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SUSITNA-WATANA
HYDROELECTRIC PROJECT

Eulachon Distribution and Abundance in the Susitna River

Technical Work Group Meeting
3nd Quarter 2013

September 23, 2013

RSP 9.16 Eulachon Study

Run Timing and Duration

- Fixed-station sonar (DIDSON)
- Dipnets

Identify and Map Spawning Sites

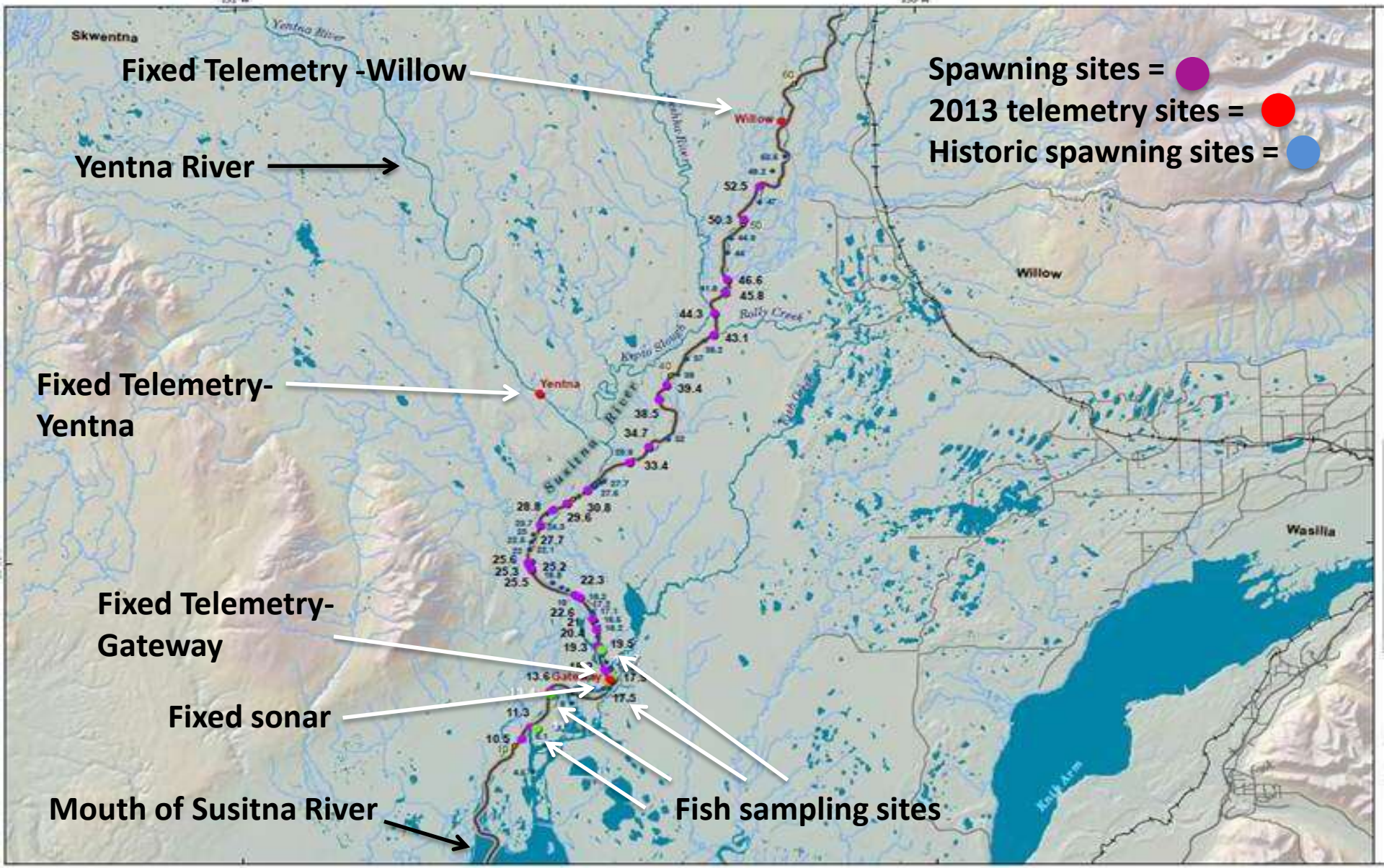
- Radio telemetry
- Mobile sonar and visual surveys

Spawning Habitat Characteristics

- Sonar (side scan) for substrate evaluation
- Physical characteristics

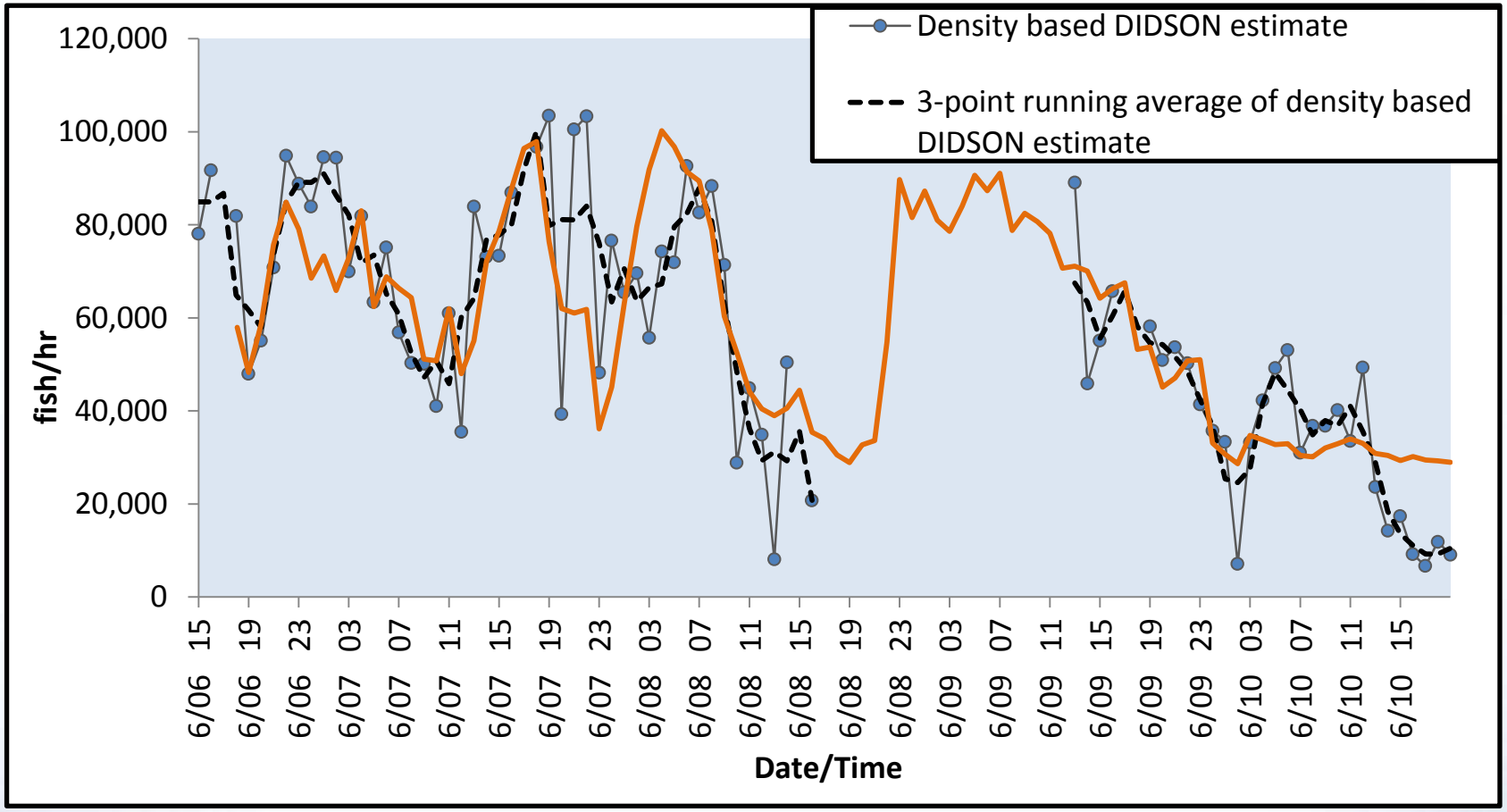
Population Characteristics

- Baseline characteristics
- Marine fish observations


Fixed Telemetry -Willow
Yentna River
Fixed Telemetry- Yentna
Fixed Telemetry- Gateway
Fixed sonar
Mouth of Susitna River
Fish sampling sites
Spawning sites =
2013 telemetry sites =
Historic spawning sites =
Skwentna
Willow
Yentna
Wasilla
Susitna River
Kashwitna River
Rolly Creek
Kroto Slough
Knik Arm
52.5
50.3
46.6
45.8
44.3
43.1
39.4
38.5
34.7
33.4
30.8
29.6
28.8
27.7
25.6
25.3
25.5
25.2
22.3
22.6
20.4
19.3
19.5
13.6
17.5
11.3
10.5

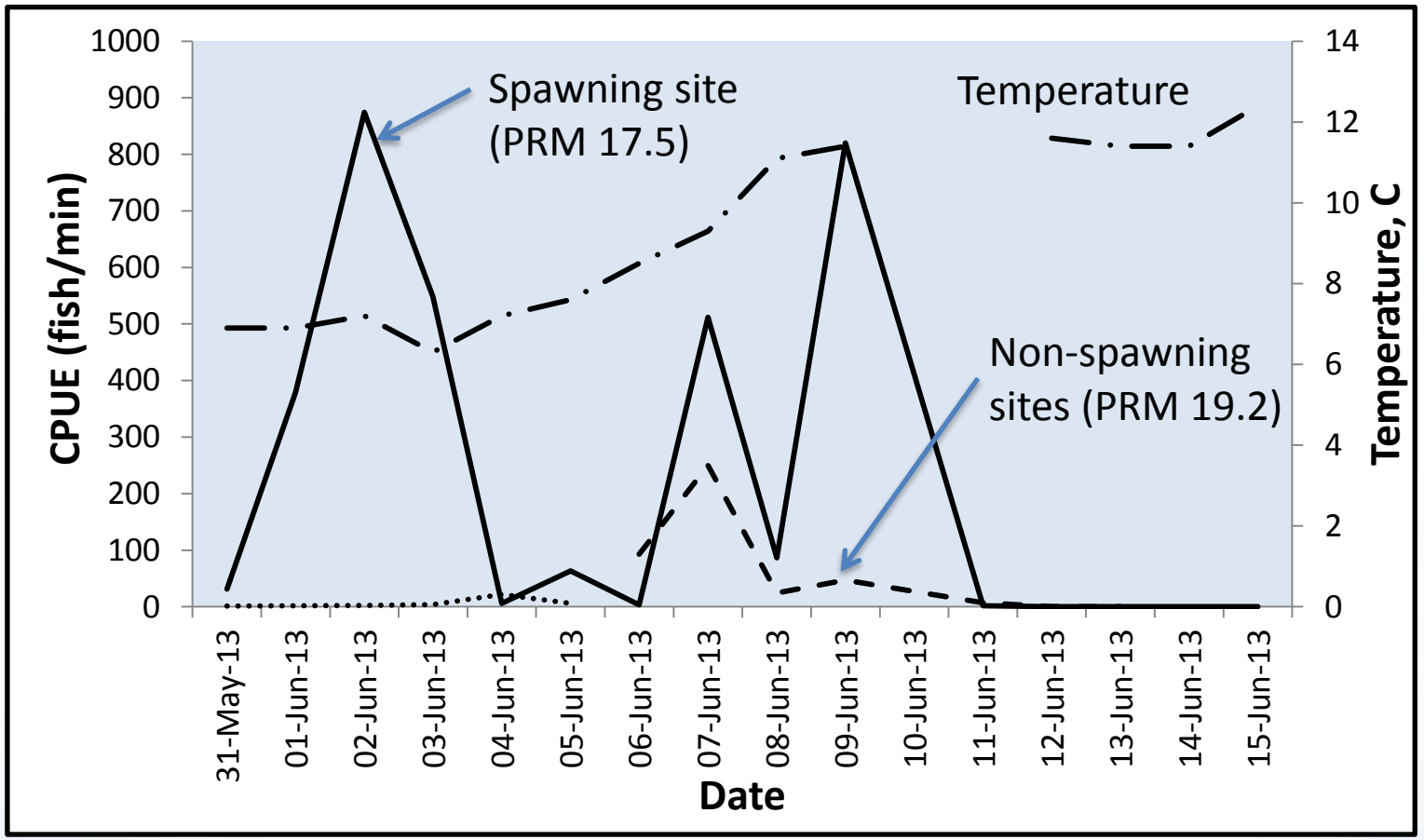
Run Timing and Duration

Passage Estimates Using Sonar



Run Timing and Duration

CPUE from Dipnets



Identify and Map Spawning sites

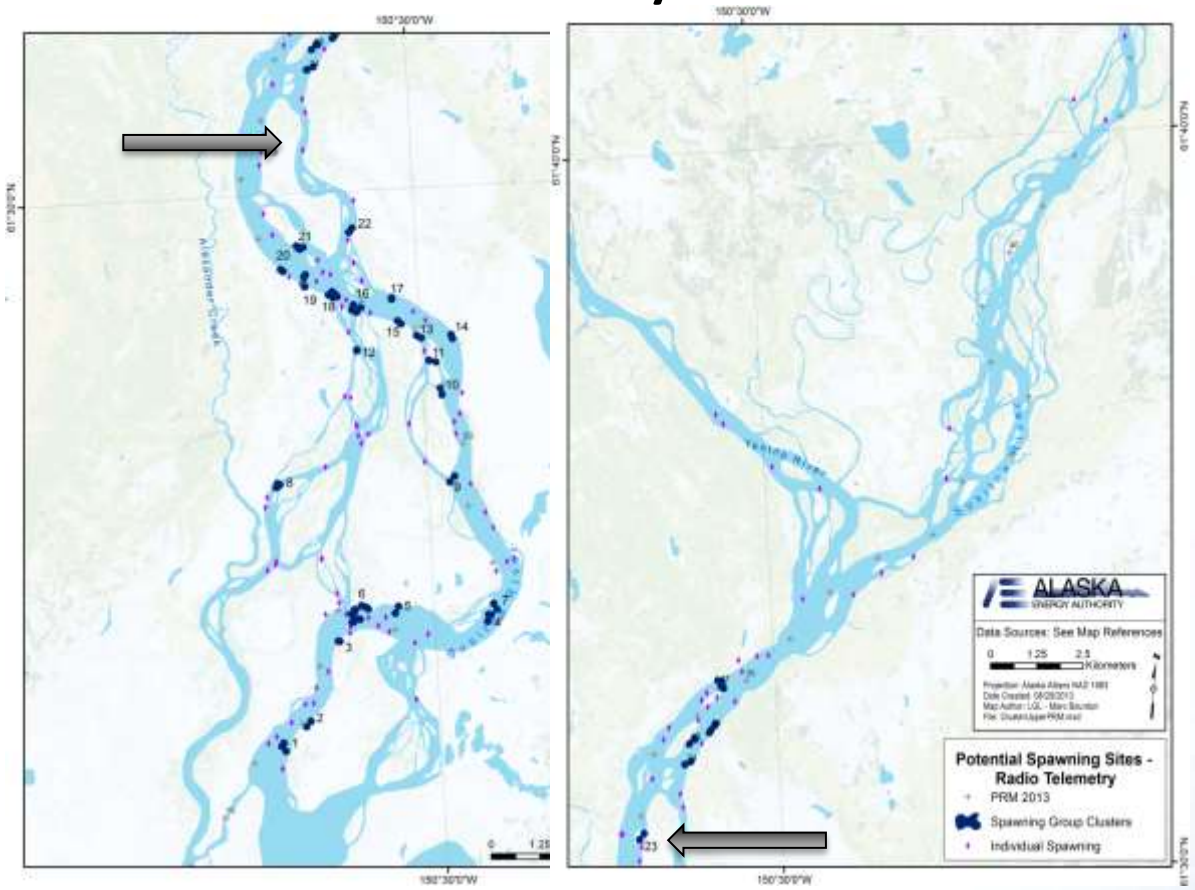
Radio Telemetry

- Hundreds of potential sites identified from radio telemetry
  - 28 confirmed by sonar and visual surveys
- Range of potential and confirmed spawning sites, PRM 10 to ~ PRM 50, was consistent between sonar and visual observations and with 1980s data.

Identify and Map Spawning sites

Radio Telemetry

- Postseason analysis to help guide inseason efforts in 2014
- Resulting subset of likeliest sites (individual fish and clusters)
- Unable to confirm as 2013 sites from post-field analysis

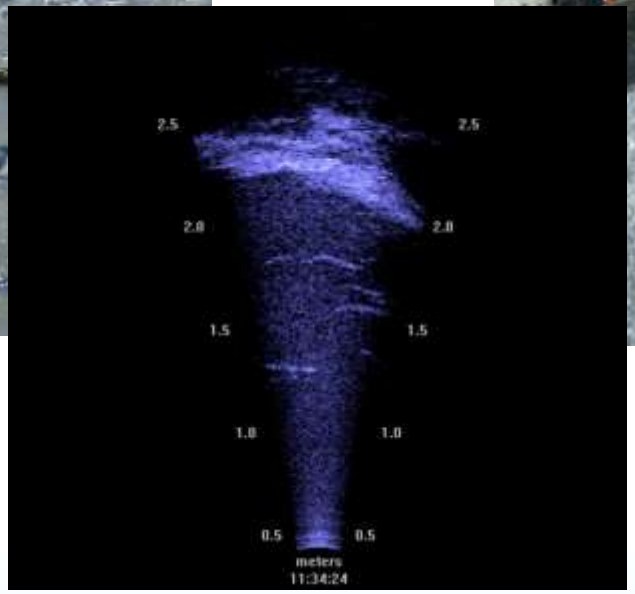


Identify and Map Spawning sites

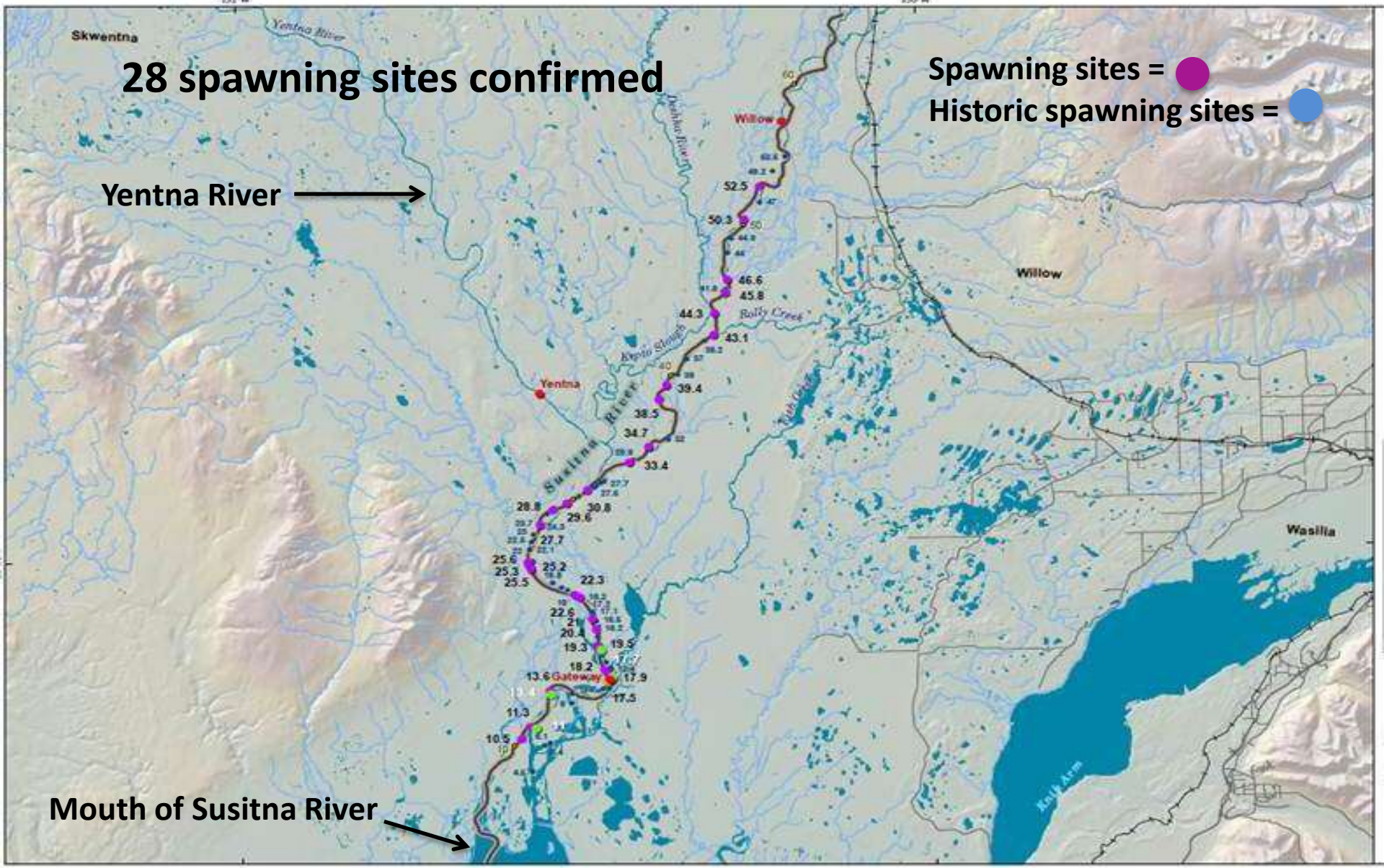
Mobile Sonar and Visual Surveys

Spawning eulachon

Eggs in the gravel



DIDSON video at spawning site



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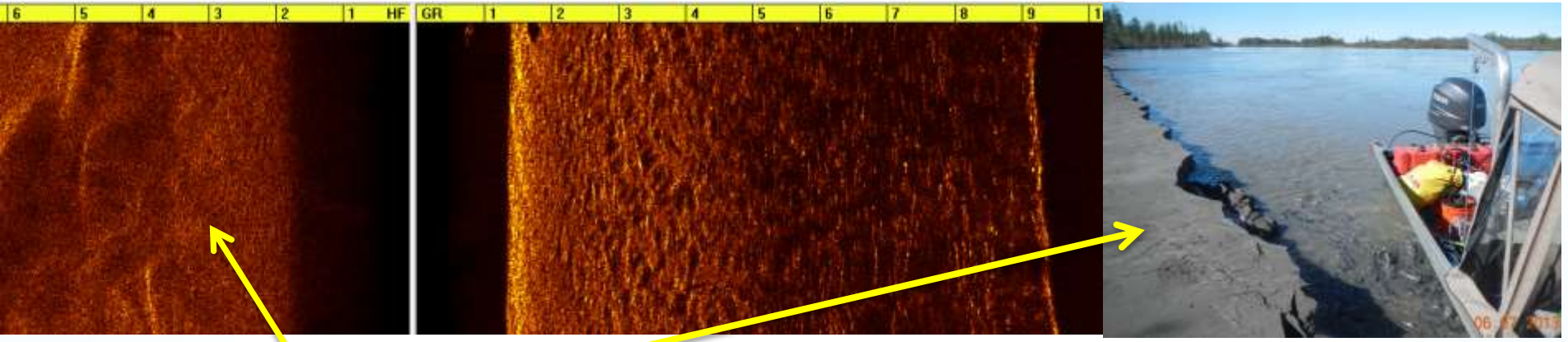
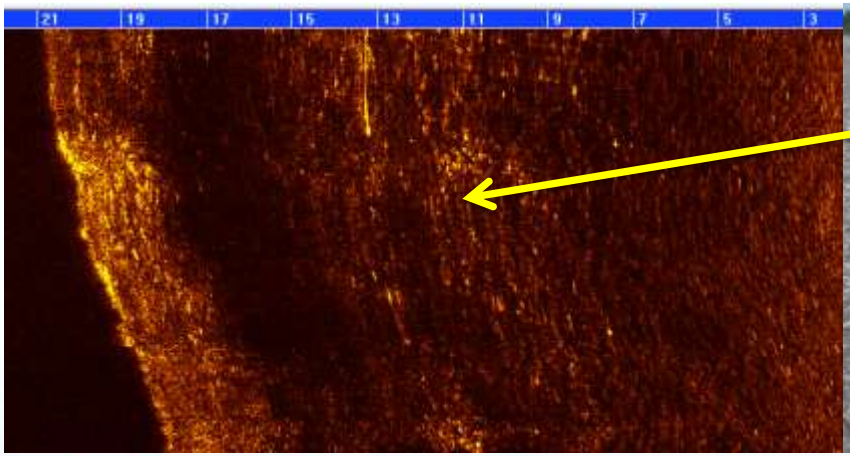
Spawning Habitat Characteristics

Sonar for Substrate Evaluation



Sand cut bank



Gravel bar

Spawning Habitat Characteristics

Physical Characteristics

				Substrate Classification	
Site ID	**Date**	**PRM**	**Mesohabitat**	**Acoustic Description**	**Visual Survey**
1	29-May	17.5	run	sand	100 % sand/silt
2	31-May	25.5	run	sand	100 % sand/silt
3	01-Jun	13.6	run	sand/silt	100 % sand/silt
4	01-Jun	25.3	shallow riffle	sand	100 % sand/silt
5	02-Jun	25.6	run	sand	100 % sand/silt
6	02-Jun	33.4	run	gravel bar, finer sediment over gravel	25% sand/silt, 75% mixed gravel
7	02-Jun	29.6	run	gravel and sand	100 % sand/silt
8	03-Jun	11.3	run	sand	100 % sand/silt
9	03-Jun	18.2	run	no side scan sample	100 % sand/silt
10	03-Jun	22.6	run	gravel and sand	25% sand/silt, 75% mixed gravel
11	04-Jun	17.9	run	no side scan sample	100 % sand/silt
12	05-Jun	19.5	run	sand	100 % sand/silt
13	05-Jun	20.4	run	sand	100 % sand/silt
14	05-Jun	21	shallow riffle	sand	100 % sand/silt

Spawning Habitat Characteristics

Physical Characteristics

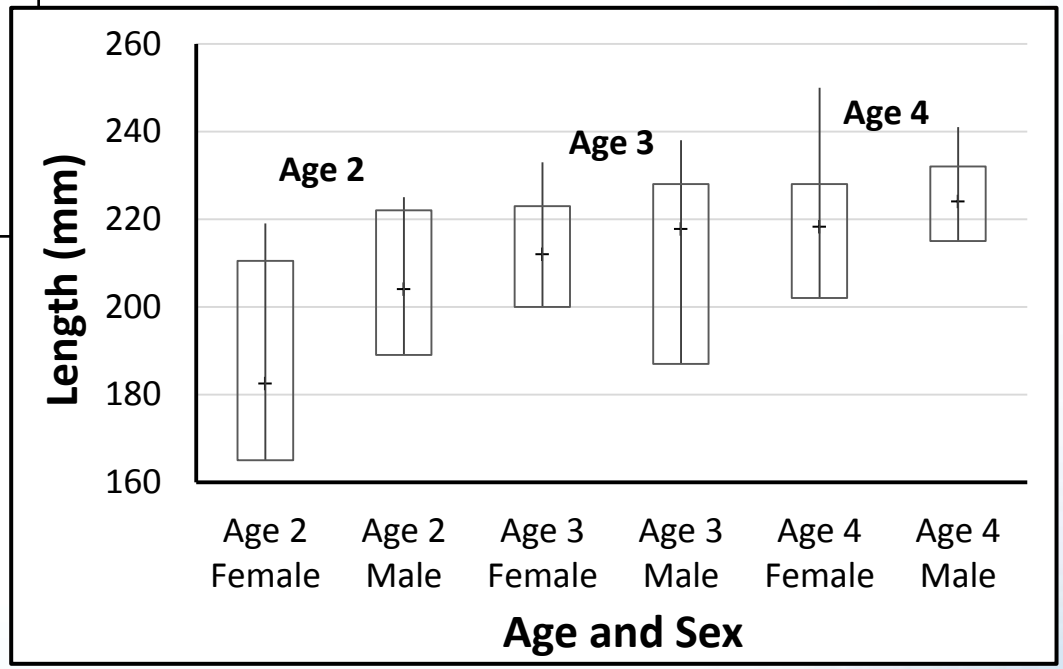
Water quality parameters at 28 spawning sites from PRM 10.5- 50.3

Water Quality Parameter	Min	Max	Range	Mean
DO (mg/l)	6.64	20.75	14.11	12.21
Conductivity (µscm)	41	90	49	63.14
Turbidity (NTU)	116	586	470	331.68
pH	5.87	7.59	1.72	6.7
Temperature (C°)	5.2	10.29	5.09	7.54
Depth (m)	0.15	1.5	1.35	0.42
Velocity (m/s)	0.05	0.72	0.67	0.48

Population Characteristics

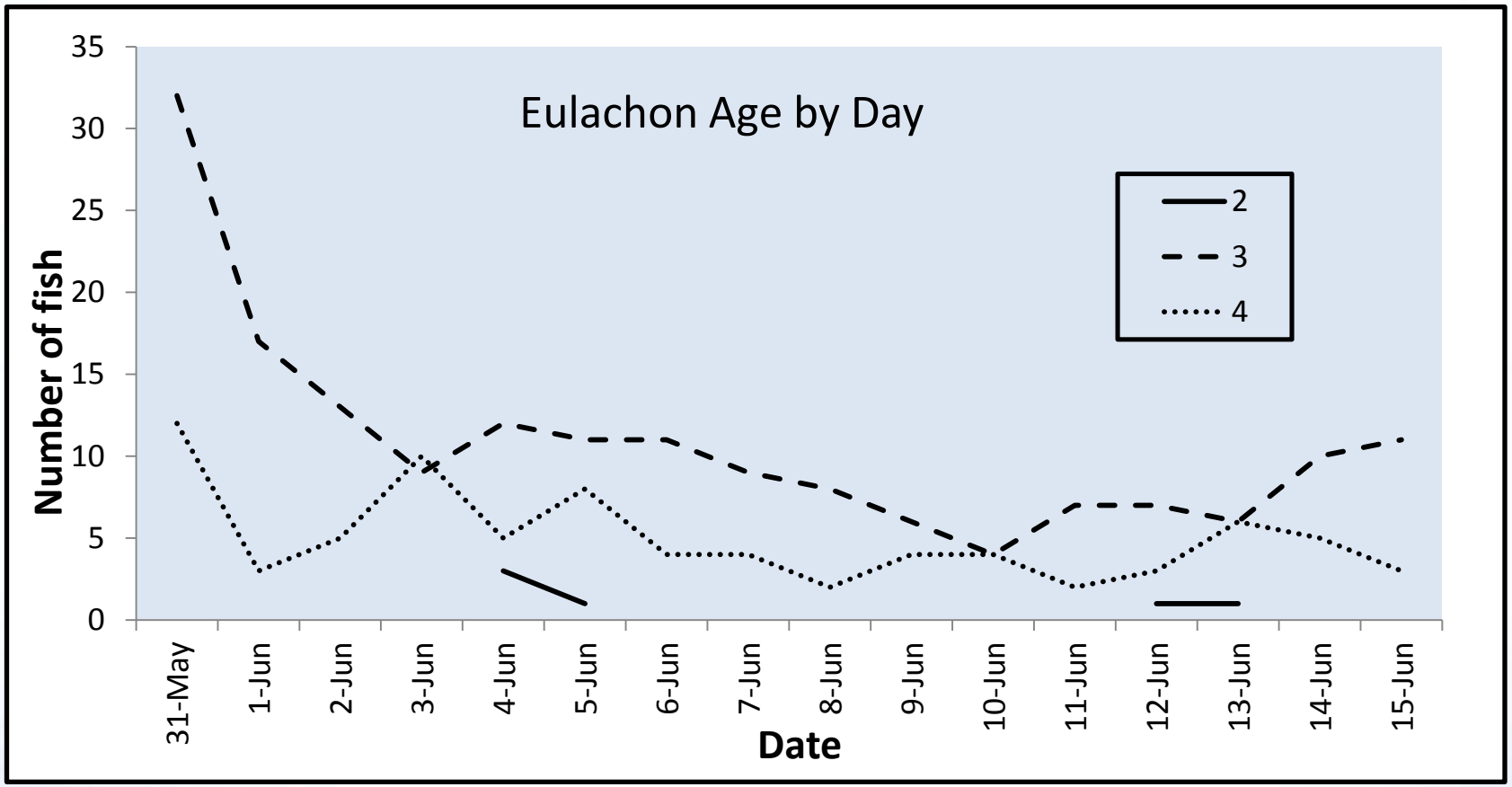
Baseline Characteristics

Sex	Number of fish	Percent
F	1,107	45
M	1,327	54
U	13	1
Total	2,447	100
Overall M:F	1.20	



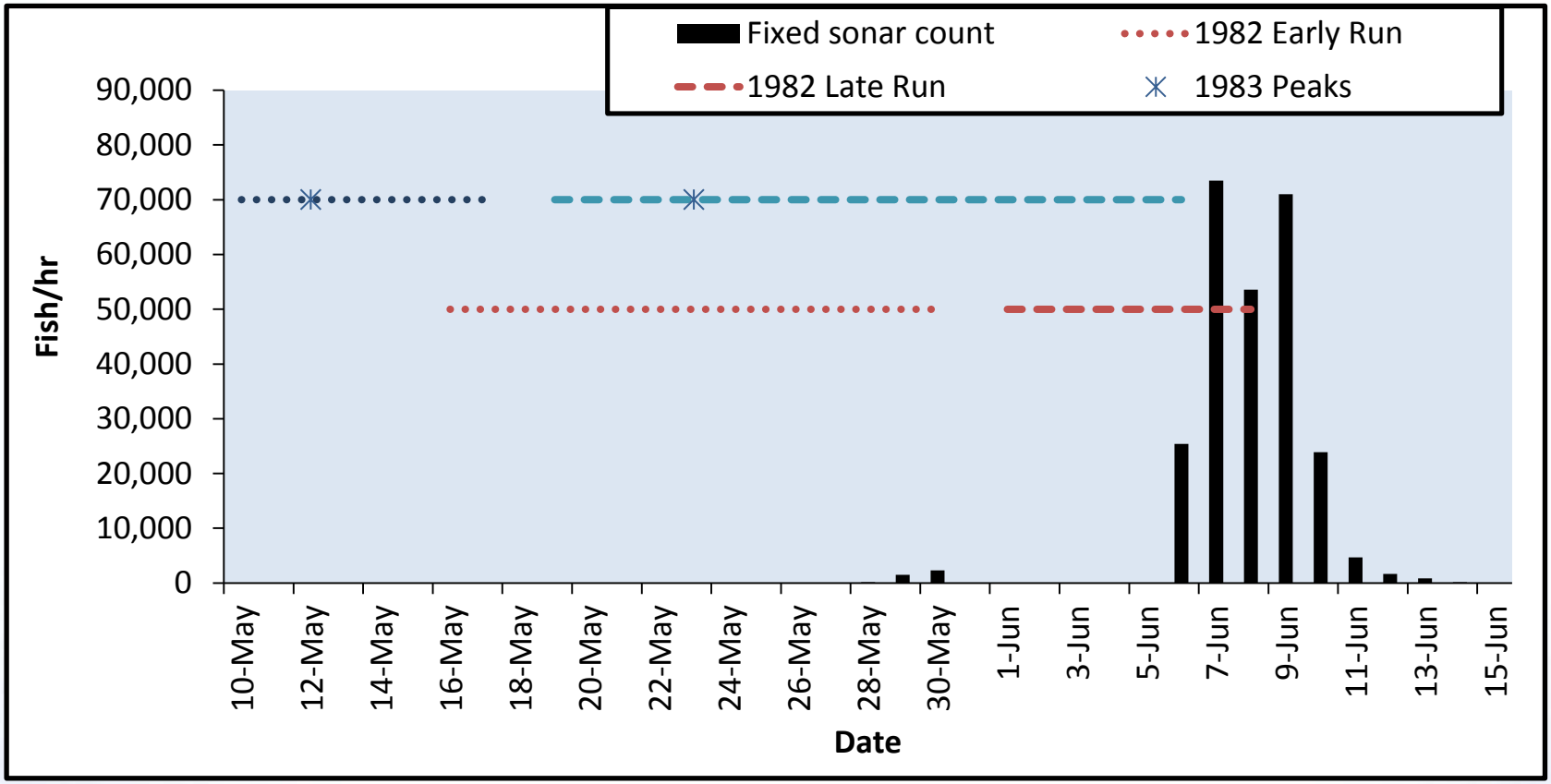
Population Characteristics

Baseline Characteristics



Population Characteristics

Baseline Characteristics



Eulachon Study

Variances from RSP

- Weir at fixed-station sonar removed due to concern of influencing spawning behavior (RSP 9.16.4.1.1).
- Water velocity was not needed to calculate passage rate therefore measurements not taken (RSP 9.16.4.1.3).
- 2 fish/minute dipnet catch was used to determine end of run, instead of 0 fish/day collected over 5 consecutive days. This rate was estimated as less than 0.25 % of catch at peak (RSP 9.16.4.1.1).
- Habitat characterization from boat only so used random sites as opposed to grid design at confirmed spawning sites (RSP 9.16.4.3.3).