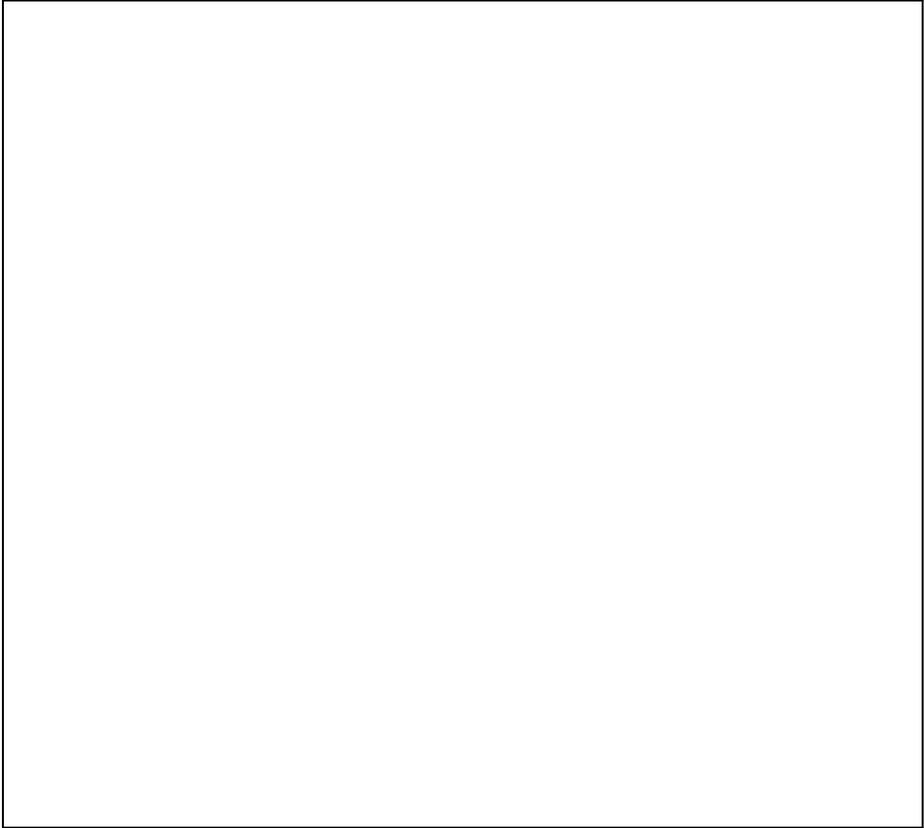
# BIOMAGNIFICATION

# State of Alaska

## Public Health Recommendations



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- Benefits far outweigh potential adverse effects
  - Traditional foods are a healthy dietary choice
- 

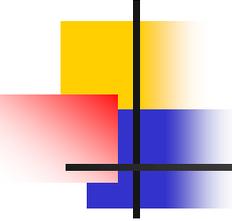
How could climate change affect traditional foods?



# Glaciers Melting

Shown here are Austin Post's 1958 photo of the McCall Glacier terminus, alongside of a 2003 photo by Matt Nolan taken at almost the same spot.



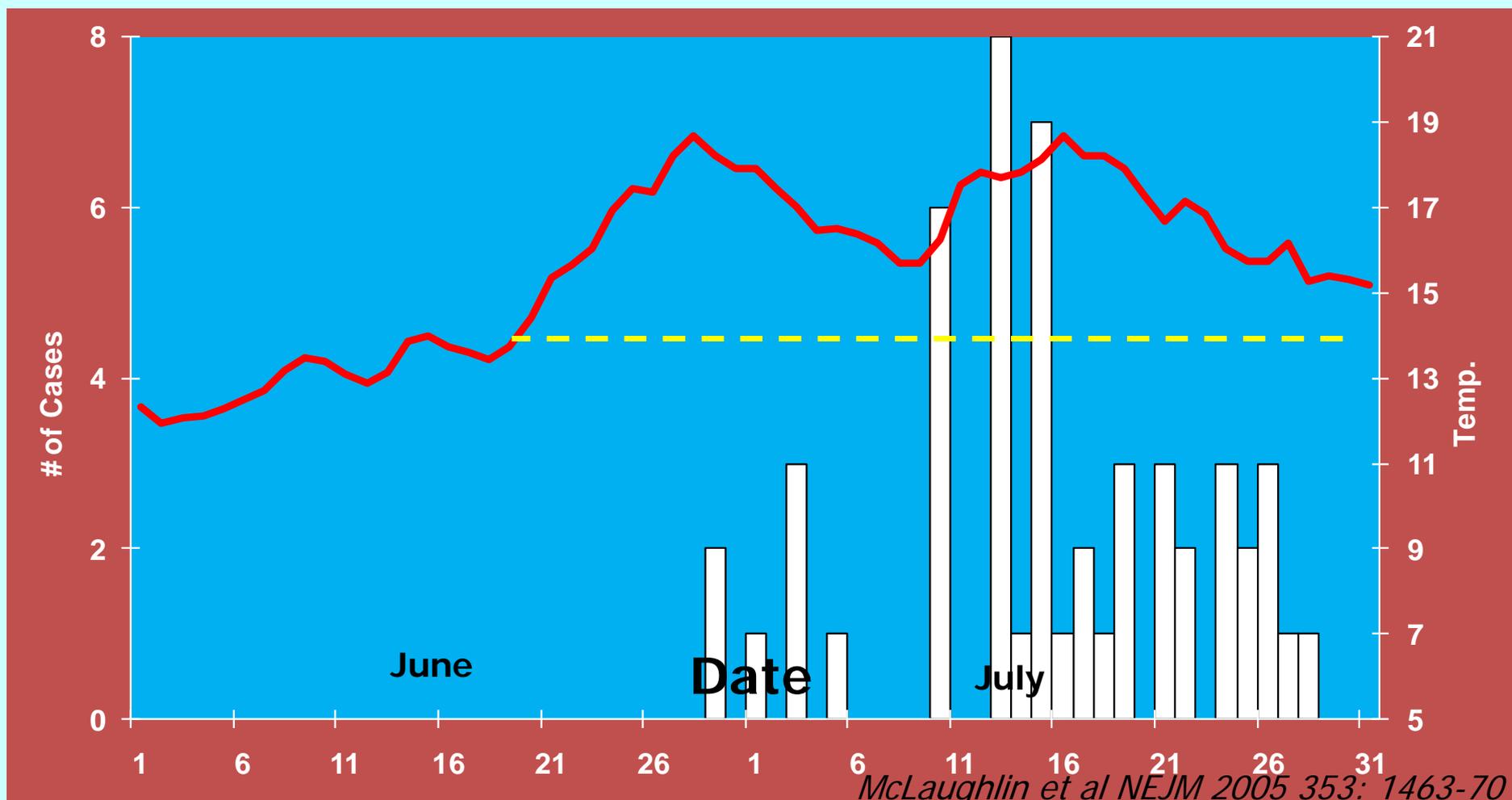


# Melting glaciers may be a source of POPs to Arctic lakes

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- n Alberta Canada – elevated concentrations of POPs in layers of ice deposited in the 1950s through 1980s
- n Bow Lake POPs input measured in 1997
  - n Glacial melt stream a major source of POPs to the lake
- n Italy – melting Alpine glaciers a current source of DDT to local lakes

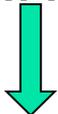
# Vibrio Outbreak: Mean Daily Farm "A" Water Temperature by Date, and Number of Farm "A"-associated Case-patients by Harvest Date of Consumed Oysters-2004



# Arctic Warming may Increase Bioaccumulation of Methyl Hg

n Temperature enhances Hg methylation

n Warming  primary productivity

n  sunlight =  demethylation by uv light

n Methylation by sulfate-reducing bacteria depends on organic matter

n Zooplankton species – Daphnia higher in Hg; dependent on dissolved organic carbon

n Methylated Hg bioaccumulates in fish

# Eagle Village spring flooding, June 2009

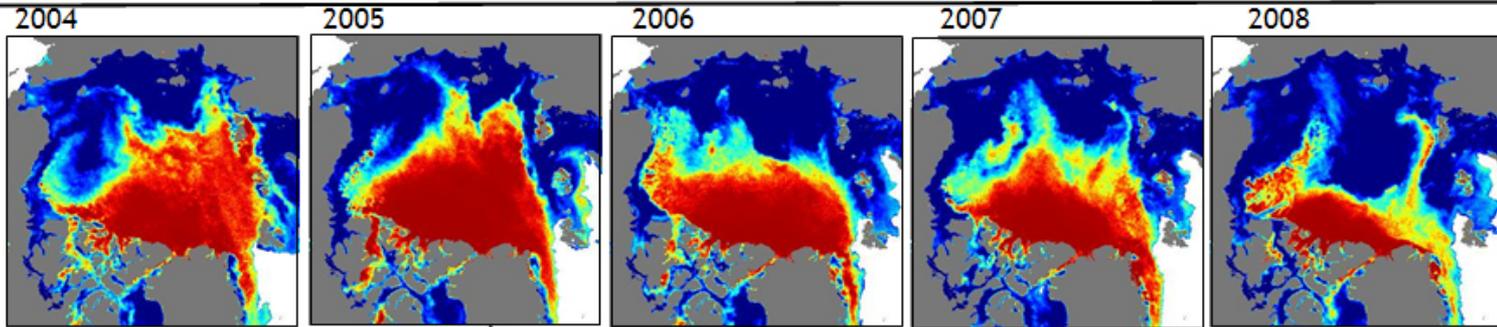


# Eroding Landfill, Port Heiden 2008



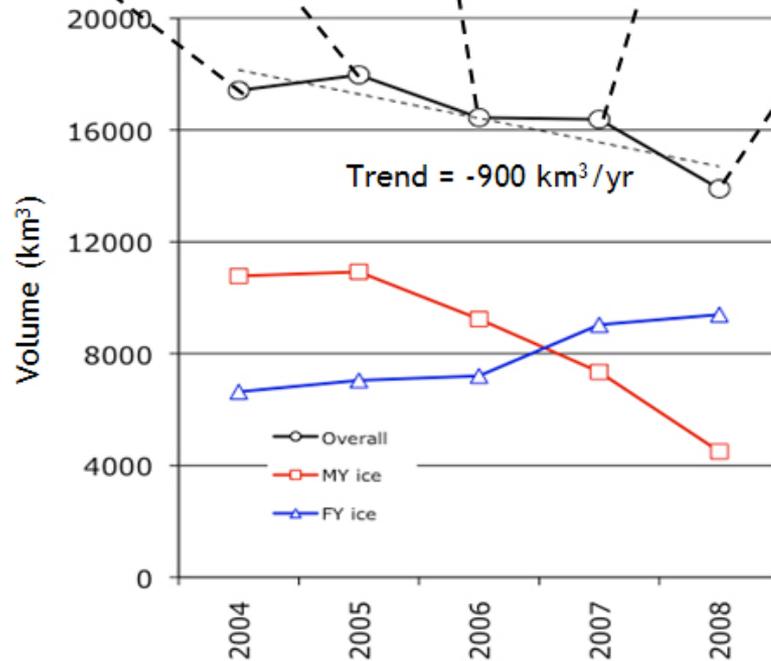


# Trend in winter sea ice volume



MY fraction  
0.0 1.0

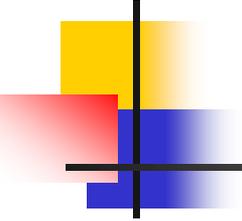
MY = multiyear ice



# Effects of decreasing sea ice on Pacific Walrus

- n Use sea ice for:
  - n Resting platform over offshore feeding areas
  - n Escape from predators
- n Since 2007, large # of walrus haul out on coast
  - n 131 young walrus killed in stampede near Icy Cape
  - n stampedes also on Russian side of Chukchi Sea in 2007





# Conclusions

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- n Traditional foods are central to Alaska Native culture, and a healthy lifestyle
- n Climate change has the potential to threaten traditional food safety and security
- n Need to protect the environment to protect traditional food abundance and safety
- n Need careful planning to minimize impacts of climate change that are unavoidable

A scenic view of a large glacier flowing into a body of water, with vibrant red flowers in the foreground. The glacier is a massive, white, textured mass that fills the middle ground. In the foreground, there are lush green plants with bright red flowers. The background shows dark, forested mountains under a clear blue sky.

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