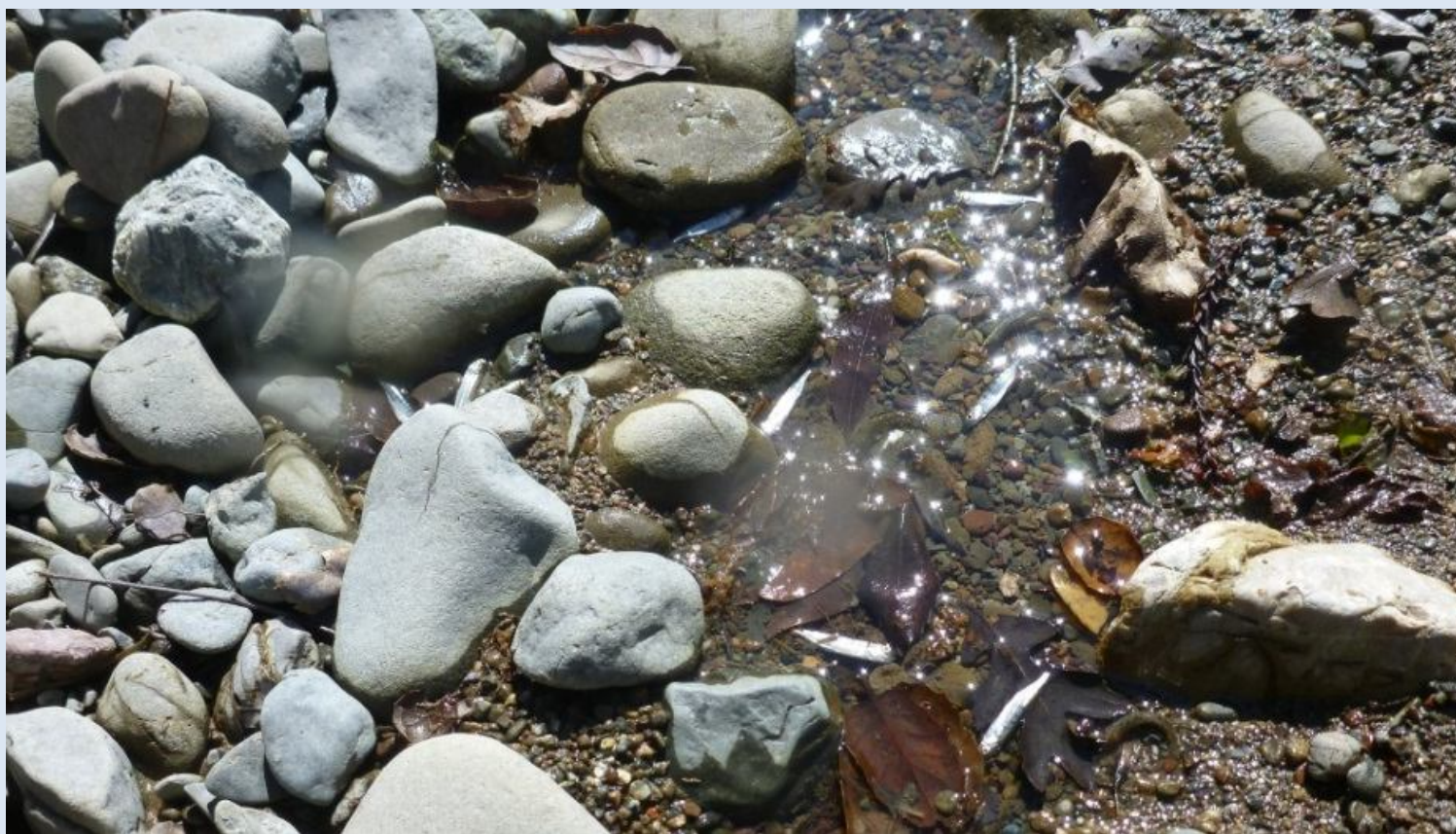


Impacts of drought on juvenile salmonids rearing in Russian River tributaries



California Sea Grant and UC Cooperative Extension

Mariska Obedzinski and Andrew Bartshire

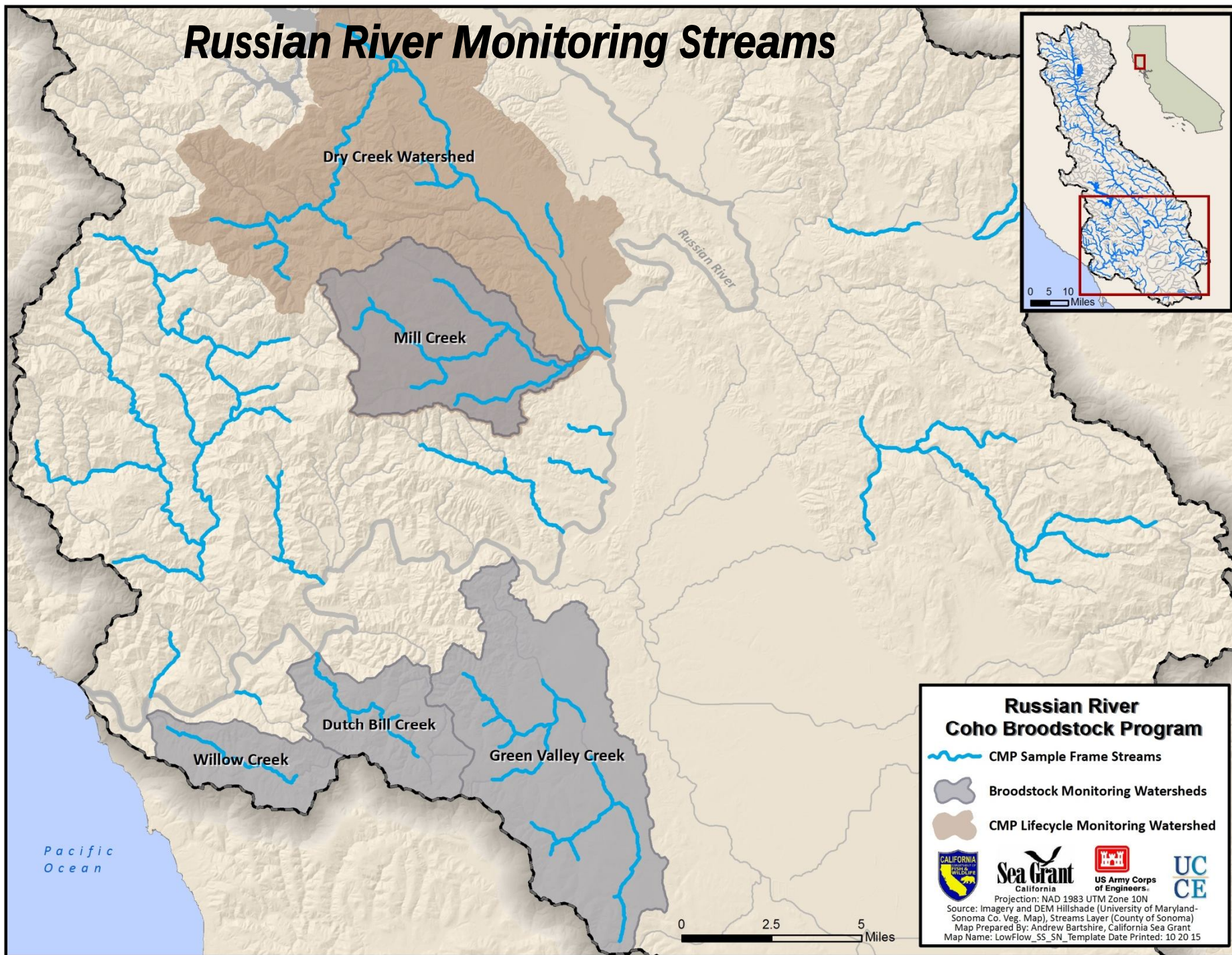


Salmonid Monitoring in the Russian River Basin

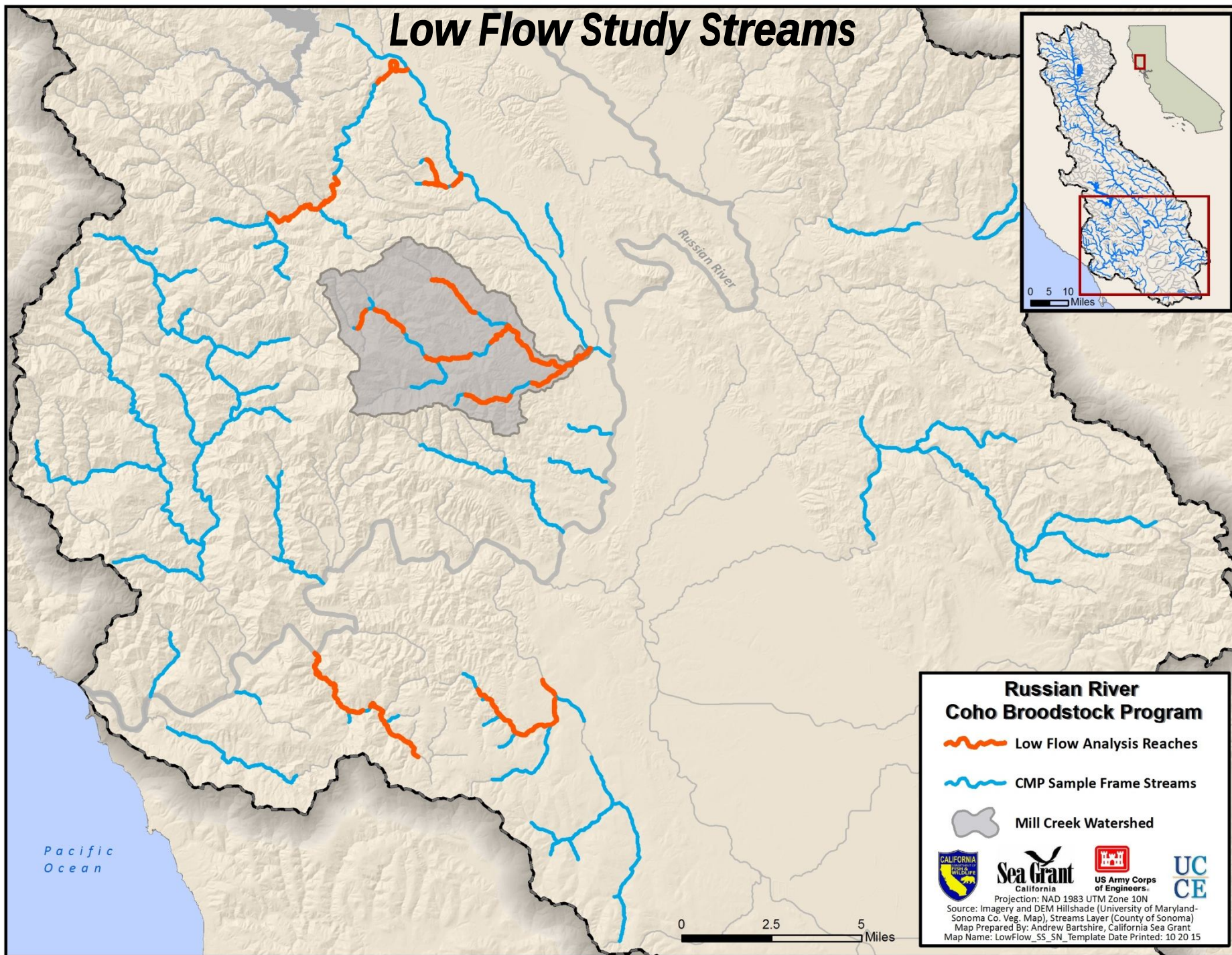
- **Russian River Coho Salmon Captive Broodstock Program**
- **CA Coastal Monitoring Program**
- **Russian River Coho Water Resources Partnership**



Russian River Monitoring Streams



Low Flow Study Streams



Russian River Coho Broodstock Program

 Low Flow Analysis Reaches

 CMP Sample Frame Streams



Mill Creek Watershed



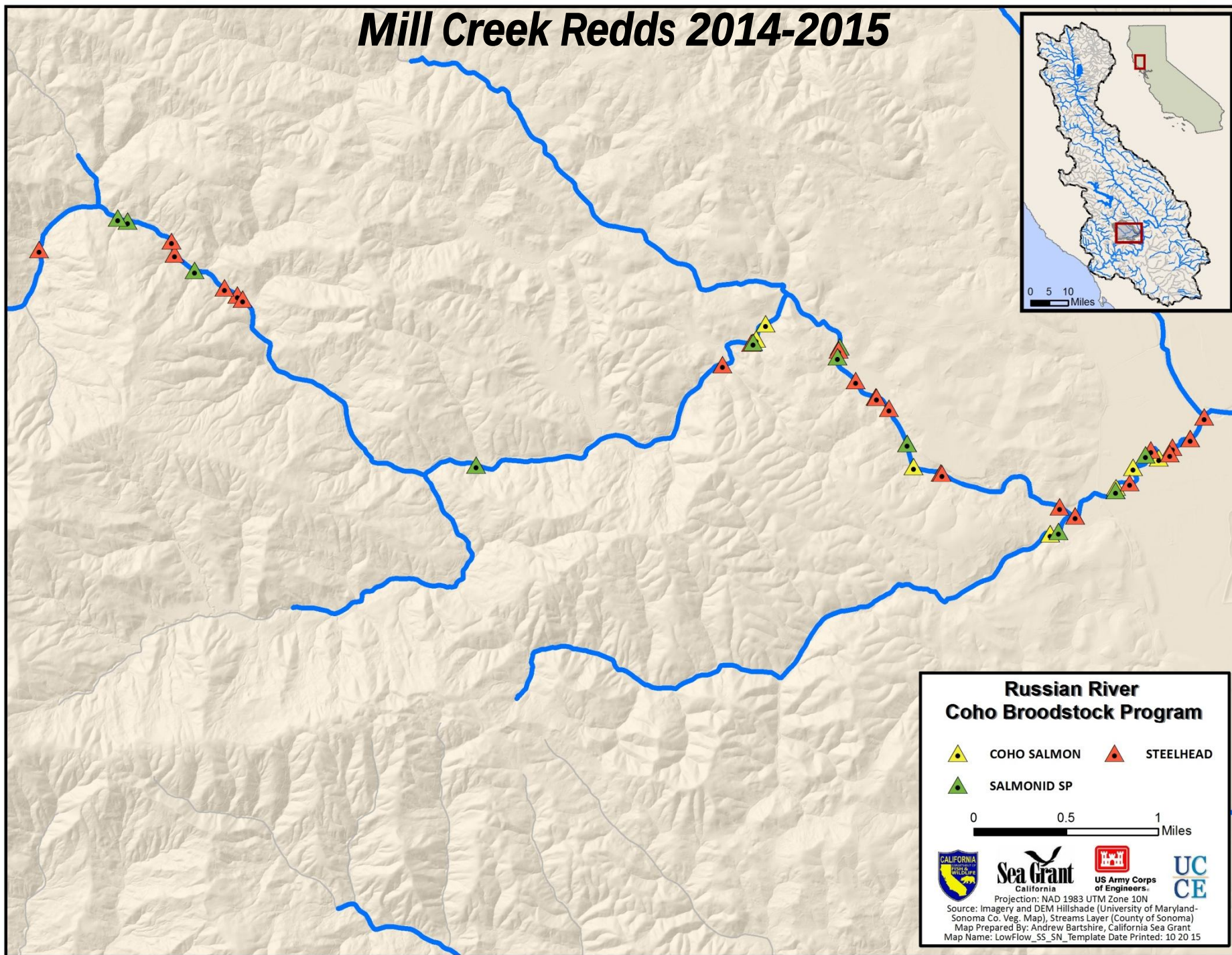
Projection: NAD 1983 UTM Zone 10N
Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
Map Prepared By: Andrew Bartshire, California Sea Grant
Map Name: LowFlow_SS_SN_Template Date Printed: 10 20 15

Redd surveys: CMP protocols

- **Count and ID redds to species (coho, steelhead, Chinook, salmonid sp)**

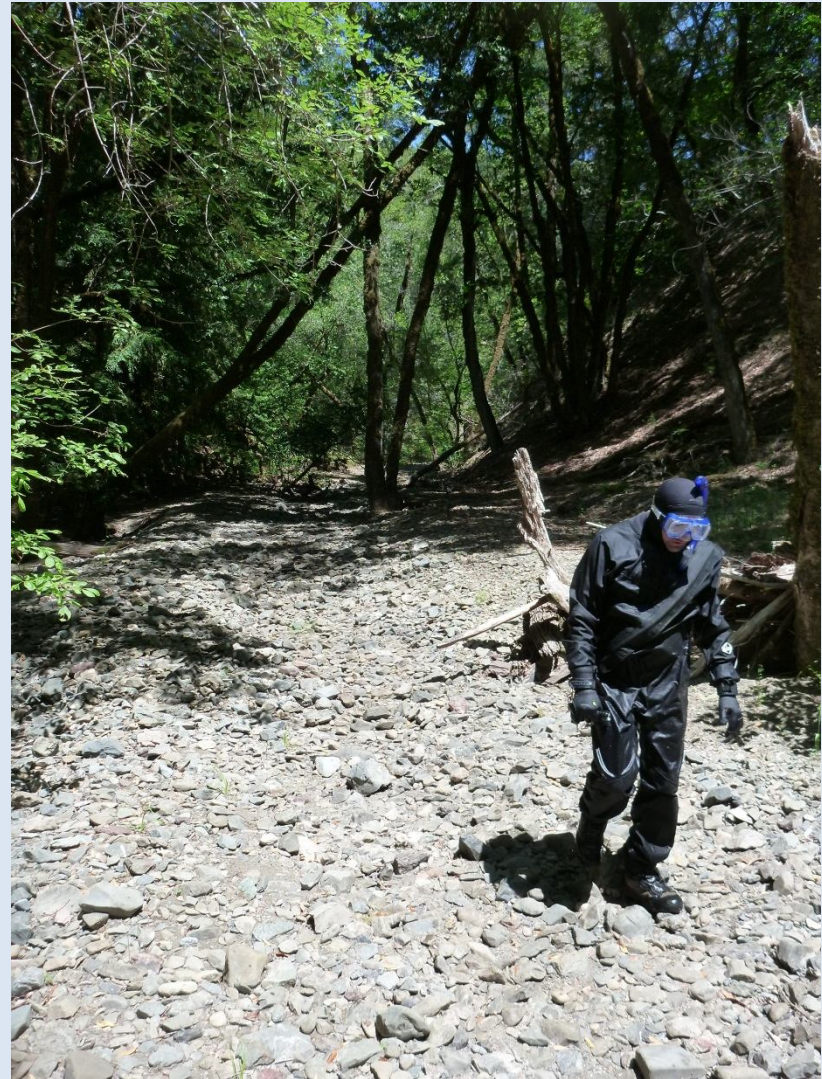


Mill Creek Redds 2014-2015

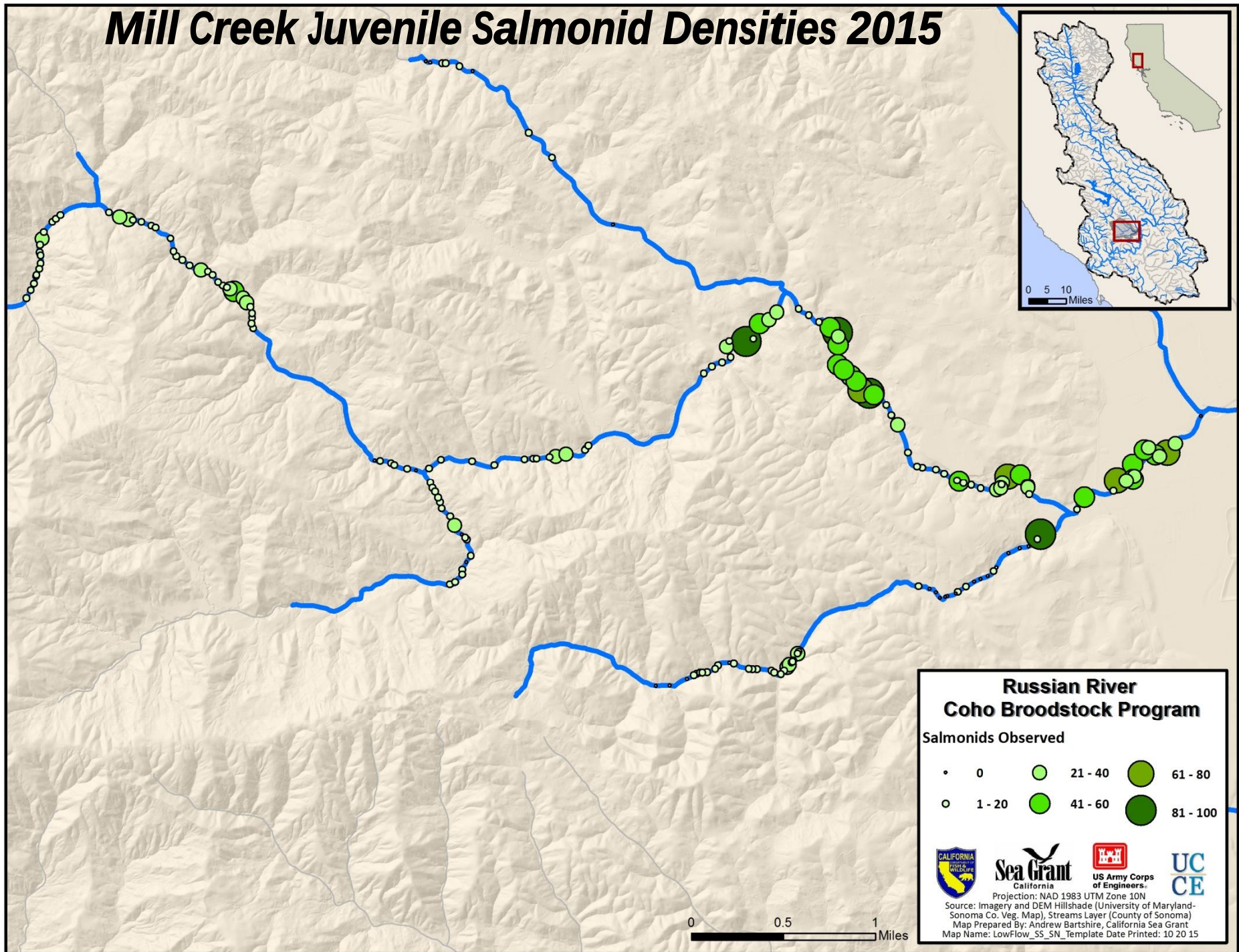


Snorkeling surveys: CMP protocols

- **Dive every other pool, count and ID salmonids**



Mill Creek Juvenile Salmonid Densities 2015

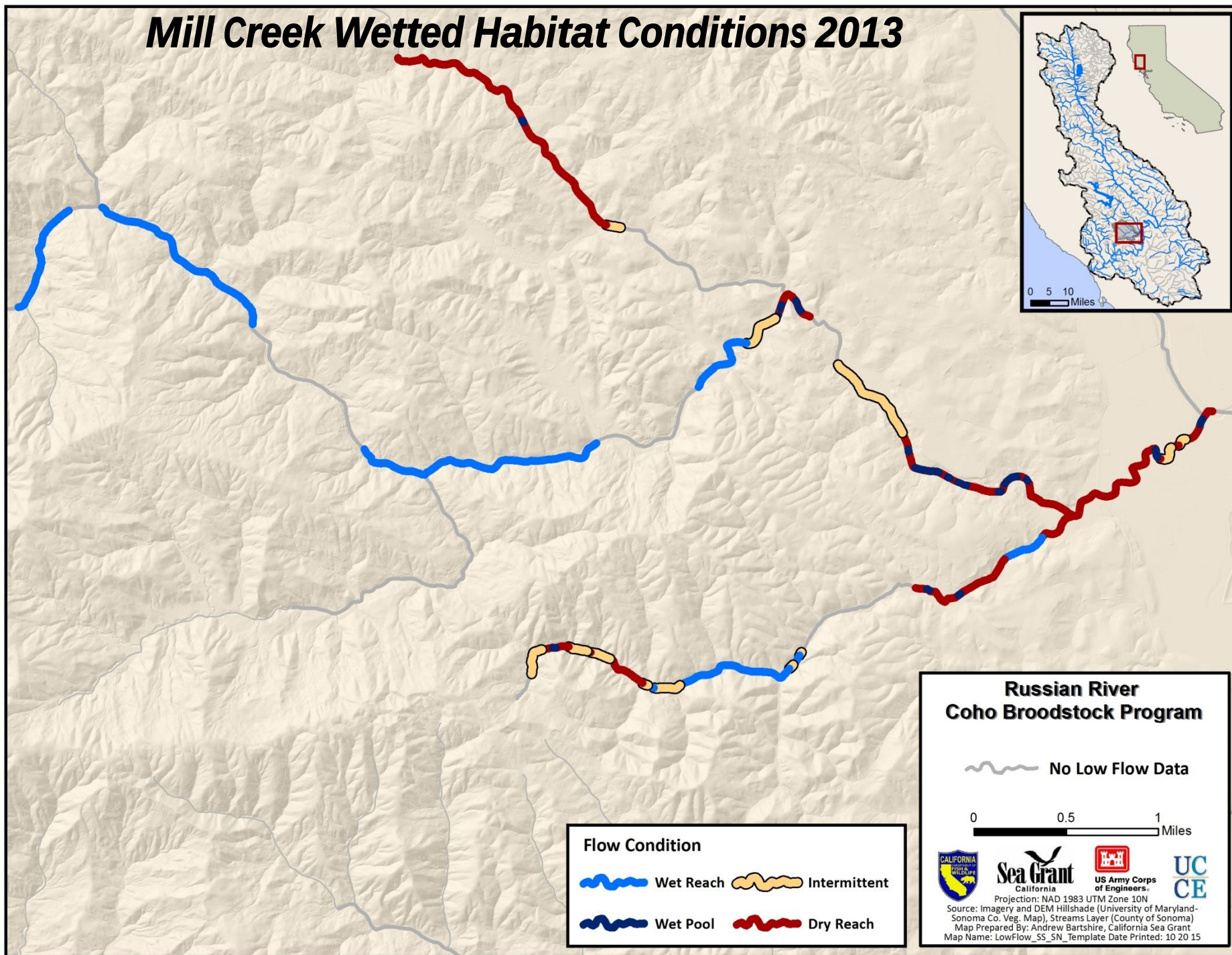


Low flow surveys: wet/dry mapping

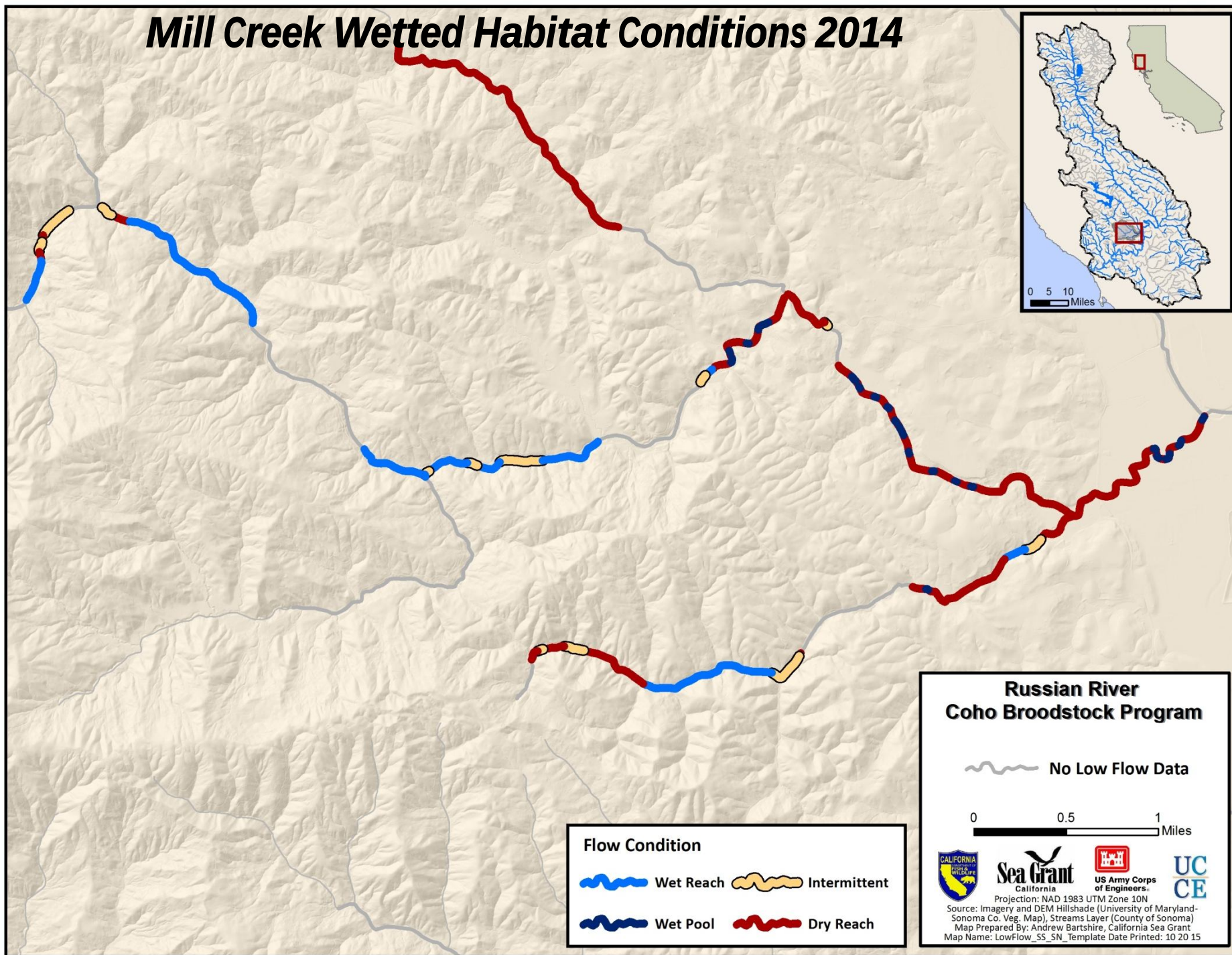
- **Walk streams in September and document wet, dry, and intermittent habitat**



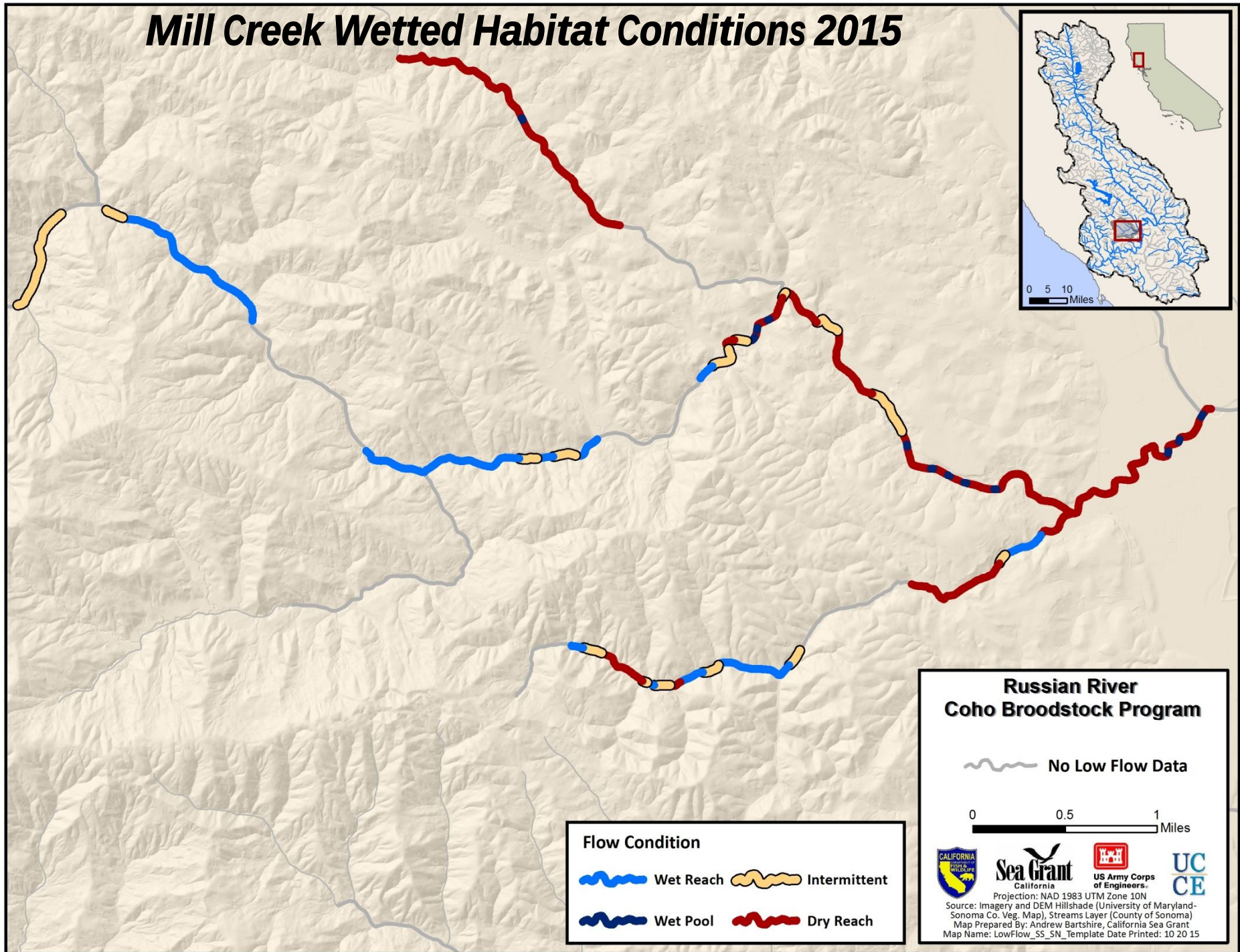
Mill Creek Wetted Habitat Conditions 2013



Mill Creek Wetted Habitat Conditions 2014



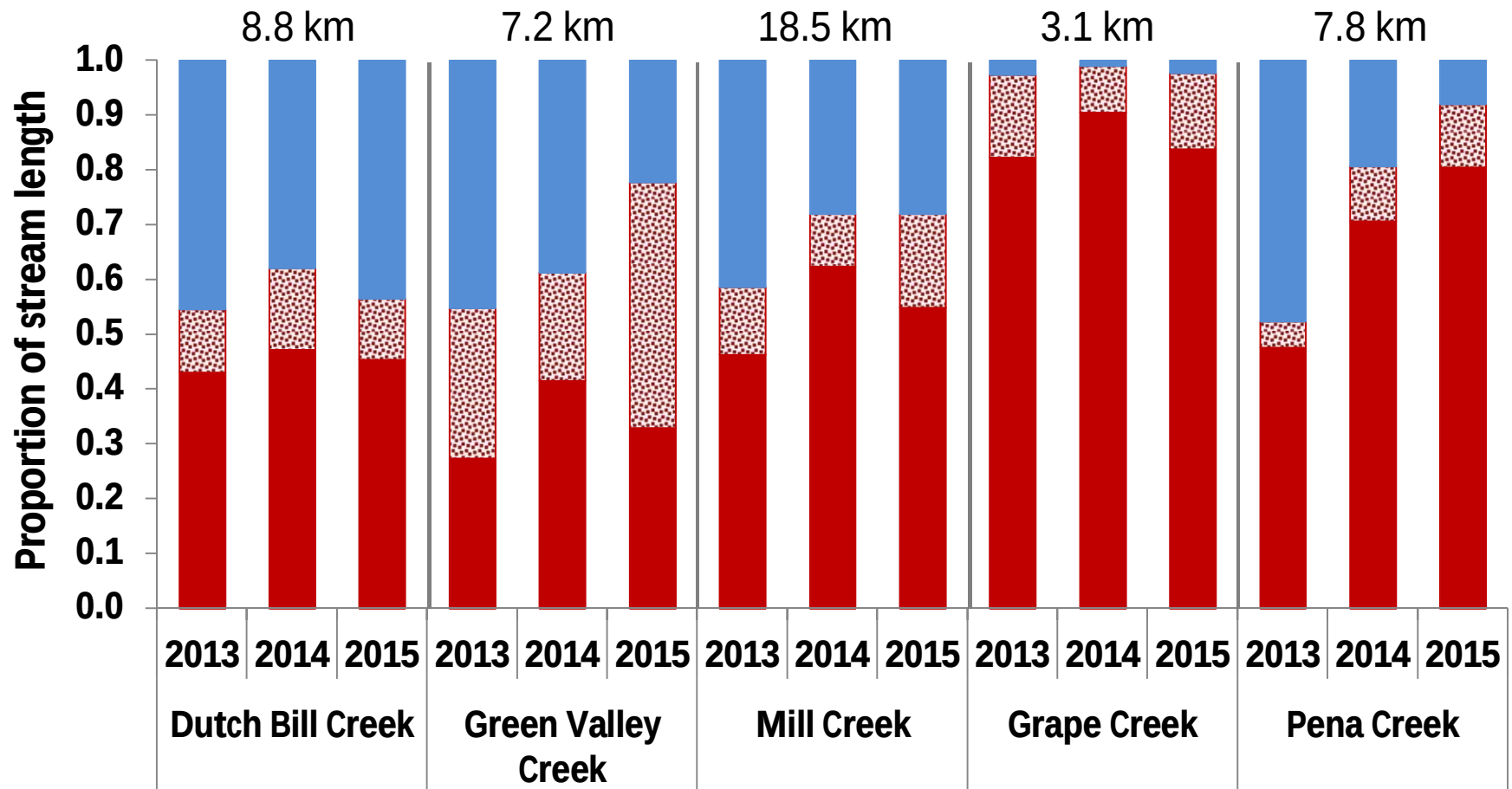
Mill Creek Wetted Habitat Conditions 2015



Low flow survey results

Wetted habitat conditions in Russian River streams, 2013-2015

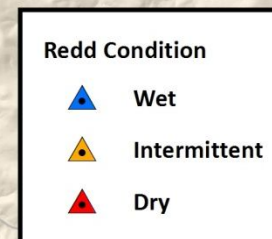
■ wet
■ intermittent
■ dry



Mill Creek All Salmonid Redds 2013-2014



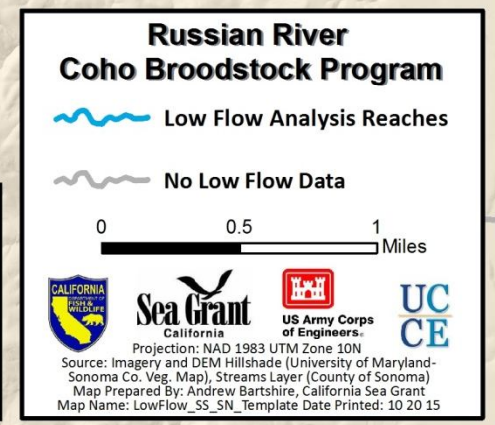
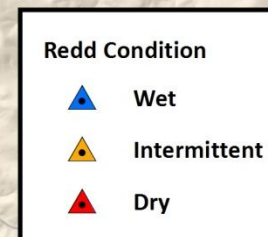
Habitat condition	Stream length (km)	Coho redds	Steelhead redds	All salmonid redds
dry	11.5 (62%)	1 (50%)	10 (53%)	13 (57%)
inter	1.8 (10%)	0 (0%)	7 (37%)	7 (30%)
wet	5.2 (28%)	1 (50%)	2 (11%)	3 (13%)



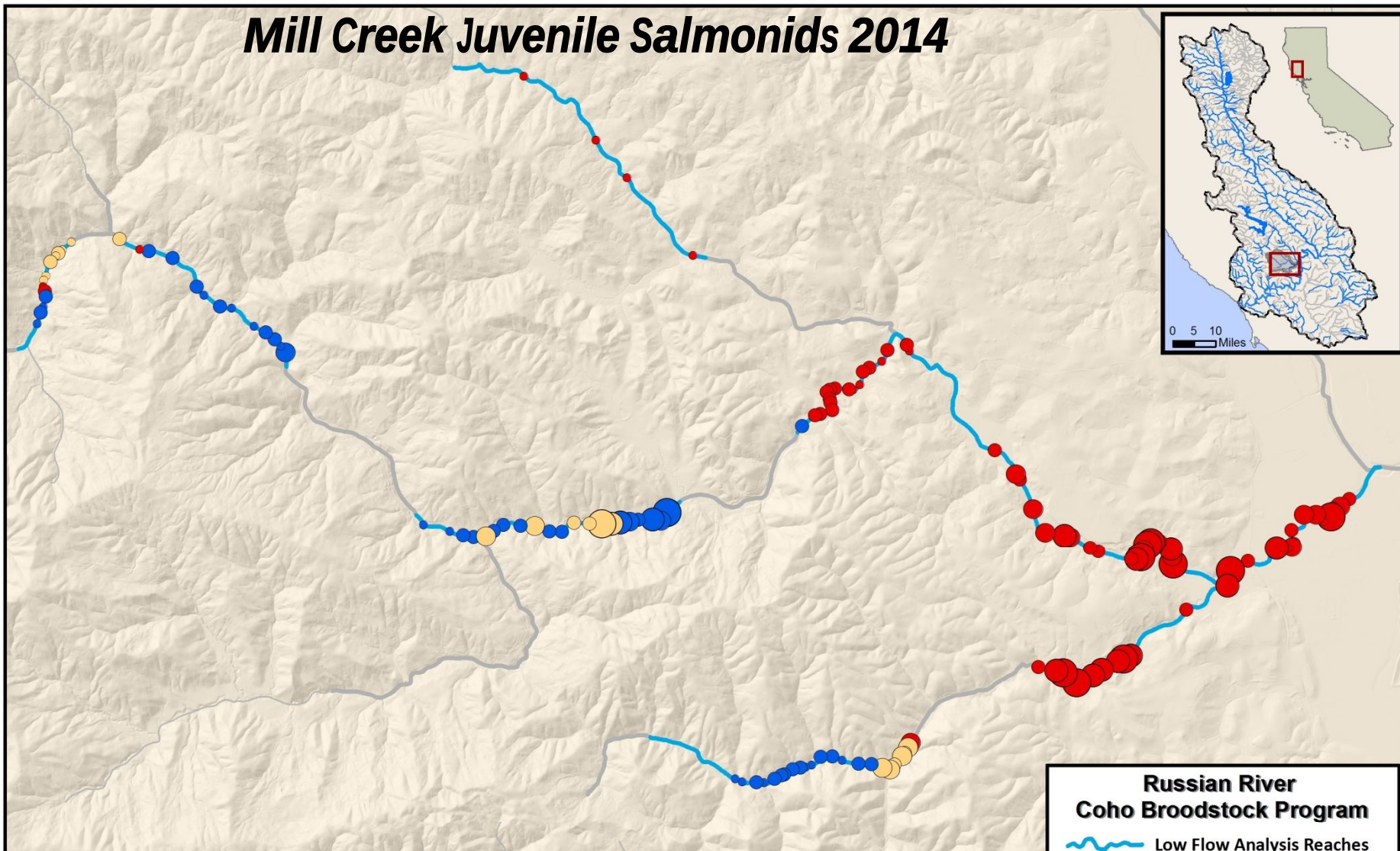
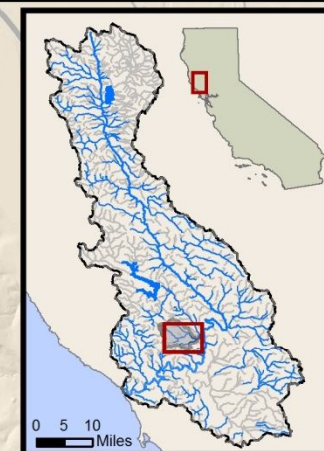
Mill Creek All Salmonid Redds 2014-2015



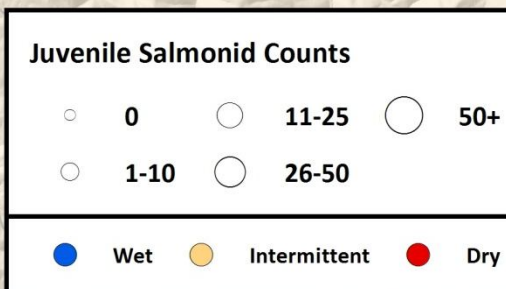
Habitat condition	Stream length (km)	Coho redds	Steelhead redds	All salmonid redds
dry	10.0 (55%)	9 (100%)	18 (62%)	34 (69%)
inter	3.1 (17%)	0 (0%)	6 (21%)	7 (14%)
wet	5.1 (28%)	0 (0%)	5 (17%)	8 (16%)



Mill Creek Juvenile Salmonids 2014



Habitat condition	Stream length (km)	Coho yoy	All juvenile salmonids
dry	11.5 (62%)	15 (6%)	1,846 (77%)
inter	1.8 (10%)	84 (35%)	222 (9%)
wet	5.2 (28%)	139 (58%)	314 (13%)



Russian River Coho Broodstock Program

Low Flow Analysis Reaches (blue wavy line)

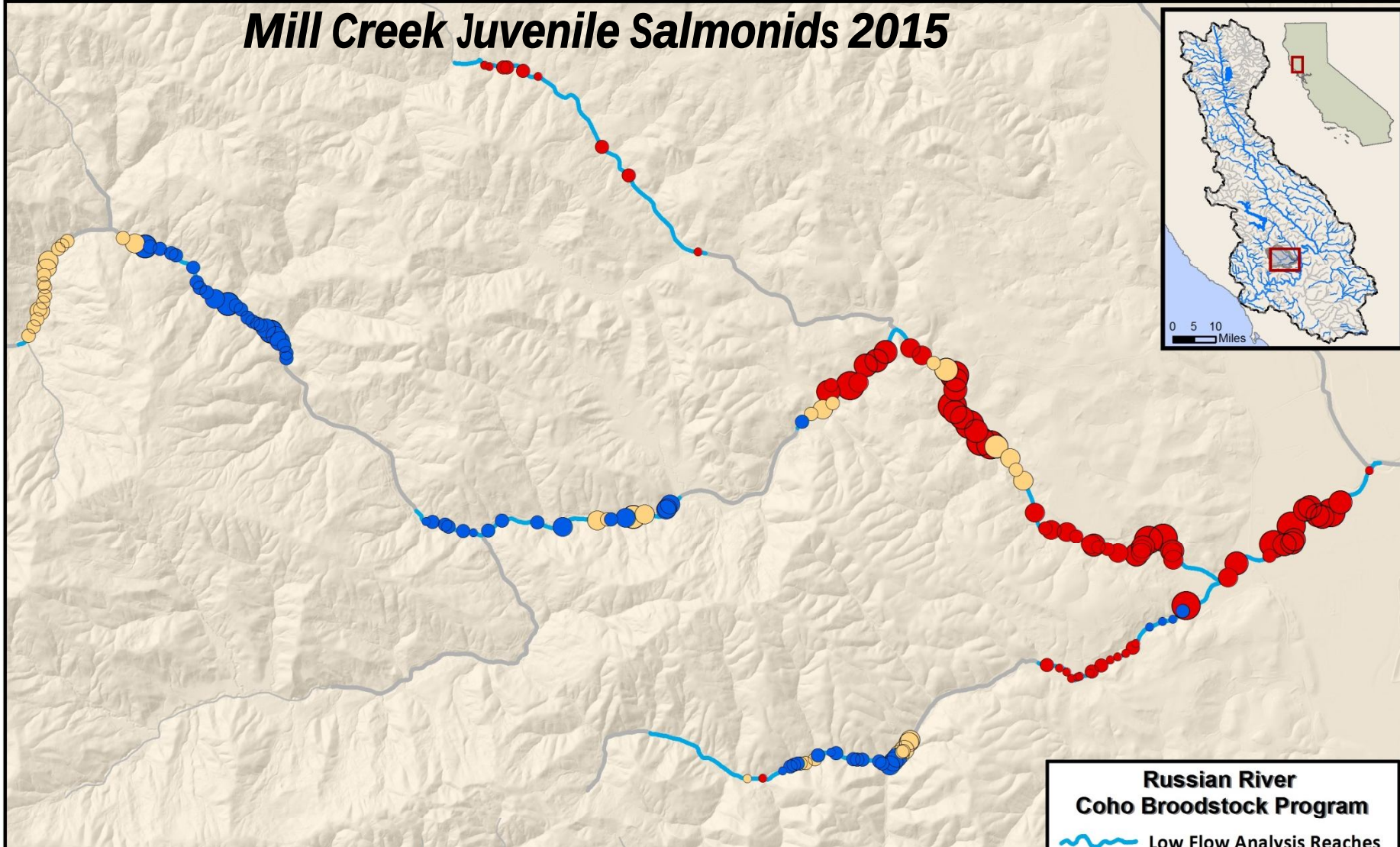
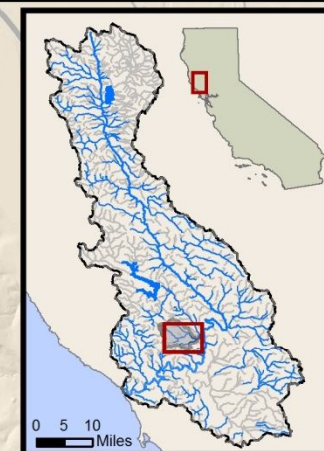
No Low Flow Data (grey wavy line)

0 0.5 1 Miles

Logos: CALIFORNIA Department of Fish and Wildlife, Sea Grant, US Army Corps of Engineers, UC CE

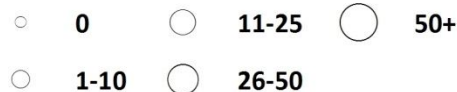
Projection: NAD 1983 UTM Zone 10N
 Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
 Map Prepared By: Andrew Bartshire, California Sea Grant
 Map Name: LowFlow_SS_SN_Template Date Printed: 10/20/15

Mill Creek Juvenile Salmonids 2015



Habitat condition	Stream length (km)	Coho yoy	All juvenile salmonids
dry	10.0 (55%)	121 (76%)	2,000 (68%)
inter	3.1 (17%)	20 (13%)	467 (16%)
wet	5.1 (28%)	19 (12%)	463 (16%)

Juvenile Salmonid Counts



● Wet
 ● Intermittent
 ● Dry

Russian River Coho Broodstock Program

Low Flow Analysis Reaches

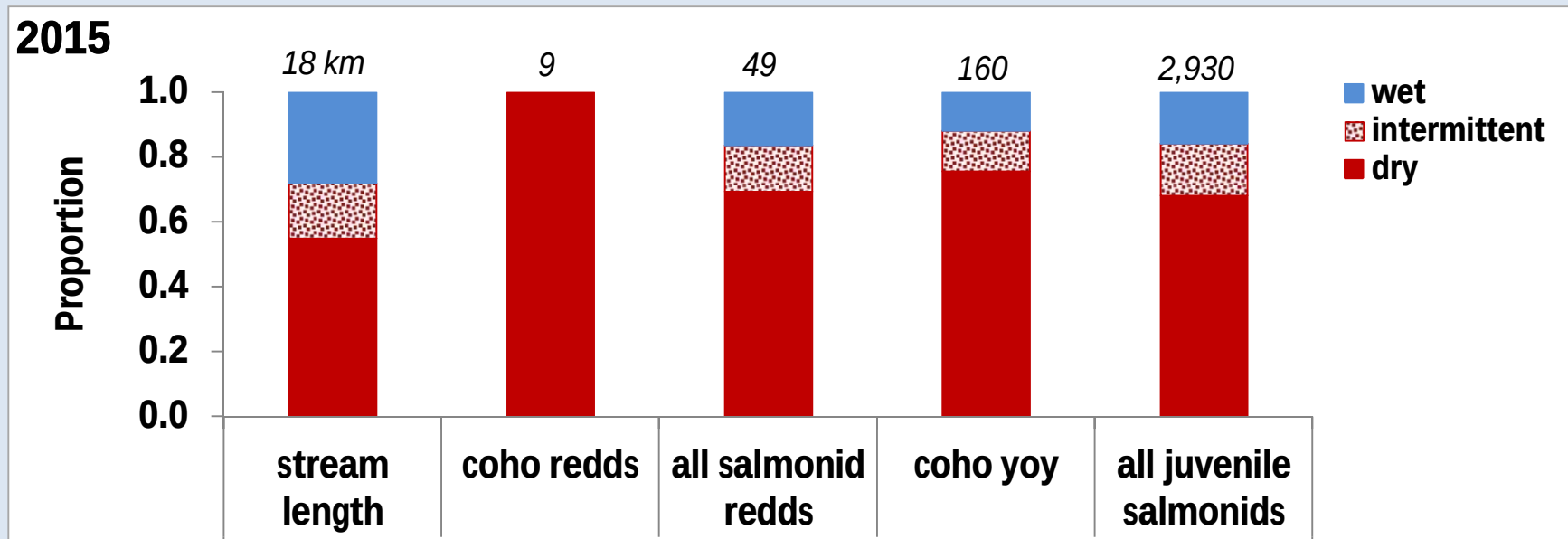
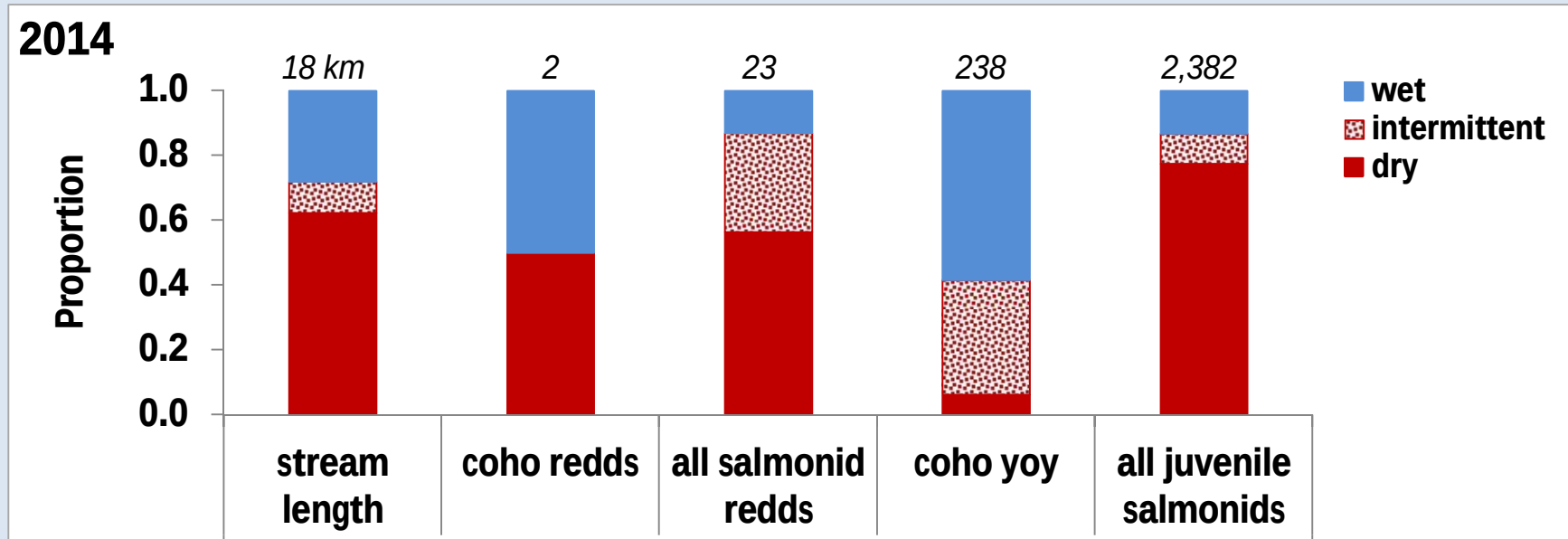
No Low Flow Data

0 0.5 1 Miles



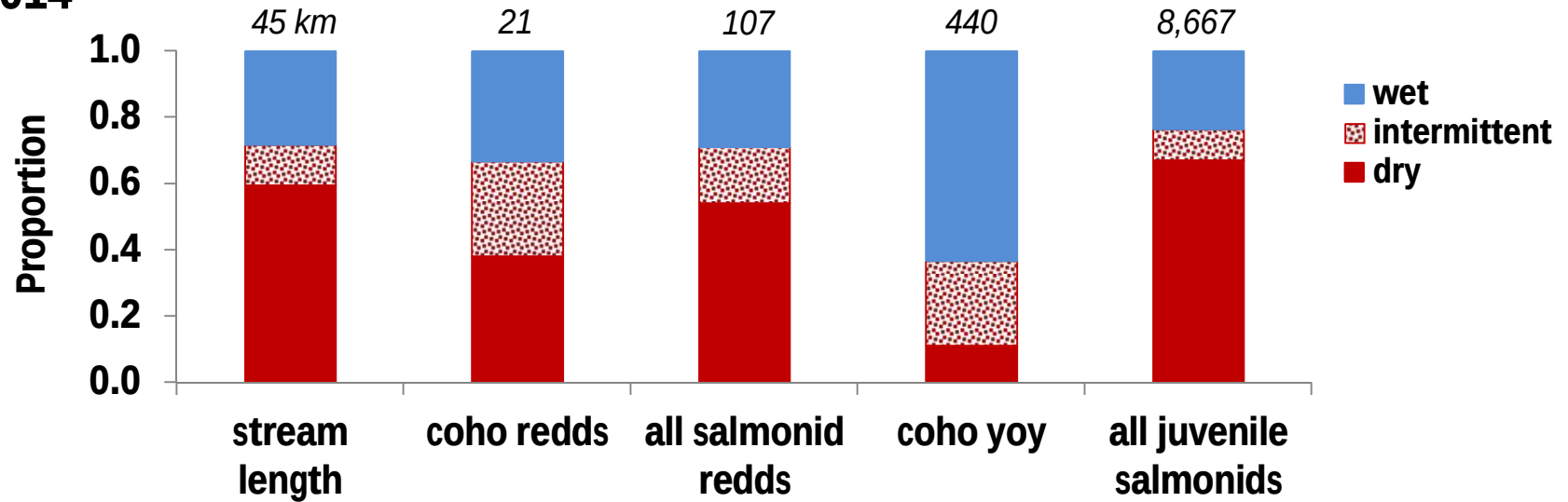
Projection: NAD 1983 UTM Zone 10N
 Source: Imagery and DEM Hillshade (University of Maryland-Sonoma Co. Veg. Map), Streams Layer (County of Sonoma)
 Map Prepared By: Andrew Bartshire, California Sea Grant
 Map Name: LowFlow_SS_SN_Template Date Printed: 10/20/15

Results: Mill Creek

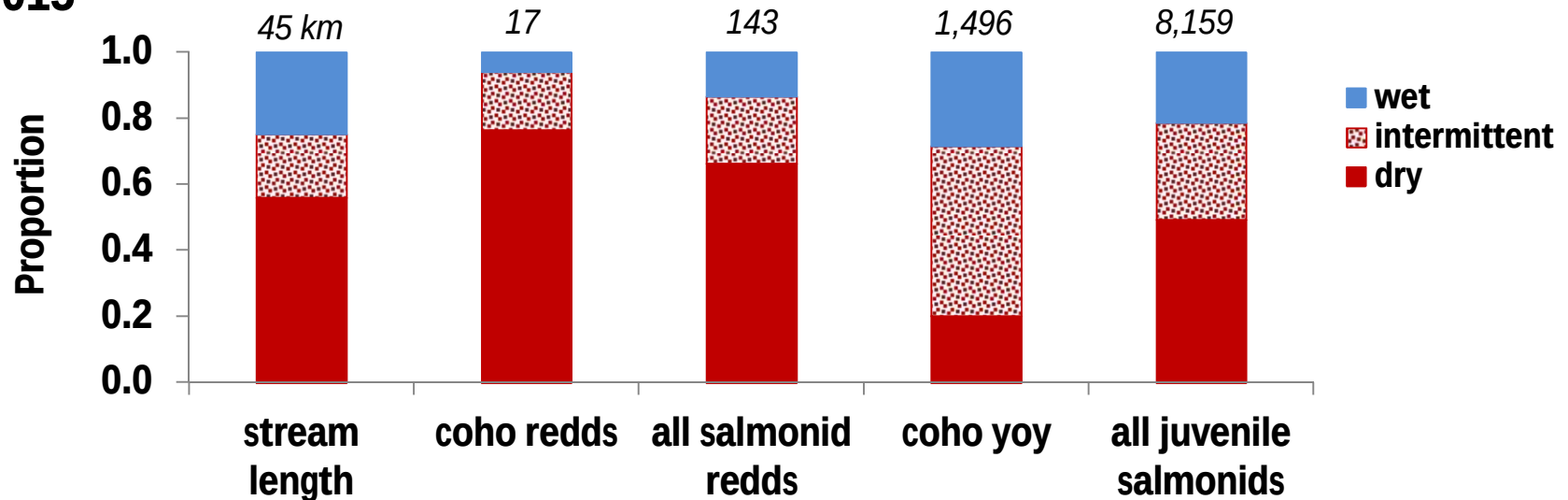


Results: all streams

2014

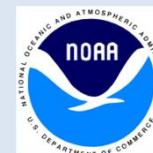


2015



Russian River Coho Salmon Water Resources Partnership

- **Stream flow monitoring and hydrological modeling (CEMAR)**
- **Outreach & education (RCDs)**
- **Project design and implementation (RCDs, OAEC)**
- **Development of policy solutions (TU)**
- **Coho salmon monitoring (CA Sea Grant)**
- **Water management planning (all)**



Acknowledgements

- **Funding Sources:**

U.S. Army Corps of Engineers

CA Department of Fish and Wildlife

National Fish and Wildlife Foundation

NOAA Restoration Center

Sonoma County Water Agency

County of Sonoma

- **Field and Hatchery Crews**
- **Cooperating Landowners**
- **Watershed Stewards Project**

