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# Duwamish Fishers Study

## ***Meeting to Discuss Preliminary Results***

June 2, 2016

South Seattle College

*Lower Duwamish Waterway Group*

*Port of Seattle / City of Seattle / King County / The Boeing Company*

# Agenda

Noon – 12:10p

## Introductions

12:10 – 12:40p

## Context

- Study overview
- Project milestones and context
- Meeting objectives
- Key questions
- Potential negative impacts

12:40 – 1:00p

## Study Overview

- On-river survey
- Key informant interviews

1:00 – 2:45p

## Preliminary Data Analysis

- Part 1 questions (1:00 – 1:45p)
- Break (1:45 – 1:55p)
- Part 2 questions (1:55 – 2:45p)

2:45 – 3:00p

## Data Report and Next Steps



*Lower Duwamish Waterway Group*

*Port of Seattle / City of Seattle / King County / The Boeing Company*

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# Study Objectives

- **From the Implementation Plan:**

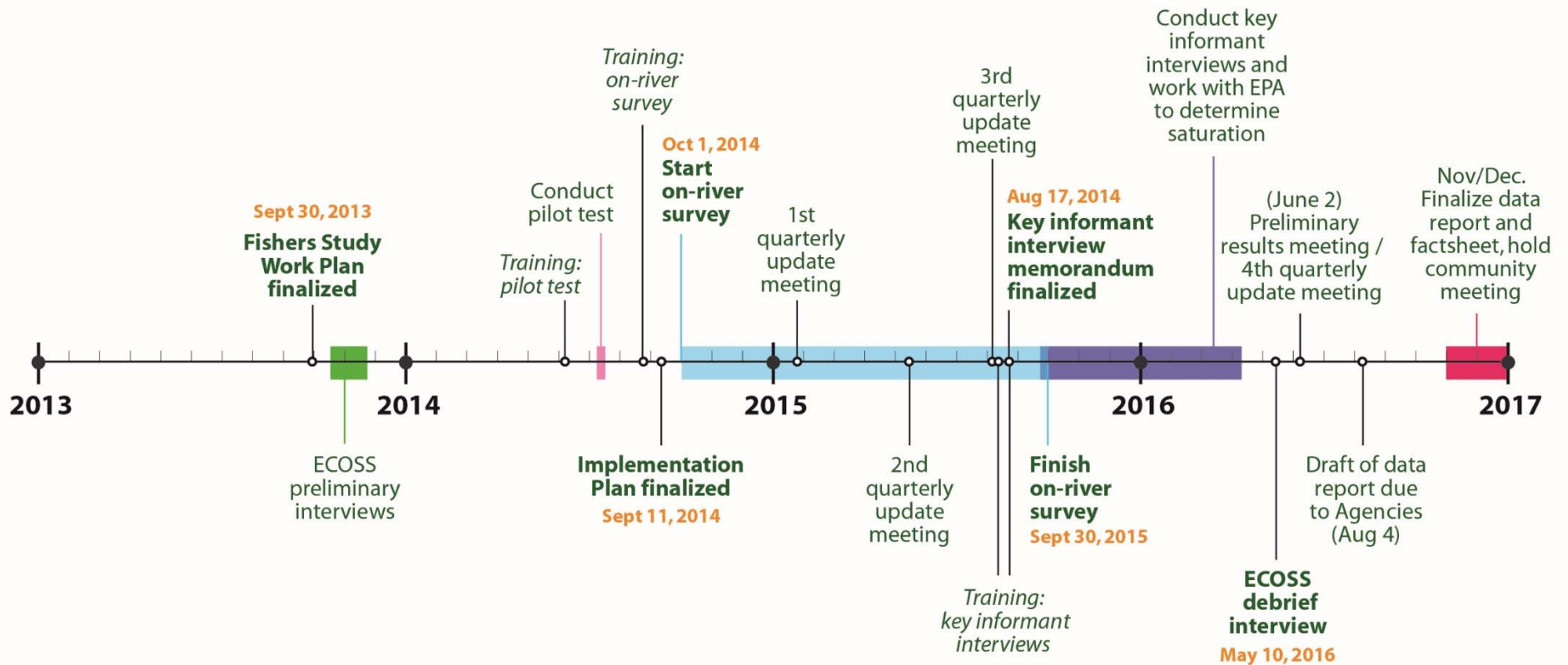
The fishers study is designed to provide information that will help develop more effective institutional controls associated with EPA's LDW Superfund Cleanup.

- **From the Work Plan:**

Once the fishers study has been completed, EPA and the Ecology will be better able to answer the following questions:

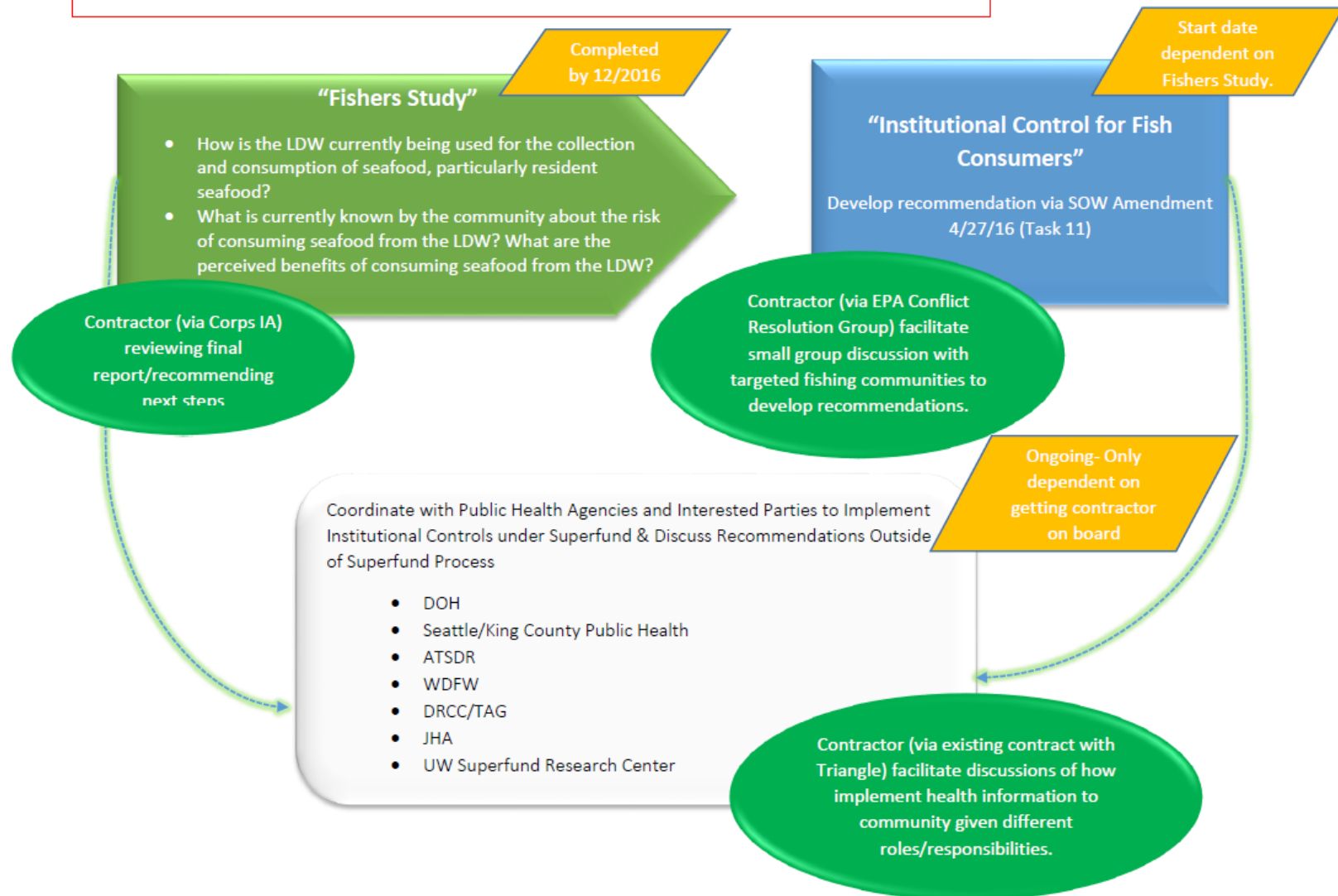
- *How could risk communication in general be improved?*
- *How could the effectiveness of current seafood consumption advisories be improved?*
- *Are there alternative approaches to communicating risk that would be more effective?*
- *What communication venues would be most trusted and effective?*

# Project Milestones



# Fishers Study Context

Working Draft 5.23.16



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# Meeting Objectives

- Q4 overview
- Preliminary findings discussion
  - Entire on-river survey
  - Key informant interviews

*Goal is to ensure a correct understanding of responses and data prior to writing the data report*

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# Key Questions

- 1. How is the Duwamish currently being used for the collection and consumption of seafood, particularly resident seafood?**
  - a) Who is fishing on the river? Why? Where? When?*
  - b) What is being caught, and what is being done with the catch?*
  - c) Who is preparing and eating the seafood?*
  - d) How is it being prepared?*
  
- 2. What are the perceived benefits of consuming seafood from the Duwamish? What is currently known by the community about the risk of consuming seafood from the Duwamish?**
  - a) What are the perceived benefits of fishing on the Duwamish?*
  - b) How do people understand risk? What are the perceptions/cultural models of risk among the groups that fish for and consume Duwamish seafood?*
  - c) If people are continuing to fish, why?*
  - d) Do the fisher groups know about the seafood consumption advisories and risks?*
  - e) How are they currently getting their information?*

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# Fishers Study – Two Parts

- **Quantitative research** – On-river survey
  - Numerical data analyzed statistically
  - Generalizable results from sample to a population
  - Measures frequency of views, behaviors, etc.
- **Qualitative research** – Key informant interviews
  - Rich description and explanation of the way people experience, act on, think about themselves and their world
  - Used to develop broad insights and deeper understanding of topics of interest



# Coverage of Key Questions

Question	On-River Survey?	Key Informant Interviews?
<b>Part 1: How is the Duwamish currently being used for the collection and consumption of seafood, particularly resident seafood?</b>		
Who is fishing on the river?	✓	
Why?	✓	✓
Where? When?	✓	
What is being caught?	✓	
What is being done with the catch?	✓	✓
Who is preparing and eating the seafood?		✓
How is it being prepared?		✓
<b>Part 2: What are the perceived benefits of consuming seafood from the Duwamish? What is currently known by the community about the risk of consuming seafood from the Duwamish?</b>		
What are the perceived benefits of fishing on the Duwamish?	✓	✓
How do people understand risk? What are the perceptions/cultural models of risk among the groups that fish for and consume Duwamish seafood?	✓	✓
If people are continuing to fish, why?	✓	✓
Do the various fisher groups know about the seafood consumption advisories and risks?	✓	✓
How are they currently getting this information? (and preferences for information sources)	✓	✓

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# Potential Negative Impacts

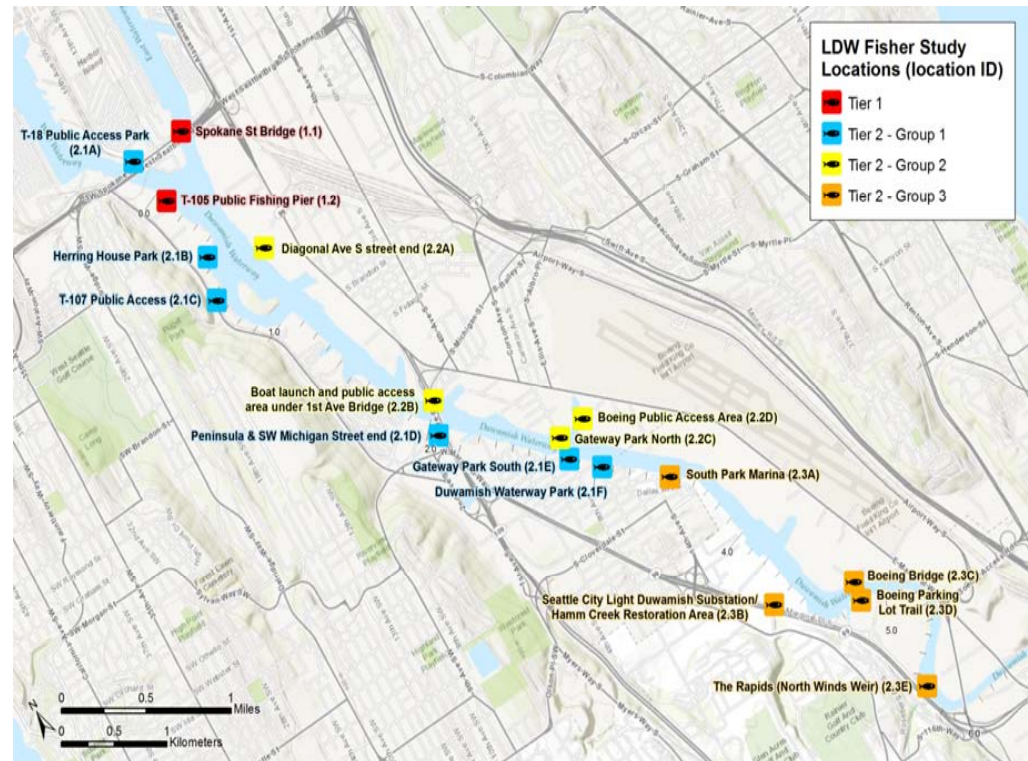
- Potential for bias in responses during on-river survey
  - Possibility that fishers wouldn't respond honestly out of fear of getting in trouble, etc.
  - Example – Some fishers reported only fishing for salmon when first interviewed, but later said they were also targeting resident species
- Unintended consequences – ways in which results of fishers study could negatively impact communities
  - Switch from fish to less healthy diet choices
  - Decrease in fishing could impact social identity of fishers (e.g., could lead to reduced fisher community cohesion, and reduced frequency of preferred leisure activity)

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# On-River Survey Overview

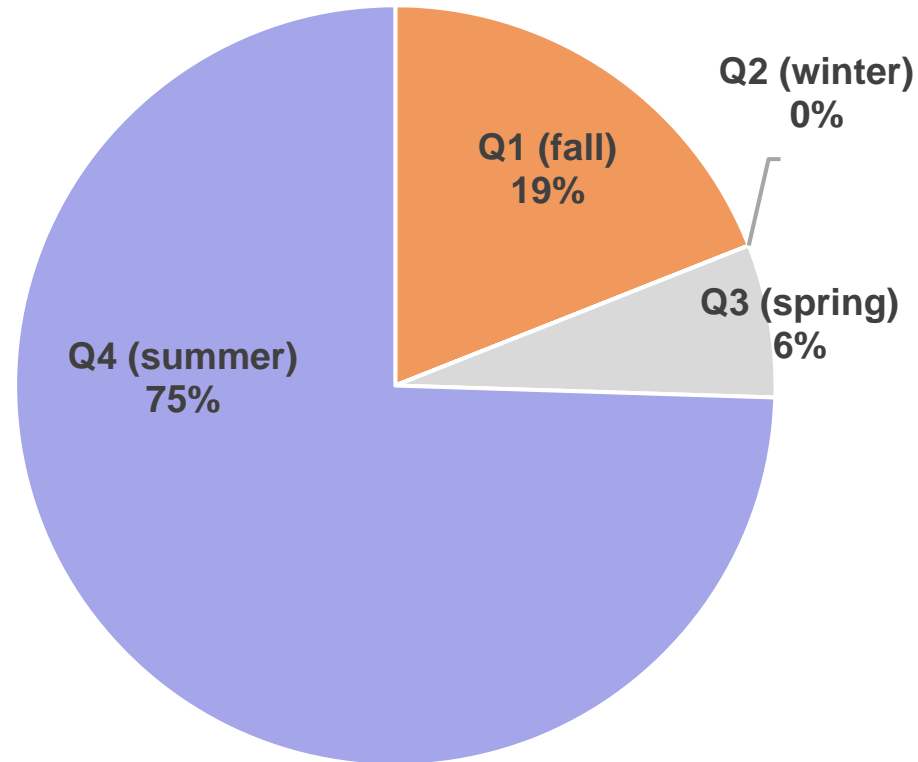
# Overview of Survey Design

- Development of survey design included input from:
  - Various parties involved in fishers study
  - Past studies of Duwamish fishers
  - 54 pre-survey interviews conducted by ECOSS
  - Public access surveys
- Variables:
  - Locations visited (Tier 1 and 2)
  - Time of day
  - Days of the week
  - Surveyor languages
  - “Tent days”



# On-River Survey Completed on September 30, 2015

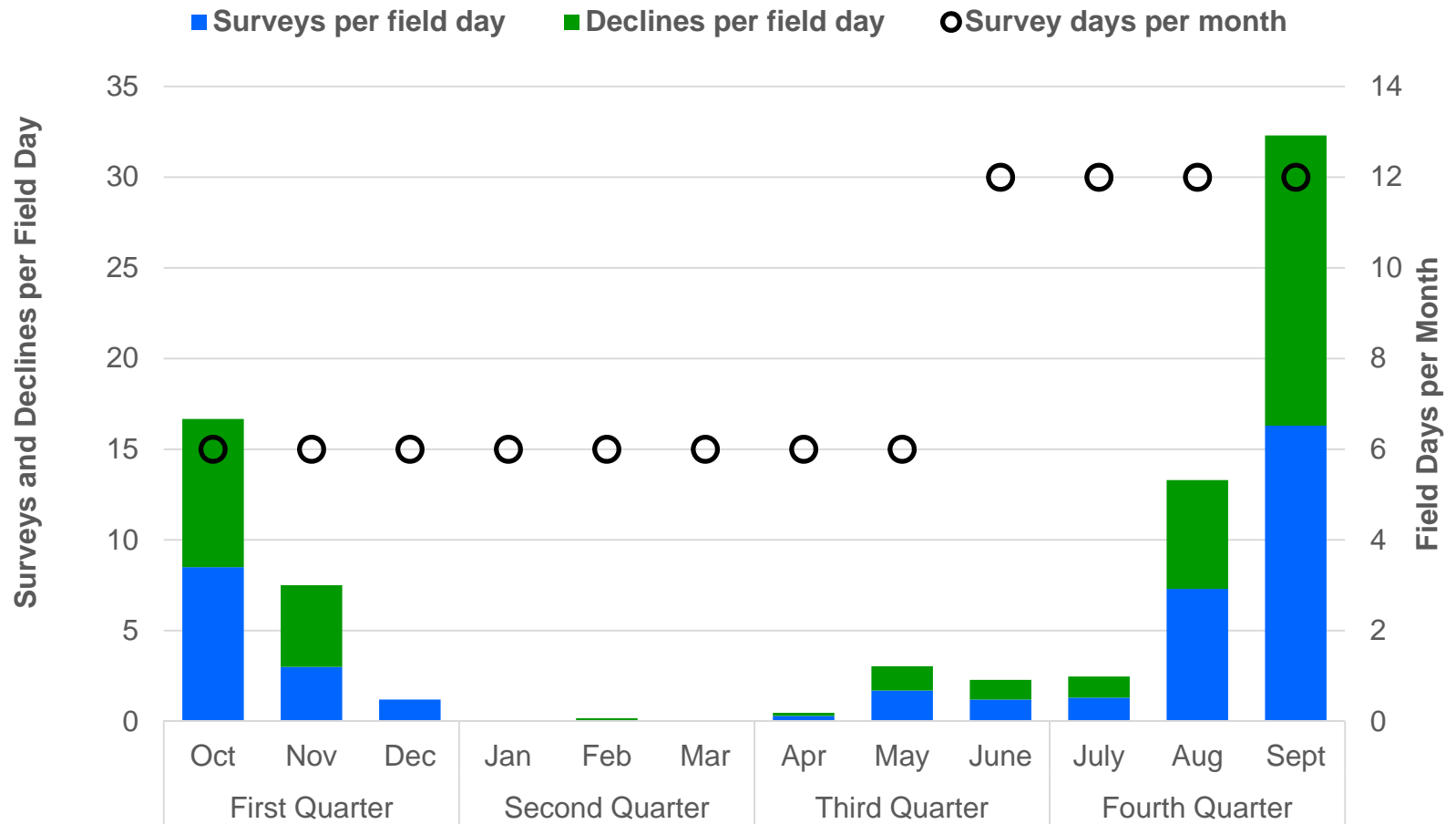
Percent of Surveys by Quarter



# Overall Summary of Surveys

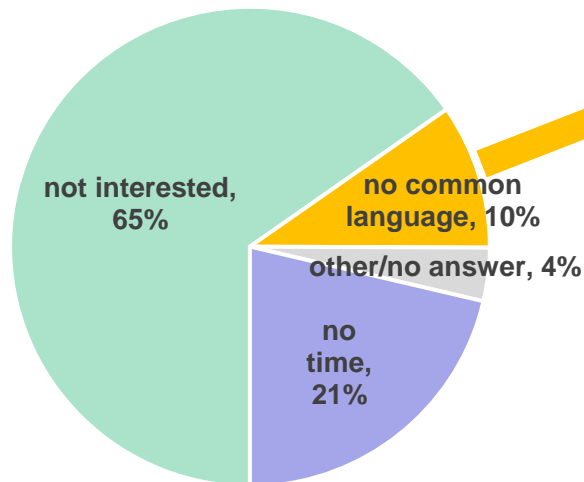
Statistic	First Quarter				Second Quarter				Third Quarter				Fourth Quarter				Overall Total
	Oct	Nov	Dec	Total	Jan	Feb	Mar	Total	Apr	May	June	Total	July	Aug	Sept	Total	
Total no. surveys conducted	51	18	7	76	0	0	0	0	2	10	14	26	16	87	195	298	400
No. surveys with first-time respondents	40	10	7	57	0	0	0	0	2	9	8	19	6	83	160	249	325
No. unsuccessful survey attempts	49	27	0	76	0	1	0	1	1	8	13	22	14	72	192	278	377
Total survey attempts	100	45	0	152	0	1	0	1	3	18	27	48	30	159	387	576	777
Success rate	51%	40%	100%	50%	na	0%	na	0%	67%	58%	52%	54%	53%	55%	50%	52%	51%

# Surveys / Declines per Field Day



# Success Rate / Declines

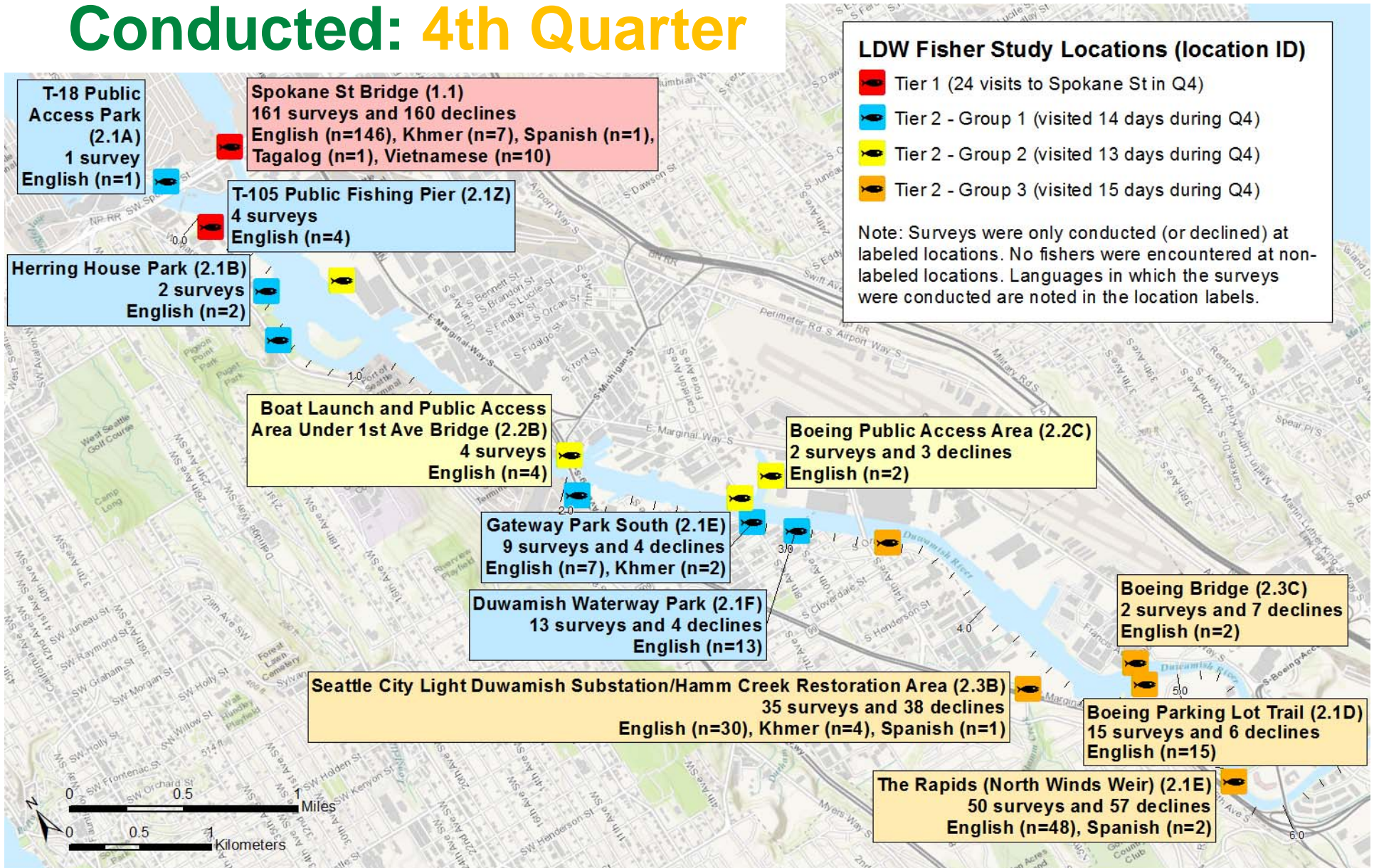
- 51% success rate overall in fishers agreeing to take survey
- Reasons for declines:
  - “No time” or “not interested” accounted for majority (~90%) of declines
  - Other 10% of declines because “no common language” on that survey day; self-administered survey available in most cases



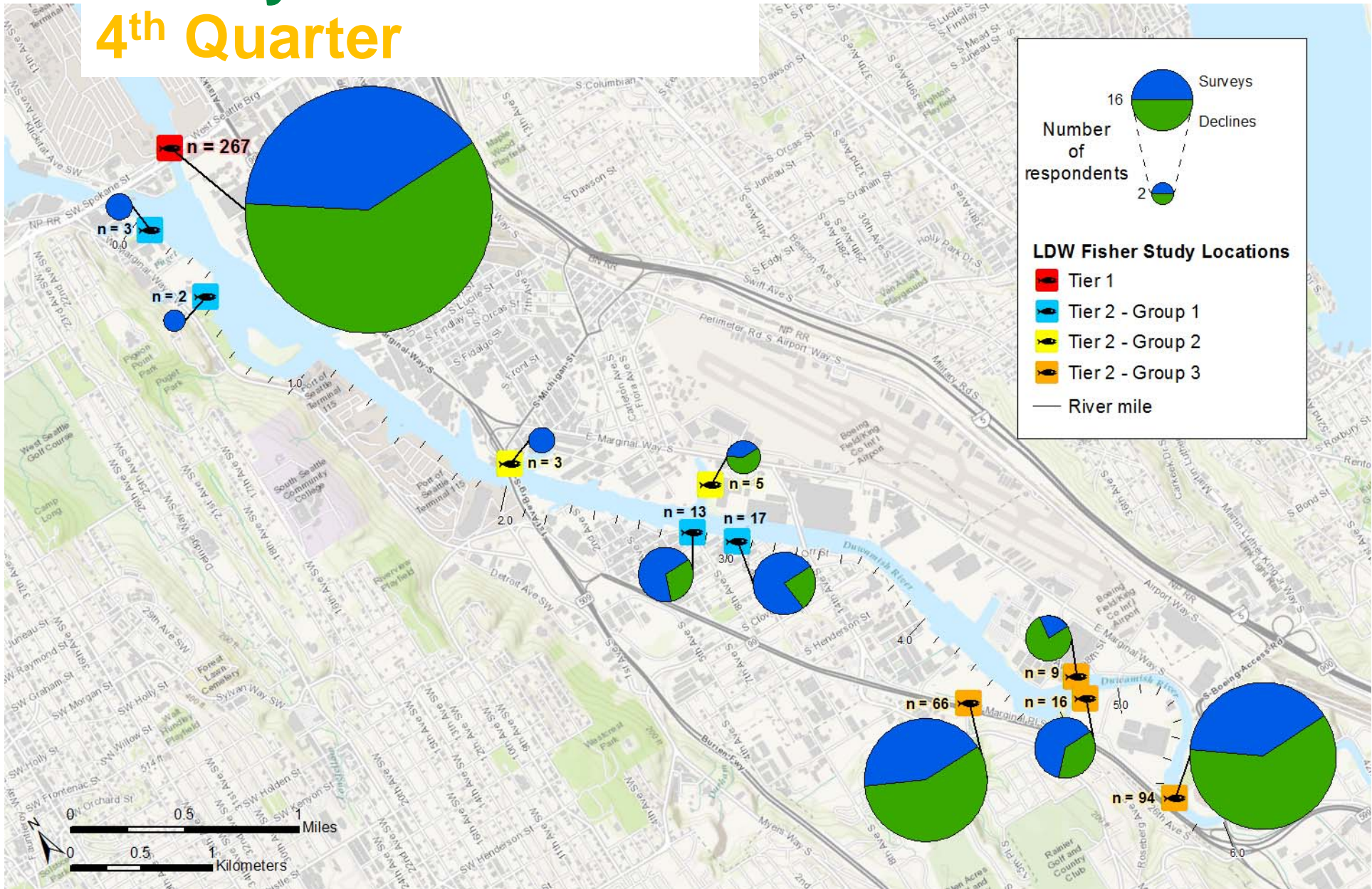
<b>Language</b>	<b>Count</b>	<b>Timing</b>	<b>Self-Administered Survey Available</b>
Chinese	3	all in Q4	✓
English	5	all in Q4	✓
Korean	1	all in Q4	✓
Lao	1	all in Q4	
Russian	7	all in Q4	
Spanish	4	all in Q4	✓
Tagalog	4	1 in Q3, 3 in Q4	✓
Vietnamese	10	5 in Q3, 5 in Q4	✓



# Locations Where Surveys Were Conducted: 4th Quarter



# Surveys and Declines: 4<sup>th</sup> Quarter



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# Business Outreach

- Total of 30 businesses on Duwamish waterfront were contacted by ECOSS
  - LDWG parties provided contacts for their properties / tenants
  - Also included ECOSS contacts
- ECOSS visited each business
  - Businesses were essentially the “gate-keepers.”
  - For most businesses, no way to determine if 1) no fishers at business, 2) fishers didn’t want to take survey, or 3) if contact at business simply didn’t know whether people were fishing.
- Resulted in 3 additional surveys
  - All self-administered in English
  - All were salmon-only fishers

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# Key Informant Interview Overview

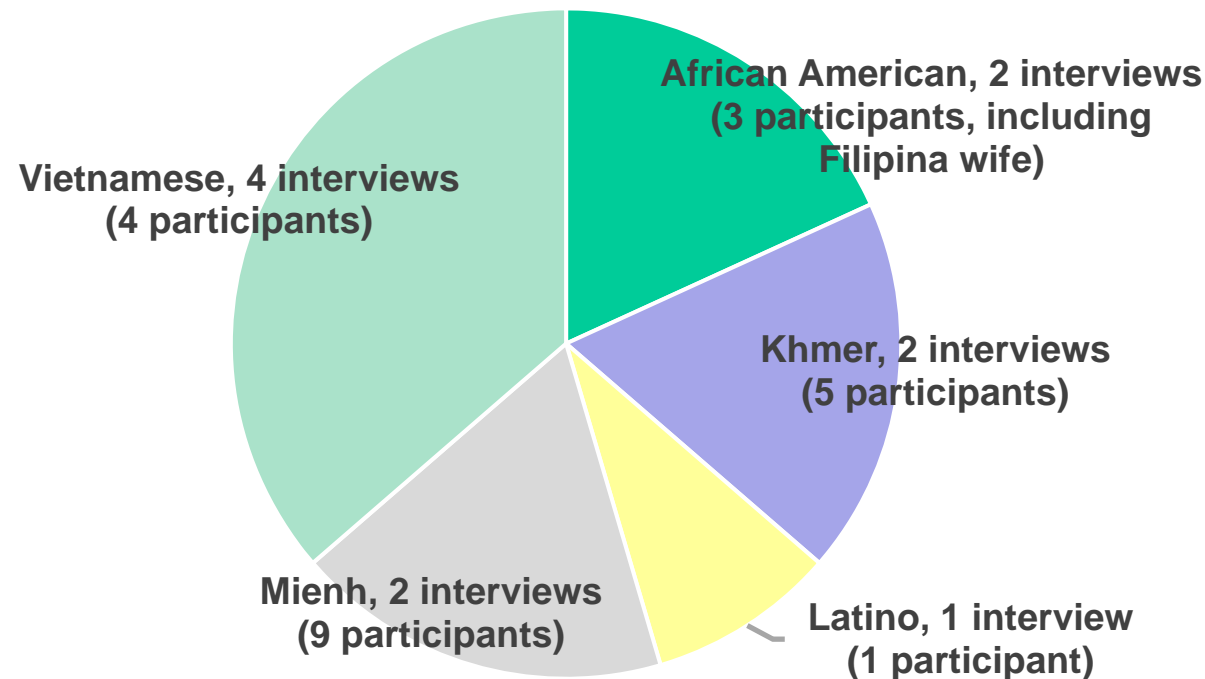
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# Key Informant Interviews

- Goal was to have more in-depth discussions with:
  - People who fish on the Duwamish
  - People who are preparers or consumers of Duwamish seafood but do not necessarily fish themselves
- Recruitment
  - Fishers from on-river survey
  - Community connections
  - Challenge because most people are fishing for salmon
- Format
  - Discussion of key topics
  - Generally about 1 hour each

# Key Informant Interviews

- Total of 11 interviews, 22 participants
- Number of interviews by ethnicity:



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## Of the 22 participants:

- Gender:
  - 12 women
  - 10 men
- Fish for Salmon vs. Resident Species:
  - 14 fish for resident species but may also fish for salmon
  - 2 fish for salmon only
  - 20 consume resident species (at least once)
- 6 were preparers/consumers only (all women)
- Age groups:
  - 3 were 18-30
  - 11 were 31-60
  - 8 were 61+

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# Saturation Assessment

- Purpose
- Process
- Conclusions



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# Topics Covered

## **Topic 1: Benefits of and obstacles to fishing**

- Benefits of eating fish
- Benefits of fishing
- What it takes to go fishing
- Duwamish as a place to fish
- Duwamish as source of food
- Impact of closed Duwamish
- Fishing as cultural tradition

## **Topic 2: Risk Assessment**

- Affect of eating contaminated seafood
- Determining safety of fish
- Safety/risk of eating fish
- Water quality

## **Topic 3: Patterns of distribution and consumption of Duwamish resident seafood**

- Distribution of seafood
- Preparation and consumption
- Role of fisher in the community
- Fishing as social activity
- Alternate ways to obtain seafood

## **Topic 4: Risk Communication**

- Advisories
- Awareness of cleanup
- Fishing alternatives
- Information sources

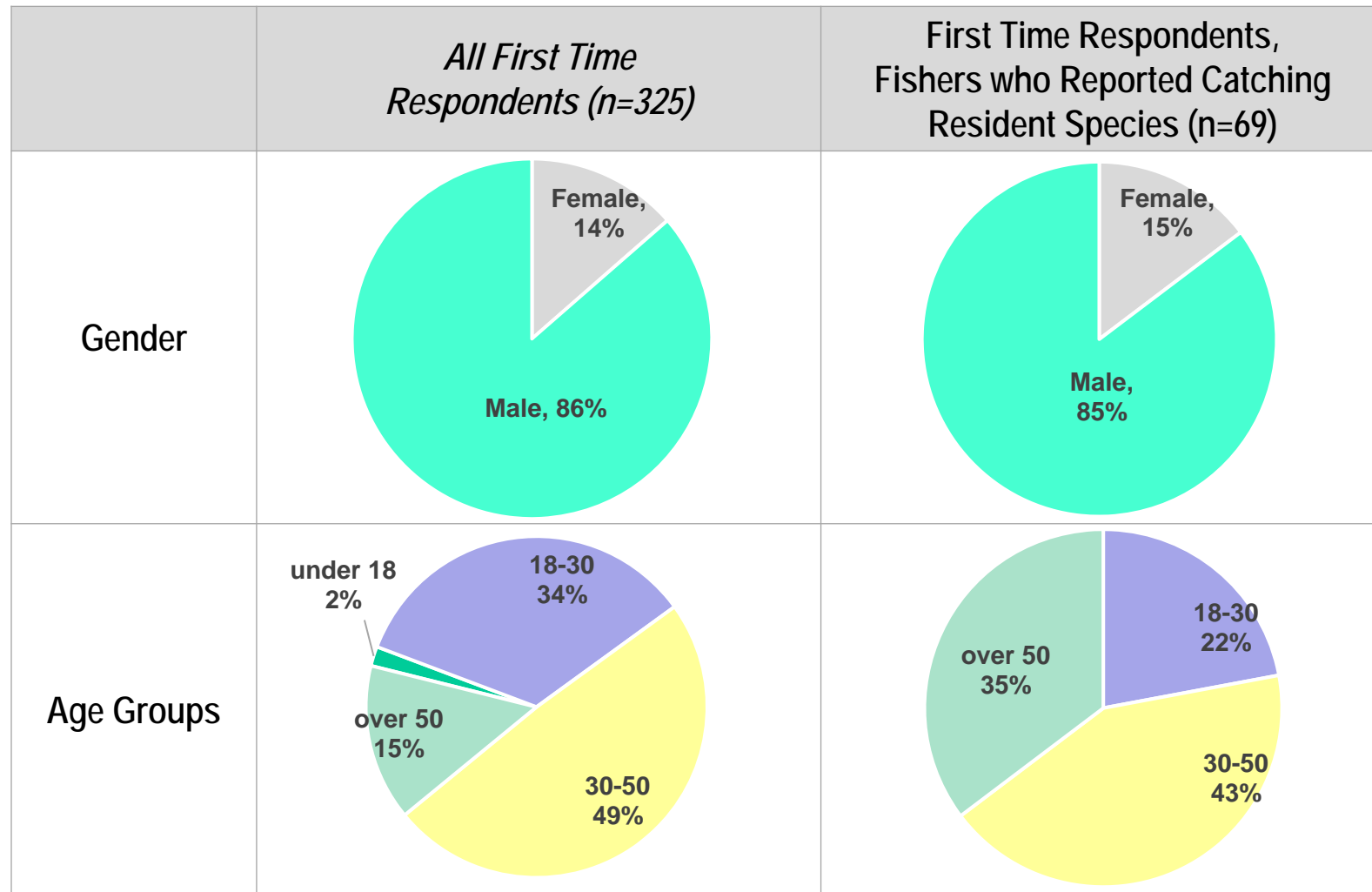
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# Preliminary Data Analysis

## ***Part 1:***

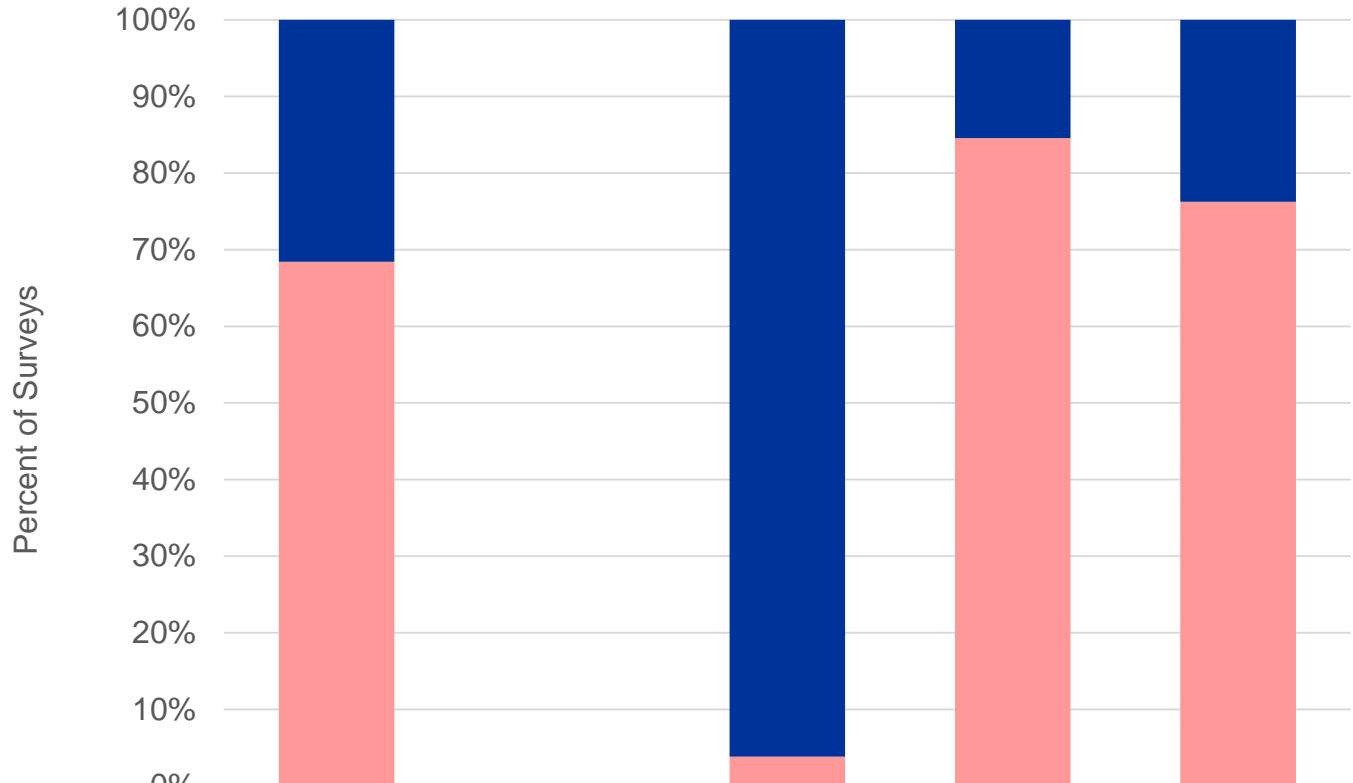
***How is the Duwamish currently being used for the collection and consumption of seafood, particularly resident seafood?***

## 1a) Who is fishing on the river?



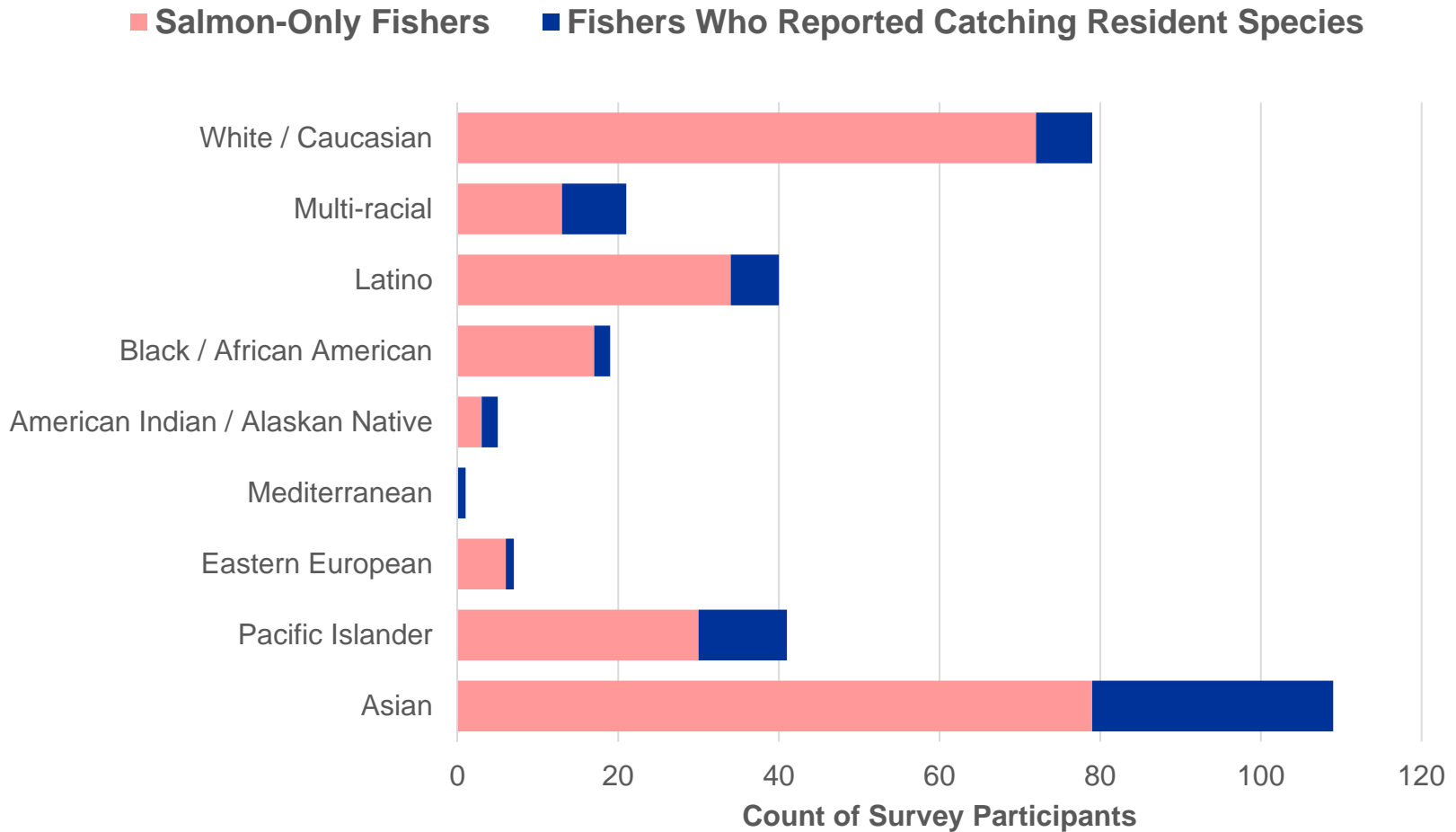
Source: On-river survey (responses for repeat survey takers were excluded to avoid double-counting).  
 Note that survey was not targeting individuals under 18 years of age.

# 1a) Salmon-Only vs. Fishers Catching Resident Species



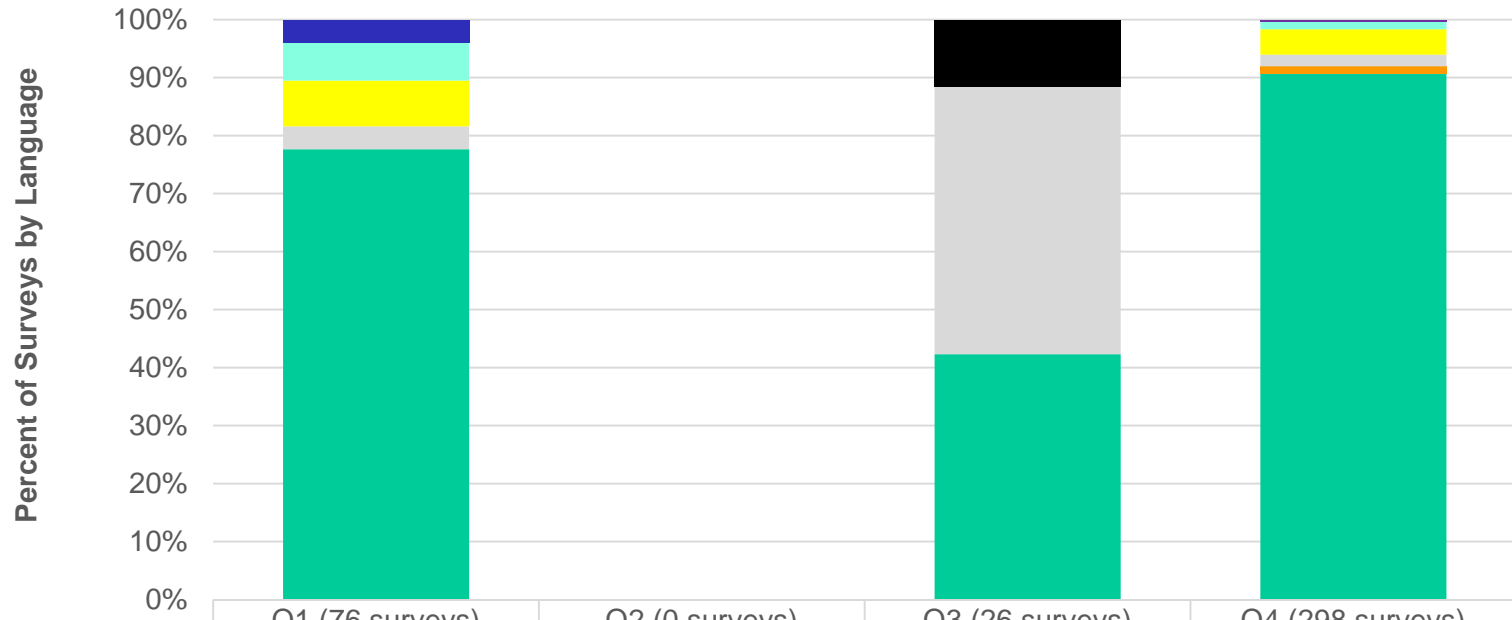
	Q1 (76 surveys)	Q2 (0 surveys)	Q3 (26 surveys)	Q4 (298 surveys)	Total (400 surveys)
■ Fishers who reported catching resident species	24	0	25	46	95
■ Salmon-only fishers	52	0	1	252	305

# 1a) Who is fishing on the river?



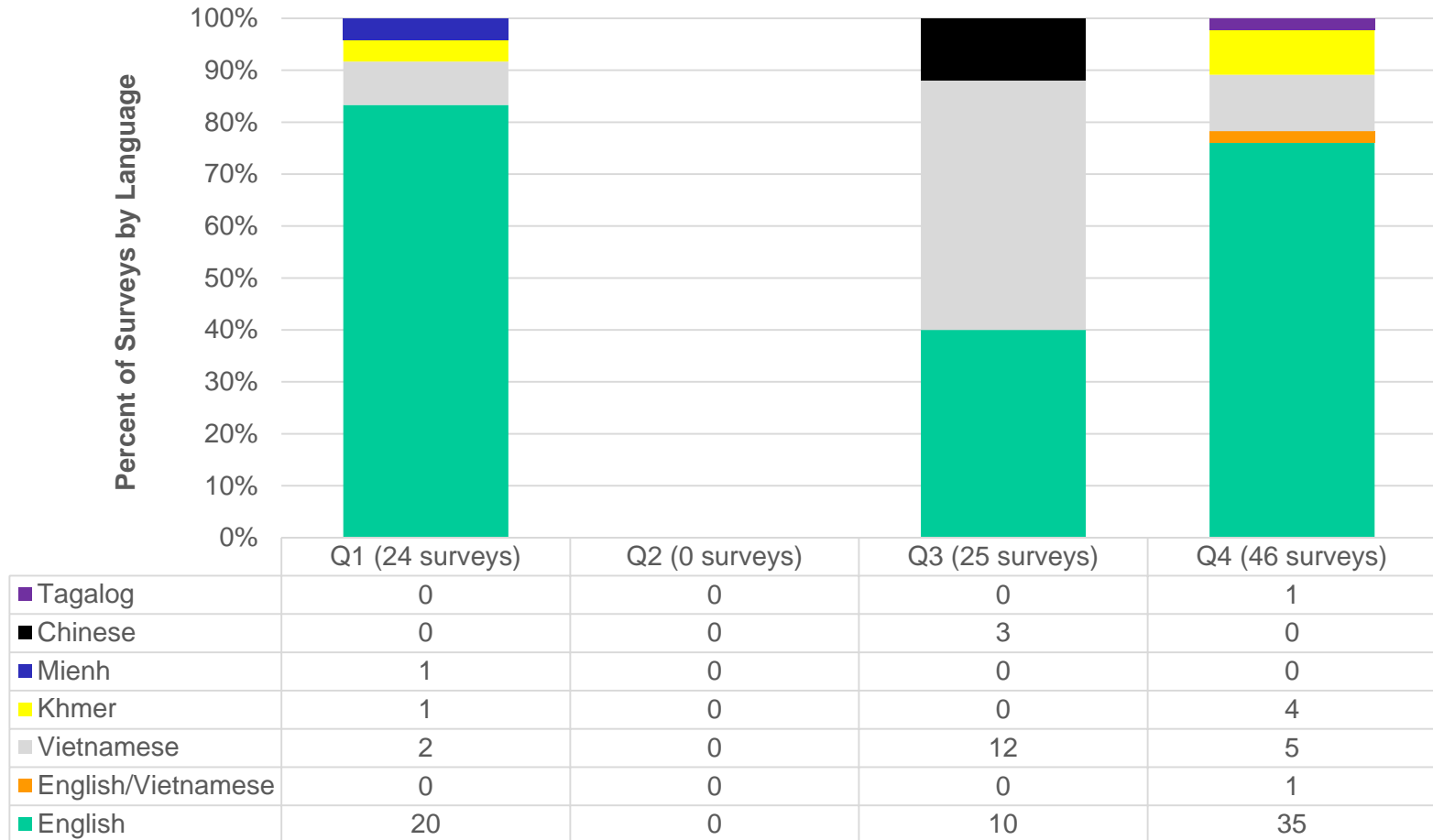
Source: On-river survey (responses for repeat survey takers were excluded to avoid double-counting)

# 1a) Summary of Languages Used: All fishers



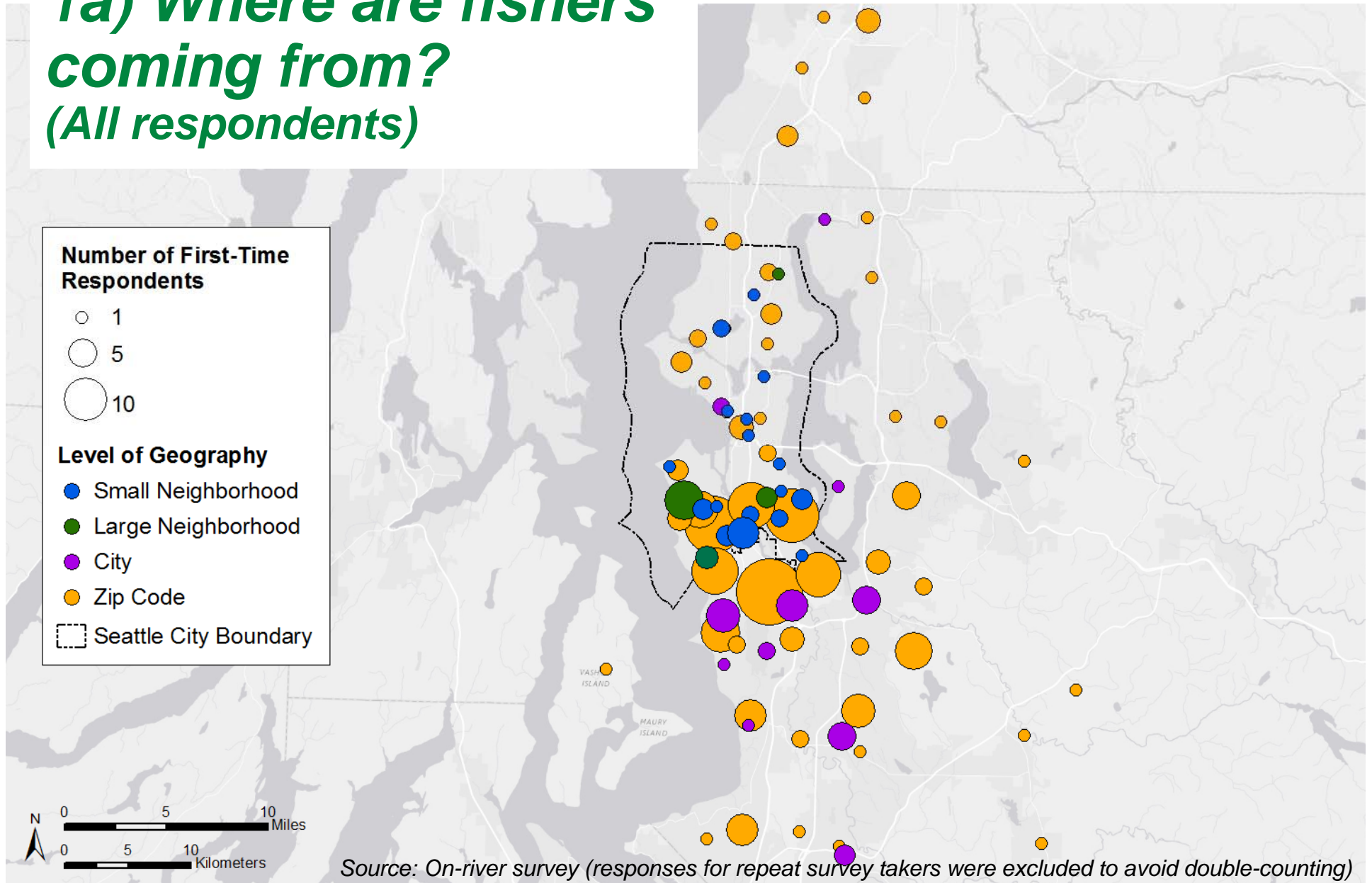
	Q1 (76 surveys)	Q2 (0 surveys)	Q3 (26 surveys)	Q4 (298 surveys)
■ Tagalog	0	0	0	1
■ Chinese	0	0	3	0
■ Mienh	3	0	0	0
■ Spanish	5	0	0	4
■ Khmer	6	0	0	13
■ Vietnamese	3	0	12	6
■ English/Vietnamese	0	0	0	4
■ English	59	0	11	270

# 1a) Summary of Languages Used: Excluding Salmon-Only Fishers

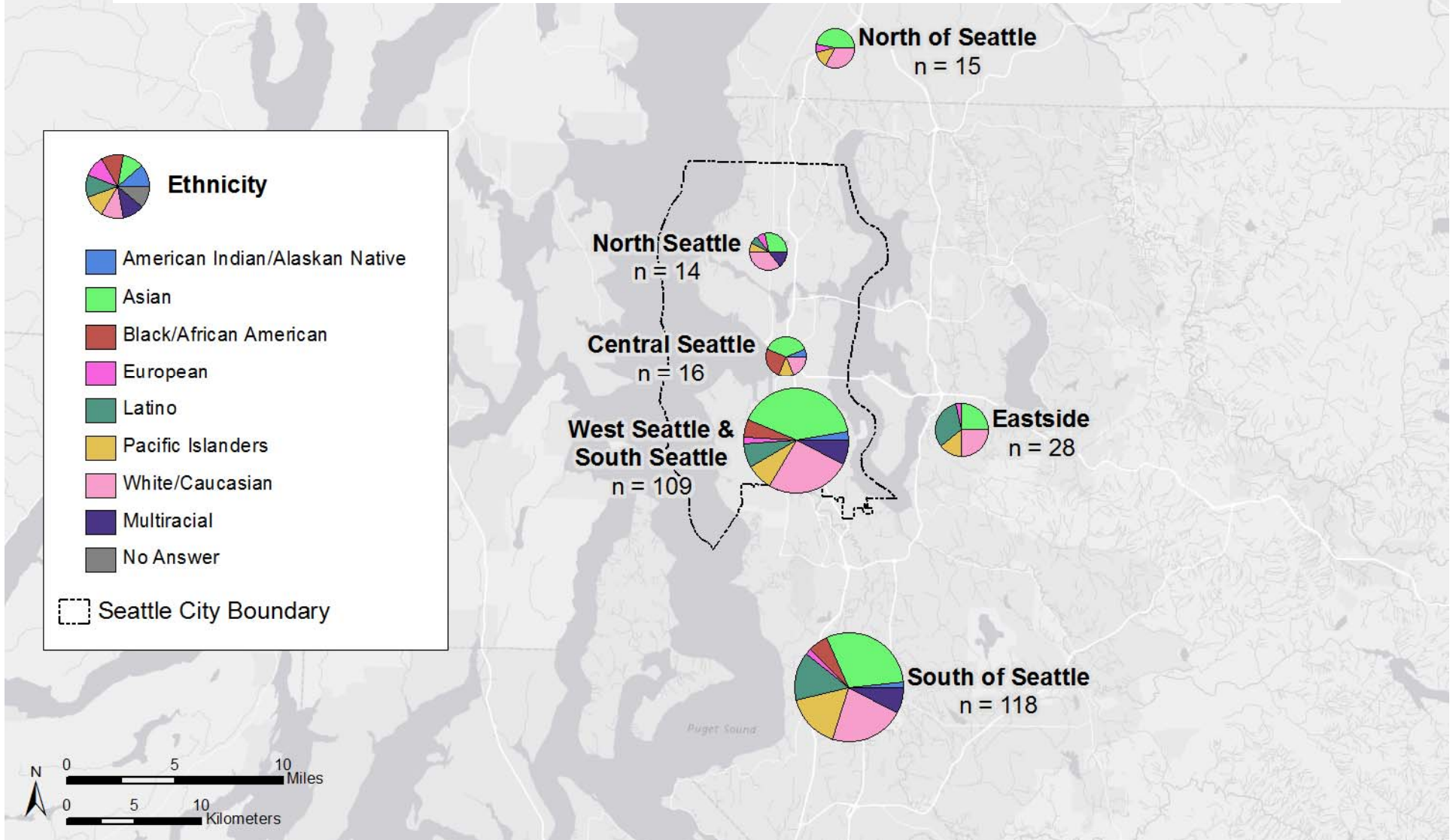




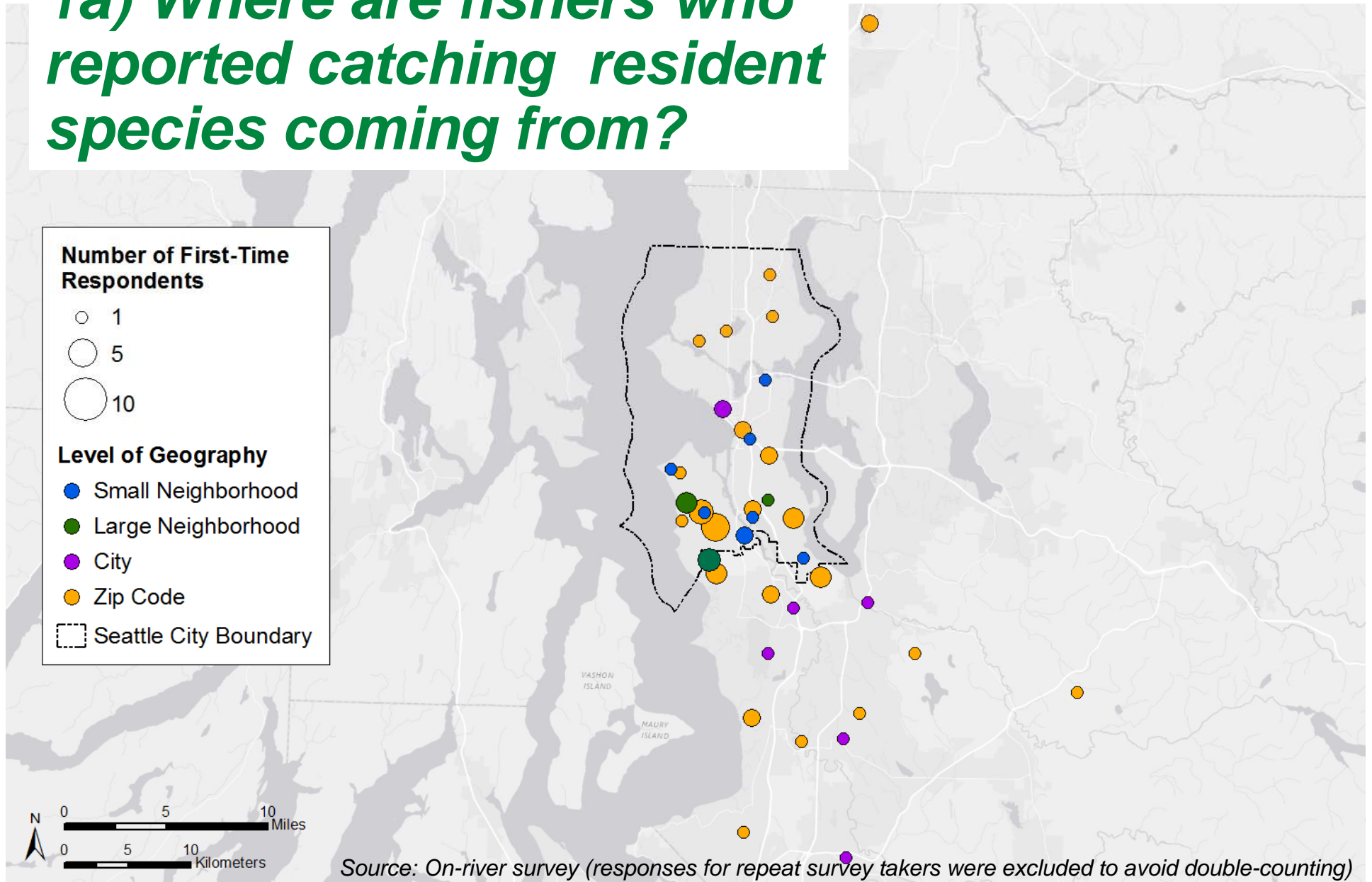
# 1a) Where are fishers coming from? (All respondents)



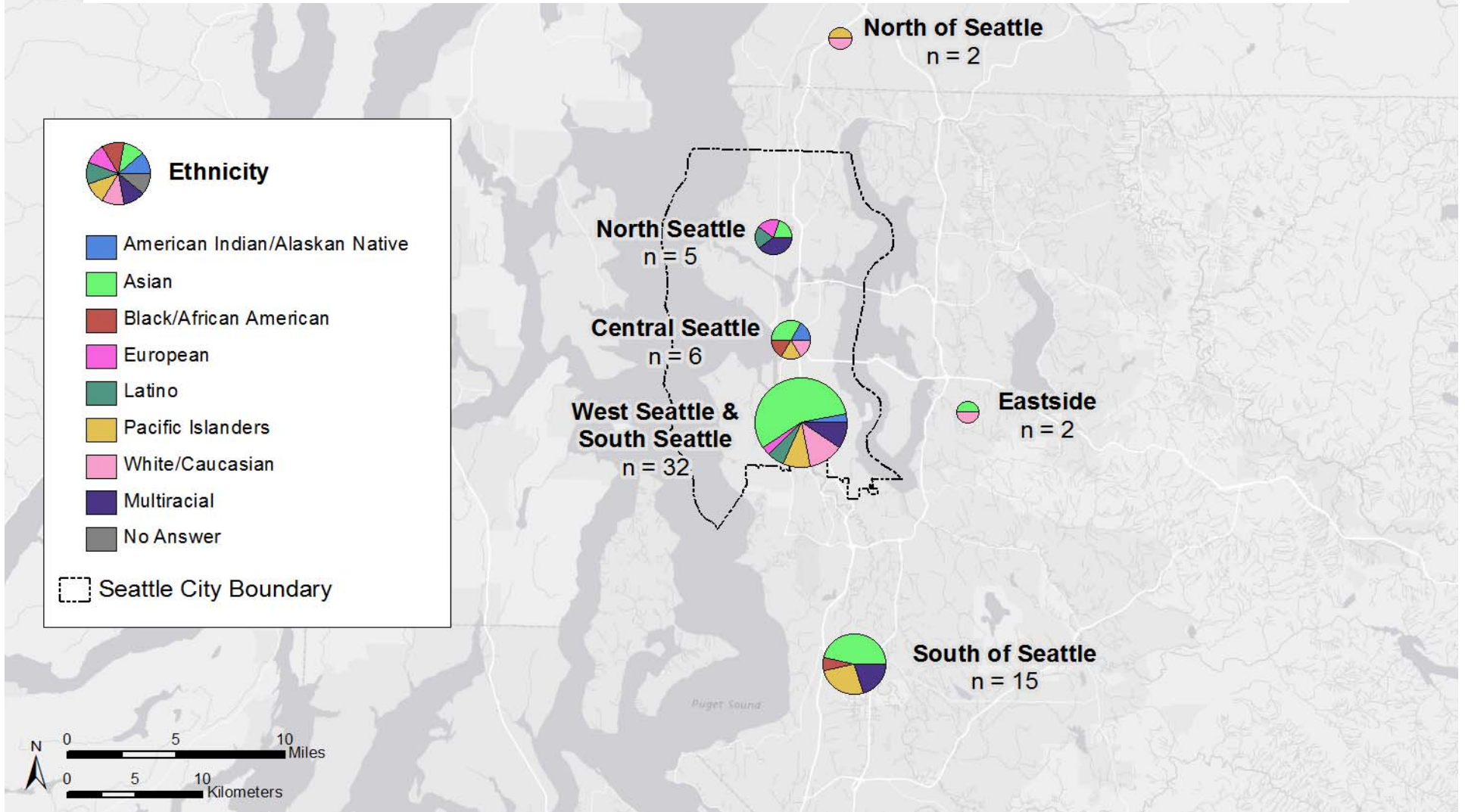
# 1a) Where are fishers coming from? Breakdown by ethnicity for all fishers



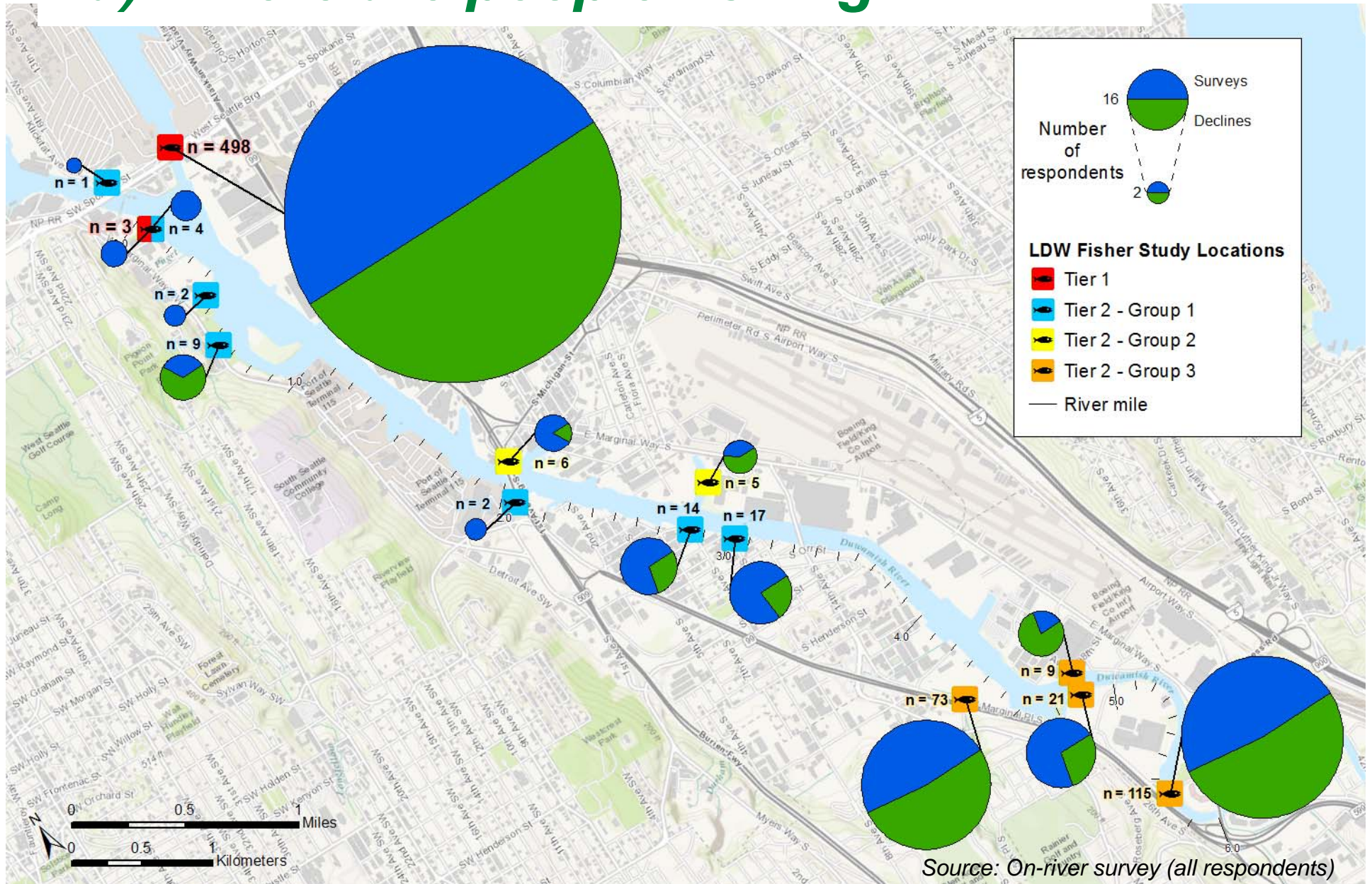
# 1a) Where are fishers who reported catching resident species coming from?



# 1a) Where are fishers coming from? Breakdown by ethnicity for fishers who reported catching resident species.

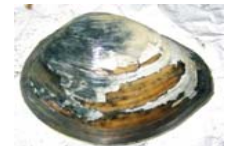


# 1a) Where are people fishing?



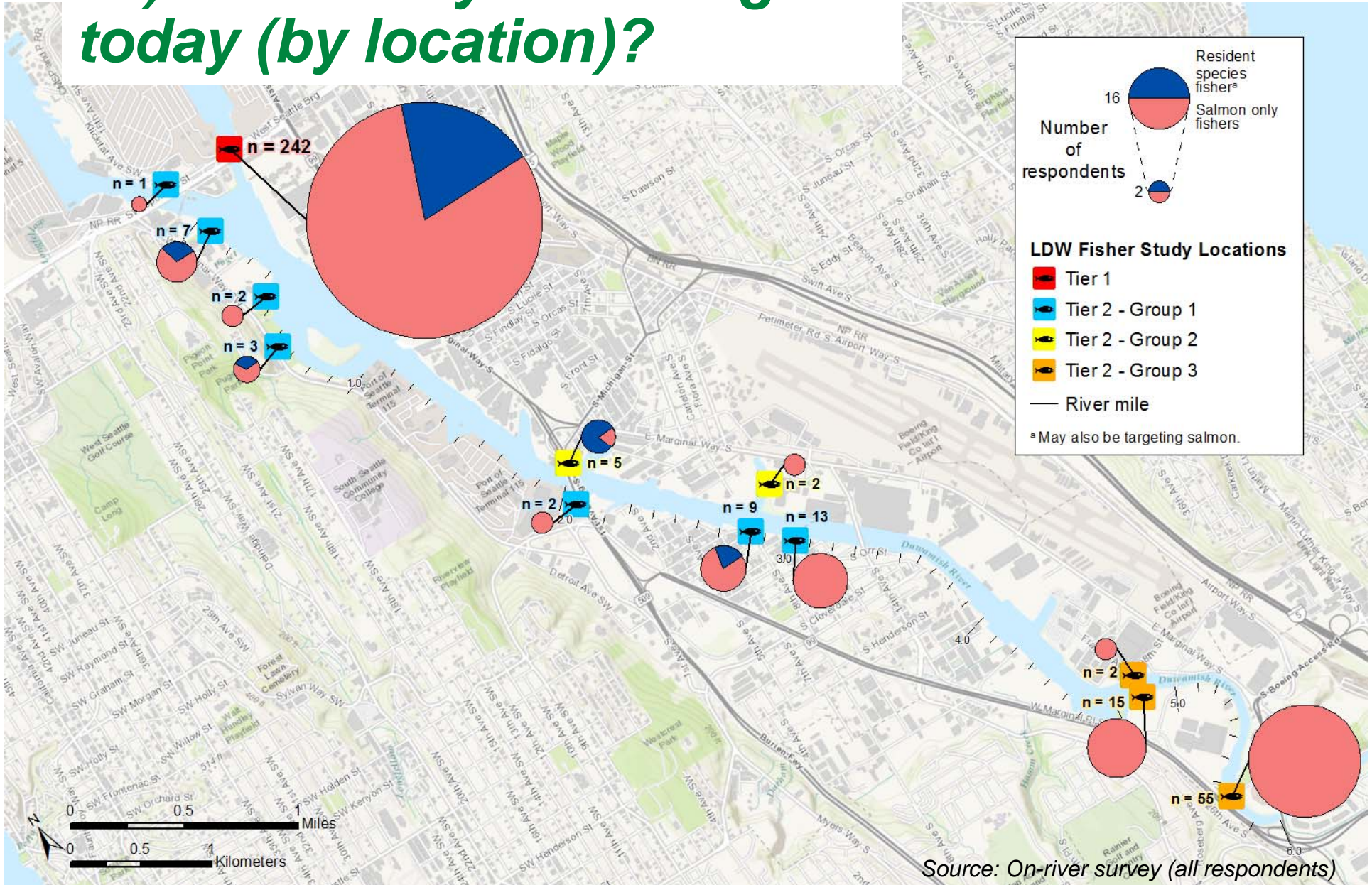
## 1b) What are you fishing for today?

Species	October	November	December	January	February	March	April	May	June	July	August	September
Salmon	48	18	6								82	192
Trout												1
Flounder/Sole	3		1									
Rockfish	1		2							1		
Sculpin			1									
Perch	2		1					6	2	2		4
Bait fish/small fish							2	5	10	3		
Herring								3	8	2		1
Dogfish			1									
Crab	3									8		
Clams	1											
Squid	1		1									
Shrimp	2											
Anything I can catch			2								1	



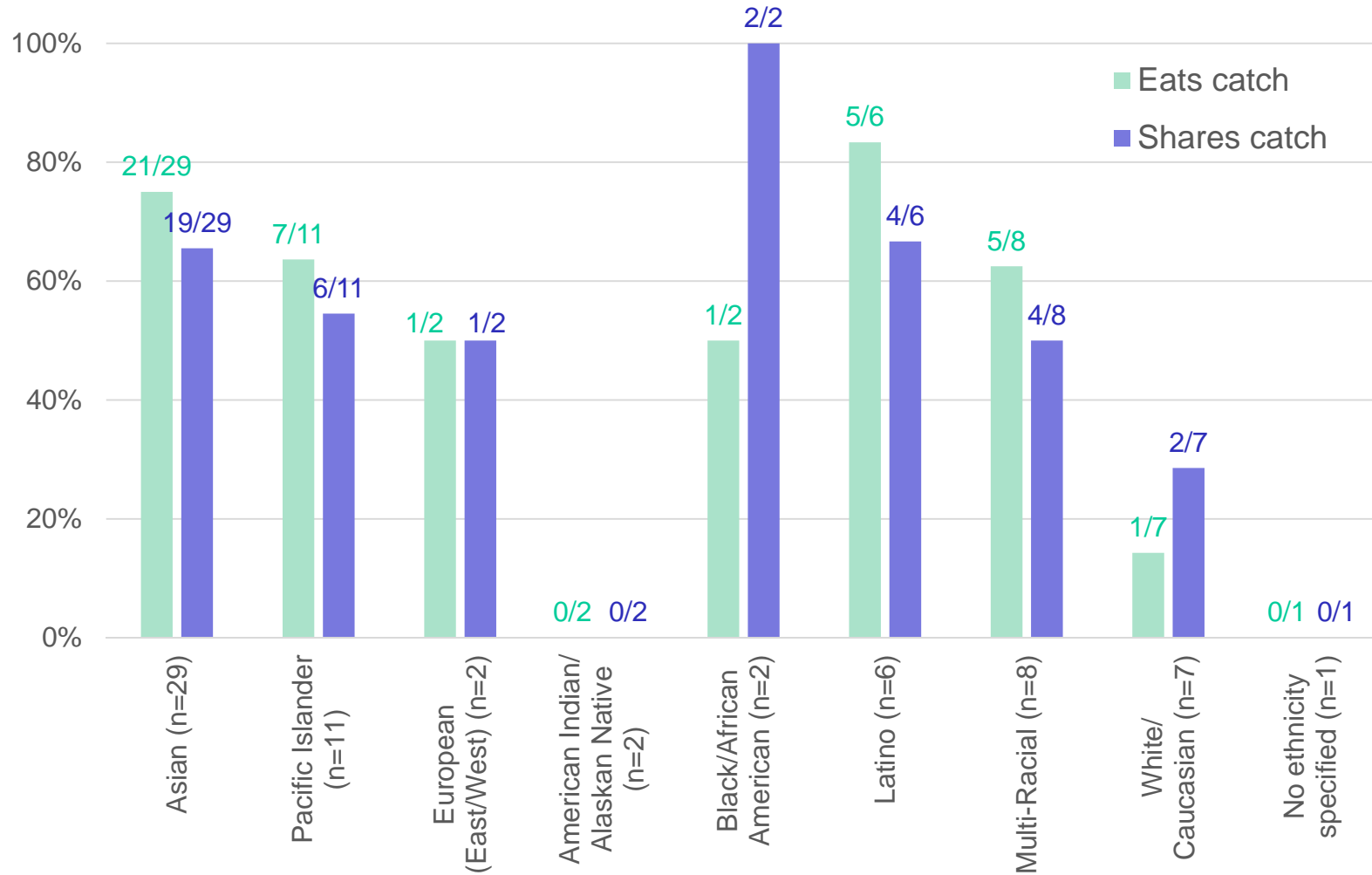
Source: On-river survey (all respondents)

# 1a) What are you fishing for today (by location)?



Source: On-river survey (all respondents)

## 1b) What is done with the resident species that are caught?



Source: On-river survey (response are for resident fishers only, first-time respondents)



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## 1b) Sharing, Trading, Selling

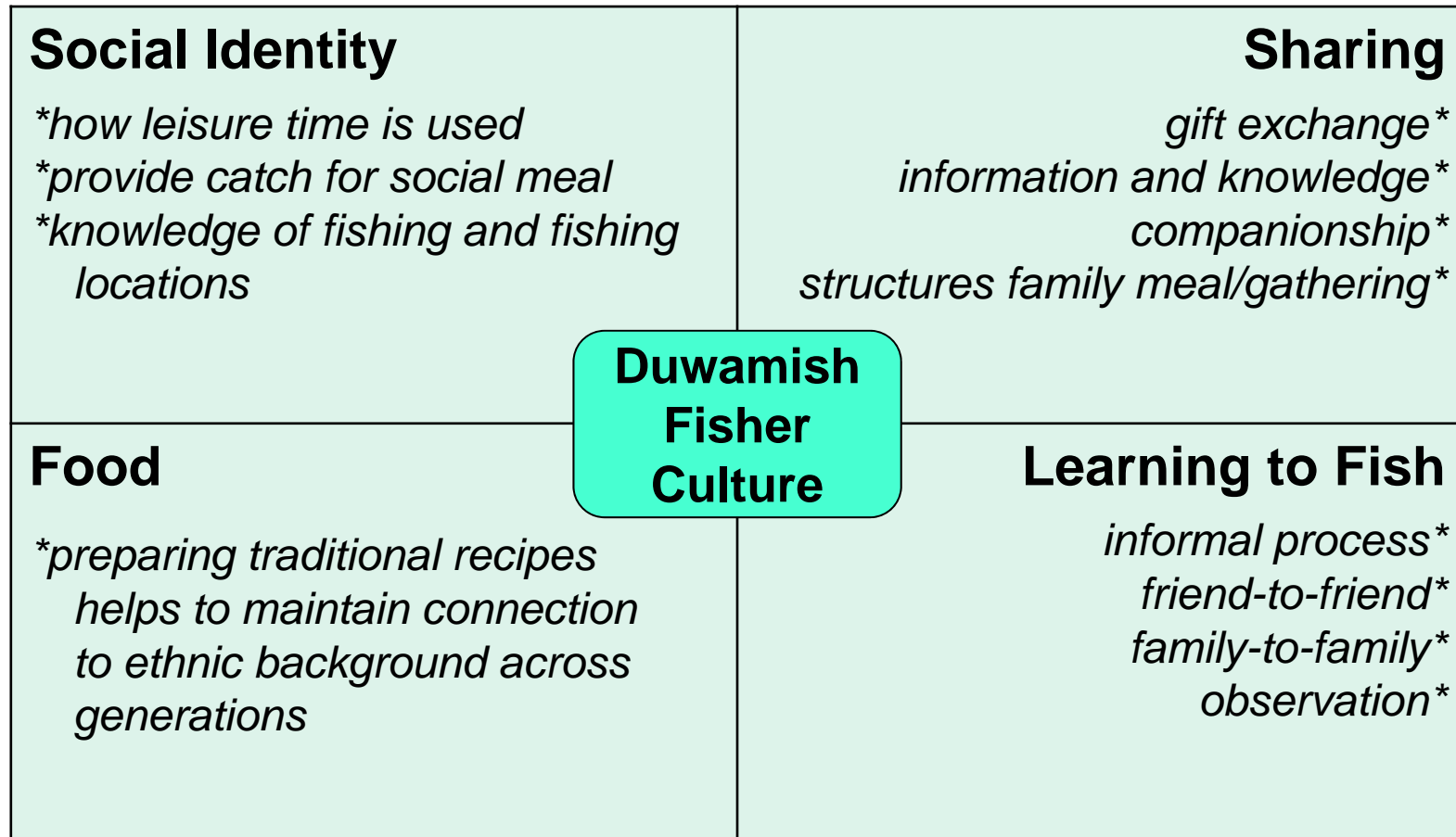
- Sharing commonly occurs as meal with immediate family
- Extra fish may be shared by the river, given to extended family/friends, or cooked up as communal meal or “fish fry”
- Some fishers occasionally trade species to get more variety
- Catch from the Duwamish generally not sold
  - Fishers don’t catch enough to sell from Duwamish
  - People who sell fish generally go to further away locations to catch fish (e.g., Columbia River, Snake River, Idaho, Oregon)
  - *“Fish I caught in the Duwamish is for food for my family, and usually it is just enough for my family, not for selling or sharing with others.”*  
(Khmer)

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## ***1c & 1d) Preparing the Seafood***

- Cleaning techniques vary among fishers
- Who does the cooking?
  - Cooking happens mostly within the fisher's household
  - Women may predominate, but men also participate in cooking
- Preparation:
  - Varies by species and family culture
  - Recipes include making soup, deep frying, boiling, baking, smoking, and making traditional dishes
- Source of seafood is known within fisher family, but not necessarily if fish was received as a gift or purchased

# 1c & 1d) Duwamish Fisher Culture



Source: Key informant interviews

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## *Results, Part 2:*

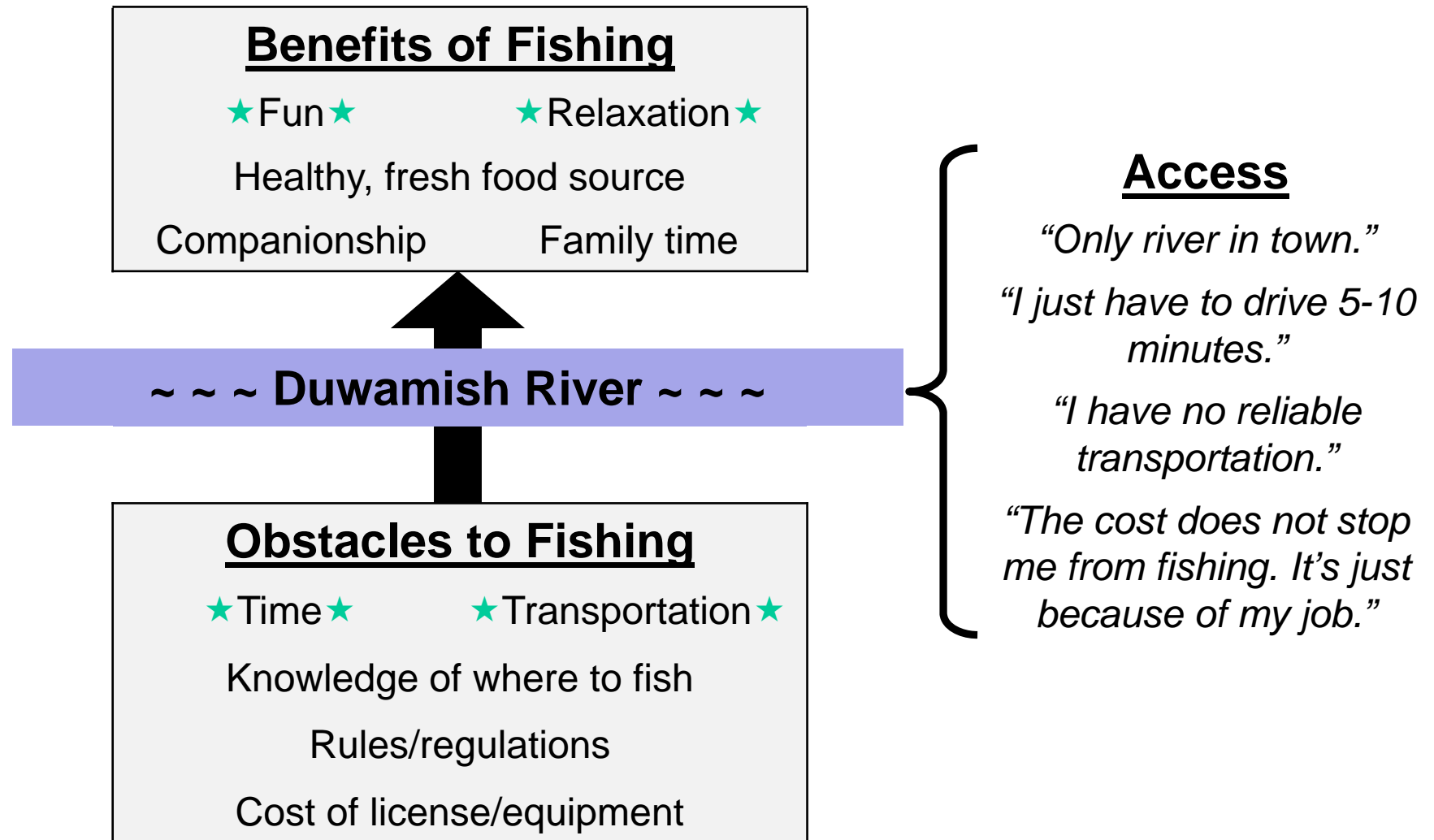
*What are the perceived benefits of consuming seafood from the Duwamish? What is currently known by the community about the risks of consuming seafood collected from the Duwamish?*

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## ***2a) Benefits of fishing***

- Leisure, activity, and hobby
  - Respite from daily stress
  - Enjoying nature
- Social activity
  - Companionship
  - Sharing rides, information
  - Family outing
- Healthy food
  - Fresher than store-bought seafood, though not free

## 2a) Importance of Duwamish To Fishers



Source: Key informant interviews

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## ***2b) Risk Perceptions:***

### ***Water Quality***

- Cleanliness based on empirical evidence
  - Smell, color, presence of trash, oil from boats
  - Physical characteristics of river: fast moving, tides moving in and out, narrowness of river
  - Duwamish is cleaner than rivers in Vietnam
- Polluted water is assessed by seeing oil on water, presence of industries along riverbank, and direct observation of chemicals moving into the river

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## ***2b) Risk Perceptions, continued:***

### ***Visual inspection of fish***

- Dark color
- Worms
- Lives on the bottom of river

### ***Experience of sickness***

- Limited to short-term, acute symptoms
- Infrequent and only in others

### ***Told by others***

- Advisories (rather than bans), other authorities, media
- Other fishers
- Sees older folks fishing and not sick
- “God’s creatures”



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## ***2b) Ways to consume seafood safely***

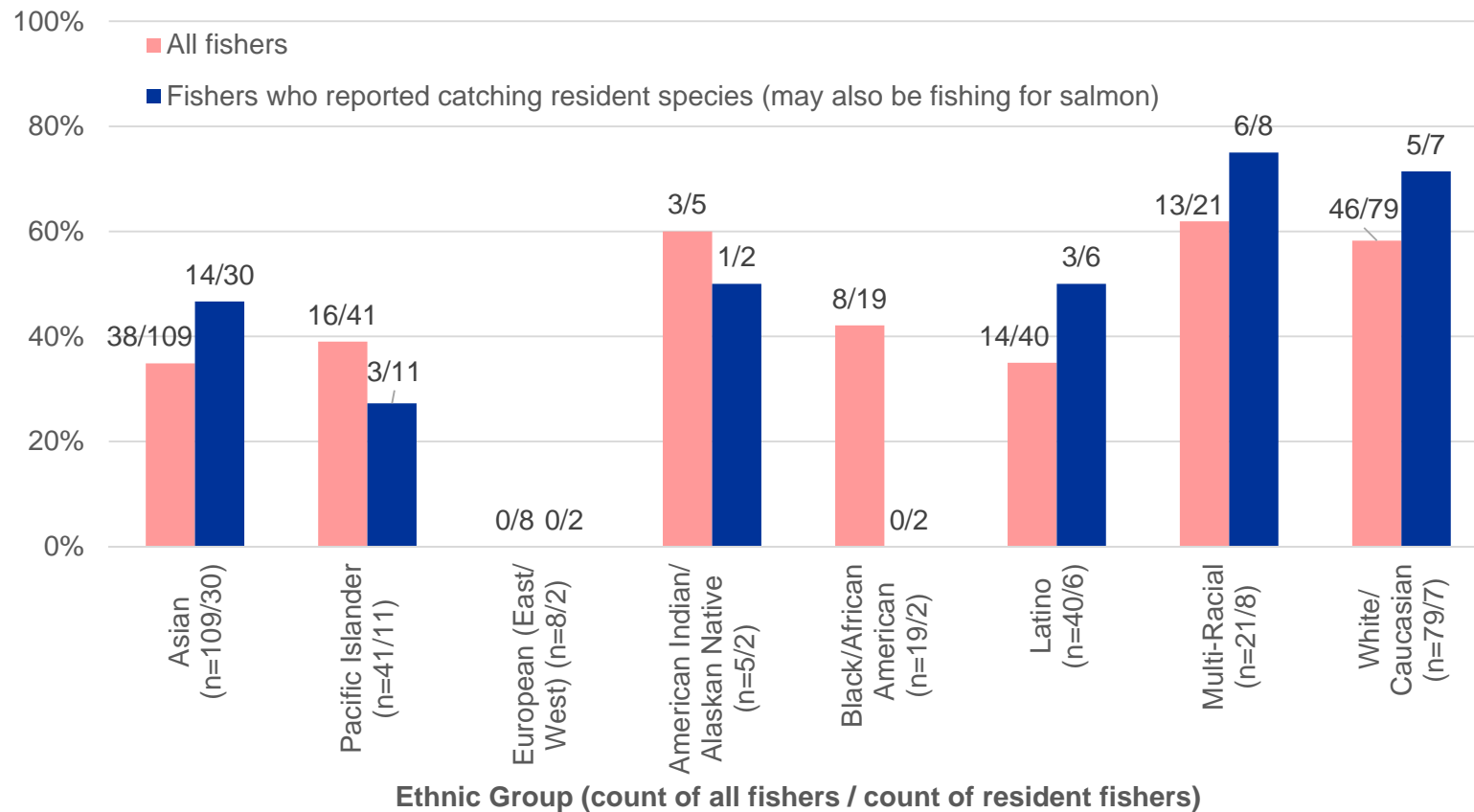
- Cleaning / preparation:
  - Scrub and clean fish well
  - Cook thoroughly, especially deep fry in oil to kill all contaminants
- Don't eat if it looks or smells bad; throw it back
- What to eat:
  - Eat only salmon and fish that swim through
  - Eat just a little
- Fish upstream to get away from industry

## ***2c) Why are people continuing to fish?***

- Fishers share a lay model of pollution
  - Based on empirical evidence that relies on what can be detected by the senses and personal experience of not getting sick
  - Logic of this model suggests that thorough cleaning and cooking makes fish safe
- Many fishers are also aware of toxic contaminants in the river but no notion of long-term impact on health – modified lay model
- These fishers avoid catching some species or limit consumption

## 2d) Do the various fisher groups know about the advisories and risks?

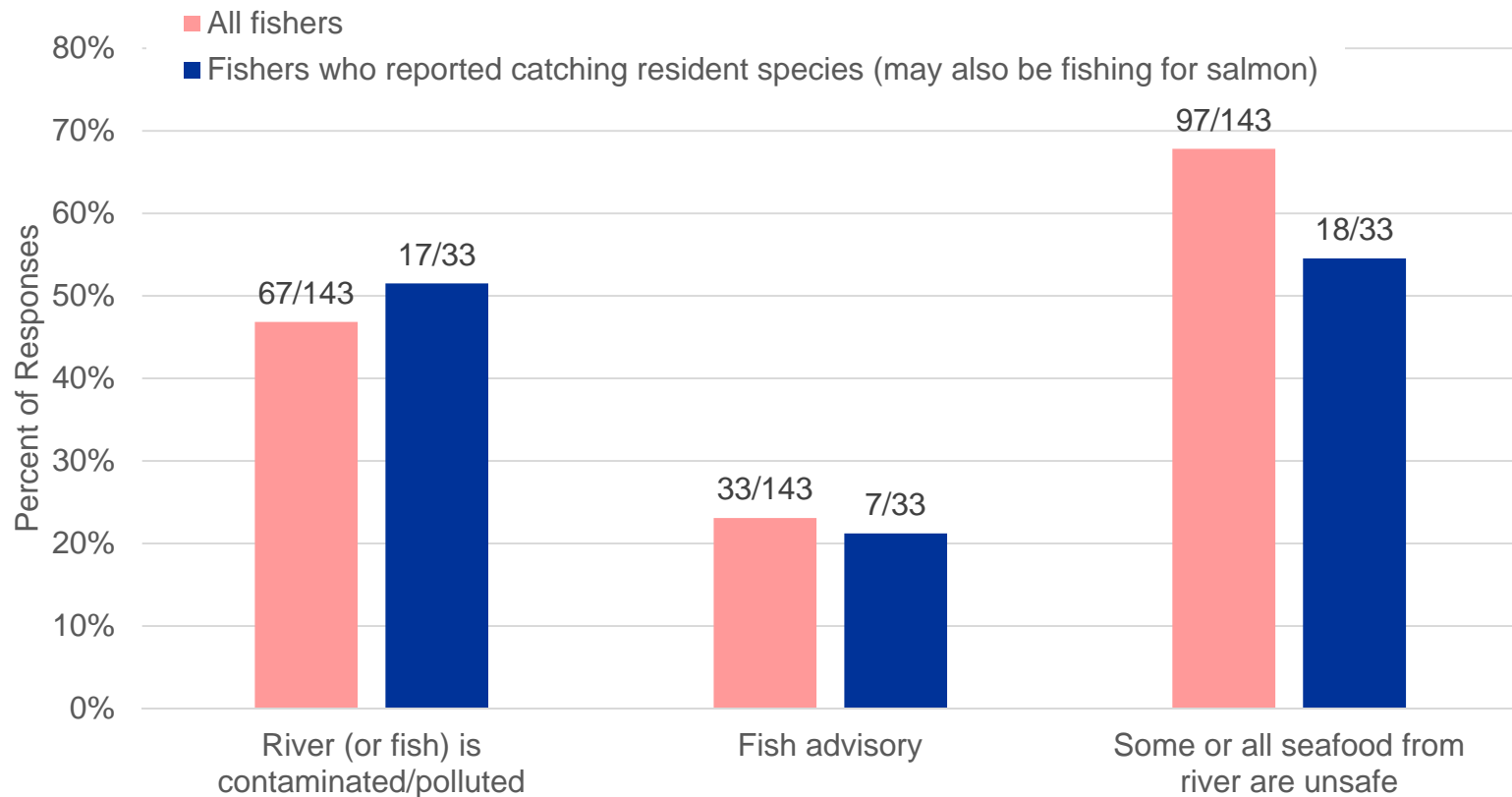
Percent of fishers who indicated yes, they have heard something about how eating seafood caught from the Duwamish might affect people's health



Source: On-river survey (responses for repeat survey takers were excluded to avoid double-counting)

## 2d) What do they know?

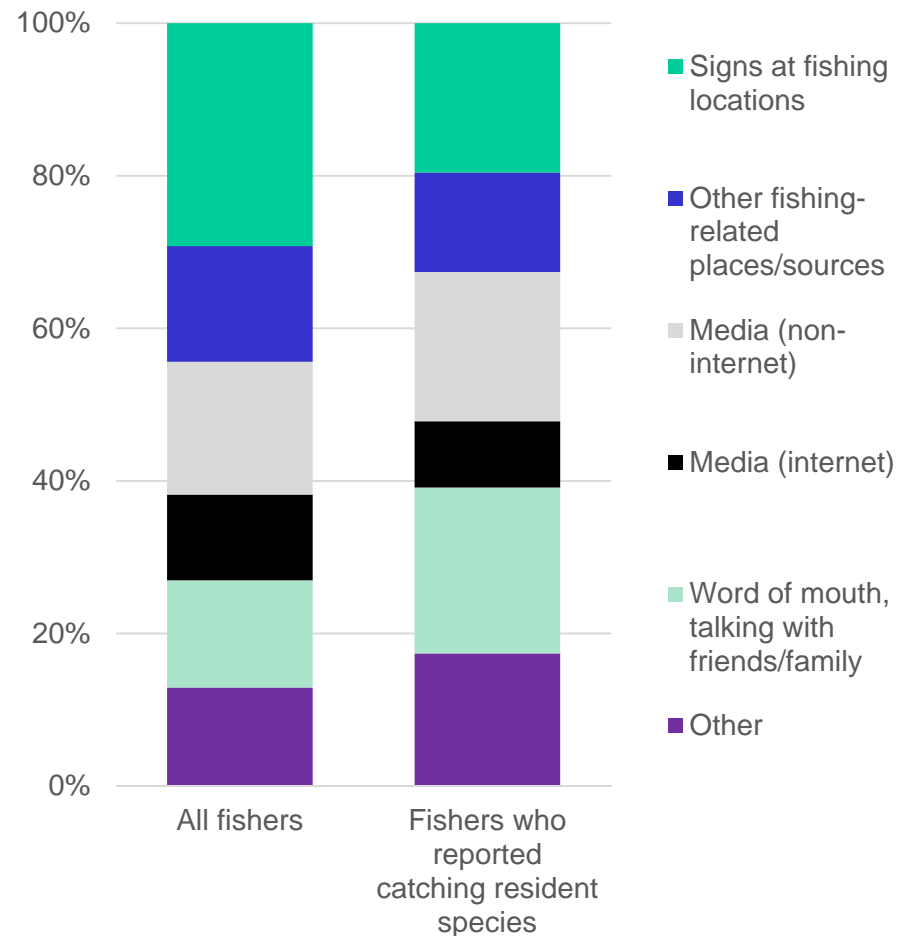
**What have you seen or heard about how eating seafood caught from the Duwamish might affect people's health?**



Source: On-river survey (responses for repeat survey takers were excluded to avoid double-counting)

## 2e) How are they currently getting this information?

- Top sources of information:
  - Signs at fishing locations
  - Other fishing-related places
  - Media sources
  - Word-of-mouth, talking with friends/family
- Differences by ethnicity and age



Source: On-river survey (responses for repeat survey takers were excluded to avoid double-counting)

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## ***2e) Preferred information sources***

- Generally similar to current information sources as shown in previous slide
- Some differences (based both on key informant interviews and on-river surveys):
  - Current signs at fishing locations not viewed as good information source
  - More interest in outreach (especially for resident fishers)
  - Less interest in internet media sources (especially for resident fishers)

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## *Alternatives to Duwamish seafood – feelings and options*

- Many people said they would be sad or disappointed if they couldn't fish on the Duwamish
- Options
  - Buy seafood at store / market
    - Generally not as fresh, but more variety
    - Some perception that store-bought fish is safer because of government inspection (e.g., Khmer community)
    - Seafood is more expensive in store than other meat options
  - Eat less fish and more meat
  - Go to other locations to fish
    - Obstacles are time and transportation
    - Probably wouldn't fish as often

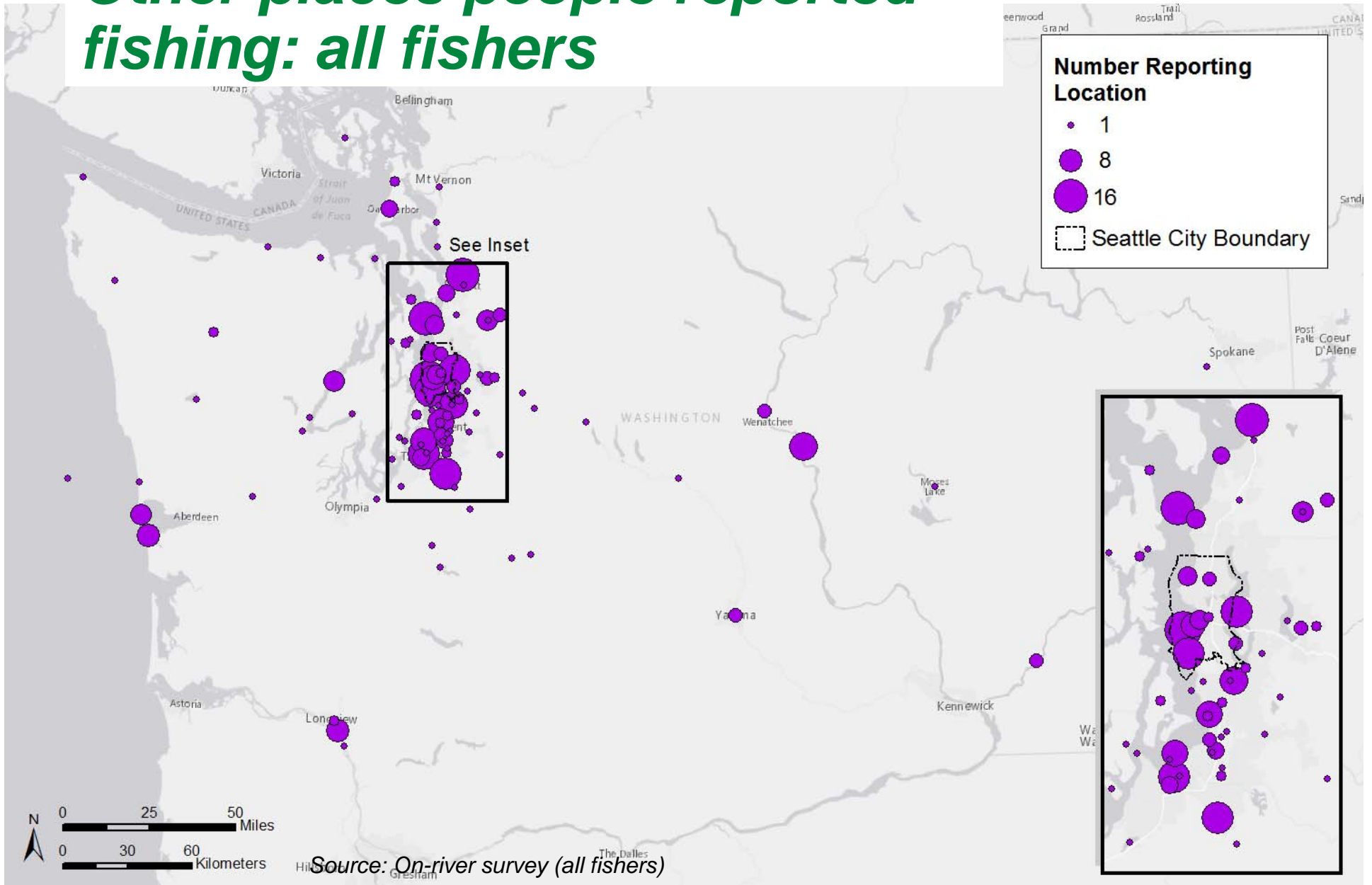
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## *Other places people reported fishing*

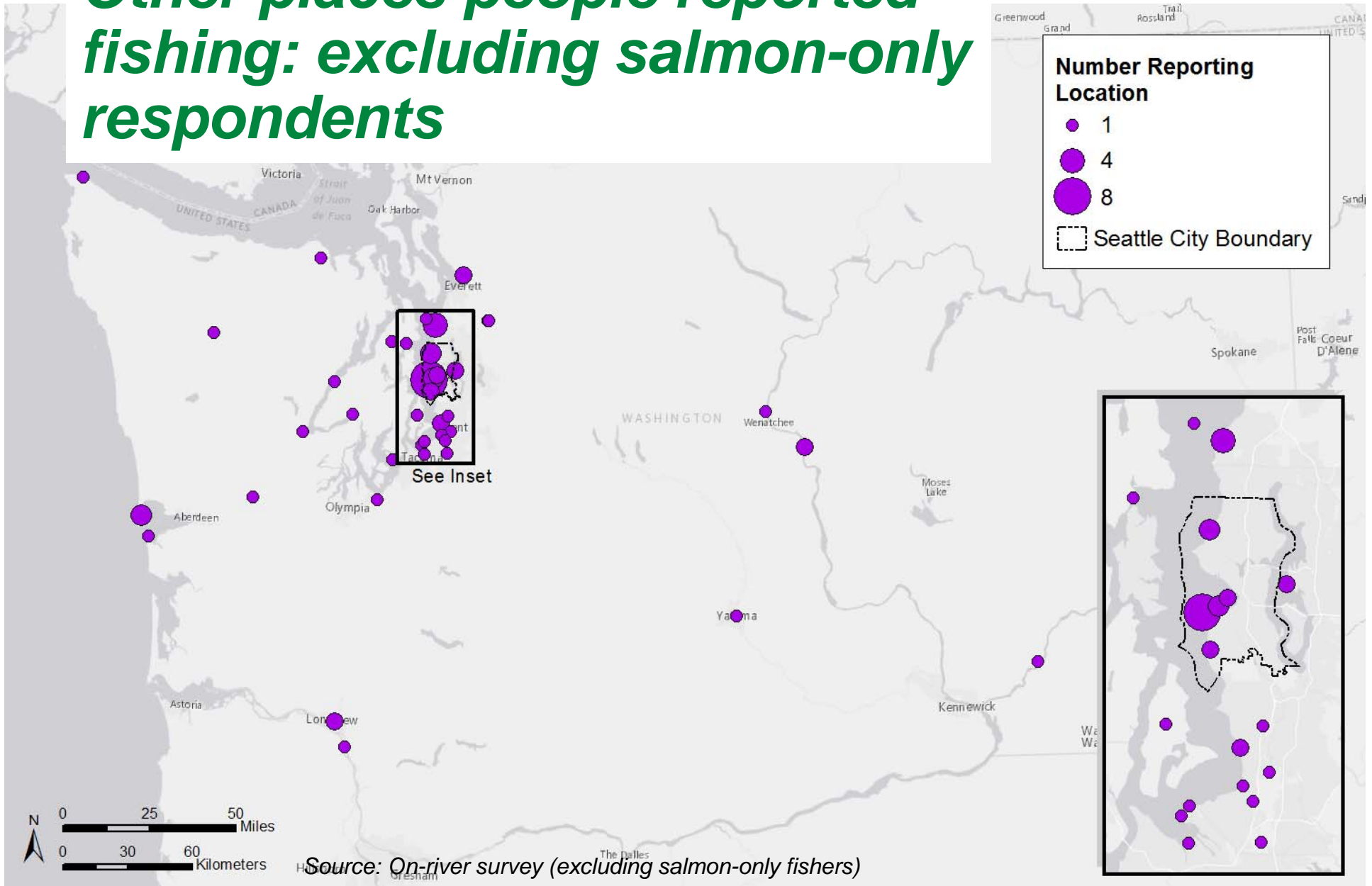
- Popular locations in the Seattle-area:
  - Alki – Seacrest pier
  - Des Moines pier
  - Dash Point pier
  - Green River
  - Lake Washington
  - Lincoln Park beach (salmon)
- Popular locations outside of Seattle:
  - Columbia River
  - Puyallup River
  - Snohomish River
  - Other locations around Puget Sound



# Other places people reported fishing: all fishers



# Other places people reported fishing: excluding salmon-only respondents



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# Initial Impressions

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## Key insights from ECOSS debrief interview (general)

- Duwamish is a convenient and welcoming location for fishers
- Fishing is an important activity for bonding, family interactions, recreation
- Duwamish is a very popular salmon-fishing location
- May keep fishing unless see people getting sick

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## Key insights from ECOSS debrief interview (communication)

- Signs are not sufficient; current signs are seen as too complicated
- Better communication strategies:
  - Need variety of methods to reach people (e.g., interactive presentations, outreach along river); more effort is required
  - Word-of-mouth is important; people trust others in their community
  - Interactive conversation is effective; especially with new immigrants
- Need to get information to wives / non-fishers regarding preparation methods and where it is better to fish
- Some communities (e.g., Cambodian) appreciate government giving them information and trying to keep them safe

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## Important Reminders When Interpreting Results

- Increasing awareness of risk alone does not change behavior
- Information on how to reduce risk must connect to local knowledge, attitudes, and practice
- “Why don’t fishers follow advisories” should be thought of as “how can ICs better meet the needs of fishers”

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## Addressing Lay and Expert Models of Risk

- Fishers lay model of risk relies on:
  - Experience
  - Accumulated knowledge of fish safety and illness
  - Empirical inspection to identify “bad” fish
- Most fishers did not have a model for unseen risk
- Effective risk communication respects fisher knowledge, provides an additional model for unseen risk, integrates local knowledge and lifestyles

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## Including the Experience of Fishers

- In key informant interviews, two fishers who worked at businesses on the river had modified their fishing behaviors
- Informing effective ways to distribute information:
  - Build respectful relationships with fishers
  - Fishers share information on the river—include fishers in communication strategies
  - Include respected community members who are fishers in communications with fishers and seafood consumers



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## Additional Insights

- Consumption is part of the experience
  - Catch and release may not be popular
- Many fishers
  - Perceive river bottom as a polluted place to avoid
  - Assume that if any fishing is allowed, then all seafood is safe
  - Expressed trust in experts and authorities

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# Wrap Up

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# Fishers Study Next Steps

- Data report
  - Draft to agencies by August 4
  - Finalize in late 2016
- Report to community on fisher study results
  - Fact sheet
    - Produce draft after receive comments on data report
    - Finalize before community meeting
  - Community meeting – late 2016

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# Data Report: Draft Outline

- Introduction (including key questions and objectives)
- Project Overview
- Methods
  - On-River Survey
  - Key Informant Interviews
  - Community Involvement
- Results – organized around key questions
- Discussion
- Next Steps

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## Handoff to Task 11

- Per Task 11 of the Statement of Work (2016), LDWG shall, as directed by EPA, support development and implementation of institutional controls for LDW seafood consumption by providing, funding, or participating in:
  - Planning group to develop and implement plan
  - Incentives for community participation (subject to legal authority of public agencies to do so)
  - Technical materials
  - Pilot testing of IC tools, such as outreach campaigns
  - Assessment of pilot test and plan revisions
  - Assessment of plan's success and recommendations

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## Questions?

*If you are interested in an electronic copy of this presentation, it will be posted on [ldwg.org](http://ldwg.org) following this meeting.*

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# Supplemental Information

*(Included for reference only;  
not part of June 2 presentation)*

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# ECOSS Pre-Survey Interviews

- Conducted in October/November 2013
- Purpose – community input on study design
- 54 community representatives provided important guidance on:
  - Languages
  - Fishing locations
  - When and how to best approach fishers
- Comments on why people fish and risk perceptions very similar to results from on-river survey and key informant interviews



# On-River Survey Ethnicities

Ethnicity Group	Ethnicity	All	Resident Fishers	Percent of Fishers who Catch Resident Seafood
Asian	Asian	1		
	Burmese	2		
	Cambodian/Khmer	26	7	27%
	Cham	1		
	Chinese	14	3	21%
	Hmong	3	1	33%
	Japanese	1		
	Korean	5	1	20%
	Lao	9	1	11%
	Mienh	2	1	50%
	Nepali	3		
	Thai	2	1	50%
Vietnamese	40	15	38%	
European (East)	Bosnian	1		
	Poland	1		
	Romanian	1	1	100%
	Russian	2		
	Ukrainian	2		
European (West)	Mediterranean	1	1	100%
Pacific Islanders	Fijian	1		
	Filipino	22	8	36%
	Hawaiian	1		
	Indonesian	1		
	Other Pacific Islander	3	2	67%
	Samoaan	12	1	8%
	Tongan	1		
Other Groups	American Indian/Alaskan Native	5	2	40%
	Black/African American	19	2	11%
	Latino	40	6	15%
	Multi-racial	21	8	38%
	White/Caucasian	79	7	9%
No answer		3	1	-
<b>Total: Asian Populations</b>		<b>109</b>	<b>30</b>	<b>28%</b>
<b>Total: Pacific Islanders</b>		<b>41</b>	<b>11</b>	<b>27%</b>
<b>Overall Total</b>		<b>325</b>	<b>69</b>	<b>21%</b>

# Key Informant Interviews: Participant Demographics

Interview ID	Interview Date	Ethnic or Community Group (relationship)	Gender	Age Group	Fishes?	Fishes for Resident Fish?	Fishes for Salmon?	Consumes Resident Fish?
E1.1	10/2/2015	P1: African American	Male	31-60	✓		✓	only salmon
E2.2	10/8/2015	P1: African American (husband)	Male	61+	✓		✓	✓
		P2: Filipino (wife)	Female	31-60	✓	✓	✓	✓
K1.3	9/25/2015	P1: Cambodian (friend)	Male	31-60	✓	✓	✓	✓
		P2: Cambodian (friend)	Male	61+	✓	✓	✓	✓
		P3: Cambodian (friend)	Male	31-60	✓	✓	✓	✓
K2.2	12/13/2015	P1: Cambodian (friend)	Male	31-60	✓	✓ (once)	✓	✓
		P2: Cambodian (friend)	Female	31-60				✓ (once)
ME1.5	11/2/2015	P1: Mien (daughter)	Female	18-30				only salmon
		P2: Mien (wife)	Female	61+				✓
		P3: Mien (husband)	Male	61+	✓	✓	✓	✓
		P4: Mien (daughter)	Female	31-60				✓
		P5: Mien (daughter)	Female	31-60	✓	✓	unclear	✓
ME1.4	11/9/2015	P1: Mien (wife)	Female	61+	✓	✓	✓	✓
		P2: Mien (husband)	Male	61+	✓	✓	✓	✓
		P3: Mien (other family)	Male	18-30	✓	✓	✓	✓
		P4: Mien (daughter)	Female	18-30				✓
S1.1	10/23/2015	P1: Latino	Female	31-60	✓	✓	✓	✓
V1.1	9/22/2015	P1: Vietnamese	Male	61+	✓	✓	✓	✓
V2.1	12/9/2015	P1: Vietnamese	Female	31-60	✓	✓	✓	✓
V3.1	12/9/2015	P1: Vietnamese	Female	31-60				✓
V4.1	12/9/2015	P1: Vietnamese	Female	61+	✓	✓	✓	✓