

# **Wildlife Toxicology Laboratory (UAF): Reaching Out**

LEO webinar  
February 19, 2013  
2:00 to 3:30pm  
20 minute presentation

# Opportunities for Collaboration

- Local Environmental Observers: much of our knowledge (local, indigenous, western) has come from “observations.”
- Some observations are from a hilltop others via highly technical means: truth or utility are the **same** (can have good or bad observations regardless of method)
- Often observations lead to **testable questions** (hypothesis) or **repeat sampling to better understand** (elders).

# ANTHC, Dr. Berner and "RAMP" or *Rural Alaska Monitoring Project*

- Funded to develop tools for community based sampling.
- Assist with addressing interesting or concerning findings in environment.
- One method is use of blood soaked filter paper (blood from animals)
  - Assess chemical contaminants in blood
  - Look for antibodies to specific pathogens
  - Look for components of pathogens (DNA)

# What kind of analysis does the lab perform

- **Chemical** – elements (Hg, Cd, Se, Zn,...), stable isotopes (feeding ecology), organic contaminants (PCBs,...), lipids/fatty acids...
- **Statistical** – Post Doc and Research Professional excellent with **data management and statistical analysis**.
- **Develop Monitoring Programs** – NPS, State of Alaska, ourselves,...
- Assess **antibodies** in blood (Brucella in seals)
- **Disease Investigations** – sampling and consultation with experts and communities.

# Disease Investigations

- Spotted seal infected uterus
  - Hunter killed in Kotzebue
  - Appeared healthy, major infection
  - 1<sup>st</sup> documentation of this bacteria in Alaskan seals
  - Single animal resulted in publication because of scientific interest (case study)
  - No zoonotic disease concern once identified
- Grouse specimens from Unalakleet
  - Interest in observed parasites
  - Scheduling necropsy to assess (have contacted experts to assist)
  - Developed sampling plan

# Contaminants and Nutrients Monitoring in Rural Communities

- Sample collection, chemical analysis, data management, interpretation/communication
- Emphasize balanced approach
- Community involvement (study design to communication back)
- Good science in real world context (e.g., consumed items)
- Respect connections between environmental, animal and human health.



Logo designed by  
John Oscar

# Striking a Balance:

## Nutrients and contaminants in Alaskan subsistence foods

Camilla Lieske

J Margaret Castellini

Todd M O'Hara (PI & presenter)

May 24 2012  
Bethel, Alaska



# Acknowledgements



- **Village of Mekoryuk-** including
  - Steven Whitman, Ike Kiokun
  - Dora John, Emory and Debbie David
  - Peggy Williams
  - Stephen Olrund, Nathan Hanna
  - Jean Richards, Lisa and Rose King
  - John Oscar
  - The multitude of kids who were always willing to help out
- **Muir Laboratory**
  - Aquatic Ecosystem Protection Research Directorate
  - Environment Canada
- Members of the **Wildlife Toxicology Laboratory** -including
  - Darce Holcomb, Cassie Kirk, Katrina Knott, Carla Willetto, Rhonda Swor
  - Shaina Bhojwani, Christopher Ebner, Sam Norlin, Shawn Holcomb
- **Center for Alaska Native Health Research** including Michelle Dondanville, Scarlett Hopkins, Ross Newcombe, Diana Campbell, Gerald Mohatt
- Dana Wetzel at the **Mote Marine Laboratory**





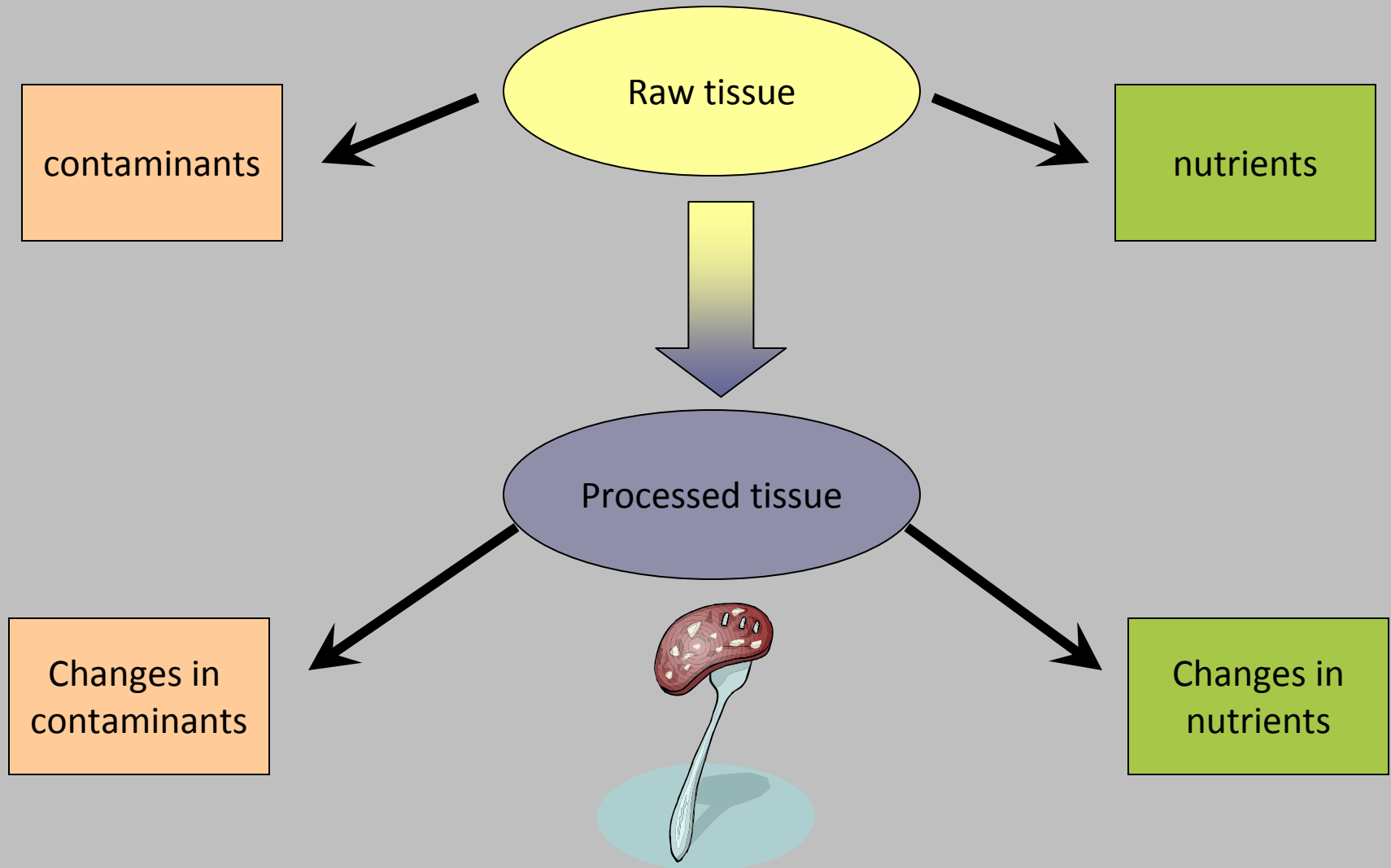


**May-August 2008**

**June & July 2009**

**May 2010**

# Overall Goals





# Dilemma

**Fish are  
nutritious**

Their consumption is vital  
to the well-being of many  
residents

**Fish contain  
contaminants**

that pose a small but  
potential health risk to  
consumers

**Changes in  
intake?**

# Samples Collected

---

2008, 2009, 2010 combined

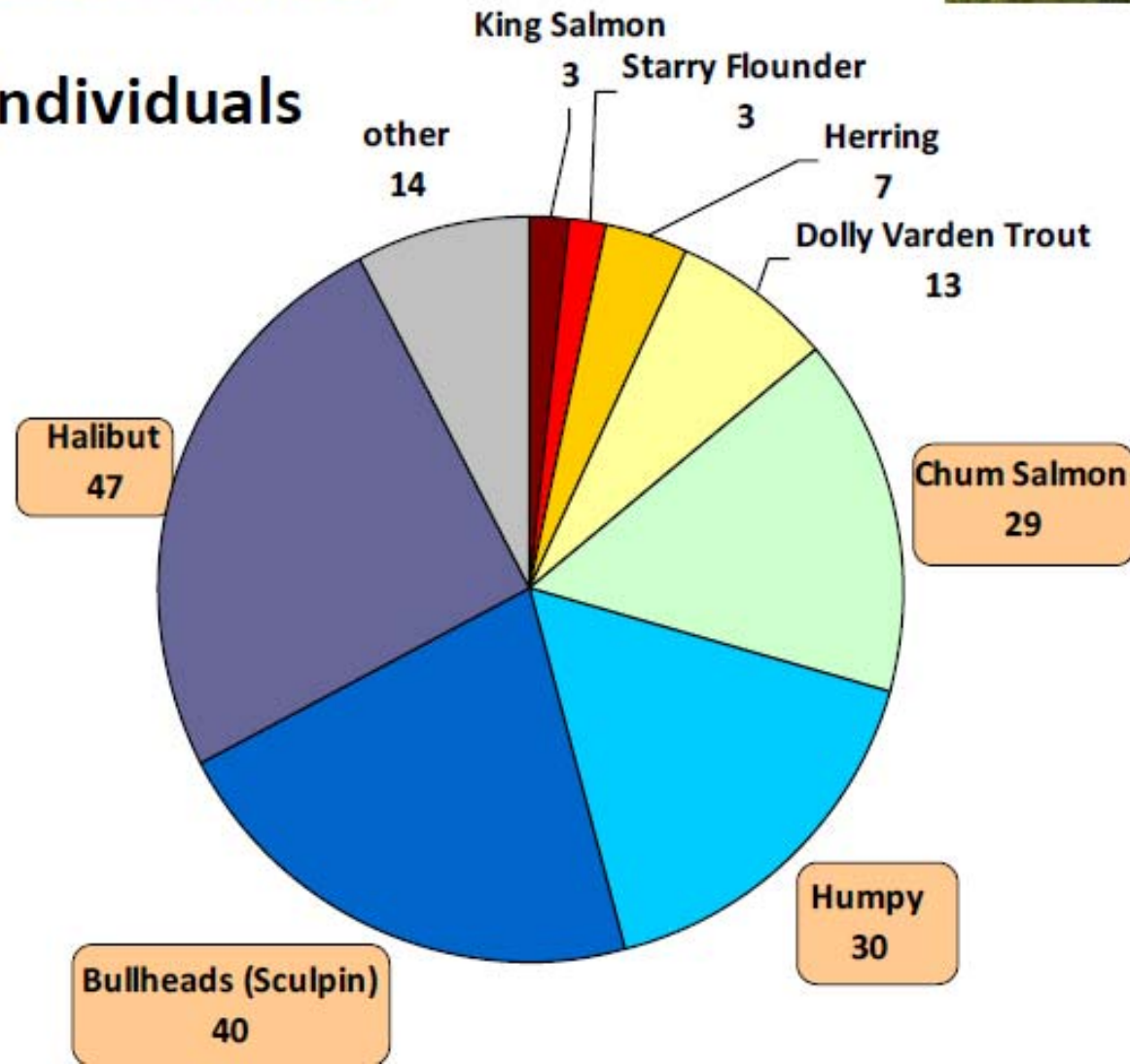
- ▣ 253 individual organisms
  - 186 Fish
  - 42 Plants
  - 3 reindeer, 6 muskox, 1 seal oil, 5 seals, 2 walrus, 5 birds, 2 gull eggs, 1 pooled mussel
- ▣ 482 samples (raw and processed) for analysis

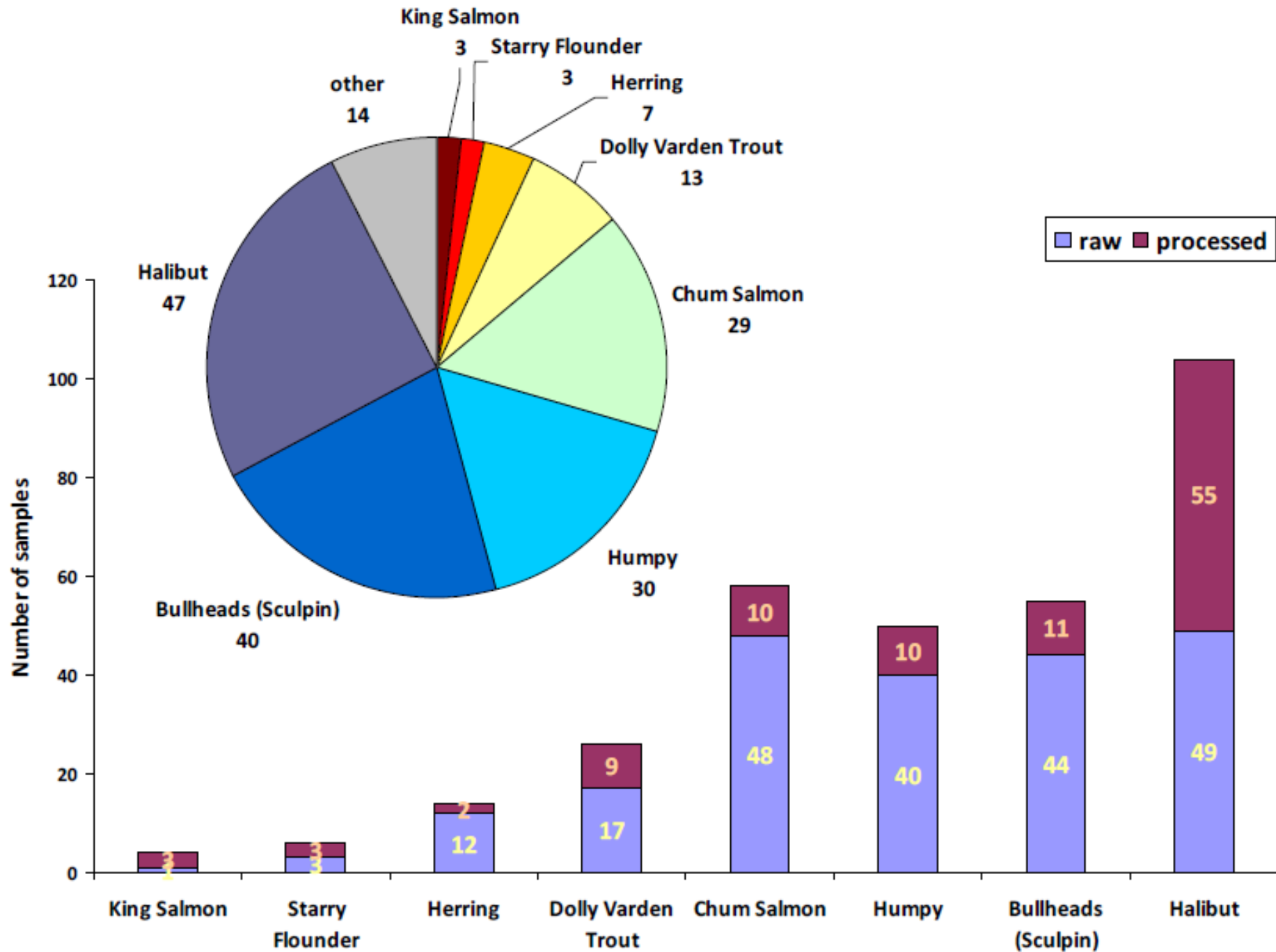


# Fish



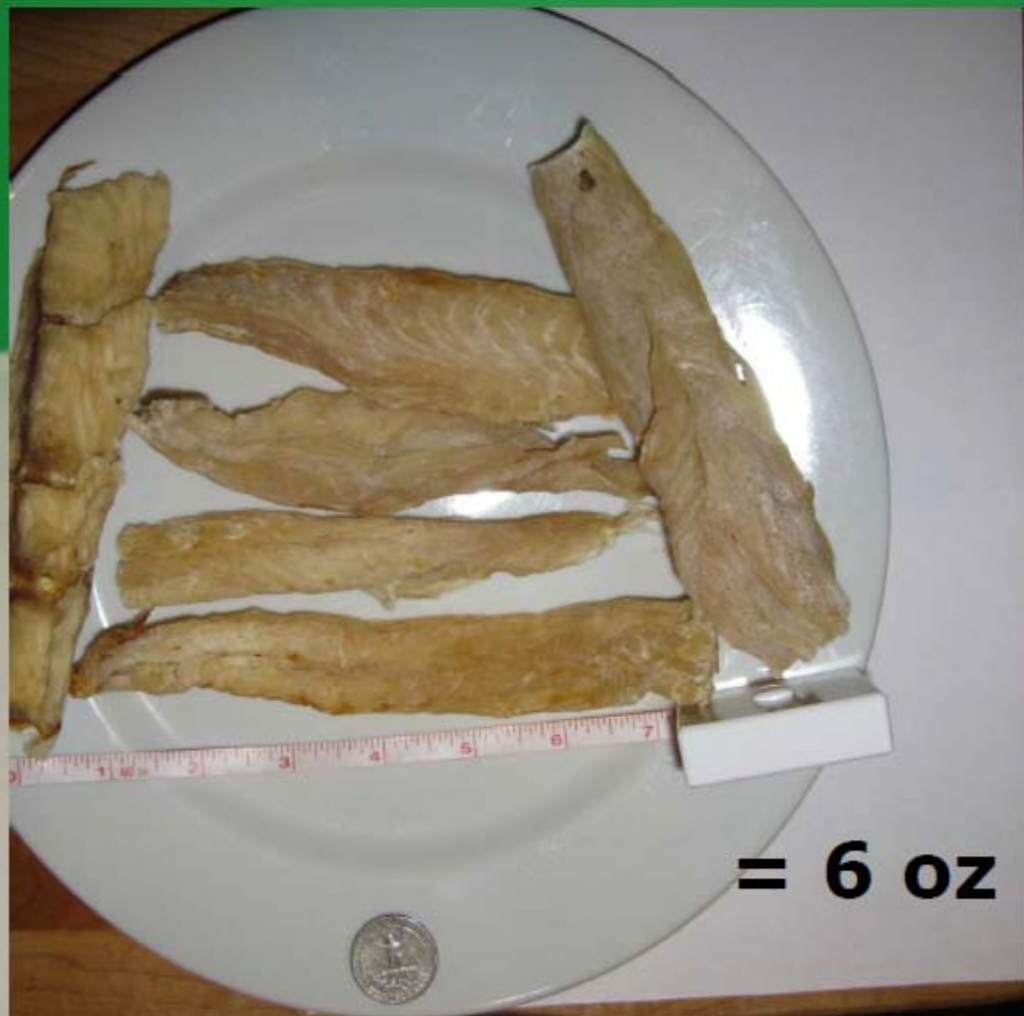
## Number of Individuals







# Serving Sizes



**= 6 oz**

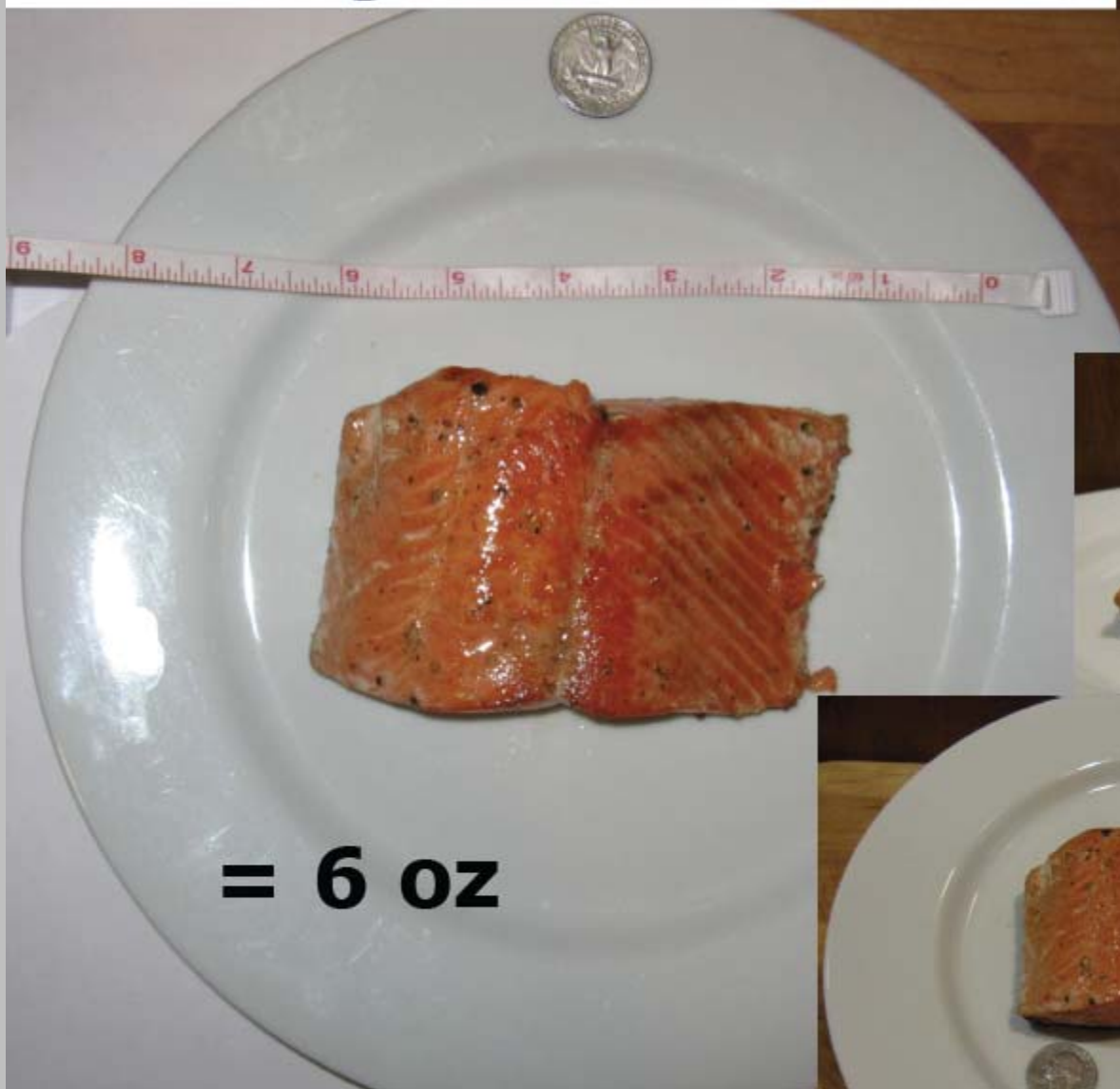


**= 1 oz**



**= 1 oz**

# Serving Sizes







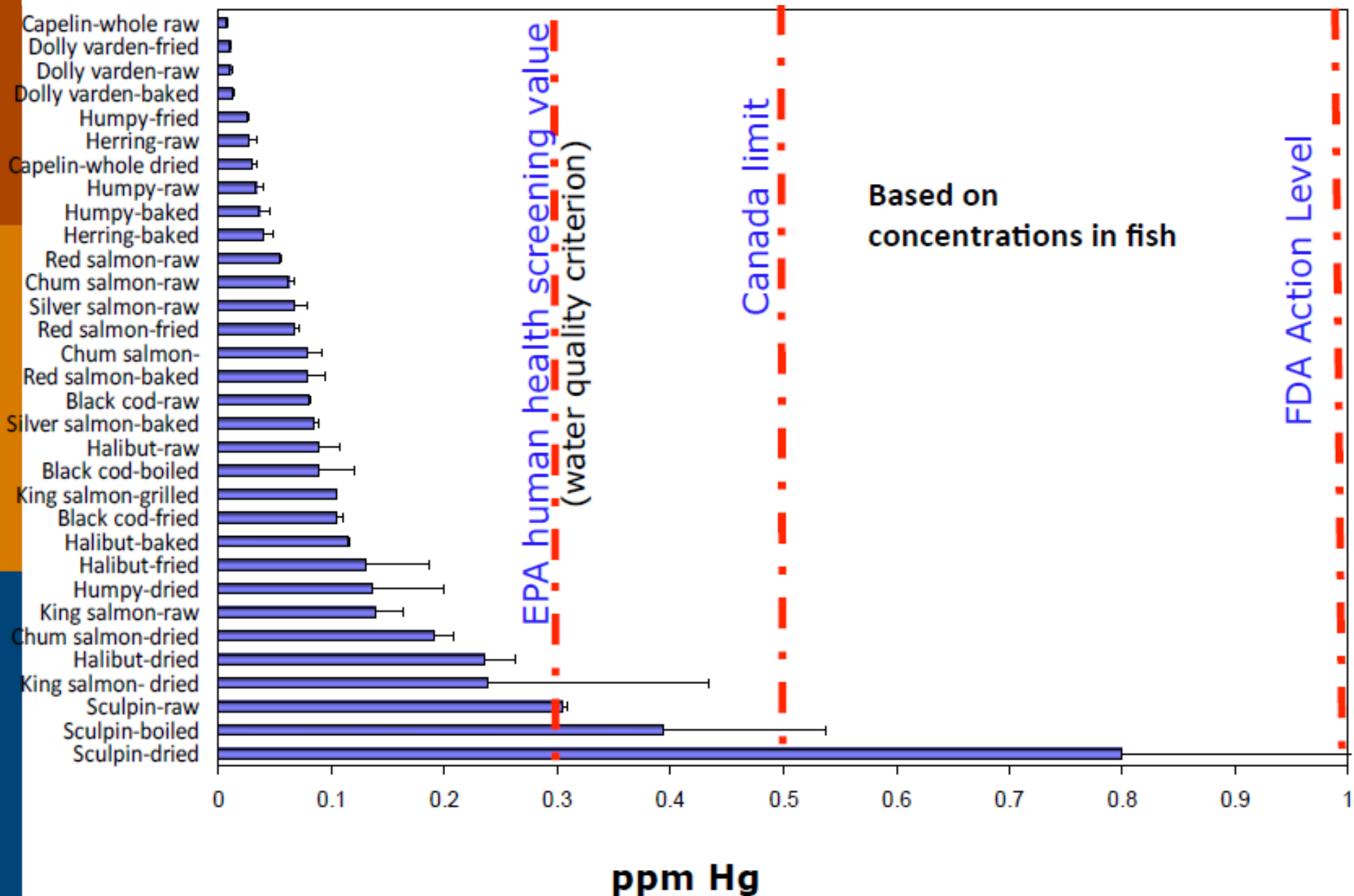
Type	# batches 2008/2009	# raw 2008/2009	# processed 2008/2009
<b>Beach Greens</b> <i>Honckenya peploides</i>	5/4	5/4	5/2
<b>Wild Spinach</b> <i>Rumex arcticus</i>	8/4	6/2	9/5
<b>Wild Celery</b> <i>Angelica lucida</i>	6/1	6/1	1
<b>Medicine Plant</b> <i>Artemisia tilesii</i>	3/1	3/1	5
<b>Pond Greens</b> <i>Ranunculus pallasii</i>	1/1		1/1
<b>Marsh Marigold</b> <i>Caltha palustis</i>	0/1	0/1	
<b>Labrador Tea</b> <i>Ledum groenlandicum</i>	2/0	2/0	1/0

# Chemical Analyses

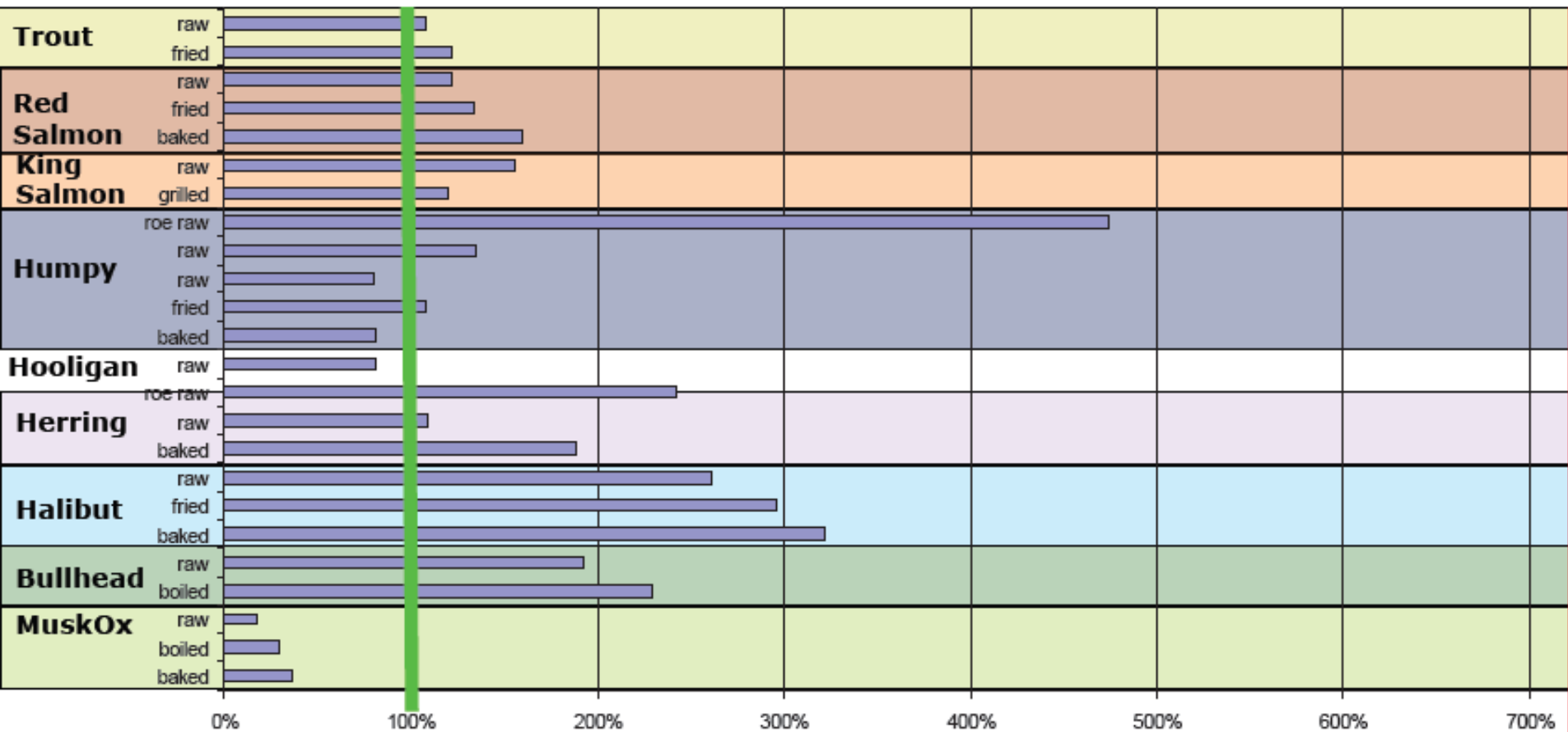
- Metal and mineral analysis
  - Mercury, Cadmium, Lead, Arsenic
  - Selenium, Copper
- Fatty Acids - underway
- Organohalogen contaminants



# Mercury in Fish from a Single Community: Community Relevant Profile

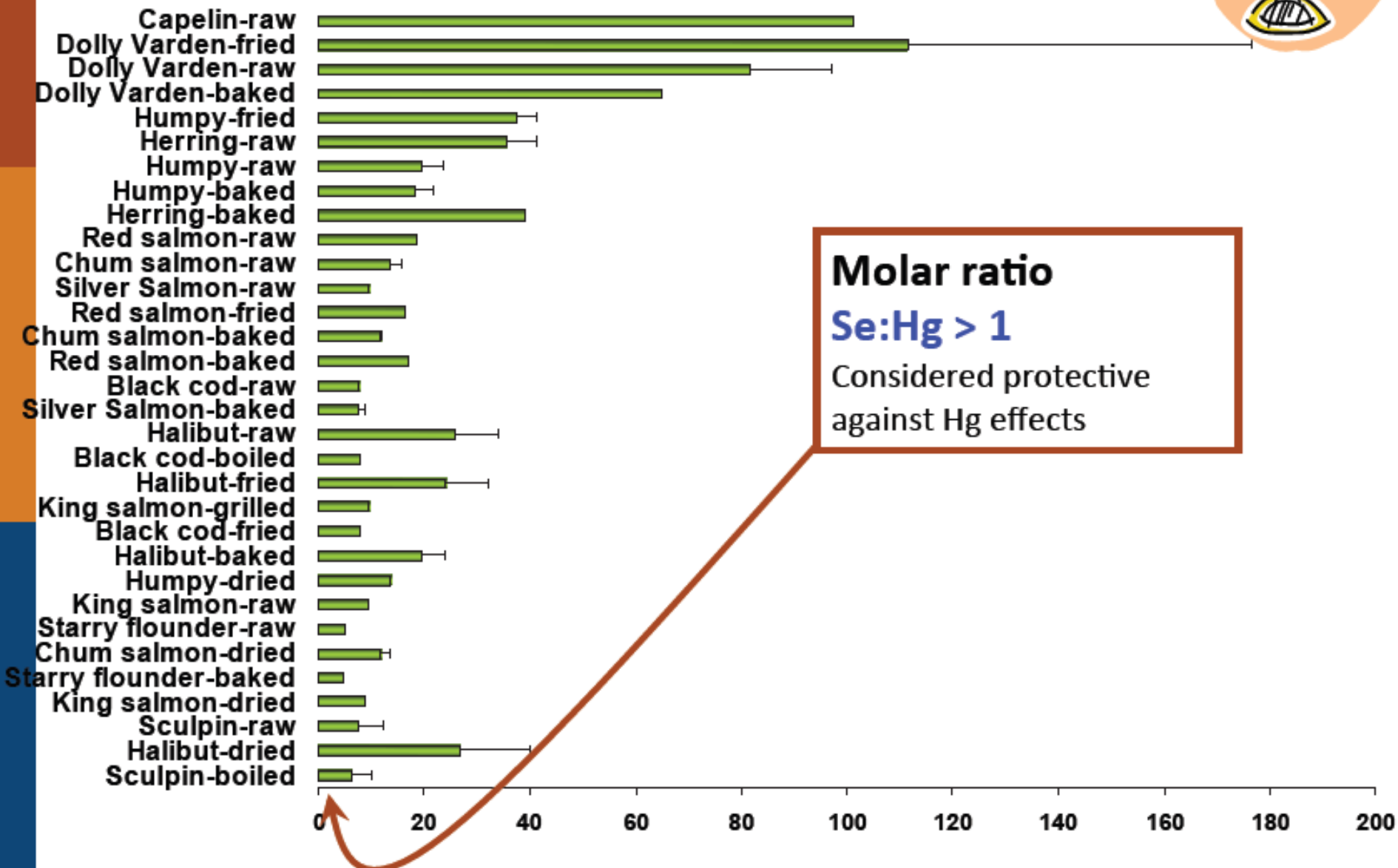


# Selenium



Selenium % Daily Recommended Intake in 6 oz portion

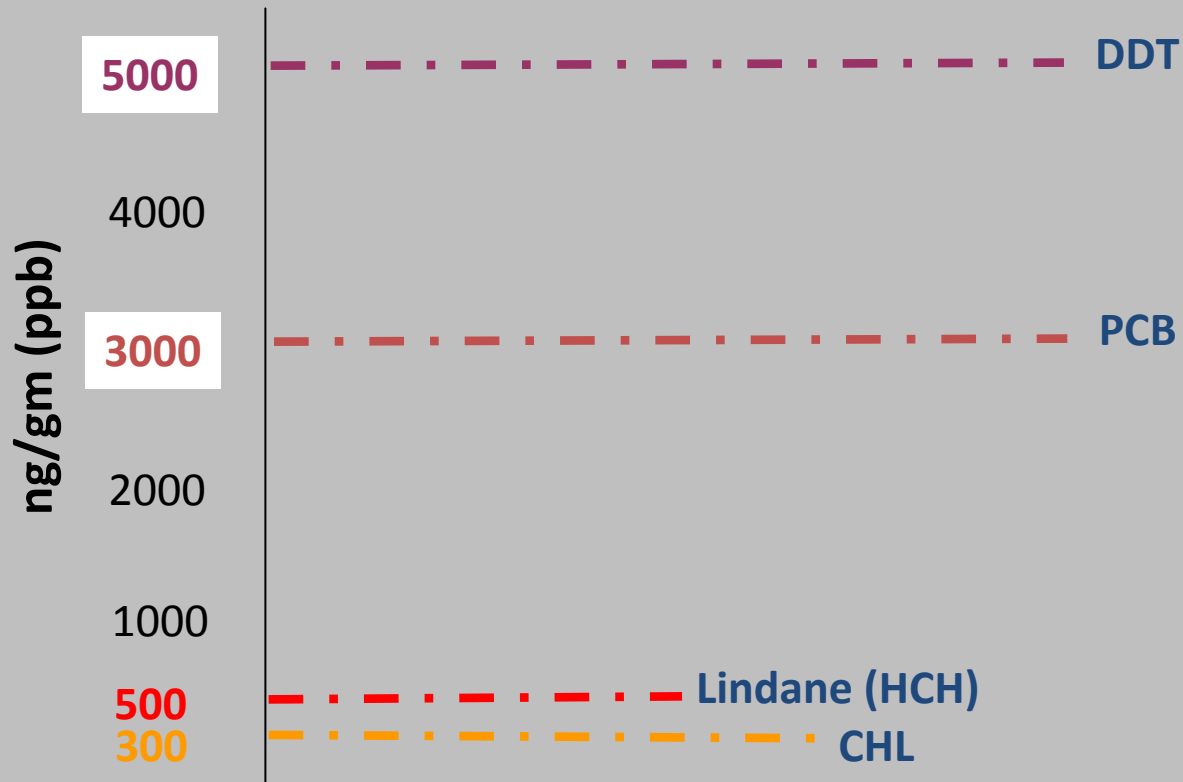
# Selenium:Mercury Molar Ratio

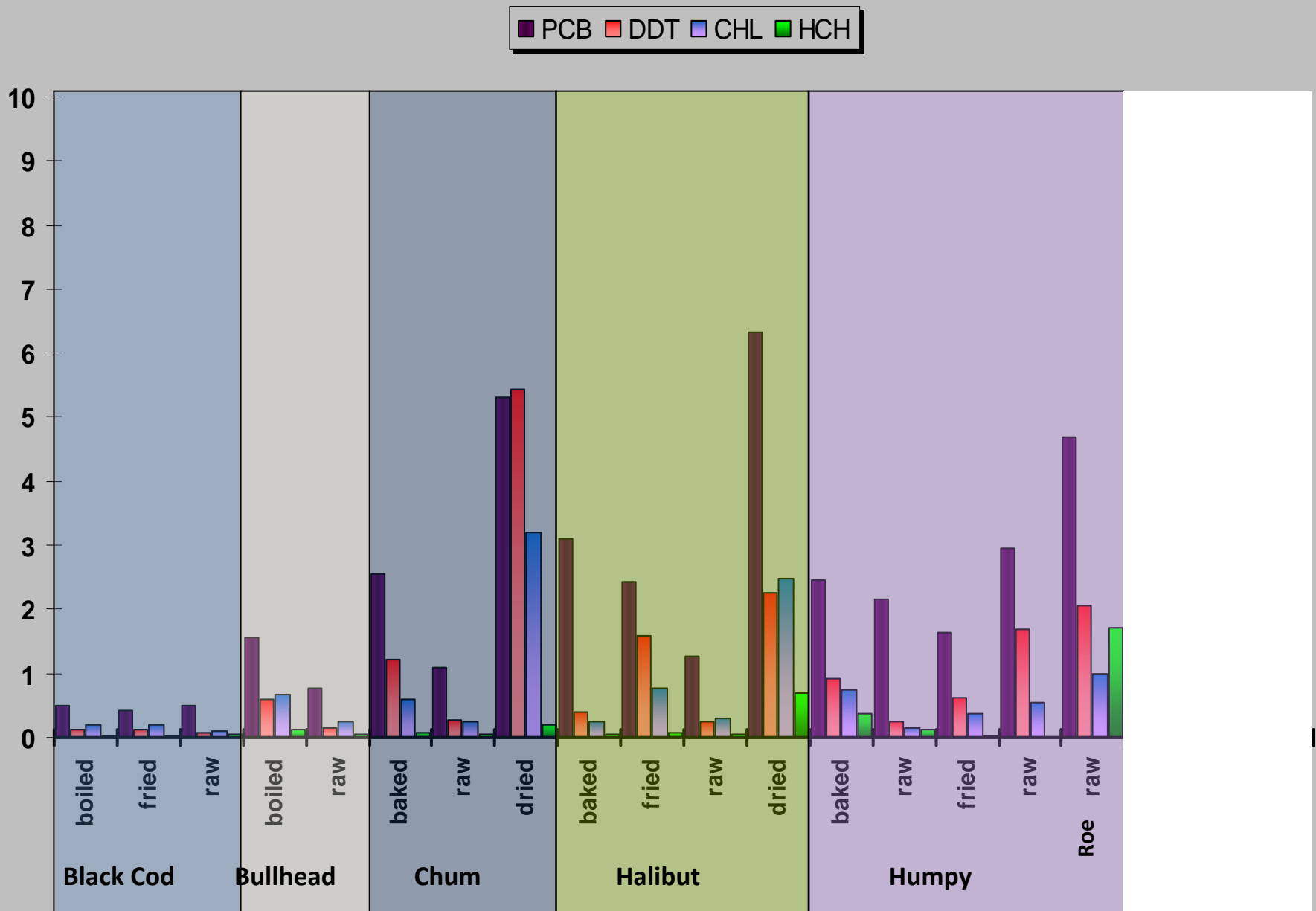


# Organohalogenes

- 125 different OHs analyzed
  - PCBs (industrial)-
  - DDT (insecticide)
  - Chlordane Related Compounds (CHL)
    - Heptachlor Epoxide, Oxychlordane, g-Chlordane, a-Chlordane, Transnonachlor, cis-nonachlor
  - Hexachlorocyclohexanes (HCH)
    - Insecticide such as Lindane

# FDA action levels





**Very Low Concentrations as Compared to FDA Action Levels**  
**All are well below 10 ppb wet weight**



# Fatty Acids

Preliminary data indicates marine fish & mammals are lipid (fat) rich

Fats are mostly PUFAs (the good fats!)

Cooking (processing) in some cases may concentrate fats and/or allow for oxidation!

Recent information from Seychelles research indicates amelioration of Hg adverse effects (reduced toxicity)

## Important things to remember

---

- ❑ Need to consider multiple nutrients and multiple contaminants at the same time.
- ❑ Amount eaten, body size, pregnancy status, etc are important when thinking about exposure
- ❑ Meal intake of fish is **not** single type
- ❑ Food preparation methods can make a difference

# Sentinels/Animal Models

- Our lab continues to study wildlife fish consumers as well.
- Some would call this “comparative toxicology” as we study many mammals and various aspects of exposure to Hg
- Some are concerned about temporal trends that indicate an increase over time in this region.

# How do we best capture your observations and insights?

- Insight on how people use things from the environment for food.
  - Items used
  - How and when consumed
- What changes in wildlife and fish have occurred that may be related to their health?
  - Images made to share, samples collected, etc.
- What leads to avoidance of healthy foods?  
Are these justified?
  - Newspaper articles or science advice?

**Thank you!**  
**Questions?**