Fish Consumption & Contamination

Tools and strategies for multi-stakeholder health risk communication

SUPERFUND RESEARCH PROGRAM

ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
UNIVERSITY of WASHINGTON | SCHOOL OF PUBLIC HEALTH

Healthy Fishing in the Duwamish: Let's Catch Salmon

VIDEO PROJECT PARTNERS

Community & Non Profit Orgs <-> Community Health Advocates <-> Government Agencies

DUWAMISH RIVER CLEANUP COALITION

ECOSS Environmental Coalition of South Seattle

JustHealthAction

DVSA

FUN TO CATCH TOXIC TO EAT
The only Duwamish River seafood safe to eat is Salmon

Public Health Seattle & King County

Washington Department of FISH and WILDLIFE

EPA

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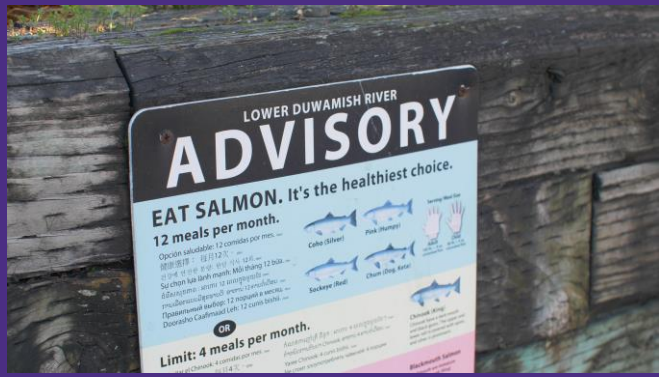

OBJECTIVES

- **Discourage consumption of resident fish from the Duwamish River**
- **Promote healthy consumption of salmon – how to catch, prepare, and eat to reduce toxic exposures**
- **Increase compliance with state fishing laws to avoid fines and jail**
- **Respond to request by fishing communities for multi-lingual *videos***

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WHY VIDEOS?

- **Inclusive**
- **Accessible**
- **Multilingual**
- **Comprehensive**
- **Increased reach**

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WHAT'S COVERED?

- **9 Videos**
  - Intro, licensing, gear, what to pack, how to fish, reducing toxicants, salmon recipes
- **4 languages**
  - Spanish, Vietnamese, Khmer, English
- **Evaluation**
  - Quantitative: reach (views)
  - Qualitative: impact (surveys)

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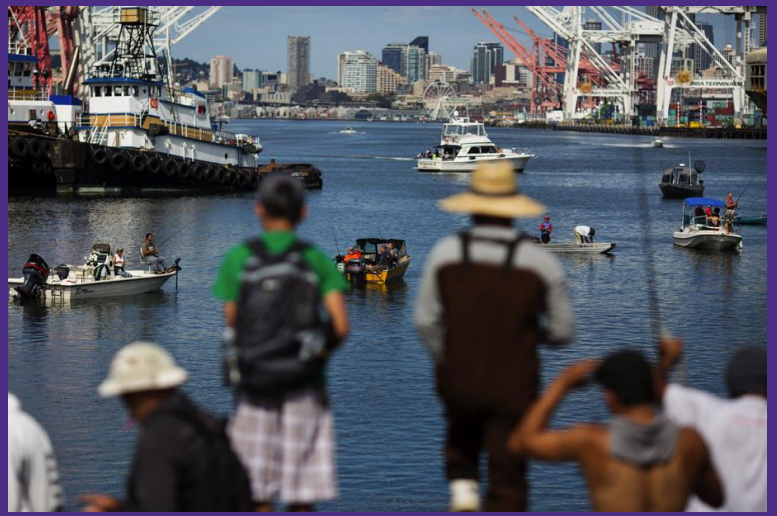

PRODUCTION

- **Initiated as a co-produced project**
  - **University**
  - **Government**
  - **Community**
- **Contracted with university-based videographer**
  - **UW Center for Communication Leadership**
- **Shared review of scripts, storyboards, draft cuts**
  - **Team members changed over course of project**

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IN THE COMMUNITY

- **Community Health Advocates**
  - EPA Fishing Institutional Controls (IC) program
- **Duwamish River Cleanup Coalition**
  - Community Advisory Group for the Superfund Site
- **Juntos Podemos Cuidar Nuestro Rio Duwamish**
  - Youth organization social media education campaign

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Successes

- Used by new community-based partners
- Excellent reach, despite Covid restrictions
- Institutionalized into Fishing IC program

Challenges

- Confusion and disagreements about health messages needed to be resolved
- Community partners had to be restored in final production

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Lessons Learned

- Key messages need buy-in of all partners at beginning and at check ins throughout project
- Attention to community-based organizations' role in every stage of production
- Importance of Partnership Agreements (MOU)
- Stay flexible!
  - Videos replaced subtitles with dubbing at CHAs request to address concerns about literacy and accessibility

Arsenic in lake fish

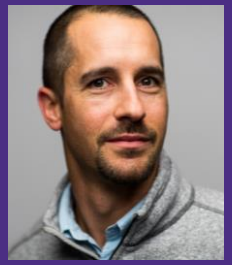
Principal investigators

- **Dr. Jim Gawel-** Chemistry and Engineering UW Tacoma
- **Dr. Rebecca Neumann-** Civil and Environmental Engineering
- **Samantha Fung-** Trainee

Arsenic in lake fish

Collaborators

- **Dr. Julian Olden-** UW School of Aquatic and Fisheries Sciences



- **Dr. Alex Horner-Devine-** Civil and Environmental Engineering

Agency partners

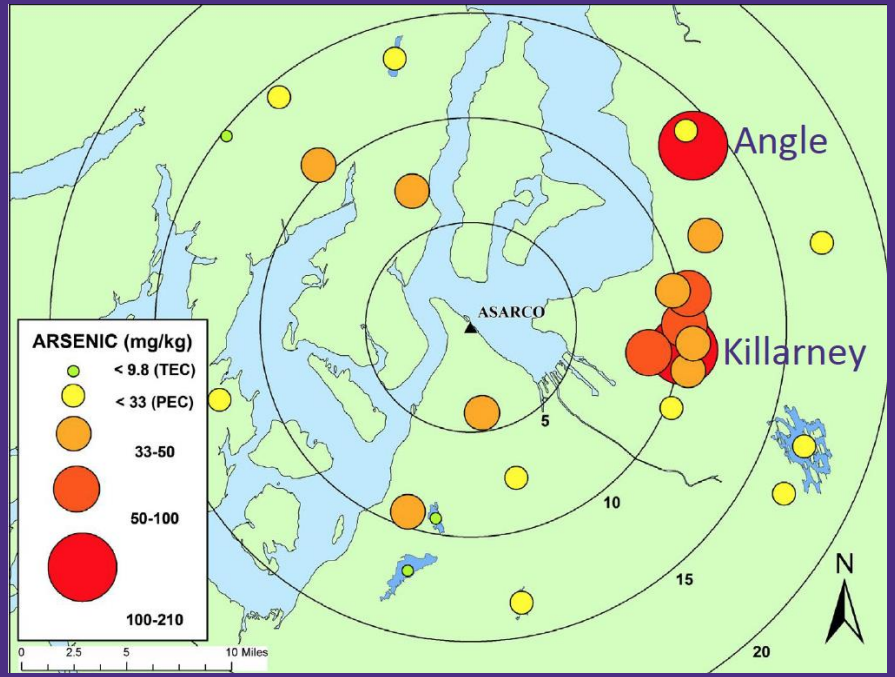
Community partners

- Steel Lake Management District
- Angle Lake Shore Club
- Municipalities (Cities of Federal Way and SeaTac)

Scientific context

Contaminated lakes

- **Concentrations of arsenic in oxygenated water are elevated in shallow lakes**
- **Levels of inorganic arsenic are high in periphyton**



Question

Does arsenic contamination pose a risk to public health?

Results

Greater potential cancer risk in snails and bluegills from shallow contaminated lakes

Aquatic organism	Lake	Cancer Risk			lake	
		Mean Consumer	90th percentile	99th percentile	As contamination	depth
Snail	Bonney	6.10E-06	3.26E-05	2.65E-04	low	shallow
Snail	Steel	3.22E-05	1.72E-04	1.40E-03	moderate	shallow
Snail	Killarney	9.81E-05	5.25E-04	4.27E-03	high	shallow
Snail	Angle	2.51E-05	1.34E-04	1.09E-03	high	deep
Crayfish	Pine	1.11E-06	5.96E-06	4.85E-05	low	deep
Crayfish	Steel	3.23E-06	1.73E-05	1.41E-04	moderate	shallow
Crayfish	Killarney	1.72E-05	9.19E-05	7.48E-04	high	shallow
Fish	Bonney	3.85E-08	1.59E-07	1.30E-06	low	shallow
Fish	Steel	2.42E-07	1.00E-06	8.15E-06	moderate	shallow
Fish	Killarney	3.36E-07	1.39E-06	1.13E-05	high	shallow
Fish	Angle	3.30E-08	1.37E-07	1.11E-06	high	deep

Cancer Risk		
$>10^{-5}$	$>10^{-4}$	$>10^{-3}$

Collaboration on Risk Communication

WA Department of Health & Seattle King County Public Health

Aquatic organism	Lake	Mean inorganic As [µg/kg wet wt]	Meal Calculations (meals/month)		
			1.0E-06	1.0E-05	1.0E-04
Snail	Bonney	202.97	0.01	0.08	0.81
Snail	Angle	834.43	0.00	0.02	0.20
Snail	Steel	1072.64	0.00	0.02	0.15
Snail	Killarney	3267.25	0.00	0.01	0.05
Crayfish	Pine	37.06	0.04	0.44	4.44
Crayfish	Steel	107.46	0.02	0.15	1.53
Crayfish	Killarney	571.88	0.00	0.03	0.29
Fish	Bonney	0.99	1.7	16.6	165.9
Fish	Angle	0.85	1.9	19.4	193.5
Fish	Steel	6.23	0.3	2.6	26.4
Fish	Killarney	8.64	0.2	1.9	19.0

Next steps

- Who's eating lake animals and how can we best engage them?
- What levels of arsenic are in other fish (collaboration with WDFW)?
- What levels of arsenic are in other lakes?
- Applying lessons learned

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THANK YOU!

BJ Cummings
bjcumngs@uw.edu
UW SRP Community Engagement Core

Lisa Hayward
lhayward@uw.edu
UW SRP Research Translation Core