Characterizing the Juvenile Fish Community in Large Glacial Rivers in Alaska

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Picture courtesy of Todd Paris - UAF

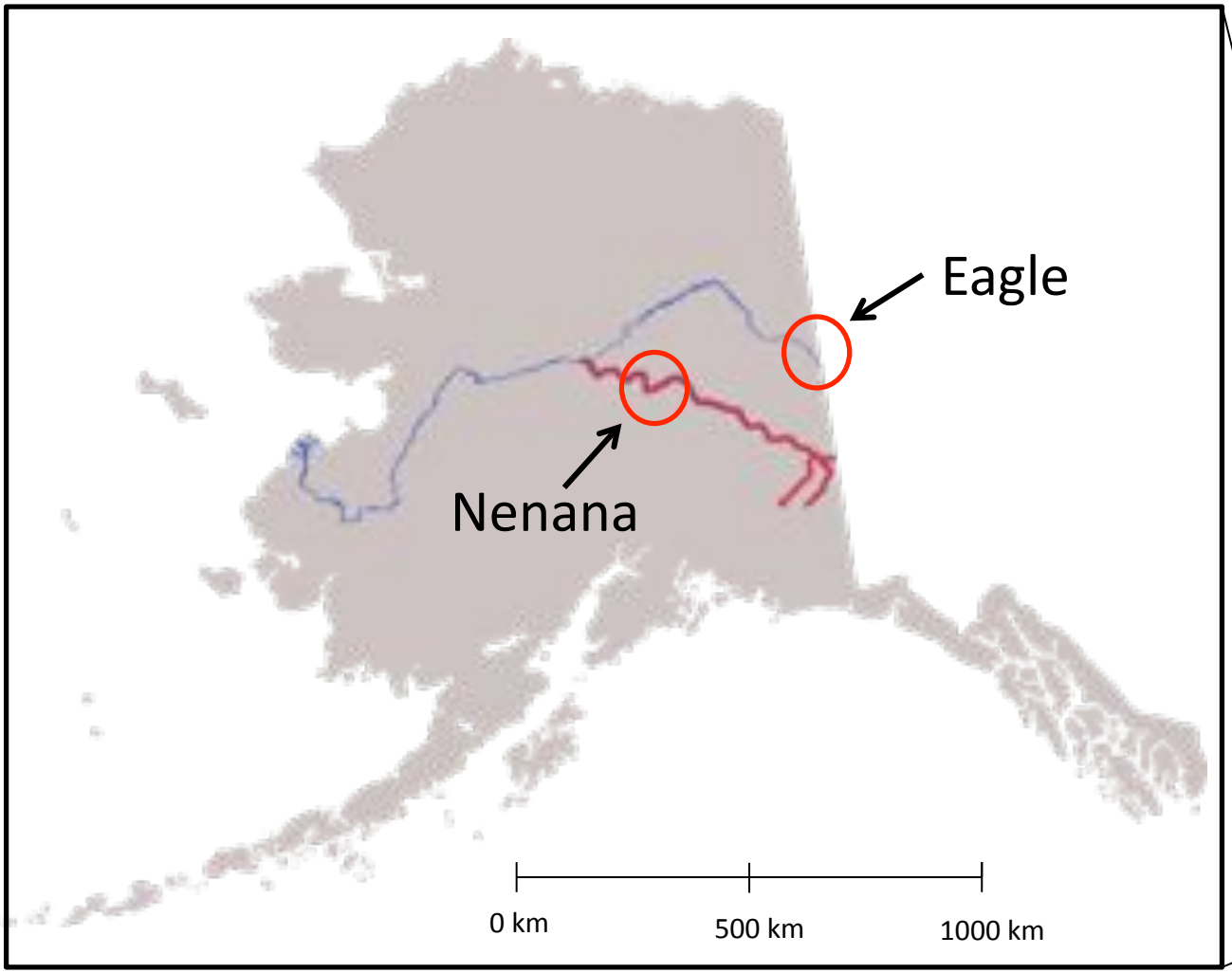
Background

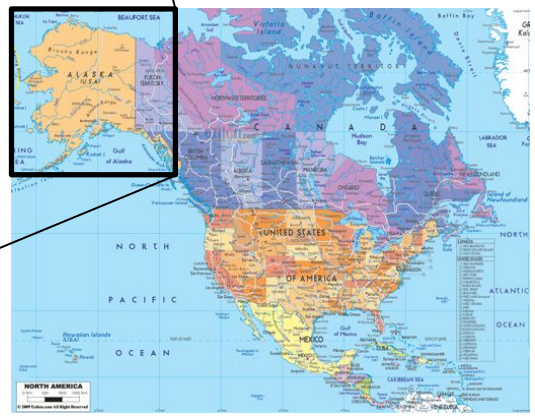
- Possible juvenile fish using river thalweg
- Potential overlap in time and space of hydrokinetic devices and juvenile fish migration
- Necessary to understand river channel use
  - Comparative index

Objectives

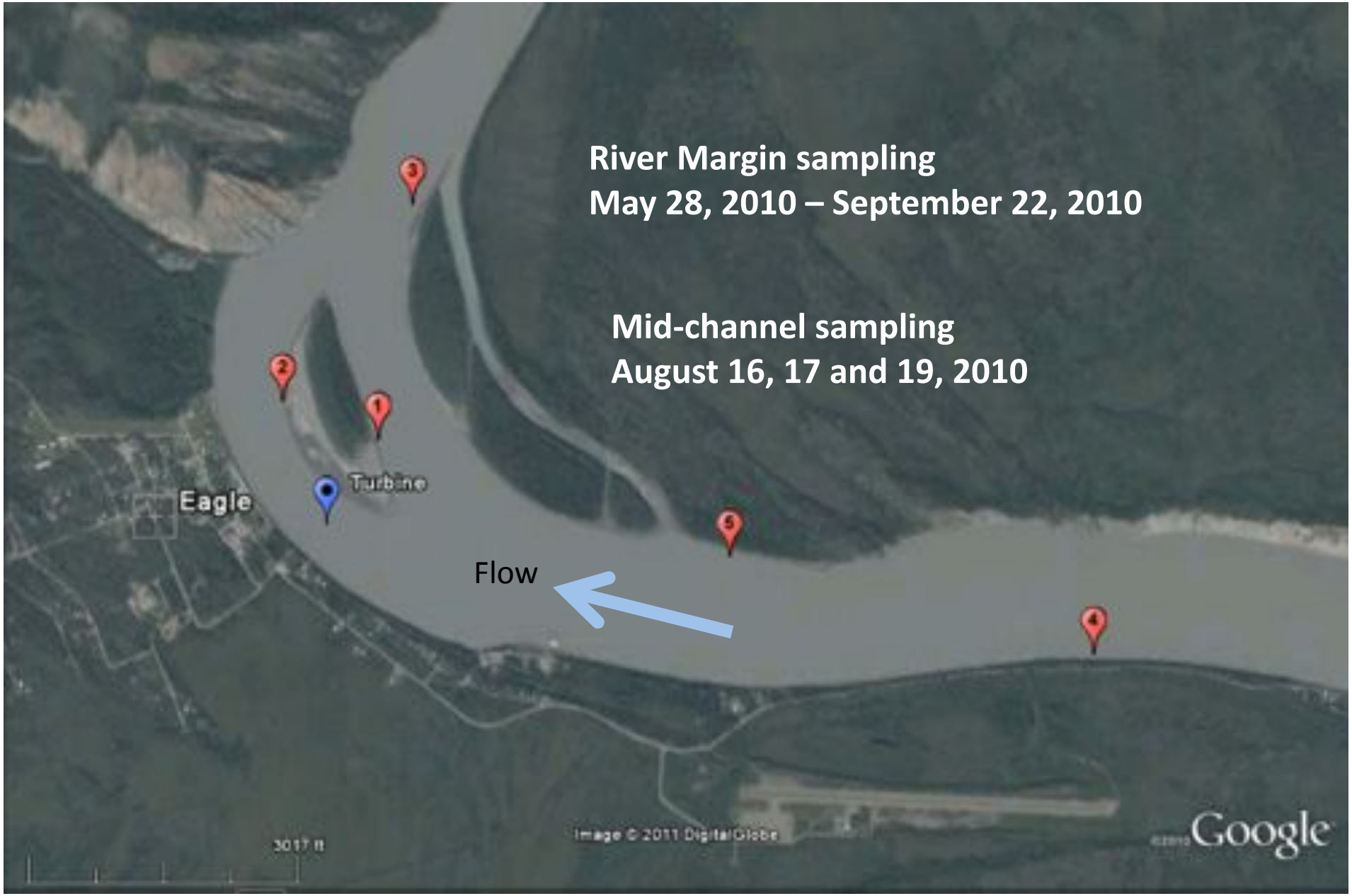
1. Characterize the juvenile fish community, including species composition, age and relative abundance, in the mainstem of the Yukon and Tanana rivers
2. Characterize the spatial (margin vs. mid-channel) and temporal (seasonal) patterns of the downstream juvenile fish migration

Yukon River 2010
Tanana River 2011





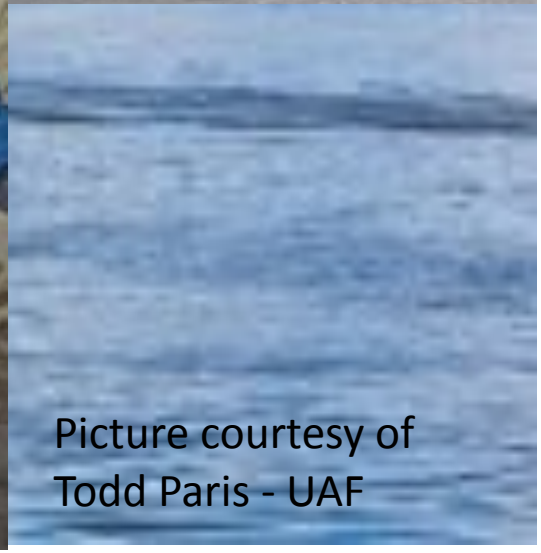
Yukon River Sampling Sites 2010



Tanana River Sampling Sites 2011

River Margin Methods

Picture courtesy of Todd Paris - UAF



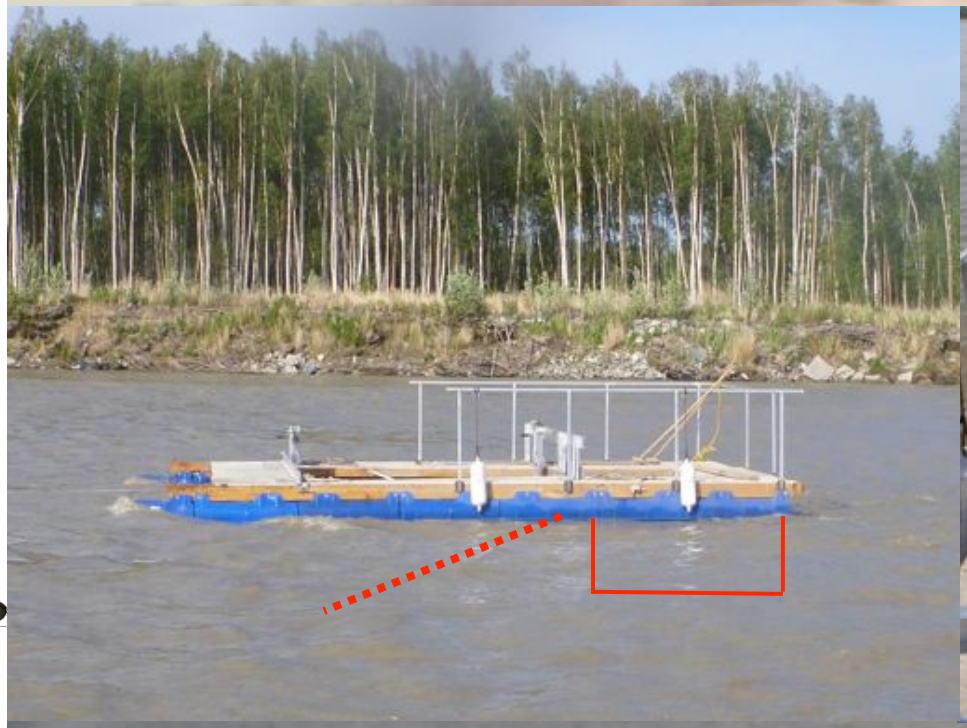
Picture courtesy of Todd Paris - UAF

- **Fyke nets**
  - **1 hour Yukon River**
  - **30 min Tanana River**

Yukon River Mid-Channel Methods

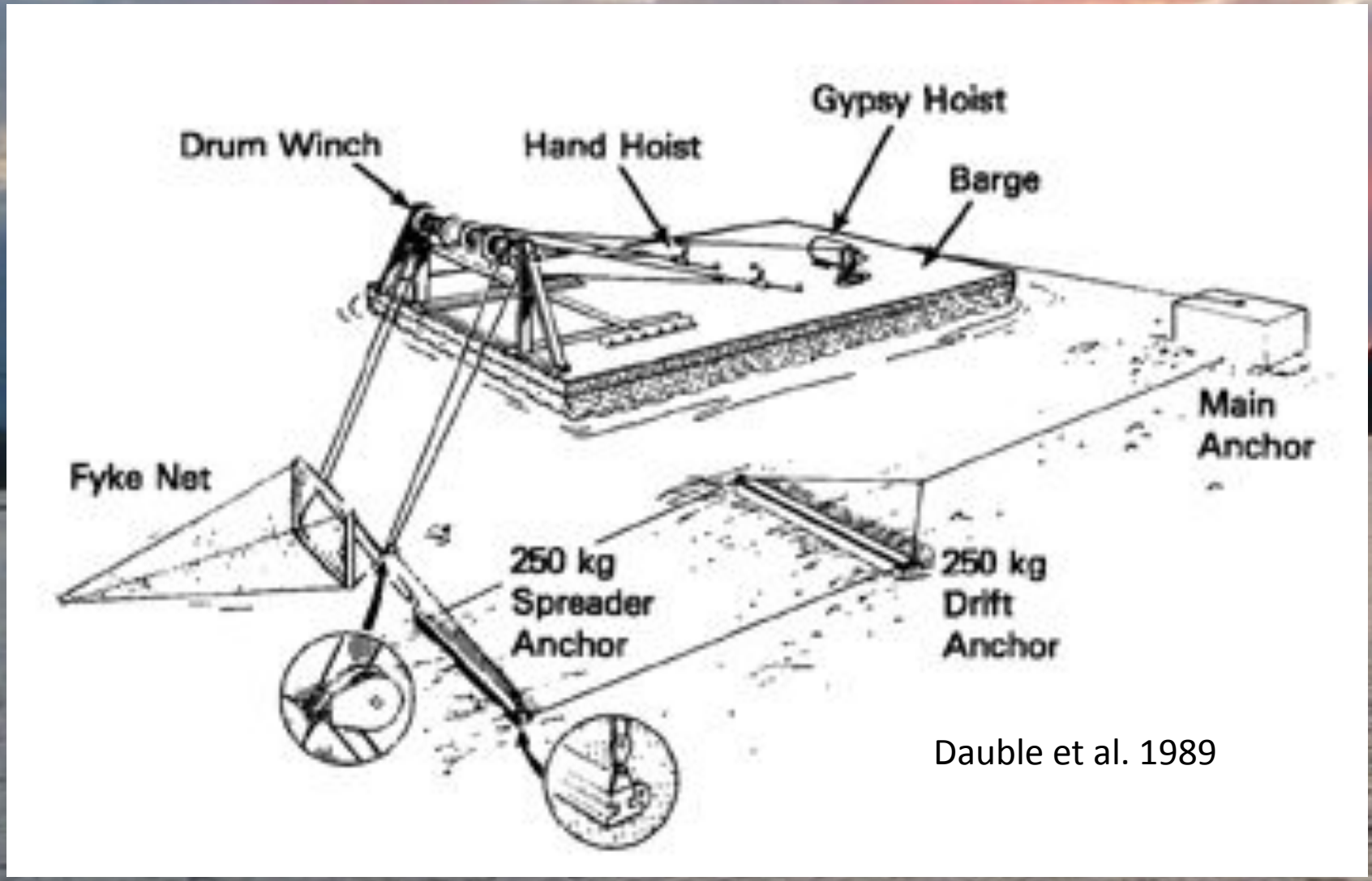
- **Frame Trawl (20 minutes)**
  - **Top water column**

Tanana River Mid-Channel Methods



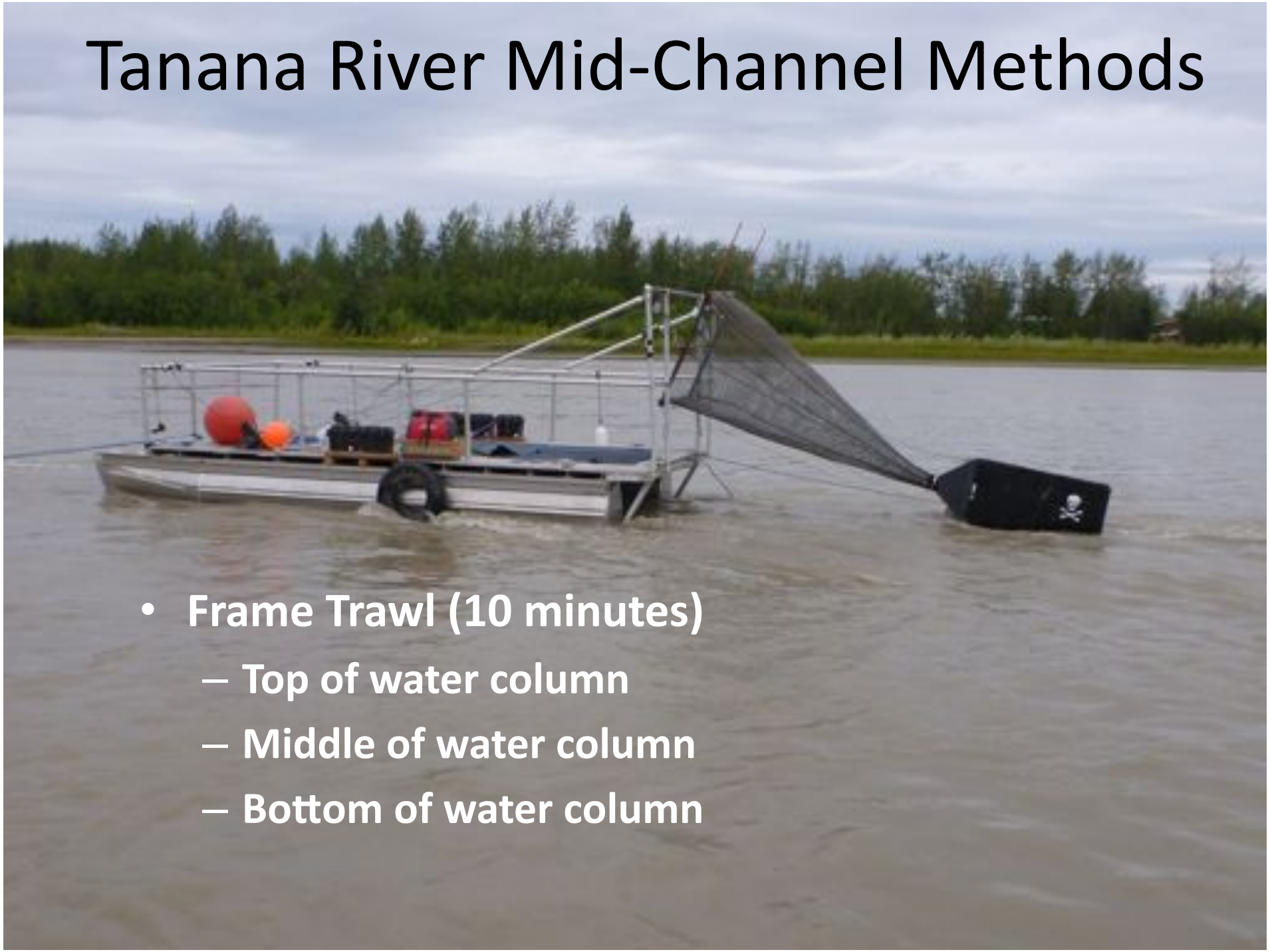
- **Incline Plane Trap (1 hour)**
  - **Top of water column**

Tanana River Mid-Channel Methods



Dauble et al. 1989

Tanana River Mid-Channel Methods



- **Frame Trawl (10 minutes)**
  - **Top of water column**
  - **Middle of water column**
  - **Bottom of water column**

Methods

Picture courtesy of Todd Paris – UAF

Picture courtesy of Todd Paris – UAF

- **Captured fish**
  - **Identified to lowest taxonomic level possible**
  - **Measured for fork length**
  - **Released alive**

Picture courtesy of Todd Paris – UAF

Data Analysis

- Counted fish
- Converted to CPUE (# fish/m^3)
  - Square root
    - Down-weight large peaks
    - Show smaller peaks
- Examine CPUE vs. location and time
- Convert to proportions
  - Comparisons between sampling gear

Yukon River 2010 Margin Catches

- Captured 6,312 fishes
- 499 total fyke net sets

- Longnose Sucker - 2,523
- Arctic Grayling - 1,932
- Whitefish spp. - 1,167
- Chum salmon - 336
- Chinook salmon - 131
- Lake Chub - 90
- Lamprey - 77
- Burbot - 28
- Inconnu - 23
- Slimy sculpin - 5

Yukon River 2010 Mid-Channel Surface Catches

Tanana River 2011 Margin Catches

- Captured 4,136 fishes
- 384 total fyke net sets

- Whitefish spp. - 1,589
- Longnose sucker - 1,000
- Chum salmon - 775
- Lake chub - 559
- Arctic lamprey - 131
- Arctic grayling - 31
- Chinook /Coho salmon - 22
- Burbot - 22
- Slimy sculpin - 4
- Alaska brook lamprey - 2
- Northern pike - 1

Tanana River 2011 Mid-Channel Surface Catches

- Captured 583 fishes
- 73 total incline plane trap sets

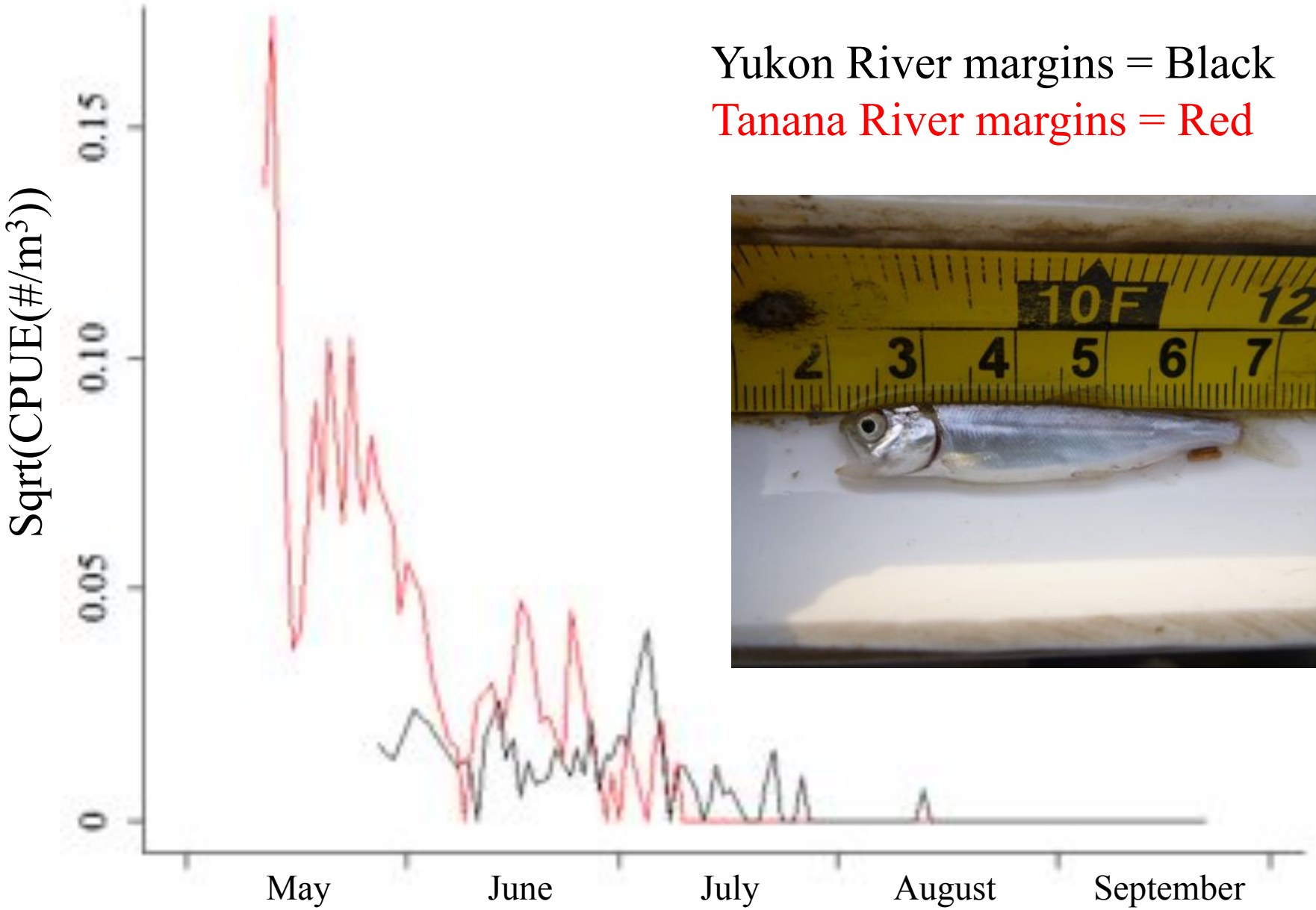
- Chinook/Coho salmon - 330
- Chum salmon - 239
- Whitefish spp. - 10
- Arctic Lamprey - 3
- Burbot - 1

Tanana River 2011 Mid-Channel Bottom Catches

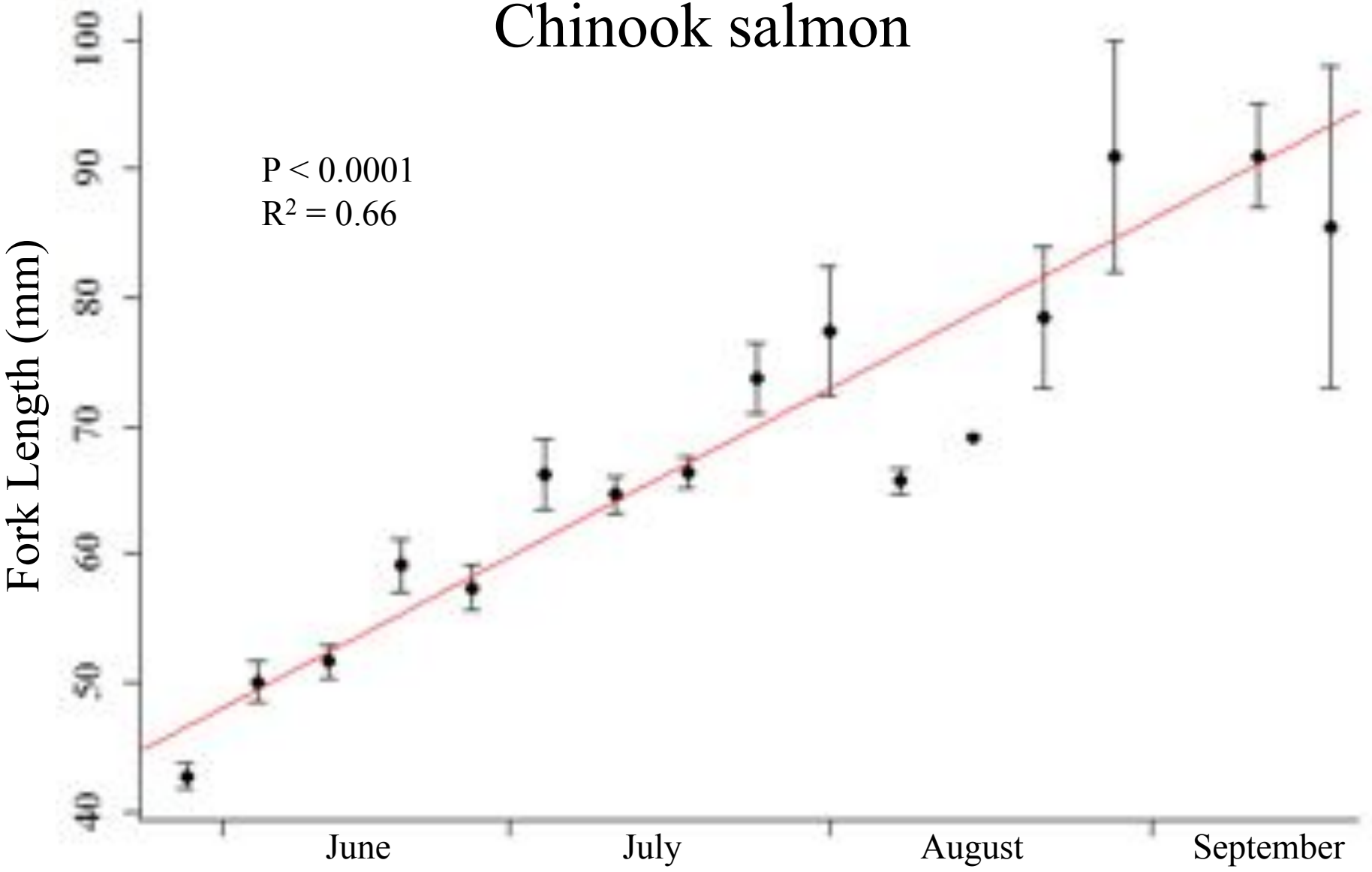
Chum Salmon

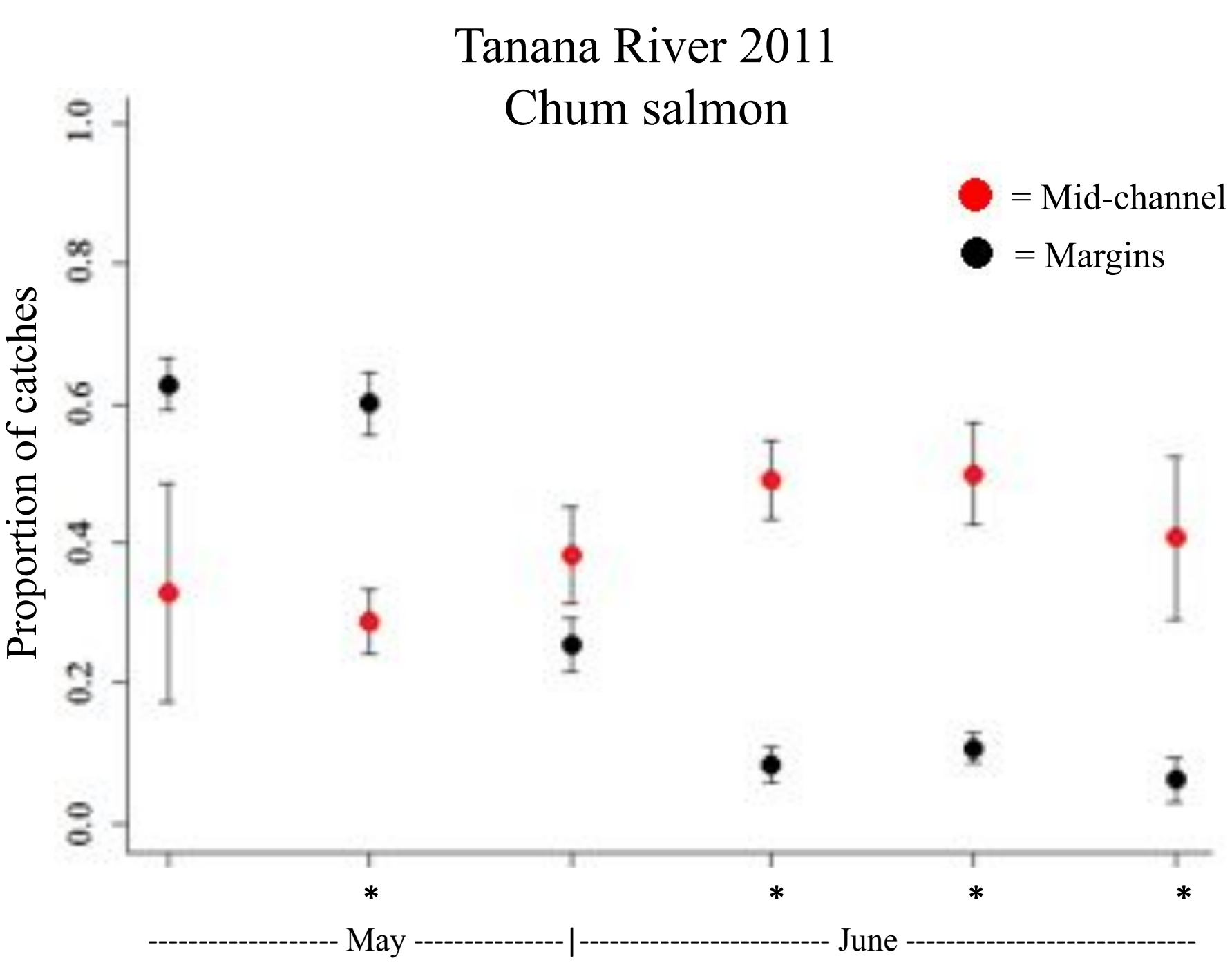
Yukon River margins = Black

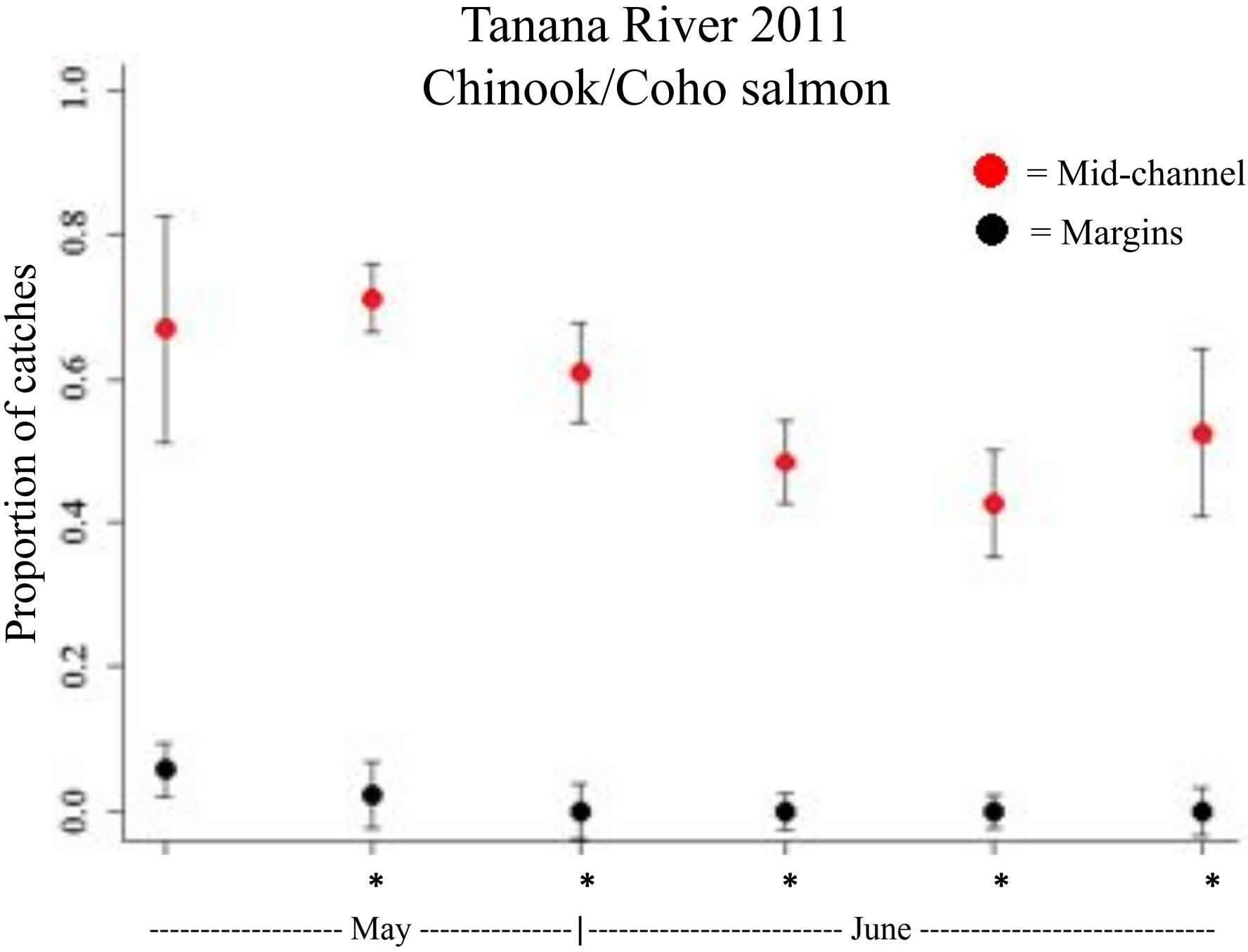
Tanana River margins = Red



Yukon River 2010
Chinook salmon




Tanana River 2011
Chum salmon
= Mid-channel
= Margins
Proportion of catches
0.0
0.2
0.4
0.6
0.8
1.0
*
*
*
*
May
June


Tanana River 2011
Chinook/Coho salmon
= Mid-channel
= Margins
Proportion of catches
0.0
0.2
0.4
0.6
0.8
1.0
*
*
*
*
*
May
June

Summary/Discussion

- First documented mid-channel sampling in large glacially influenced Alaskan Rivers
  - Logistical problems
  - Development of methodology
- Abundance
  - Yukon River
    - Longnose suckers, Arctic grayling, whitefish spp. (89%)
  - Tanana River
    - Whitefish spp., chum salmon, longnose suckers, lake chubs (88%)
- Age
  - Chum salmon – Age 0
  - Chinook salmon – Age 0 (Yukon River)
  - Chinook/Coho Salmon – Age 1+ (Tanana)
  - Whitefishes/Arctic grayling – Age 0
  - Other species – mostly juveniles

Summary/Discussion

- Timing
  - May – chum salmon, Chinook salmon, coho salmon
  - June – chum salmon, Chinook Salmon, coho salmon, longnose suckers, whitefish spp.
  - July – longnose suckers
  - August – longnose suckers, Arctic grayling

- Fish captured in margins

Longnose sucker, Arctic grayling, Whitefish spp.
Chum salmon, Lake Chub, Chinook salmon
Coho salmon, Burbot
Inconnu, Slimy sculpin, Northern pike
Arctic lamprey, Alaska brook lamprey

Summary/Discussion

- Timing
  - May – chum salmon, Chinook salmon, coho salmon
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- Fish captured in margins

Longnose sucker	Arctic grayling	Whitefish spp.
Chum salmon	Lake Chub	Chinook salmon
Coho salmon	Burbot	
Inconnu	Slimy sculpin	Northern pike
Arctic lamprey	Alaska brook lamprey	

- Fish captured in middle

Chinook salmon	Coho salmon	Chum salmon
Whitefish spp.	Arctic lamprey	Burbot

Implications

- Valuable baseline information
- Chinook salmon, coho salmon, chum salmon
  - May have the largest overlap in time and space with surface turbine May – June

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Thank You!
Any Questions???