Next four talks are related

Background and Context

2-Gates project

(1)Triggers for delta smelt migration
(2) Turbidity monitoring in the delta
(3) Linking Turbidity to Suspended Sediment
(4) Tidally correcting fisheries data

2-Gates Project asked the question:

Q?: Can we manage delta smelt distributions (and reduce smelt salvage at the pumps) by controlling the turbidity field?

Q1: Do increases in turbidity associated with the first flush trigger smelt migration?

Talk 1-Triggers for delta smelt migration

Q2: Can we use turbidity as a surrogate for managing delta smelt?

Talk 2 – Turbidity Monitoring in the Delta

Q3: Can we manage turbidity?

Talk 2 – Turbidity Monitoring in the Delta

Talk 3 - Modeling (Linking turbidity to suspended solids concentrations)

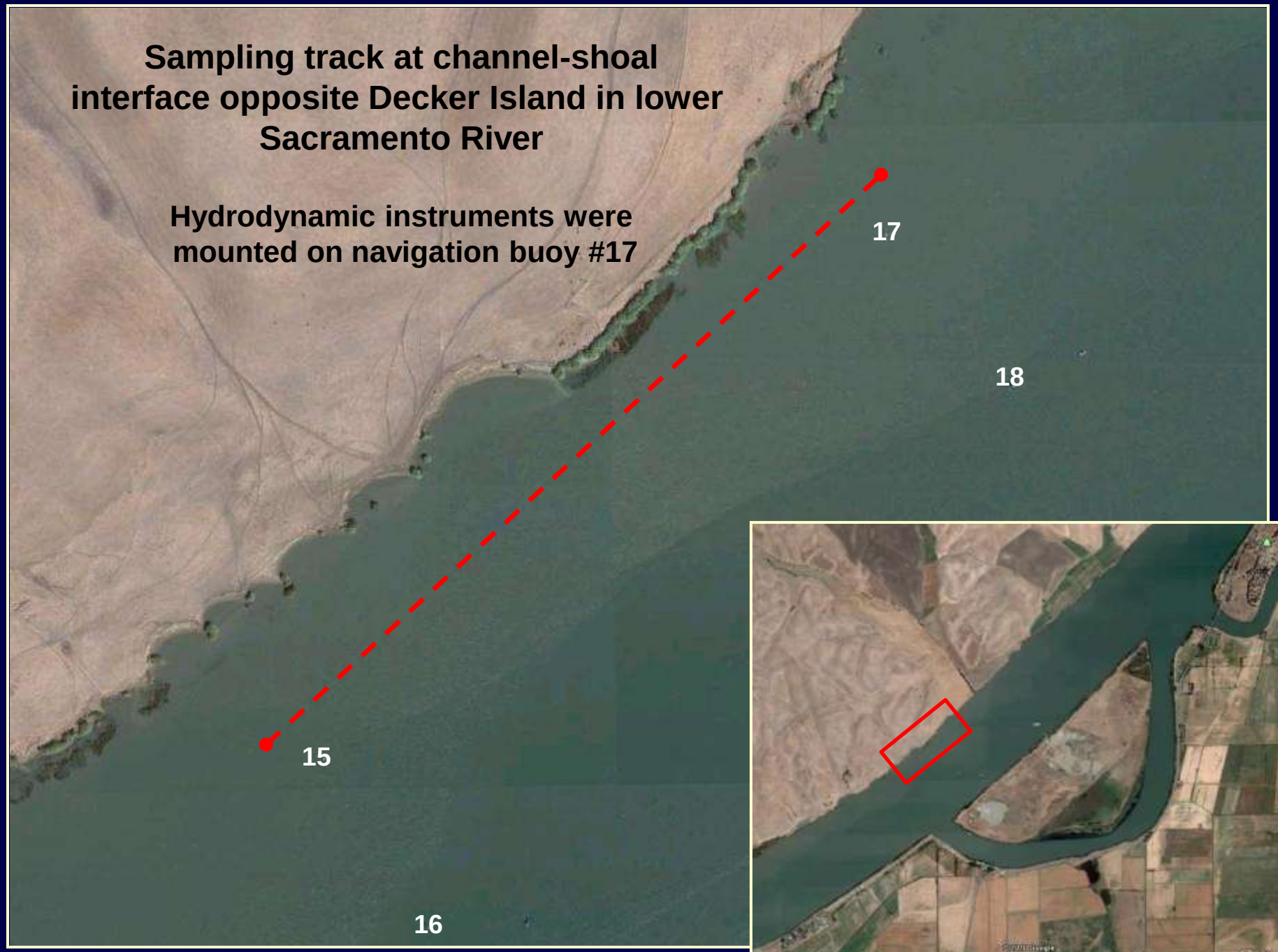
Q4: How do we interpret fisheries data in the context of a strongly tidally forced system like the Delta?

Talk 4 – Accounting for the tides in fisheries data

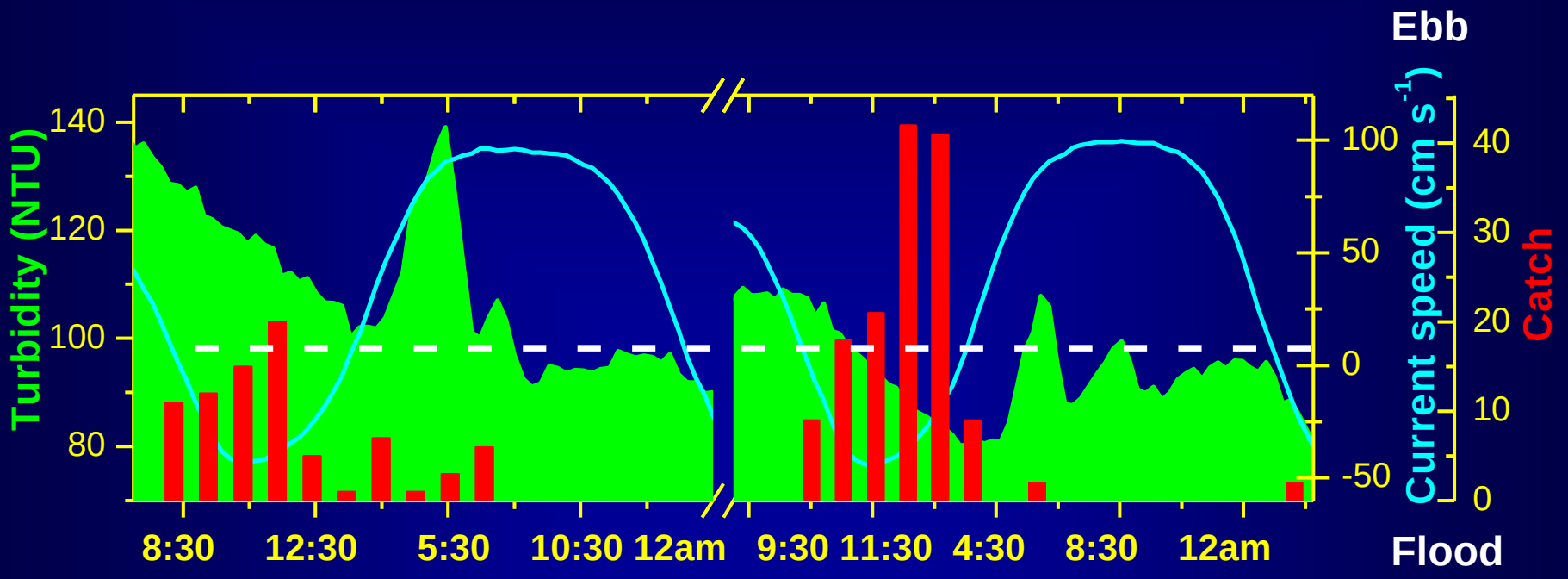
Should I Stay or Should I Go?
Tides, Turbidity, and Triggers for Delta Smelt Migration

Jon Burau, USGS
Bill Bennett, UCD
Julio Adib-Sami, CDFG

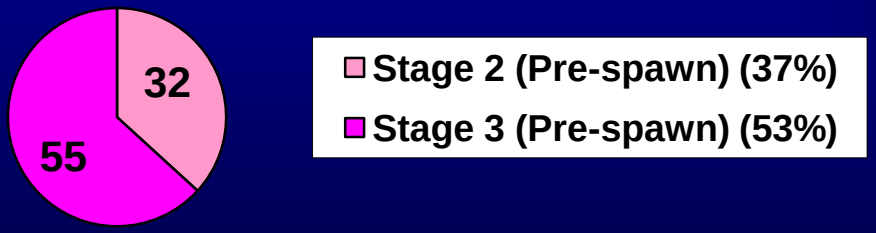
Special thanks to the captains and biologists of the Department of Fish and Game and USGS.


Sampling track at channel-shoal interface opposite Decker Island in lower Sacramento River
Hydrodynamic instruments were mounted on navigation buoy #17
17
18
15
16
Google

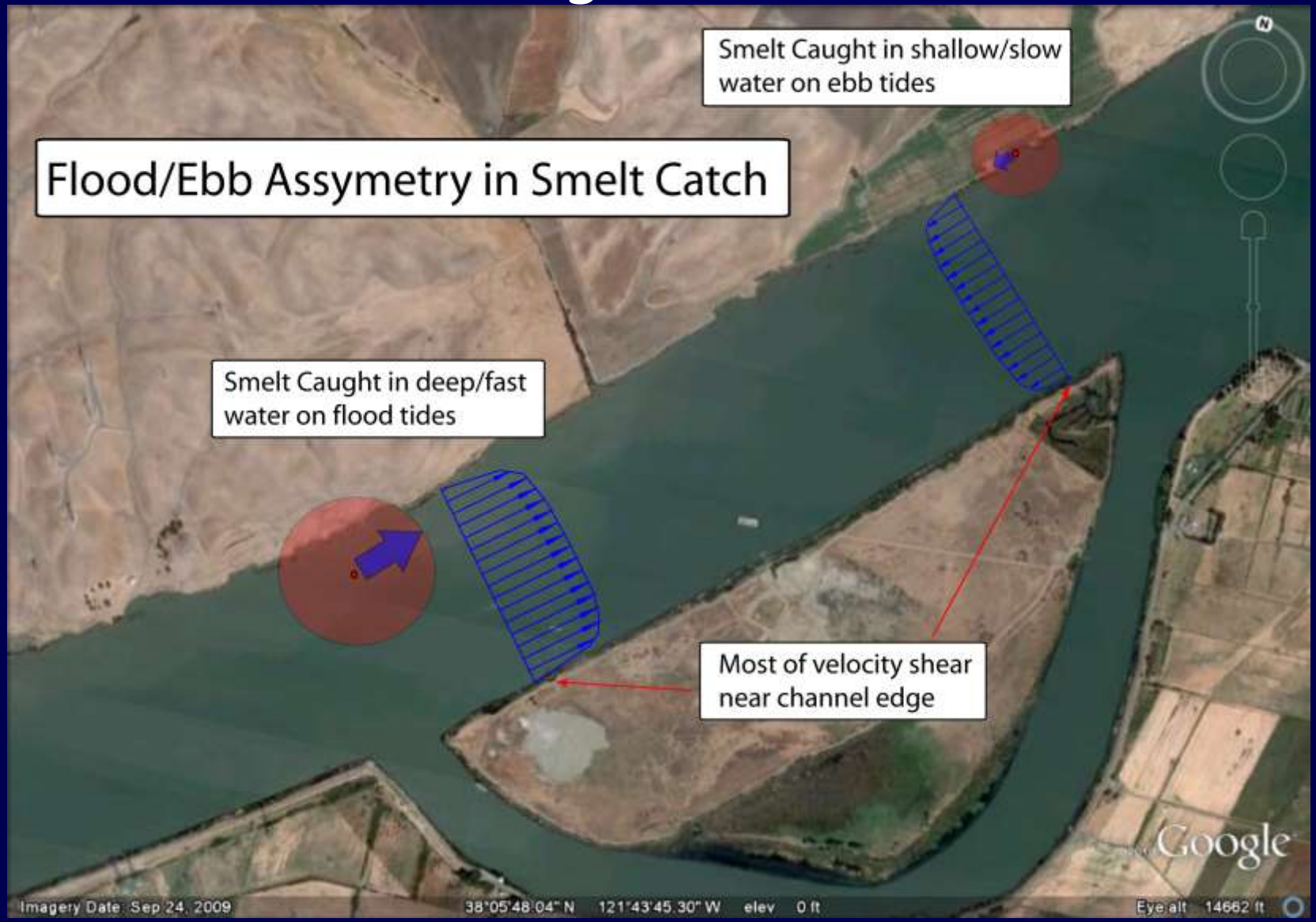
So, What Did We Catch?



Female Reproductive Stages

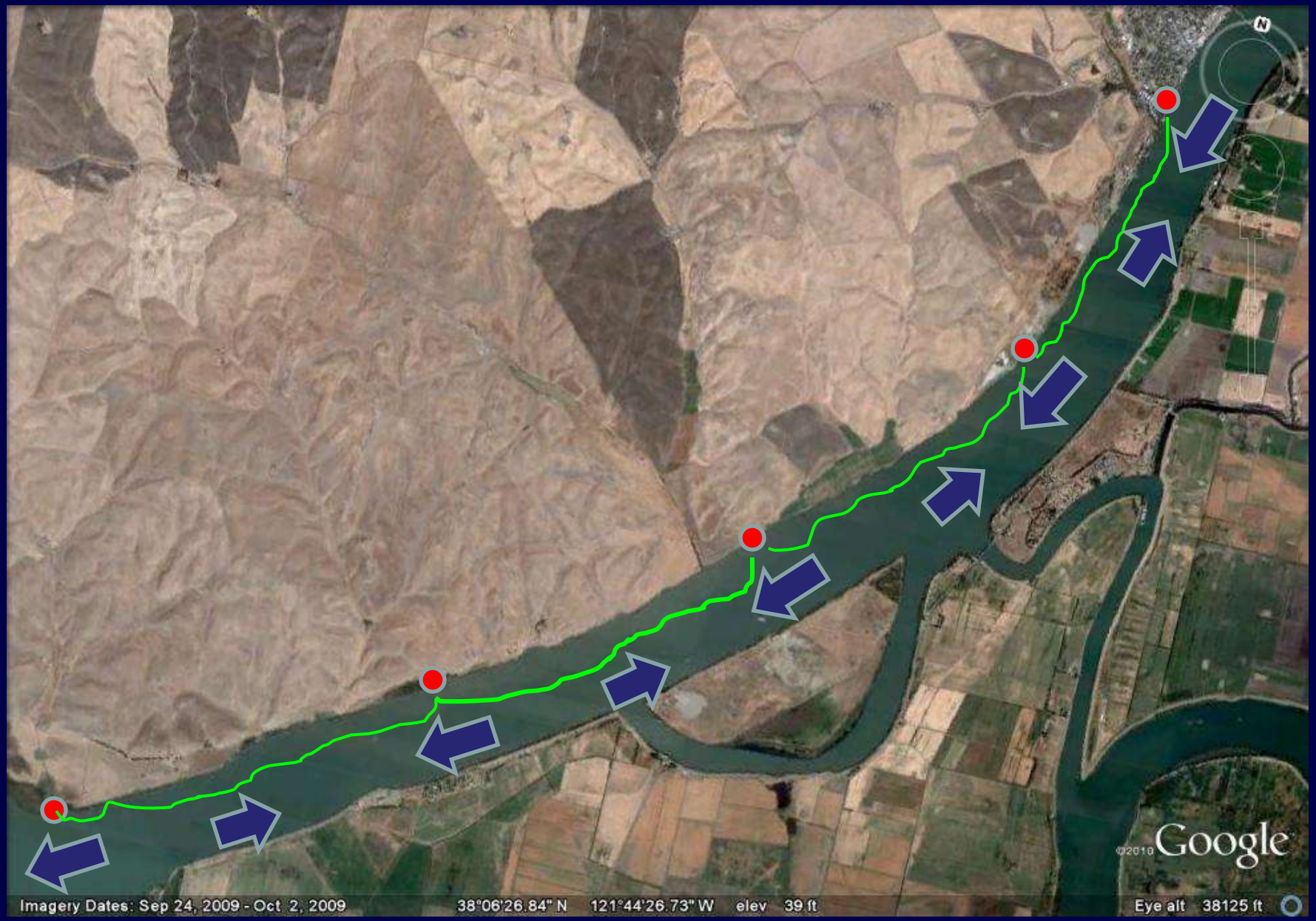


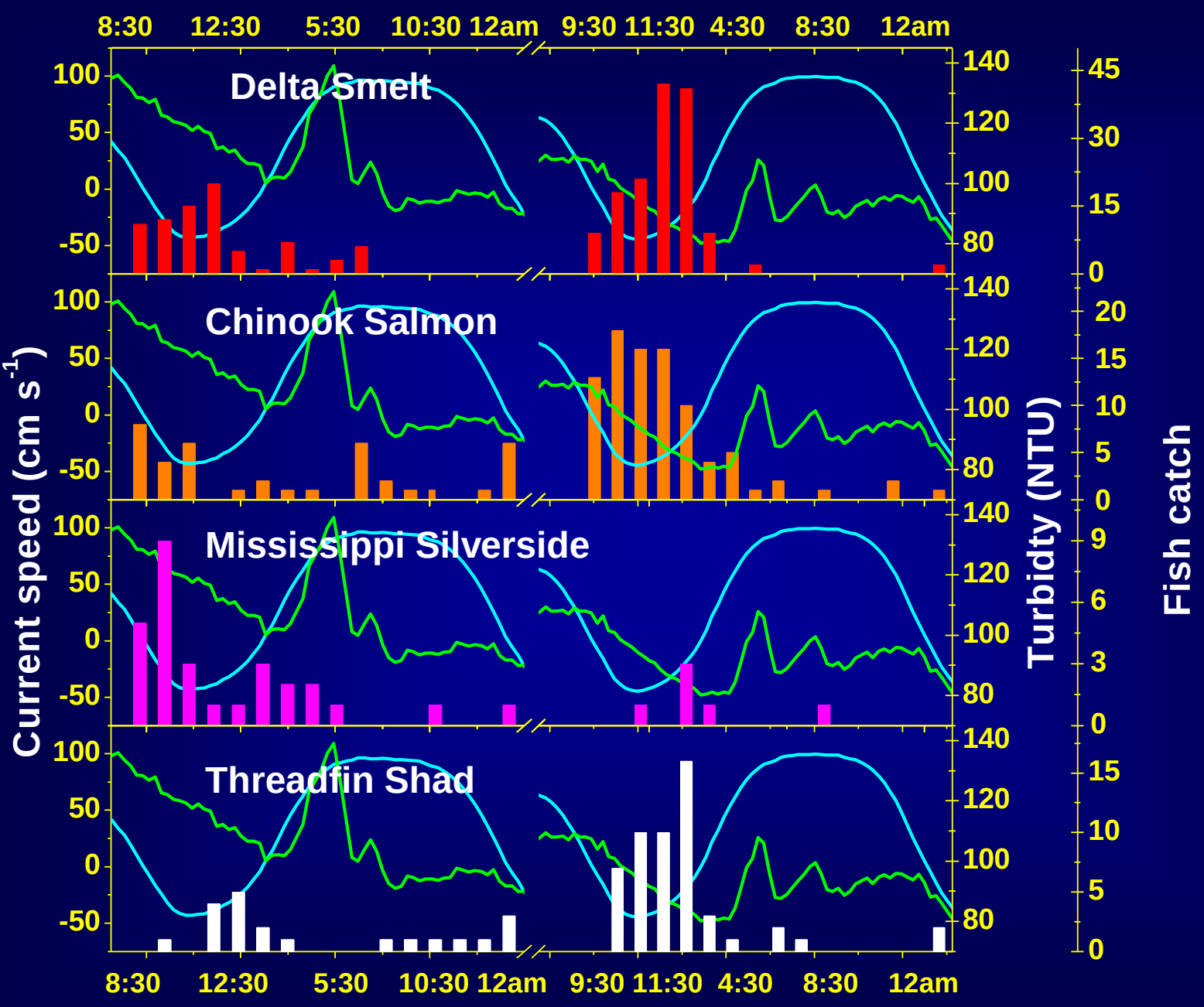
Beach seine data revealed most smelt caught on ebb tides



(J. Netto USFWS, Pers. Comm.)

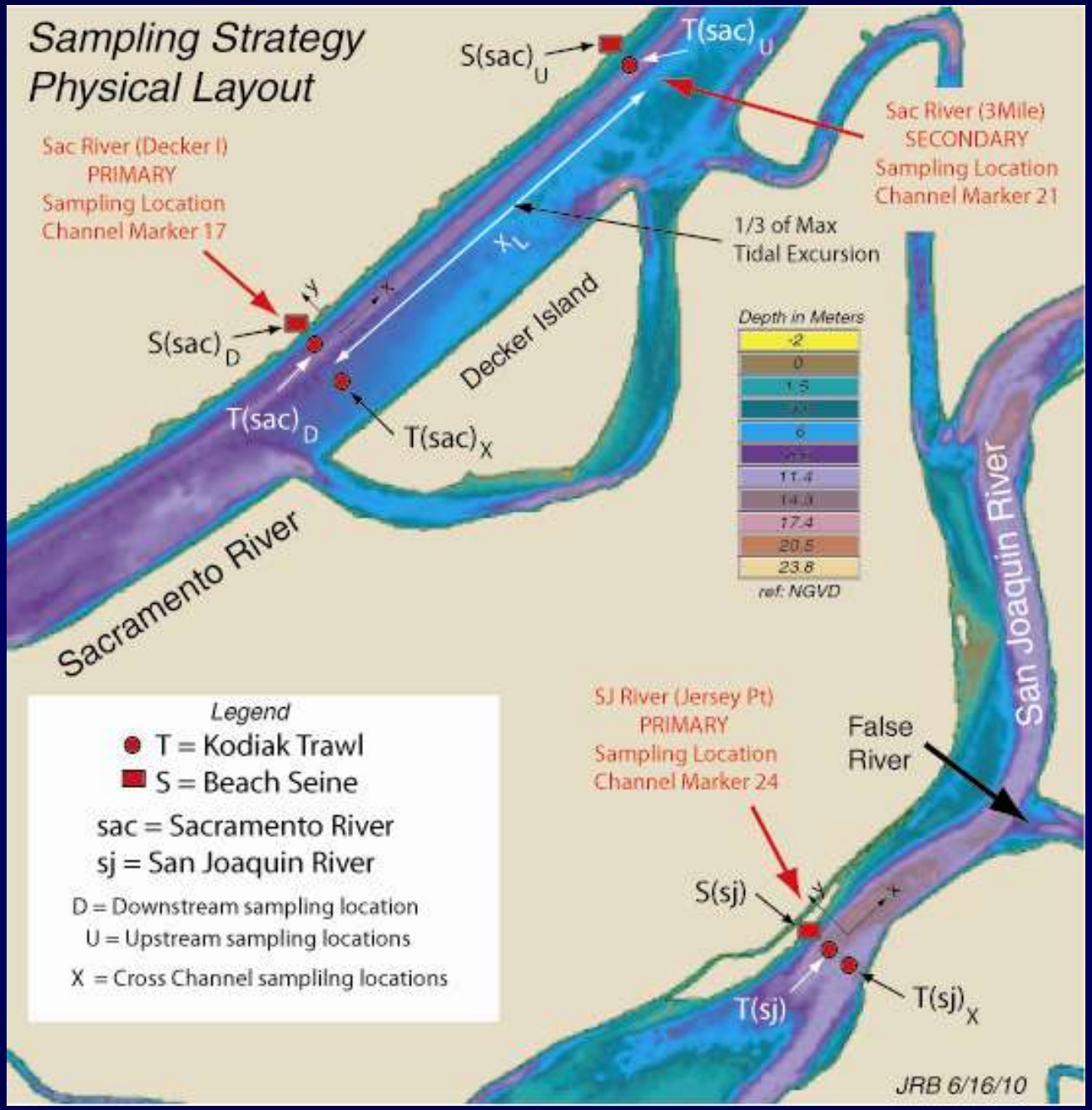
Conceptual model of "surfing with the tide"

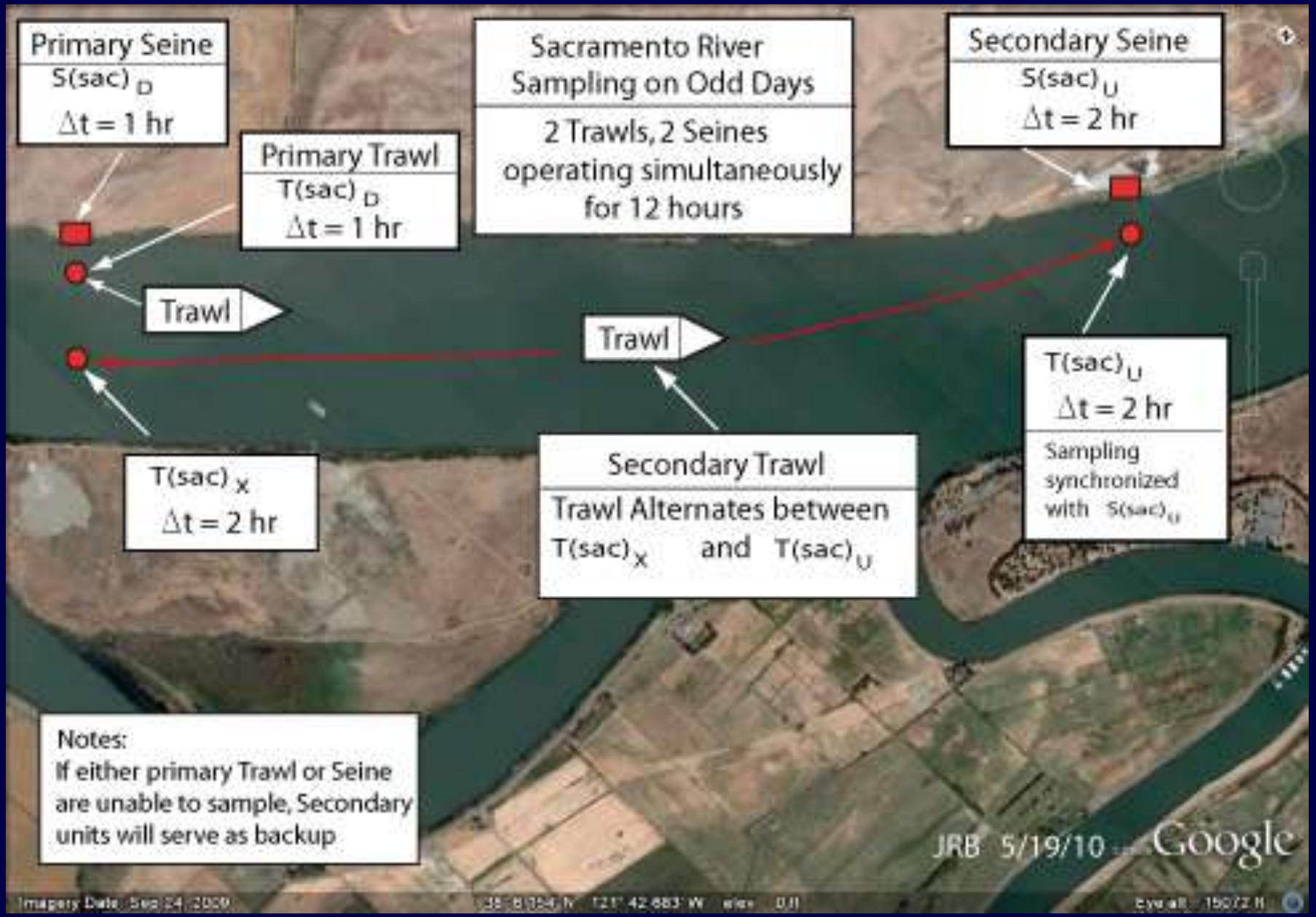



8:30
12:30
5:30
10:30
12am
9:30
11:30
4:30
8:30
12am
Delta Smelt
Chinook Salmon
Mississippi Silverside
Threadfin Shad
Current speed (cm s-1)
Turbidty (NTU)
Fish catch
100
50
0
-50
140
120
100
80
45
30
15
0
20
10
5
9
6
3

Next Steps:

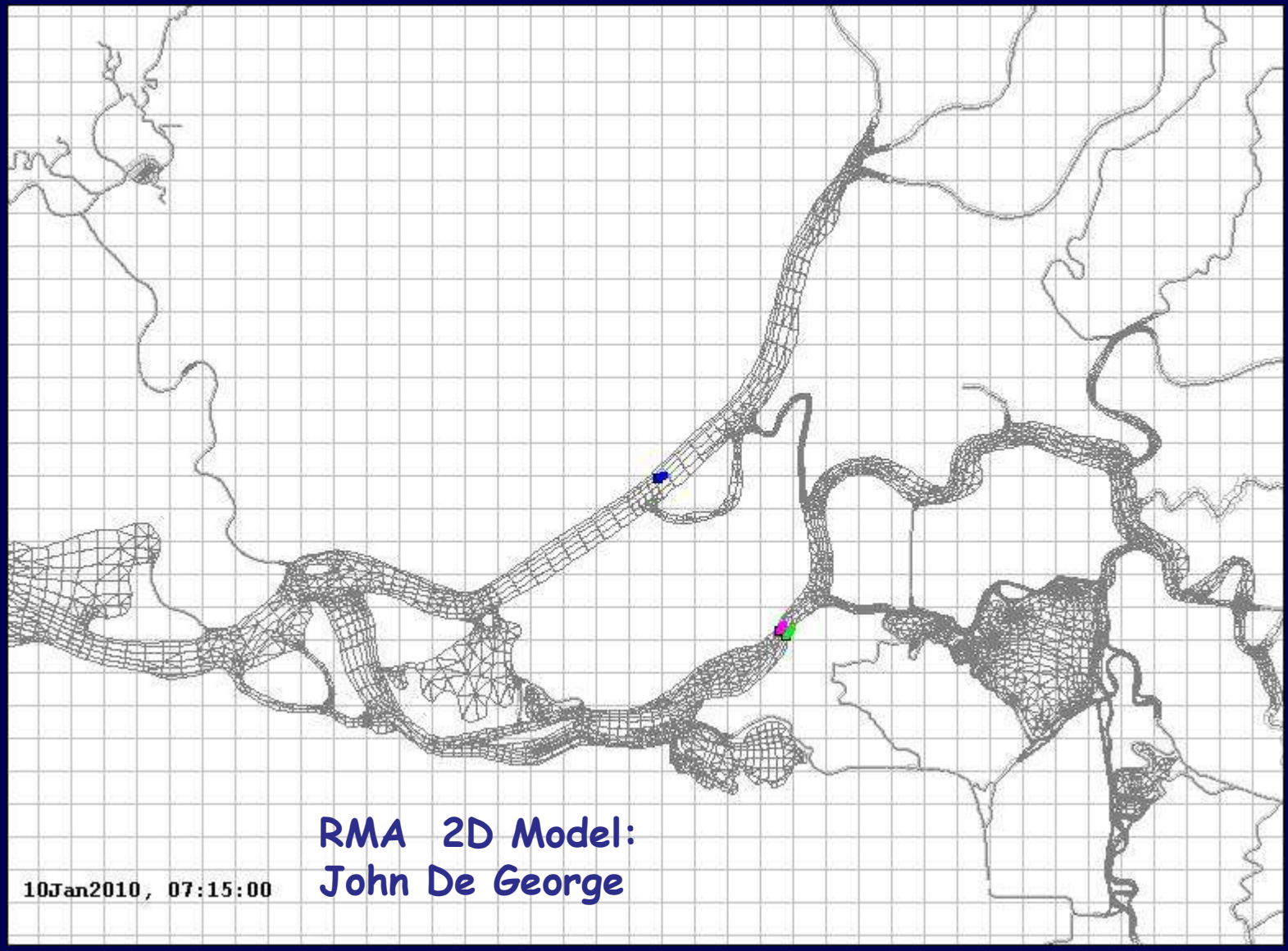
Proposed sampling for
First flush this winter


Sampling Strategy
Physical Layout
S(sac)U
T(sac)U
Sac River (3Mile)
SECONDARY
Sampling Location
Channel Marker 21
Sac River (Decker I)
PRIMARY
Sampling Location
Channel Marker 17
1/3 of Max
Tidal Excursion
XL
Y
X
S(sac)D
T(sac)D
T(sac)X
Decker Island
Depth in Meters
-2
0
1.5
3
6
11.4
14.3
17.4
20.5
23.8
ref: NGVD
Sacramento River
San Joaquin River
False
River
SJ River (Jersey Pt)
PRIMARY
Sampling Location
Channel Marker 24
S(sj)
T(sj)
T(sj)X
Legend
T = Kodiak Trawl
S = Beach Seine
sac = Sacramento River
sj = San Joaquin River
D = Downstream sampling location
U = Upstream sampling locations
X = Cross Channel samplilng locations
JRB 6/16/10


Primary Seine
S(sac) D
Δt = 1 hr
Primary Trawl
T(sac) D
Δt = 1 hr
Sacramento River
Sampling on Odd Days
2 Trawls, 2 Seines
operating simultaneously
for 12 hours
Secondary Seine
S(sac) U
Δt = 2 hr
Trawl
Trawl
T(sac) X
Δt = 2 hr
Secondary Trawl
Trawl Alternates between
T(sac) X and T(sac) U
T(sac) U
Δt = 2 hr
Sampling
synchronized
with S(sac) U
Notes:
If either primary Trawl or Seine
are unable to sample, Secondary
units will serve as backup
JRB 5/19/10
Google

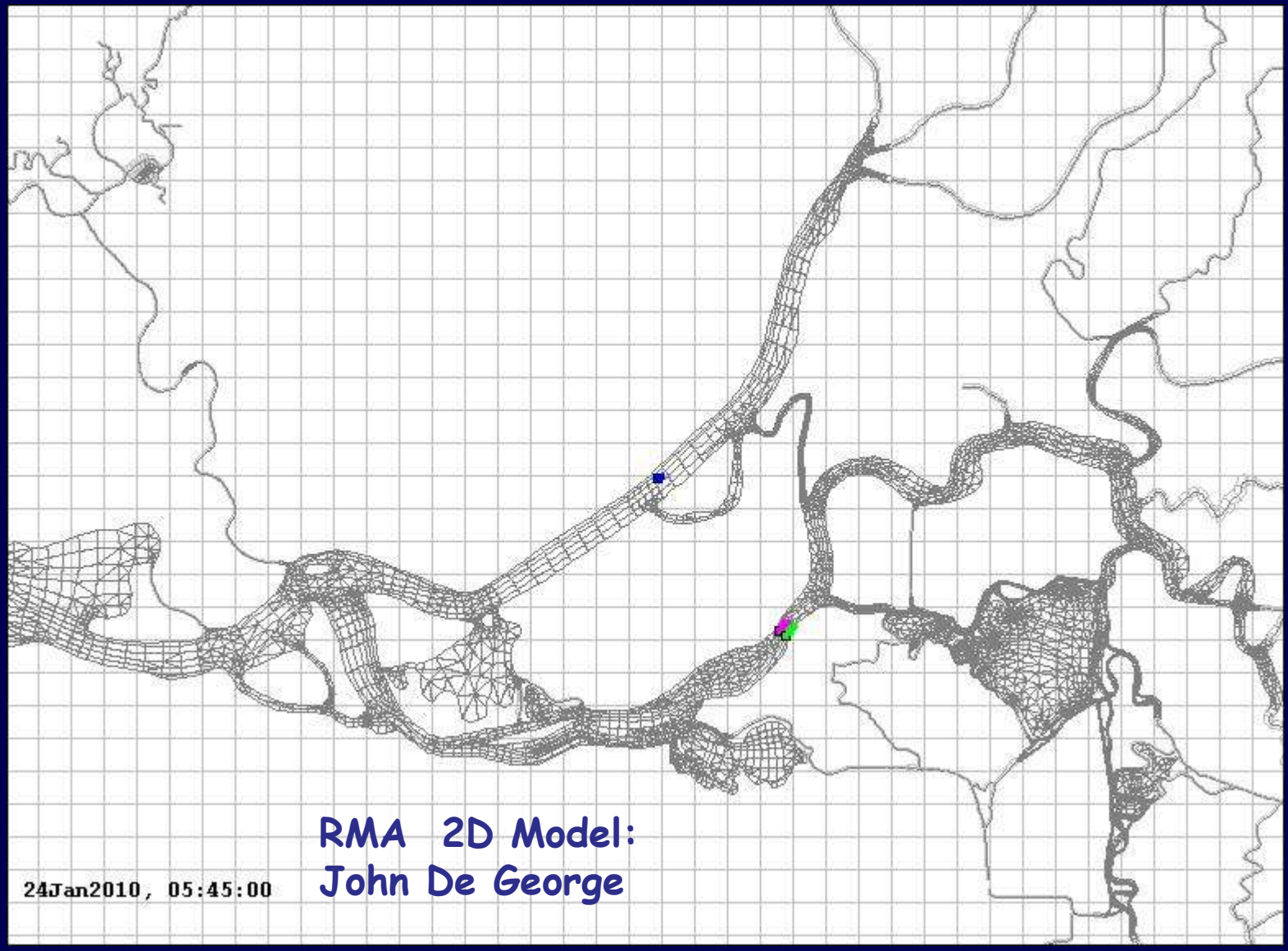

San Joaquin River
Sampling on Even Days
1 Trawl, 1 Seines
operating simultaneously
for 12 hours
Seine
S(sj)
Δt = 2 hr
Trawl
T(sj)
Δt = 2 hr
Sampling
synchronized
with S(sj)
T(sj)x
Δt = 2 hr
JRB: 5/19/10
Google
Imagery Date: Oct 2, 2009

Low Outflow: Passive Transport of Delta Smelt



Particle trajectory reversibility

High Outflow: Passive Transport of Delta Smelt




S(sj)
T(sj)
T(sj) x
3mi water
False River
False River water
JRB 5/16/10
Google


Questions?


S(sac)D
T(sac)D
T(sac)X
Water flowing out of 3mile (ebb)
JRB 5/16/10
Google