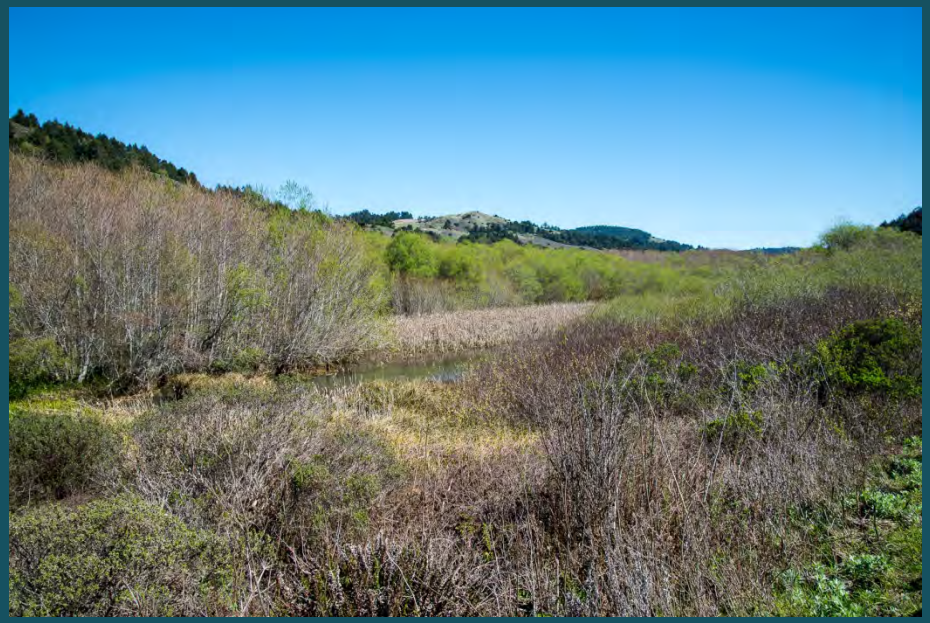
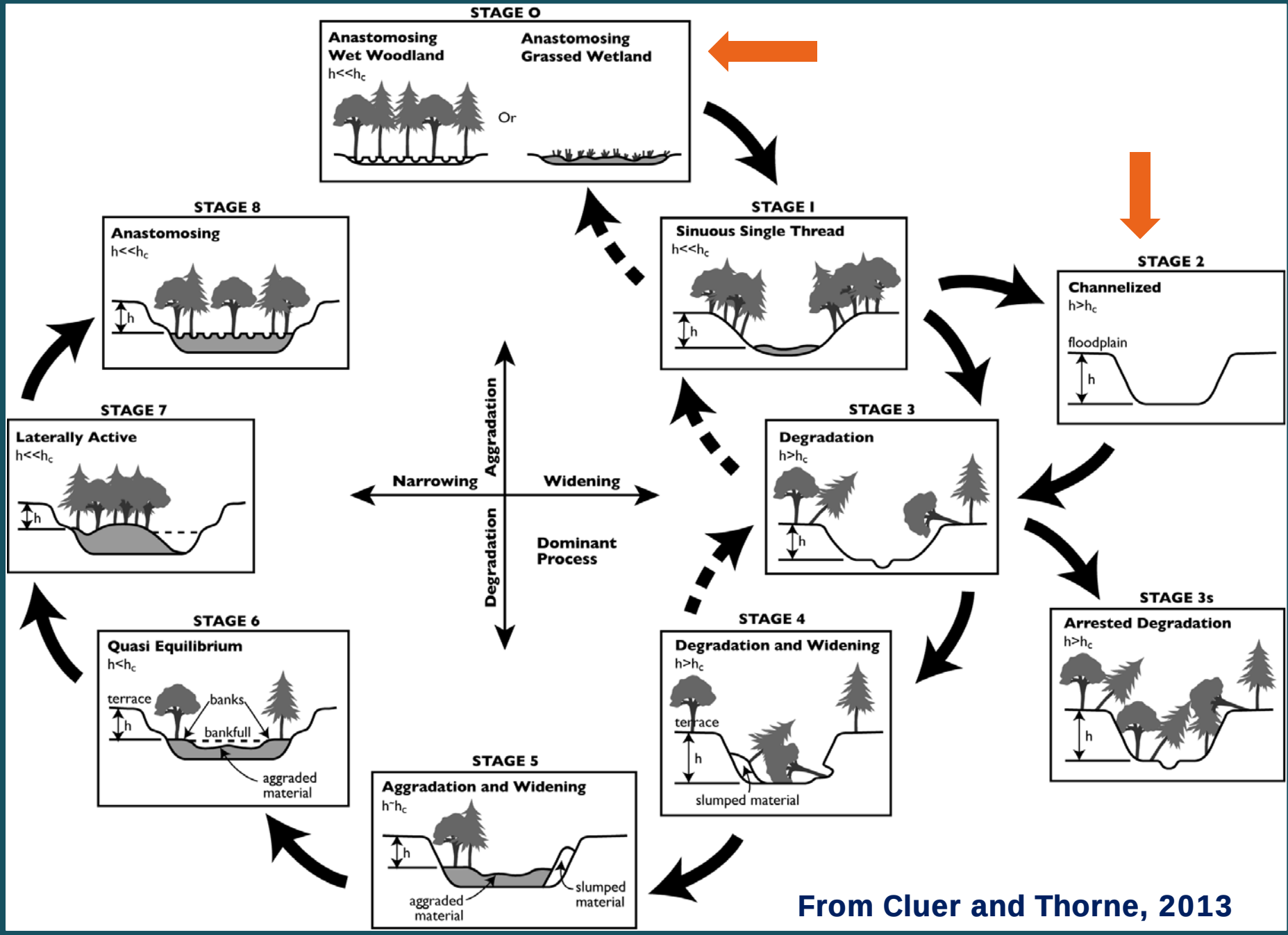
Development of a Multi-threaded Wetland Channel Complex and the Implications for Salmonids



Lauren Hammack, Prunuske Chatham, Inc.

Mariska Obedzinski, UCCE/ CA Sea Grant

Joe Pecharich, Earth Resources Technology/NOAA RC



From Cluer and Thorne, 2013

Channel Conversion

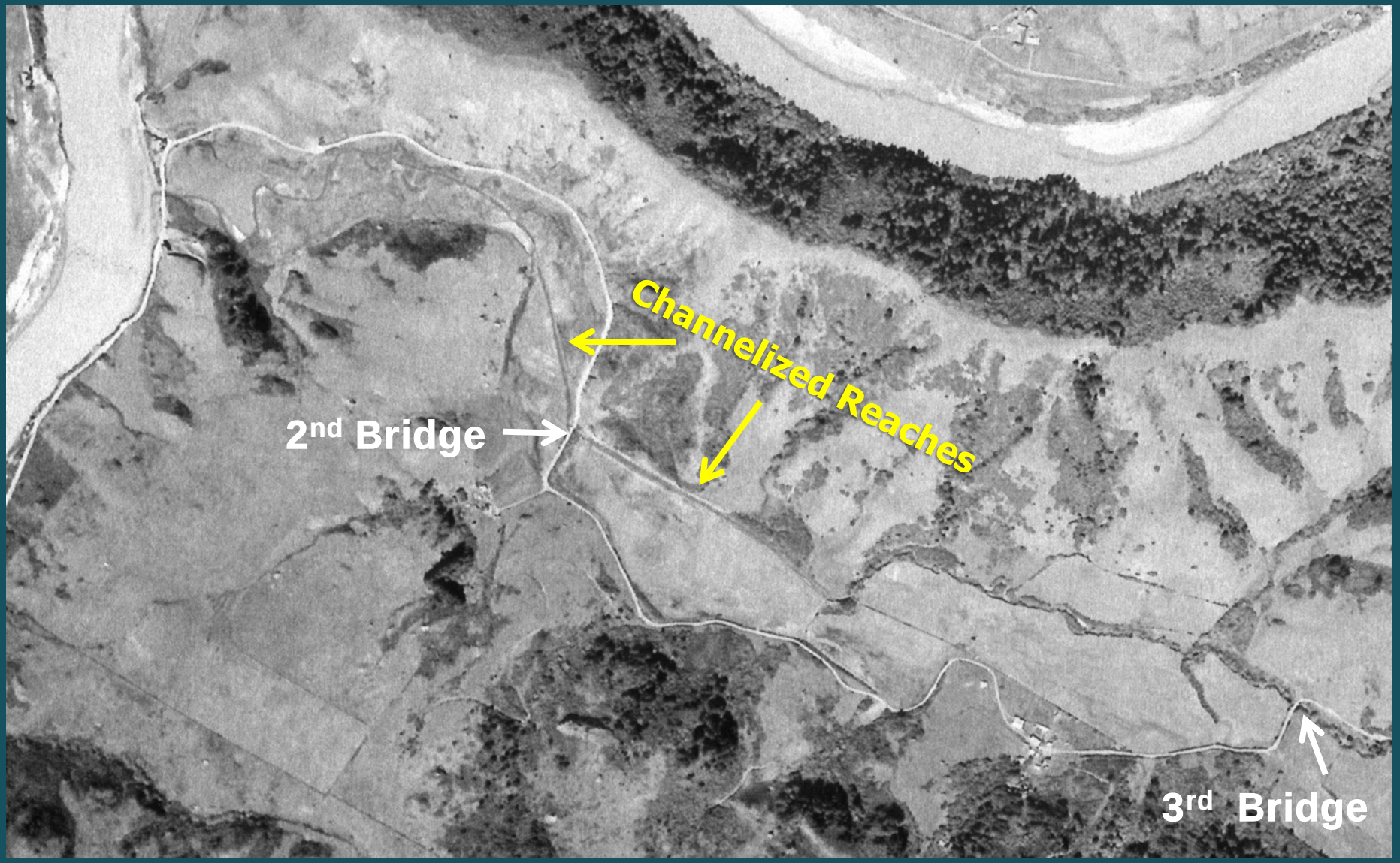
From Single Thread - Channelized

To Multi-Thread Network

Great salmon rearing habitat!

Willow Creek – Setting

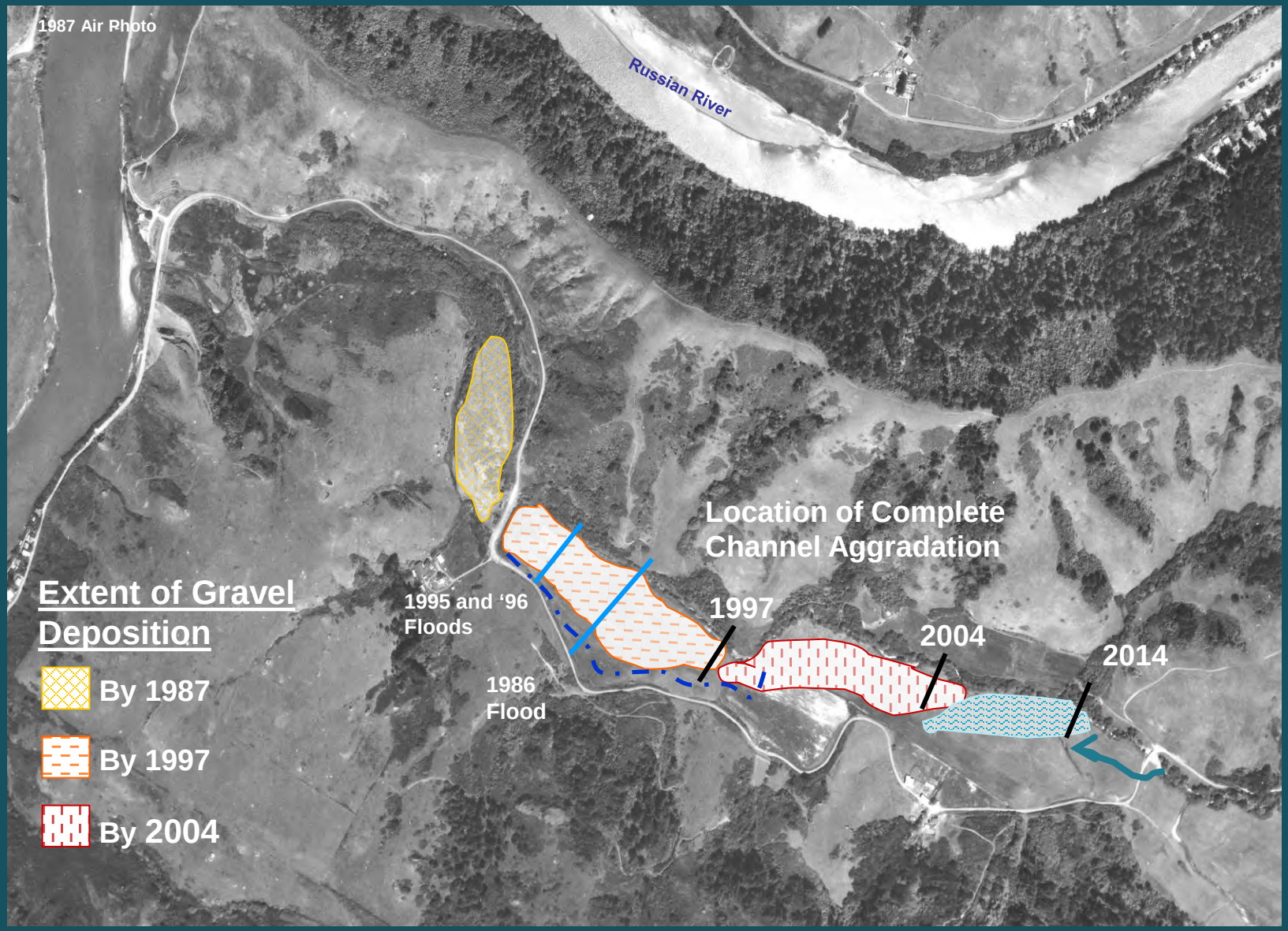
1953



Last Channel Dredging in 1983

1984

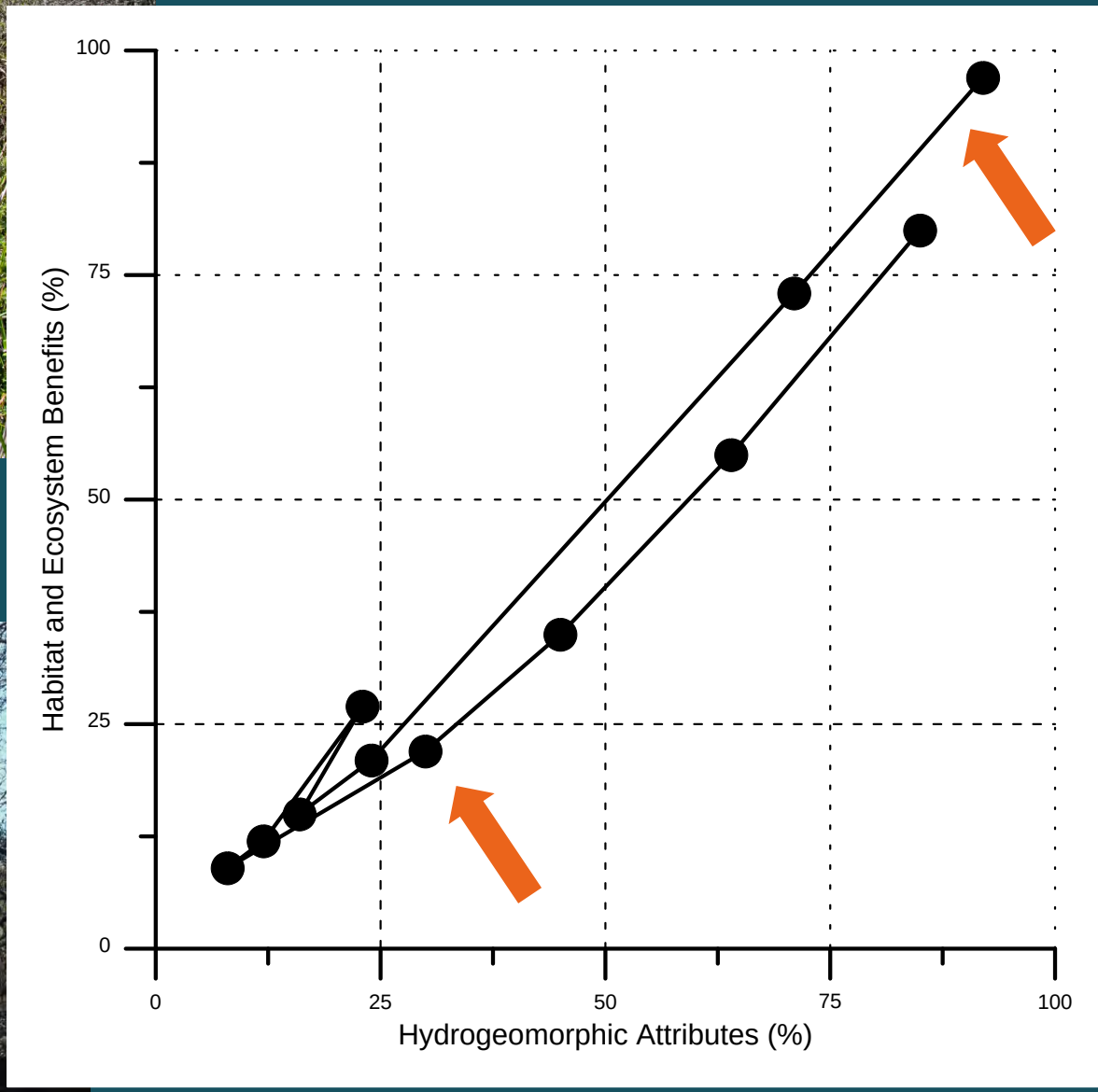
Response to Change in Management



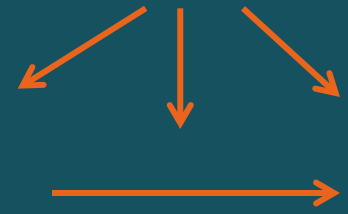
Filling of the Stage 2 channel progresses upstream.

Is followed by channel network development.


1987
2012
Imagery Date: 5/6/2012
38°26'10.09" N 123°05'10.99" W elev 0 ft
Google earth
Eye alt 7734 ft



From Cluer and Thorne, 2013



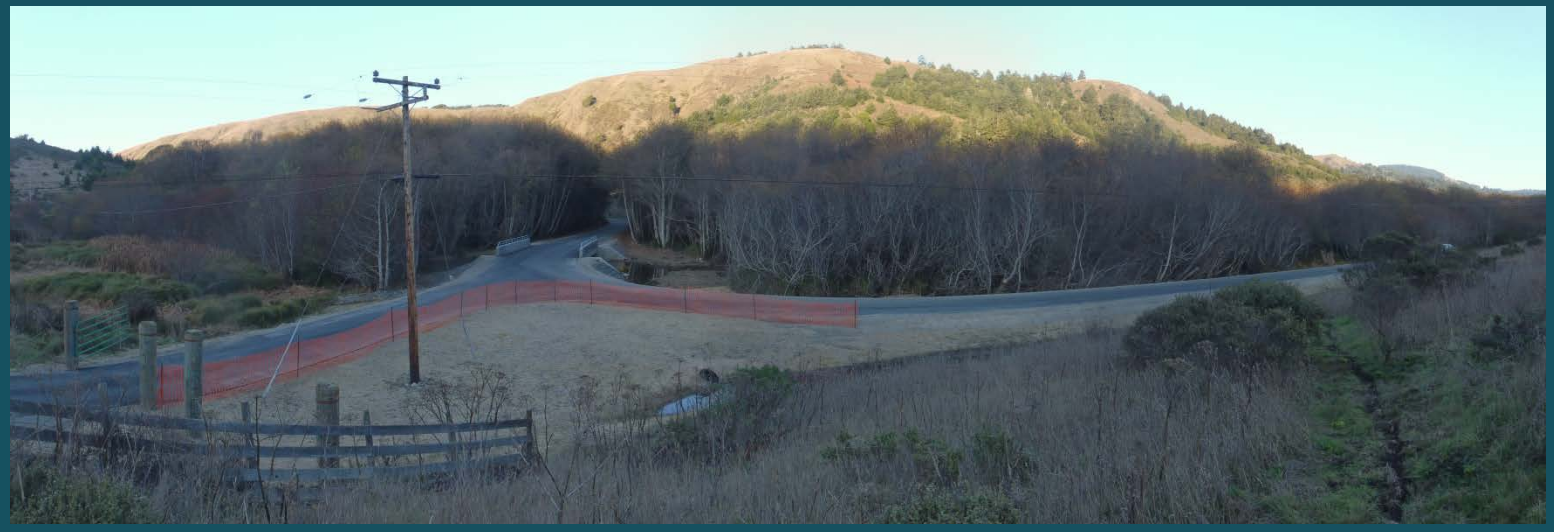
Problem: Creek is no longer flowing under bridge. Salmon not getting into the watershed.

Bermed road across floodplain restricted adult and juvenile fish passage.

Flooded with every large storm.

Photo courtesy of Derek Acomb

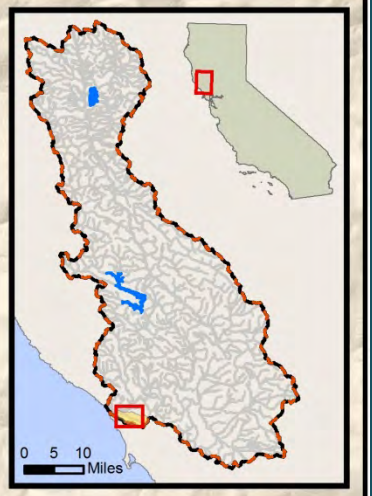
Replaced culverts with bridge in 2011



Questions raised...

- Are there connected channels through the wetlands?
- Will adult fish be able to find their way up through the wetlands?
- Will juveniles get lost on the way out?
- Will juveniles choose to rear in the wetlands?

Flat plate antenna at 1st bridge, Rkm 0.41



Hwy 116

Russian River

Second Bridge

Willow Creek

Willow Creek Rd

Upper antenna array and smolt trap, Rkm 3.70

Russian River
Coho Broodstock Program

Smolt Trap / Flow and Temperature Logger

PIT Antenna

Willow Creek Watershed

Sample Reach 3

Sample Reach 4

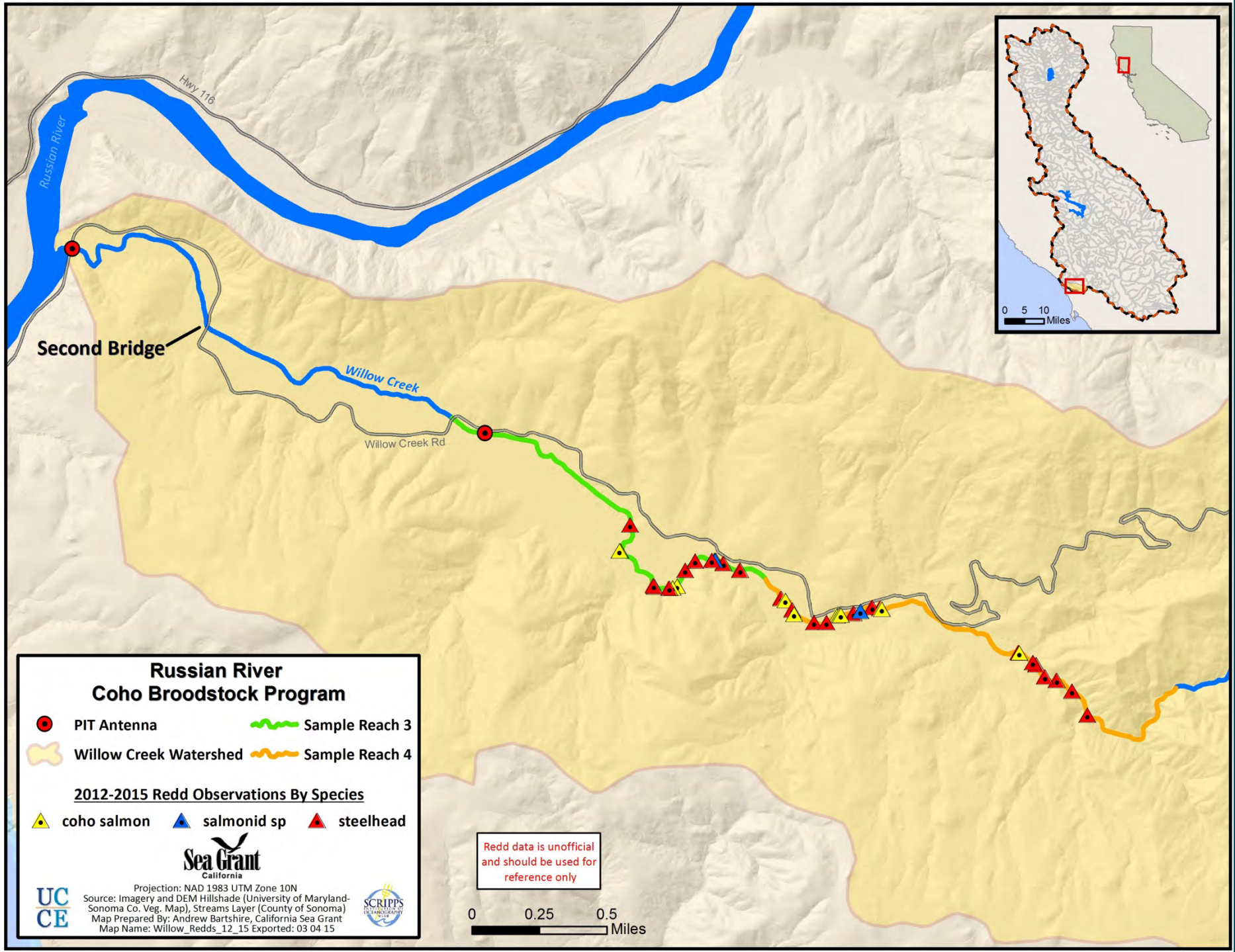
Sea Grant California

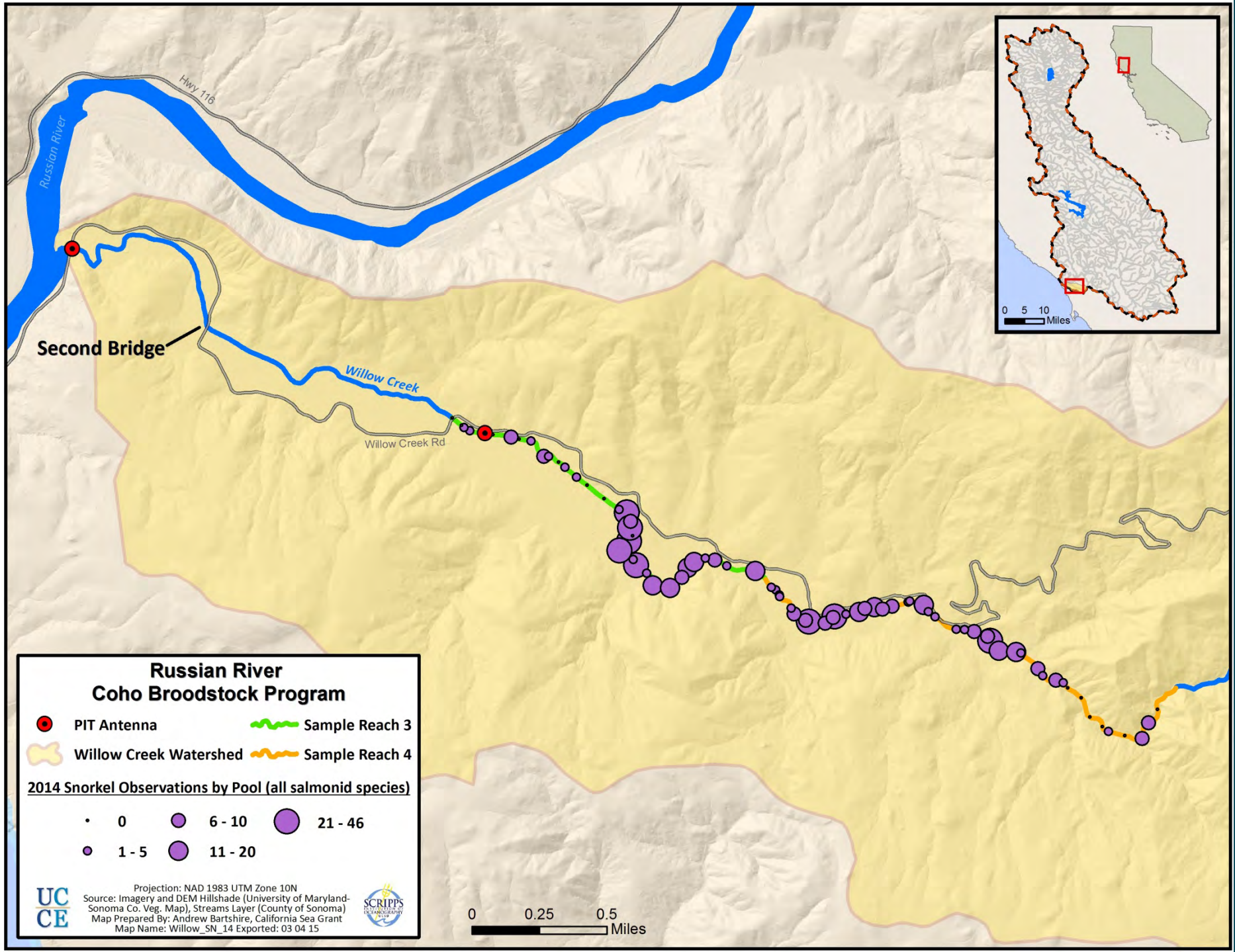
UC CE

Projection: NAD 1983 UTM Zone 10N
Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
Map Prepared By: Andrew Bartshire, California Sea Grant
Map Name: Mill_Willow_Trapsites_V2 Exported: 03 04 15

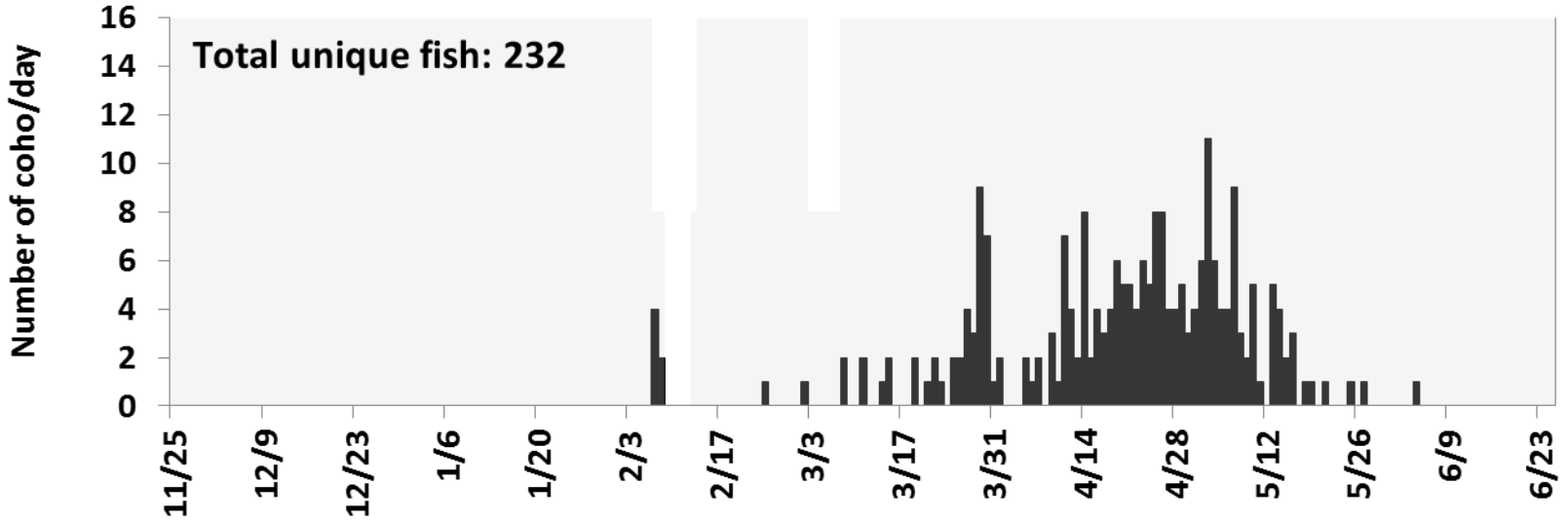
SCRIPPS

0 0.25 0.5
Miles

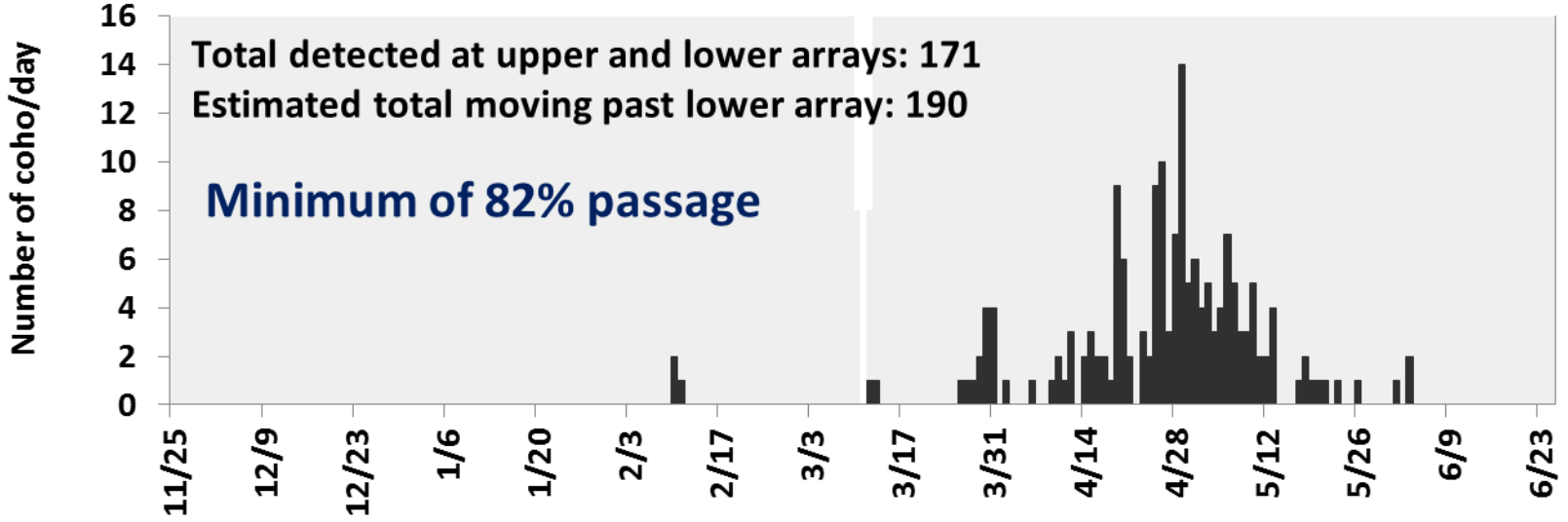

Hwy 116
Russian River
Second Bridge
Willow Creek
Willow Creek Rd
0 5 10
Miles
Russian River
Coho Broodstock Program
PIT Antenna
Willow Creek Watershed
Sample Reach 3
Sample Reach 4
2012-2015 Redd Observations By Species
coho salmon
salmonid sp
steelhead
Sea Grant
California
UC CE
Projection: NAD 1983 UTM Zone 10N
Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
Map Prepared By: Andrew Bartshire, California Sea Grant
Map Name: Willow_Redds_12_15 Exported: 03 04 15
Redd data is unofficial and should be used for reference only
0 0.25 0.5
Miles

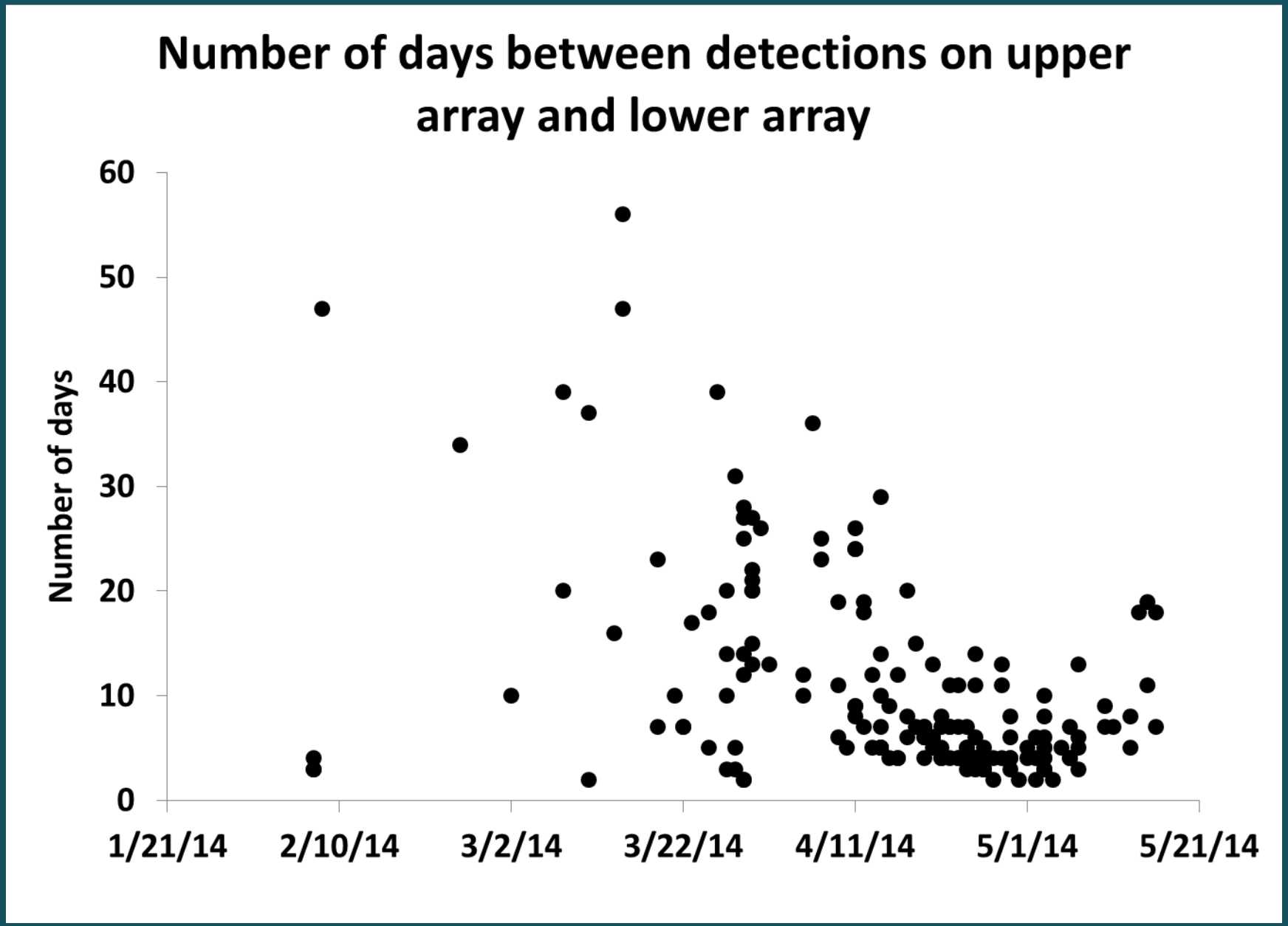

Russian River
Hwy 116
Second Bridge
Willow Creek
Willow Creek Rd
0 5 10
Miles
Russian River
Coho Broodstock Program
PIT Antenna
Willow Creek Watershed
Sample Reach 3
Sample Reach 4
2014 Snorkel Observations by Pool (all salmonid species)
0
1 - 5
6 - 10
11 - 20
21 - 46
Projection: NAD 1983 UTM Zone 10N
Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
Map Prepared By: Andrew Bartshire, California Sea Grant
Map Name: Willow_SN_14 Exported: 03 04 15
UC CE
SCRIPPS
0 0.25 0.5
Miles

2013-2014 PIT Tag Detections at Upper Willow Array



2013-2014 PIT Tag Detections at Lower Willow Array




Number of days between detections on upper array and lower array
Number of days
60
50
40
30
20
10
0
1/21/14
2/10/14
3/2/14
3/22/14
4/11/14
5/1/14
5/21/14

Restoration and Monitoring Partners:

California Dept. of Fish and Wildlife
California State Parks
CA State Coastal Conservancy
Gold Ridge RCD
Land Paths
Mendocino Redwoods Company
NOAA Fisheries
NOAA Restoration Center
Prunuske Chatham, Inc.
Sonoma County Public Works and Transportation
Sonoma County Water Agency
State Water Resources Control Board
Stewards of the Coast and Redwoods
Trout Unlimited
UC Cooperative Extension/CA Sea Grant
US Army Corps of Engineers

- Don’t be afraid of multi-threaded channels!
- Where there is opportunity – promote their formation.
- Key to water table restoration, wetland formation, and salmonid rearing habitat.