

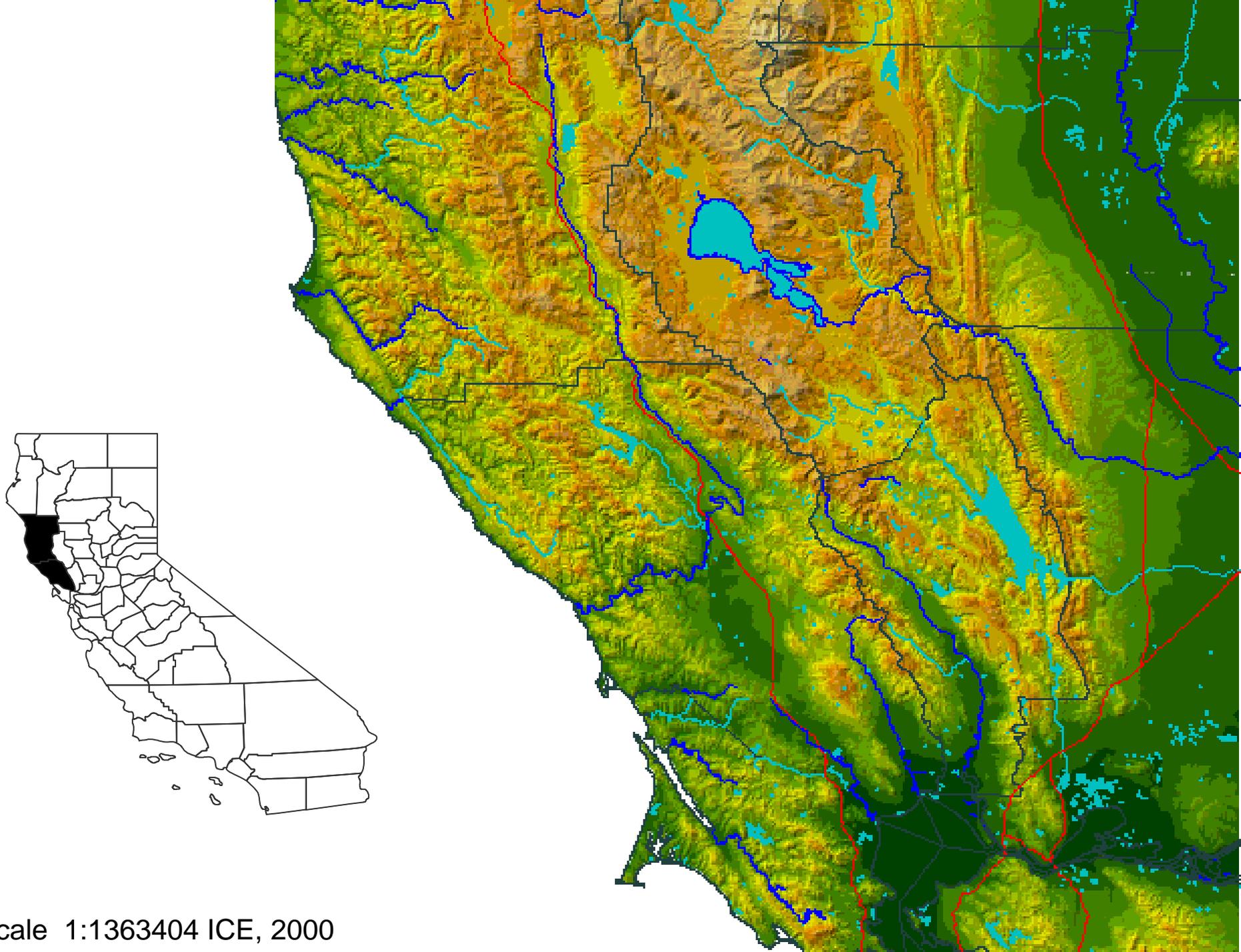
An aerial photograph of a valley in Mediterranean California. A river flows through the center, surrounded by lush green vineyards and agricultural fields. In the background, there are rolling hills and mountains under a clear sky. The foreground shows more detailed views of the vineyards and some farm buildings.

Meeting Water Needs for Irrigated Agriculture in a Salmon Bearing Stream of Mediterranean California

David Lewis, Glenn McGourty, Juliet Christian Smith, John Harper, Rachel Elkins, Jim Nosera, Prahlada Papper, Roland Sanford, Larry Schwankl, Terry Prichard

USDA CSREES 2008 National Water Conference





Scale 1:1363404 ICE, 2000





Coho Ecological Significant Units

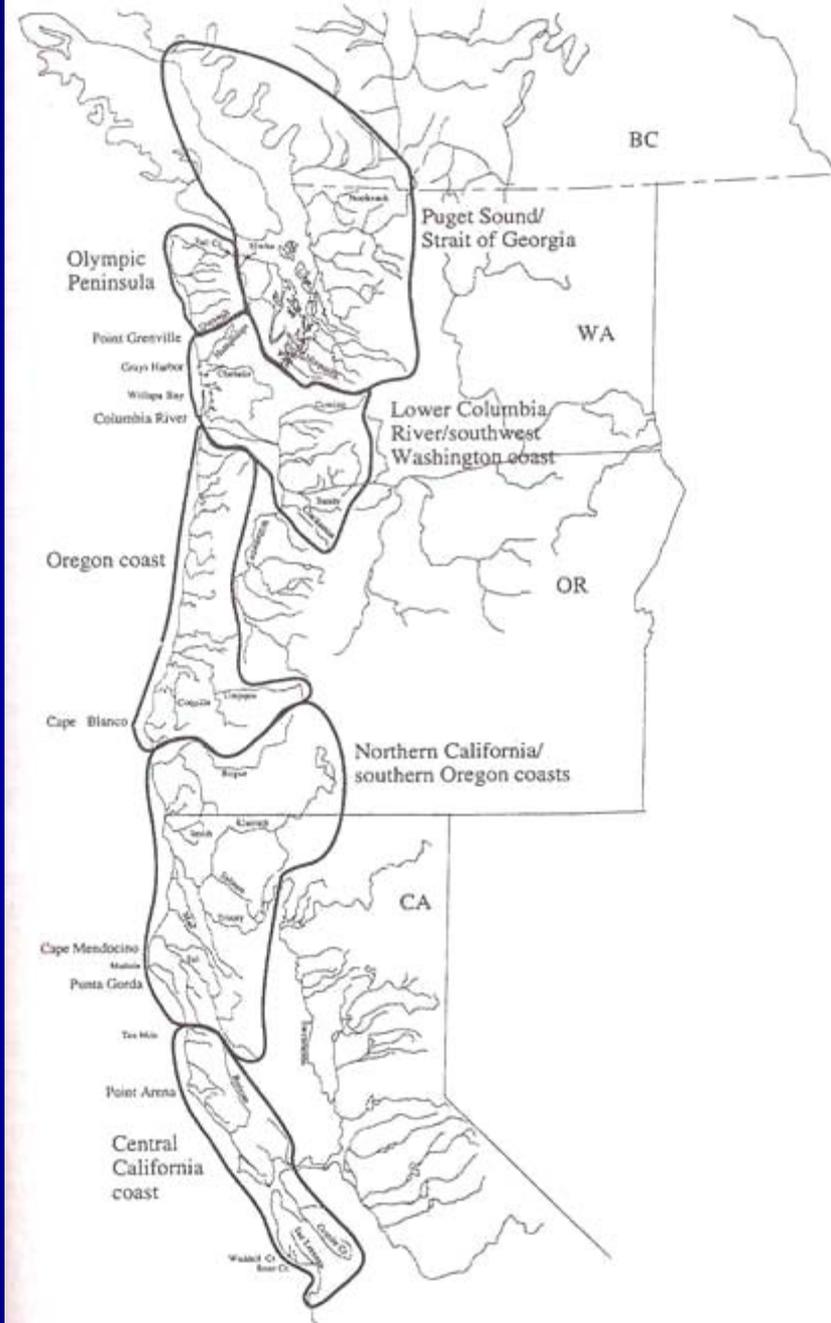
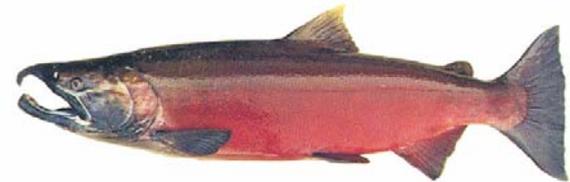
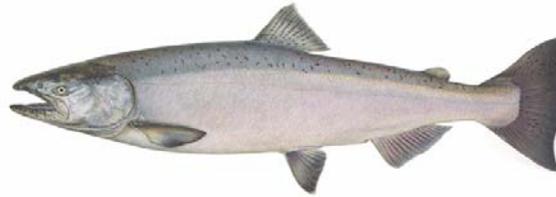


FIGURE 10.1 Proposed west coast coho salmon evolutionarily significant units (reproduced from Weitkamp et al. 1995).

Coho

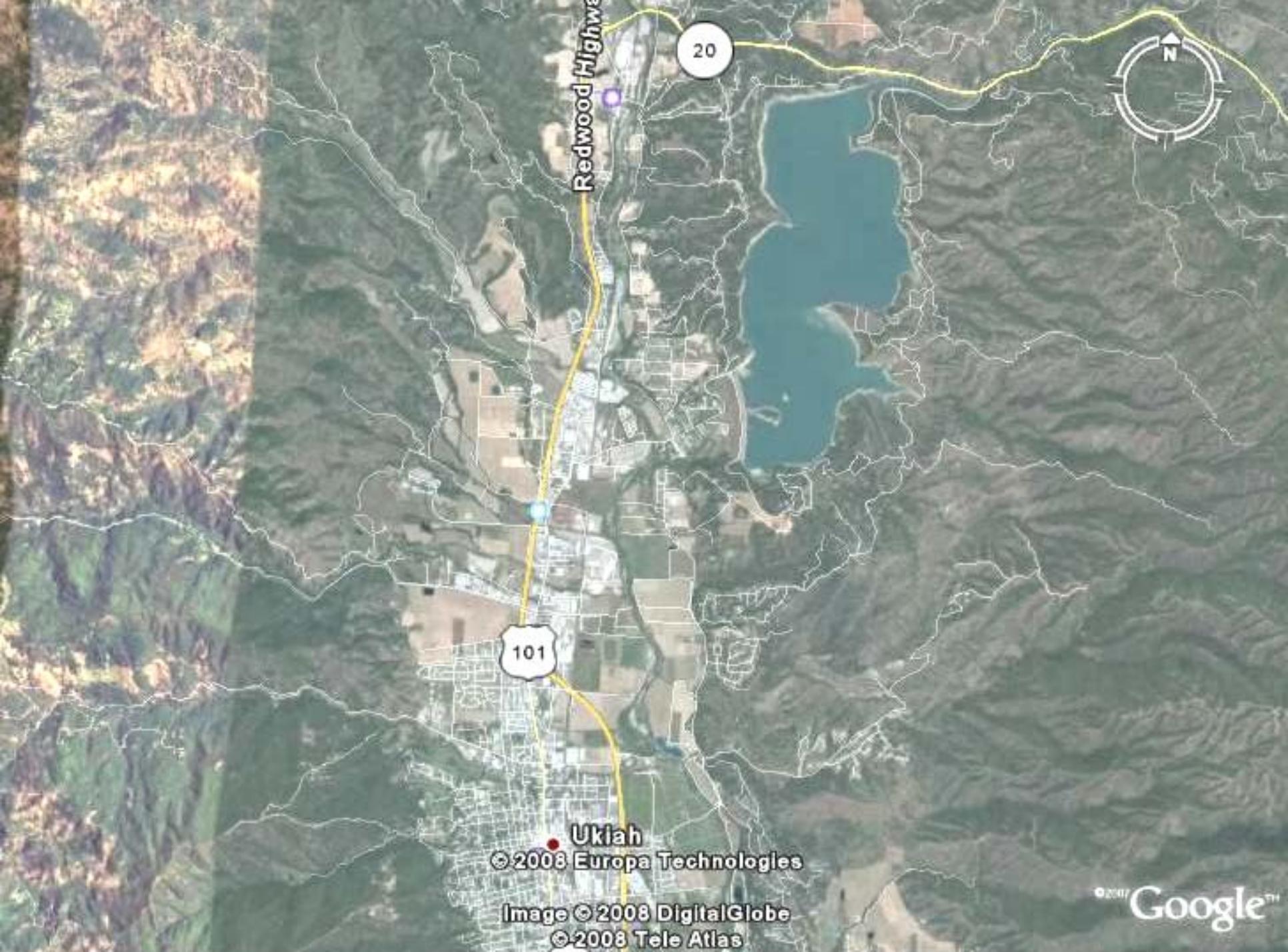


Chinook



Steelhead





Redwood Highway

20

101

Ukiah

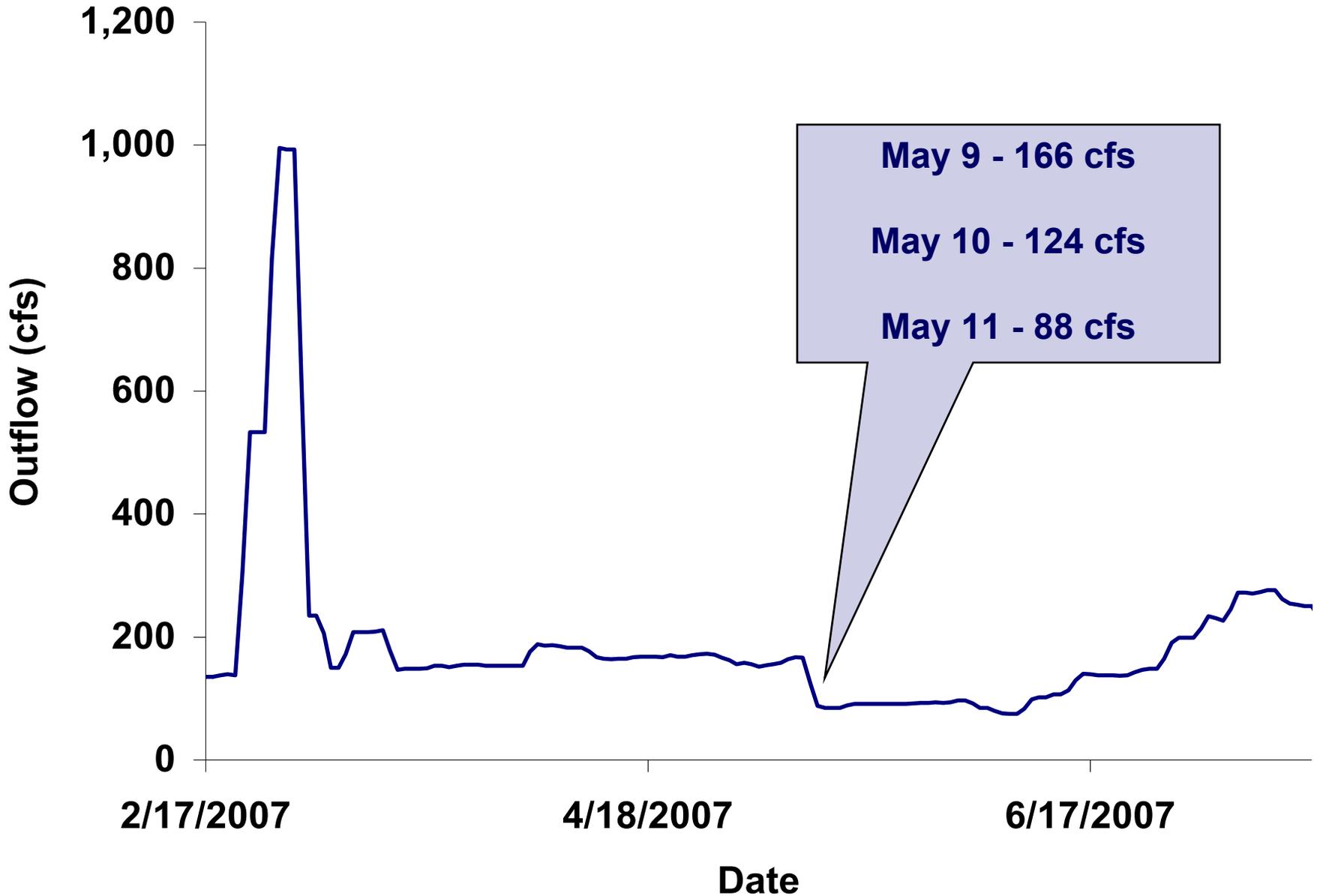
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Image © 2008 DigitalGlobe

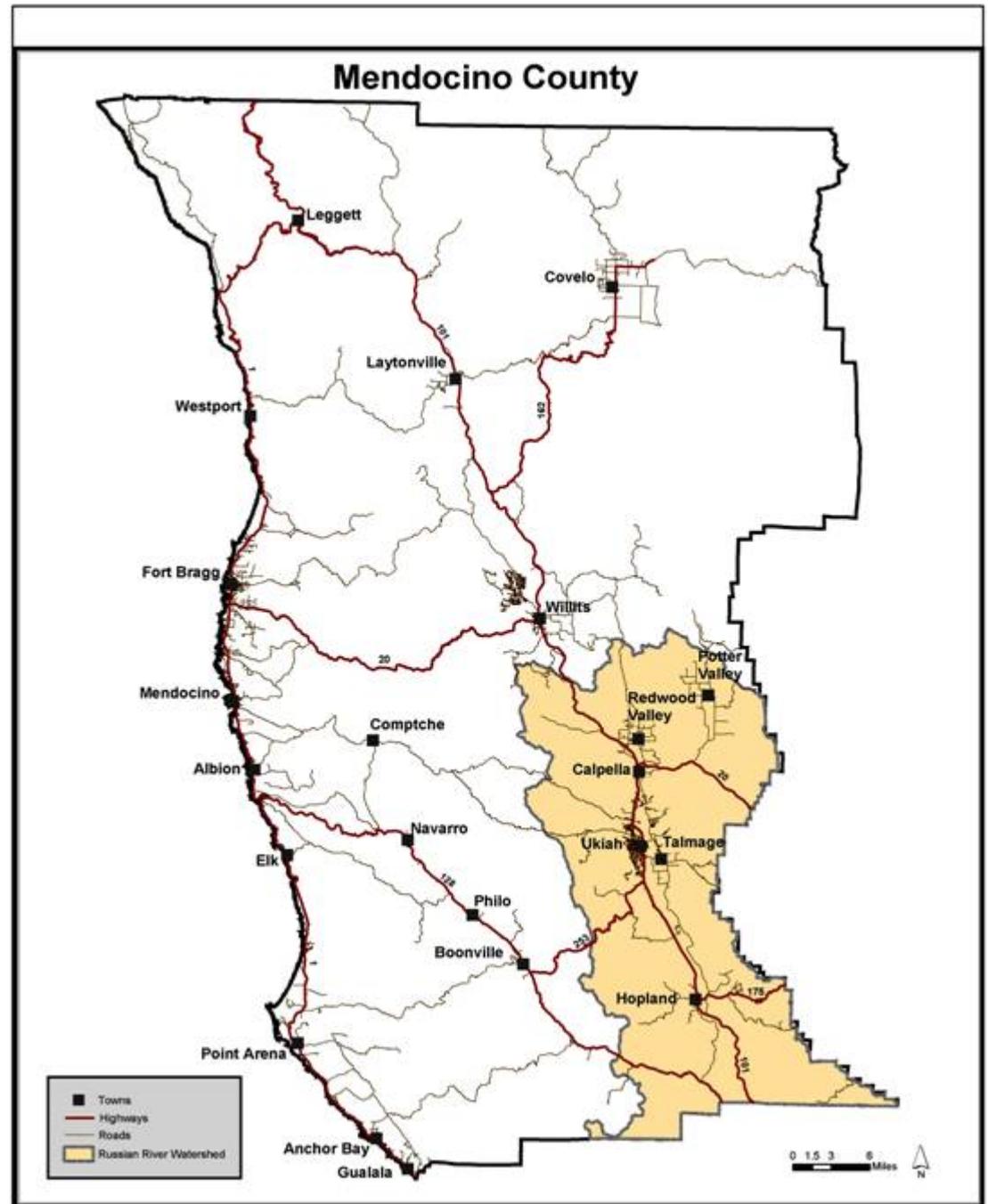
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Outflow reduced



Partnership with the Mendocino County Water Agency



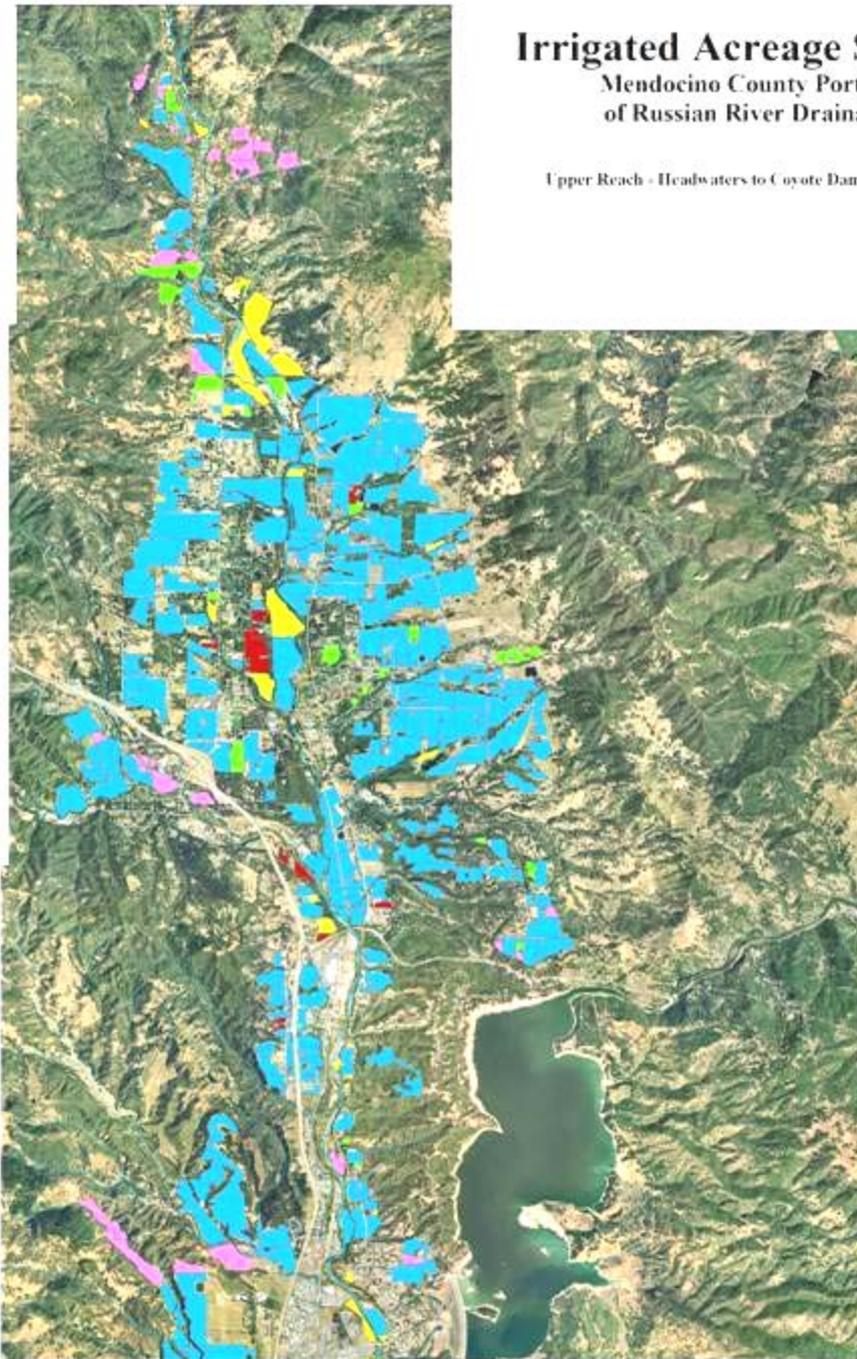
Project Purpose and Use of Results

- Provide portion of information needed to complete county-wide water supply/demand analysis
- Support agriculture in its continued efforts to secure and use water through feasible and sustainable means

Irrigated Acreage Survey

Mendocino County Portion of Russian River Drainage

Upper Reach - Headwaters to Coyote Dam Confluence



Map Information

Project: Irrigated Acreage Survey
Map Scale: 1:25,000
Map Date: 2010
Map Author: [Name]
Map Contact: [Name]

Map Description:
This map shows the irrigated acreage in the Russian River drainage basin in Mendocino County, California. The map is based on the 2010 National Wetlands Inventory (NWI) and the 2010 National Irrigation Inventory (NII).

Map Legend:
Irrigated Acreage
Wetlands
Water

Irrigated Acreage

Color	Area (Acres)
Blue	1,234
Yellow	567
Red	890
Green	1,567
Pink	2,345

Map Scale: 1:25,000
Map Date: 2010
Map Author: [Name]
Map Contact: [Name]



Initial Map Estimate

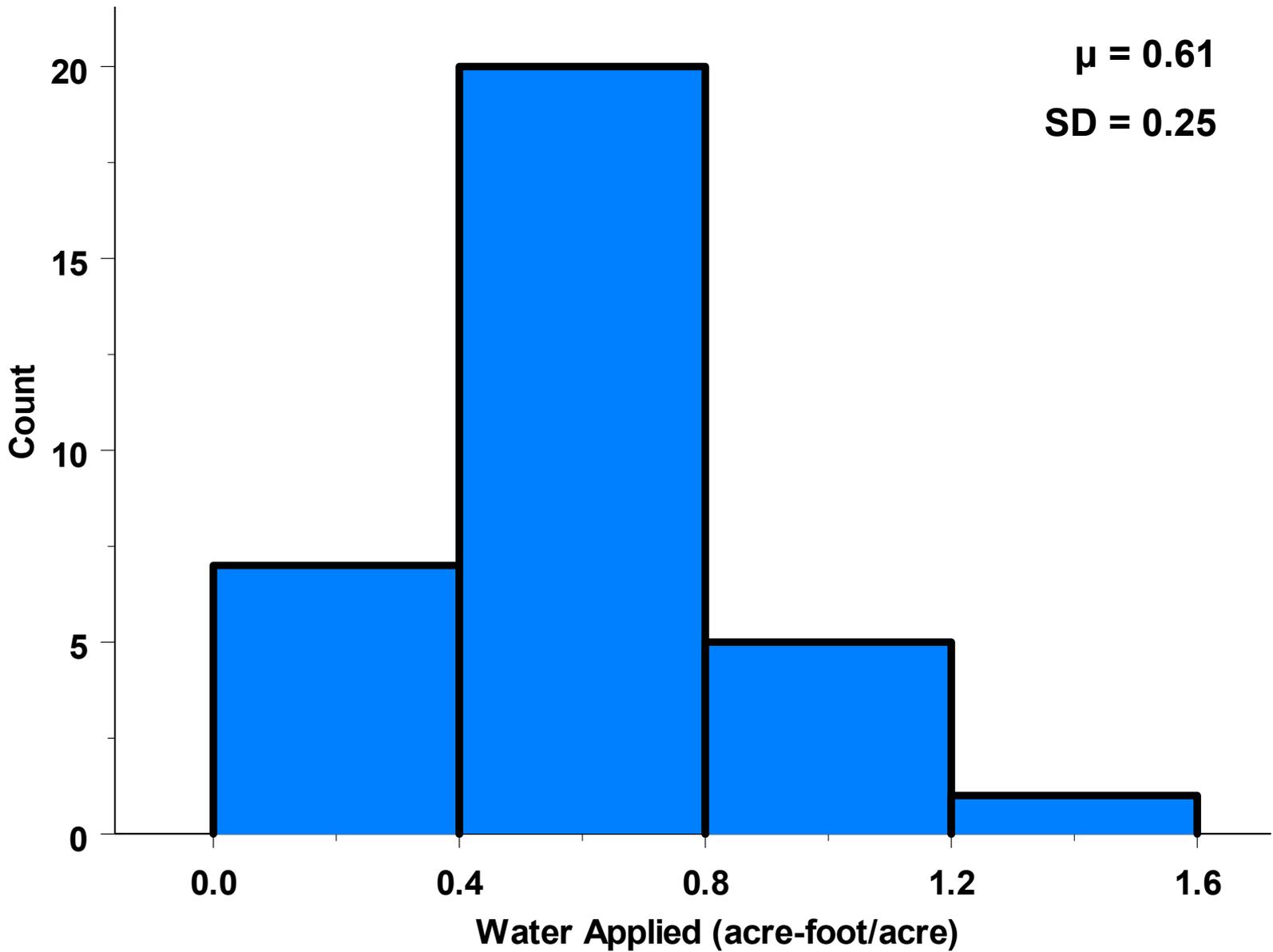
Crop	<u>Acreeage</u>			<u>Water Demand</u>			
	Upper	Middle	Lower	Totals	Rate (af/ac)	% Irrigated	Annual Total (afa)
Grapes	3,987	9,615	106	13,708	1.0	90	12,337
Orchards	126	1,543	0	1,669	2.0	100	3,338
Pastures	242	92	124	458	2.0	100	916
Row Crops	0	9	0	9	2.0	100	19
Unidentified	<u>185</u>	<u>2</u>	<u>0</u>	<u>187</u>	2.0	100	<u>374</u>
Subtotals	4,540	11,261	230	16,031			16,984
Potentially Irrigable Lands	<u>278</u>	<u>246</u>	<u>0</u>	<u>524</u>	1.5	100	<u>786</u>
Totals	4,818	11,507	230	16,555			17,770



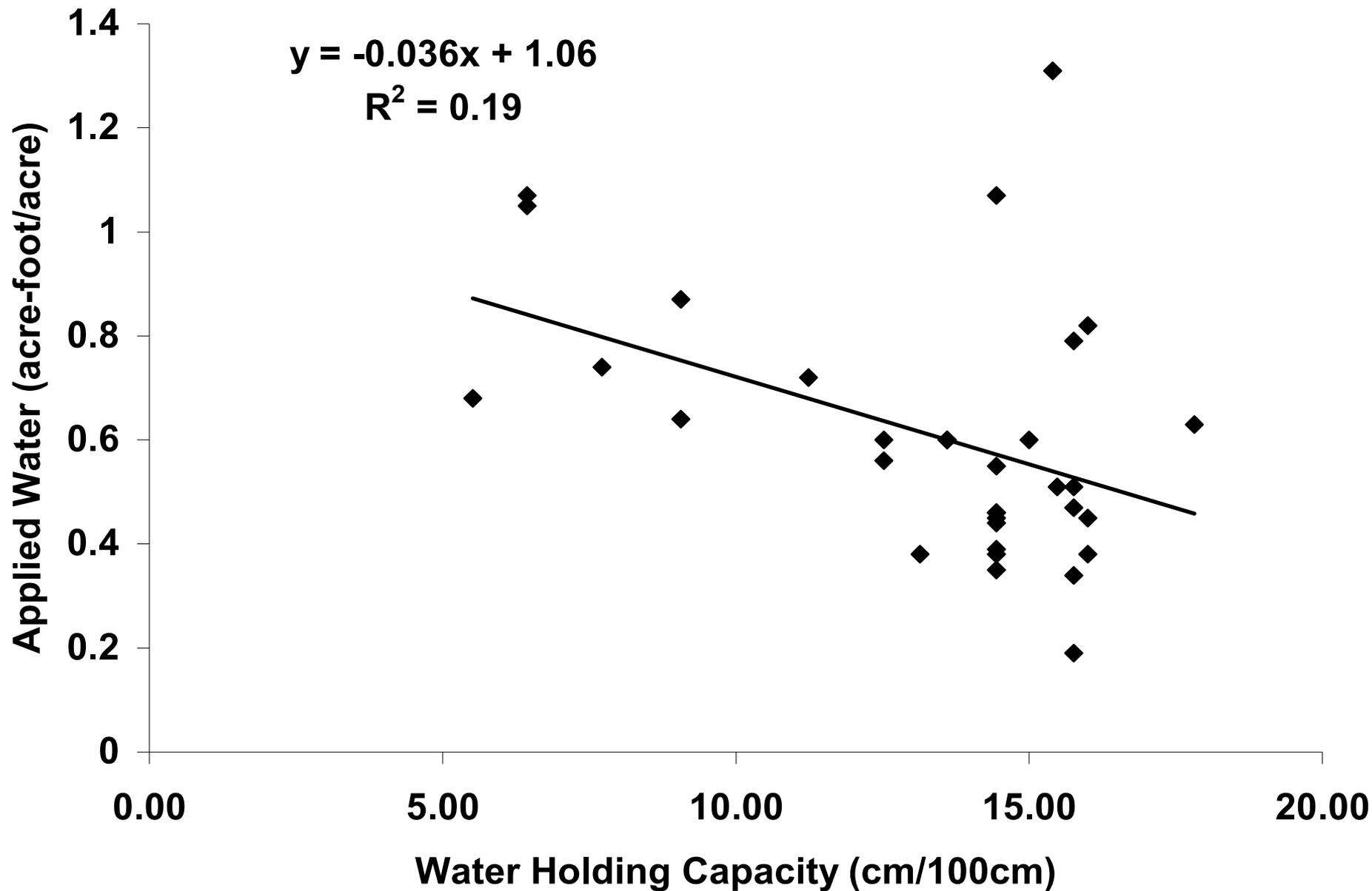
Field Evaluation

Crop	Growers	No. of Blocks	Acreage		
			Block	Irrigation System	Total
Grapes	15	33	300 (2.2%)	926 (7.5%)	4,681 (34%)
Pears	4	7	58 (3.4%)	120 (7.1%)	426 (26%)

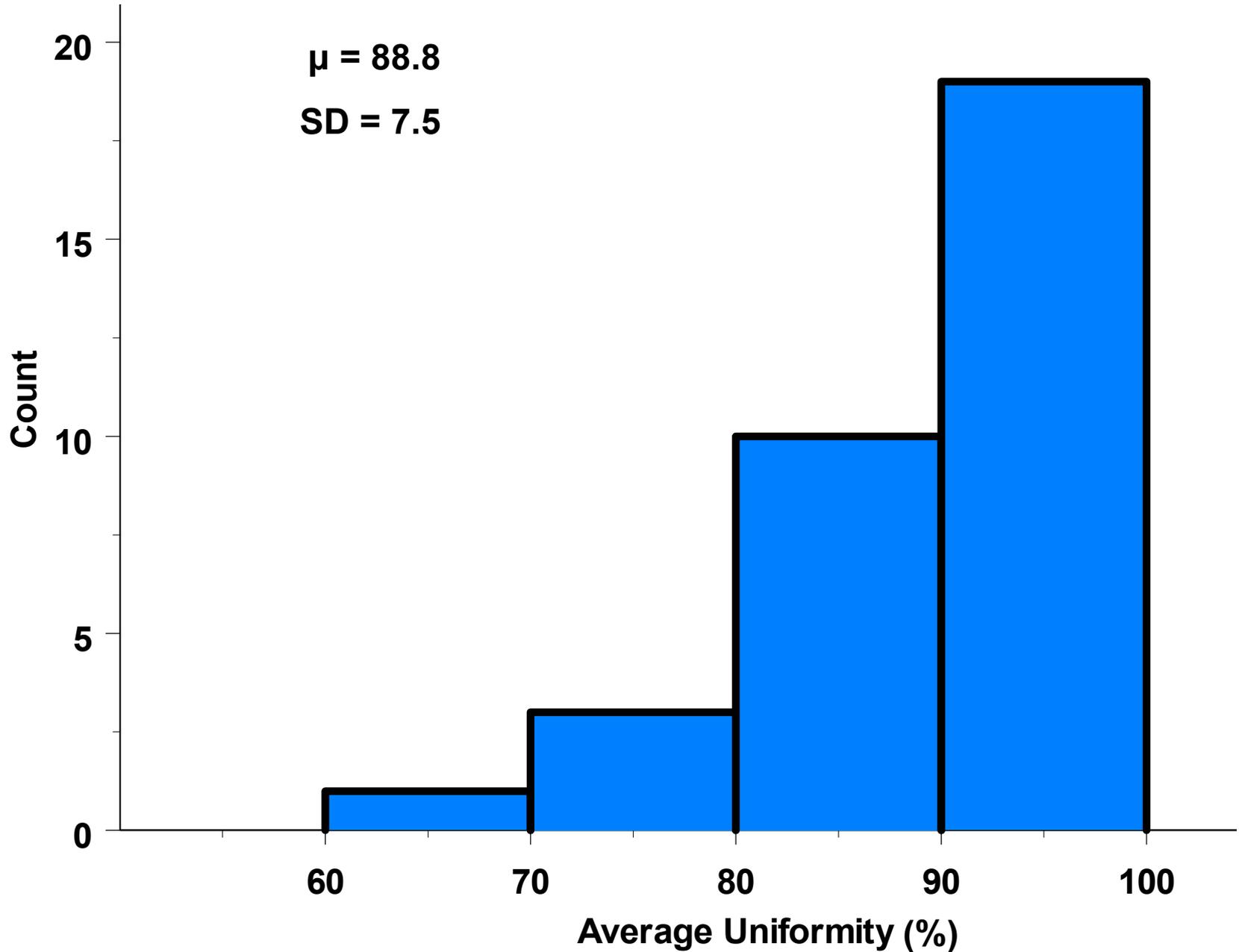
Application to meet grape crop demand



Soil Water Holding Capacity



Uniformity in Vineyards



Other Vineyard Water Uses

Frost Protection

2,954 acre-feet*

- 50 gals/min/acre X 3-11 hours X 5 -10 days X 5,623 acres
- Varietals with early bud break (e.g. chardonnay)
- Lowlands below 700 feet elevation

Heat Protection

1,844 acre-feet*

- 50 gals/min/acre X 2-3 hours X 29 days X 3,455 acres
- On 1 hour off 2-3 hours
- Noon to 6:00 (2 cycles)
- White fruit where irrigation system and water availability allow

Post Harvest

620 acre-feet*

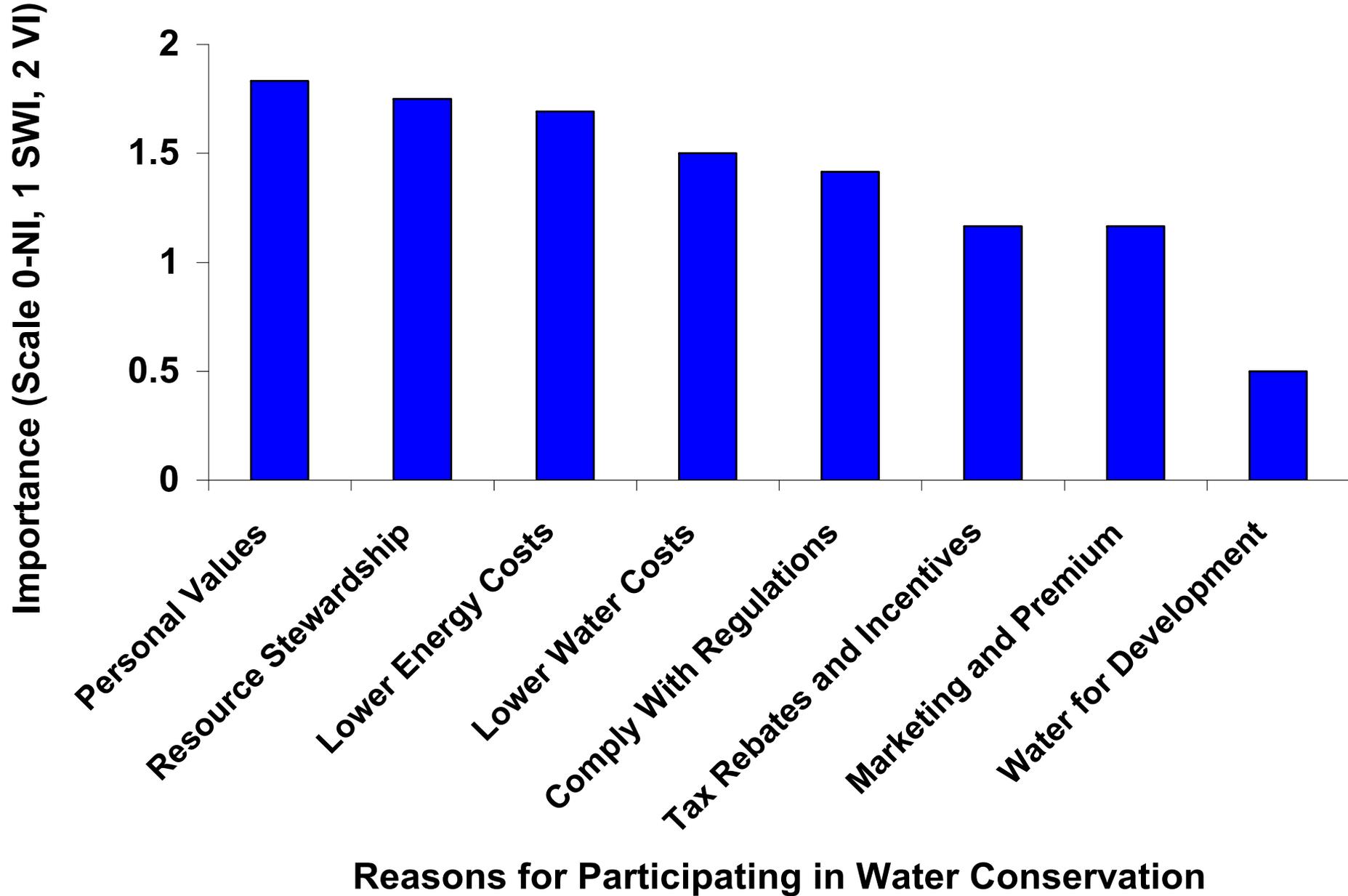
- 50 gals/min/acre X 36 hours X 1 event X 1,870 acres
- White fruit in Hopland, Ukiah, and Potter on deeper soils, cropped (5-6 tons/acre) on higher level, along Russian River

*Calculations include regional differences in needs for frost and heat protection and potential for post harvest application

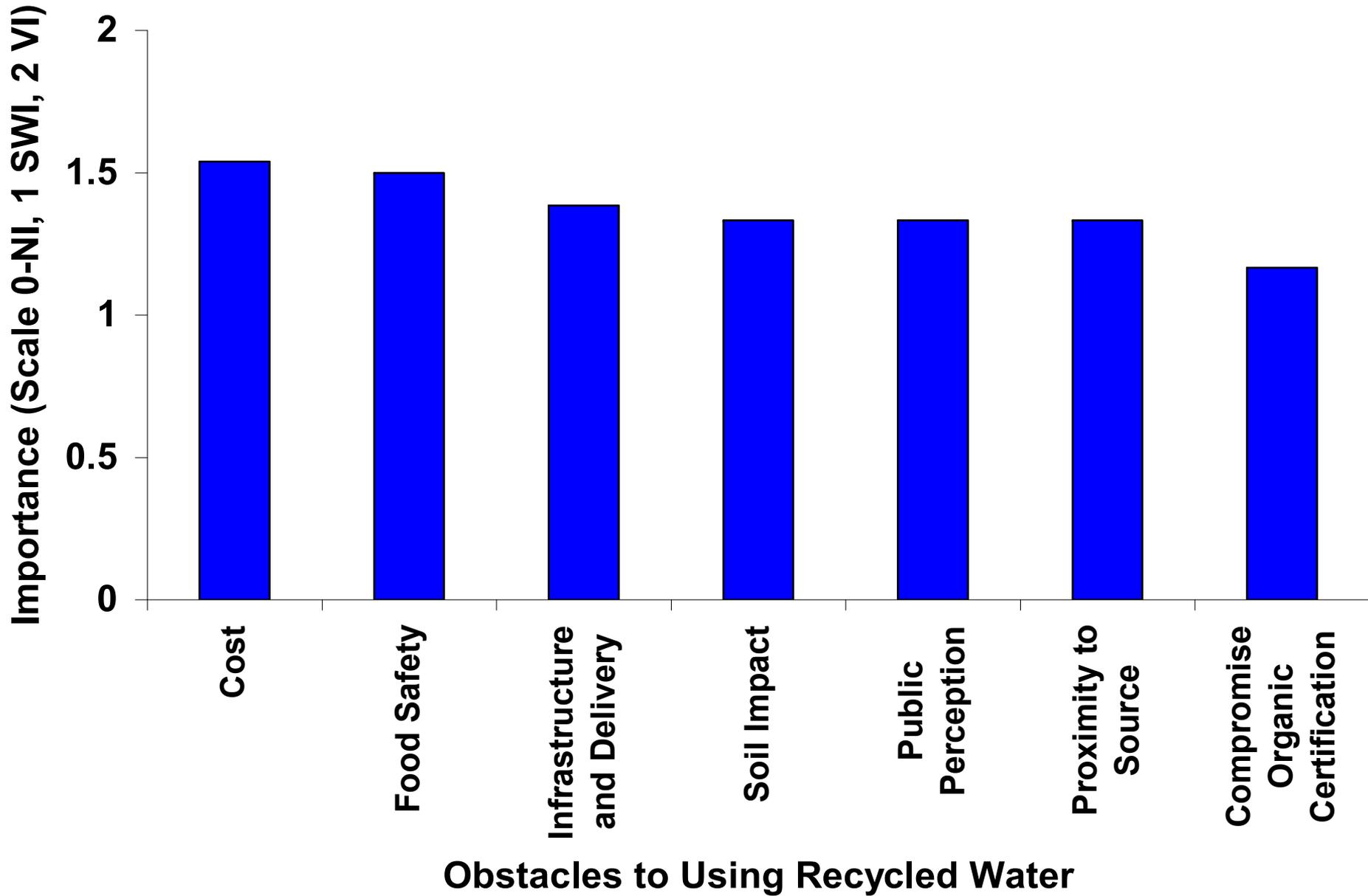
Grower Focus Groups and Survey

- Focus group meeting of 12 growers to conduct a guided survey (25 questions)
 - Transition from sprinkler to drip beginning in 70s and completed by 90s
 - Increased knowledge in water application
 - Use of on-farm weather data to regulate frost protection
 - Pulse water for heat protection
 - Water application and conservation decisions are now more than ever related to energy costs
 - Want to learn more
 - What is being achieved with post-harvest applications
 - What are the opportunities presented by recycled water (10 of 12 would use recycled water)

Water Conservation



Water Reuse



Summary Points

- Relatively high uniformity
- Rational water use for crop production
- Potentially less water demand than resource agency estimate
- Demand equals need to respond to contingencies
 - Shifts in crops grown and cultural objectives
 - Frost and heat protection
- Demonstrated adaptation and adoption of practices that can be used to meet demand
 - Shift to drip
 - Post-harvest application
 - Recycled water
- Differing of water uses that are synchronized with differing salmonid life stages