Exploring the Intersection of Land & Water Resources in California's San Joaquin Valley

As a Demonstration of the Capabilities of Data Basin for the San Joaquin Greenprint

A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

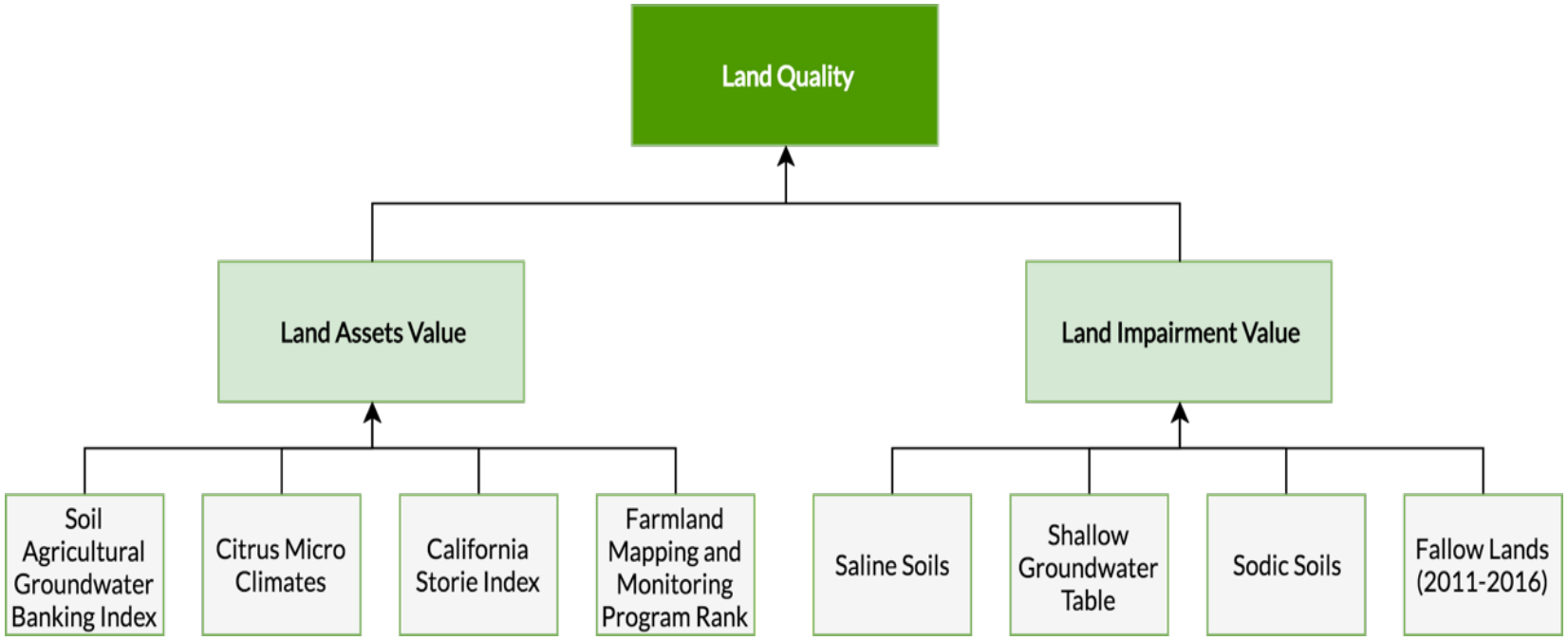
American Farmland Trust
Saving the Land that Sustains Us

Premise:
Both land and water are essential to agriculture

Combinations matter for successful resource management

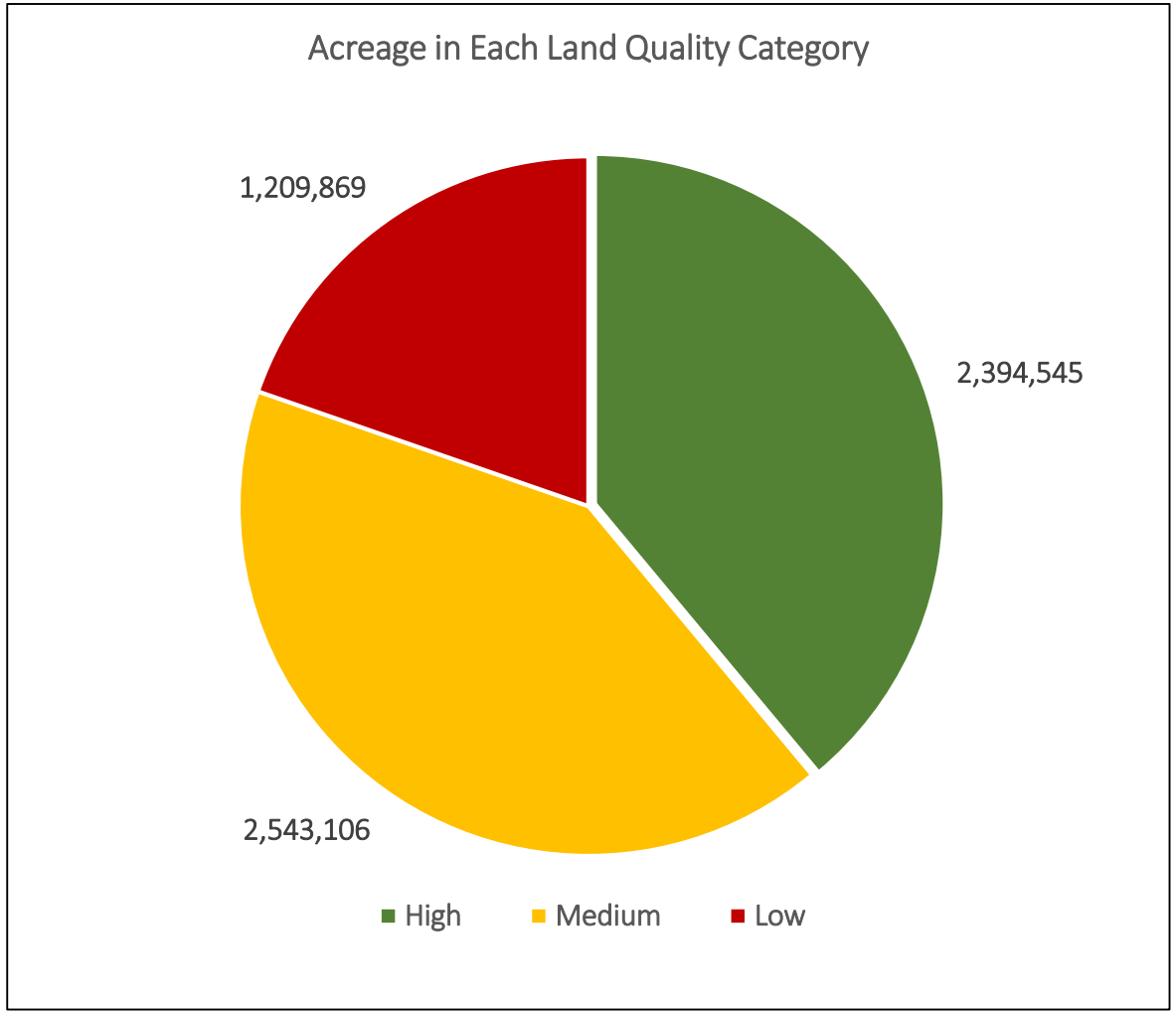
Land Quality

Land Quality Logic Model



Only 39% of agricultural land is high quality

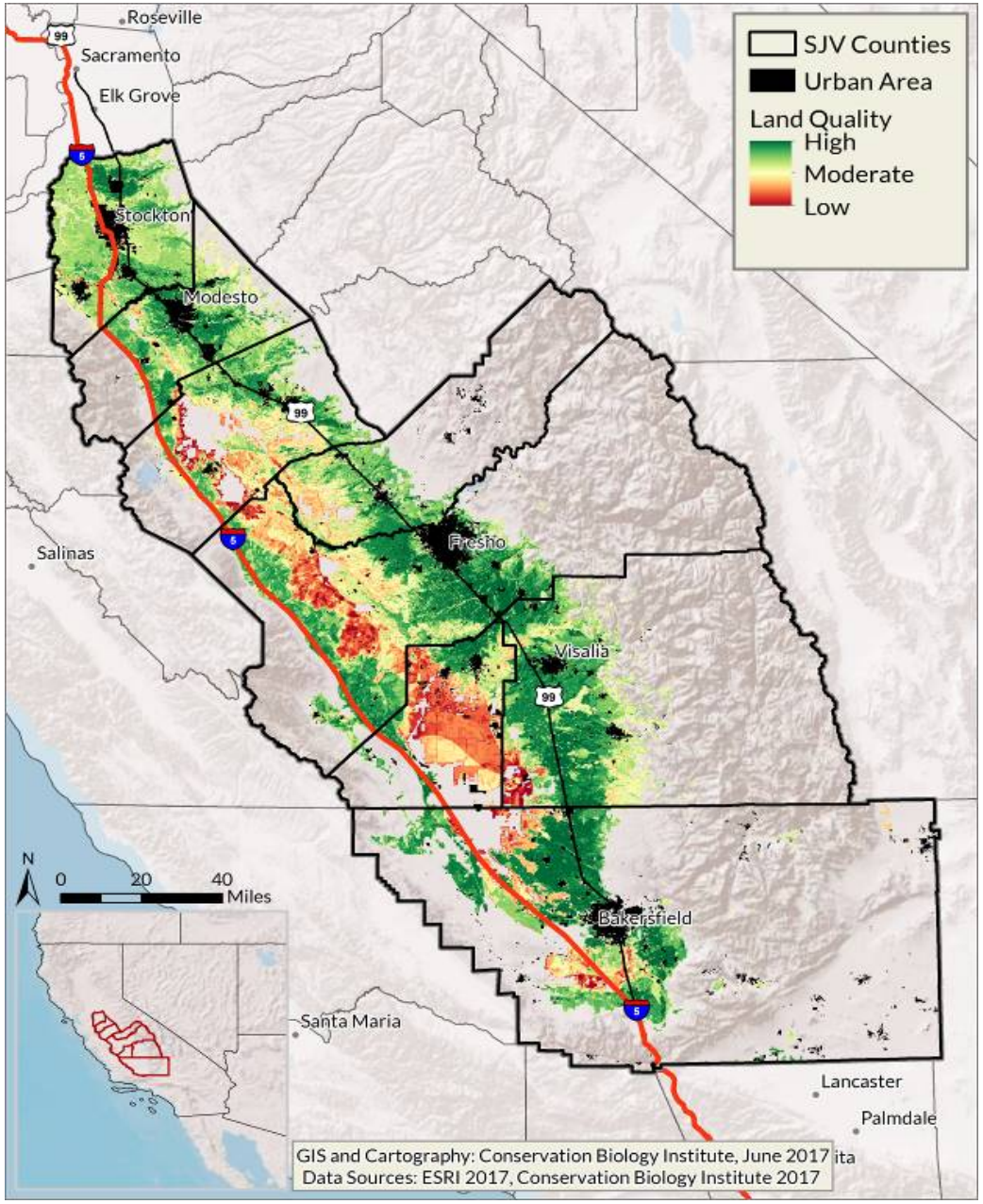
High-medium-low categories determined by Jenks method based on natural breaks in data



Profile would change if components of logic model were given different weights

Geography of land quality

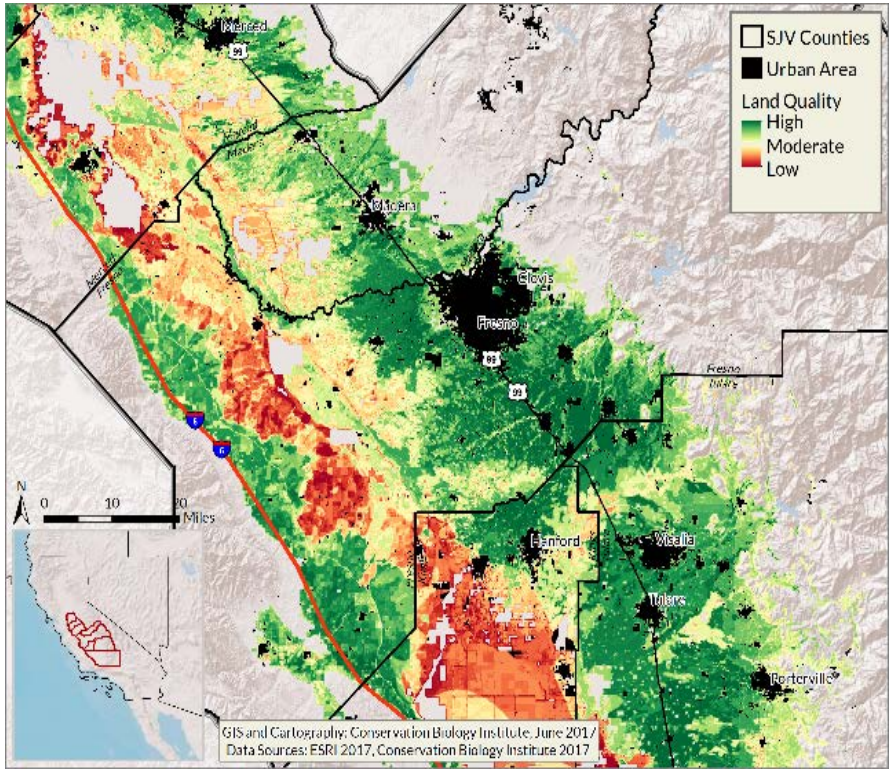
Highest quality land concentrated around cities along Highway 99 corridor



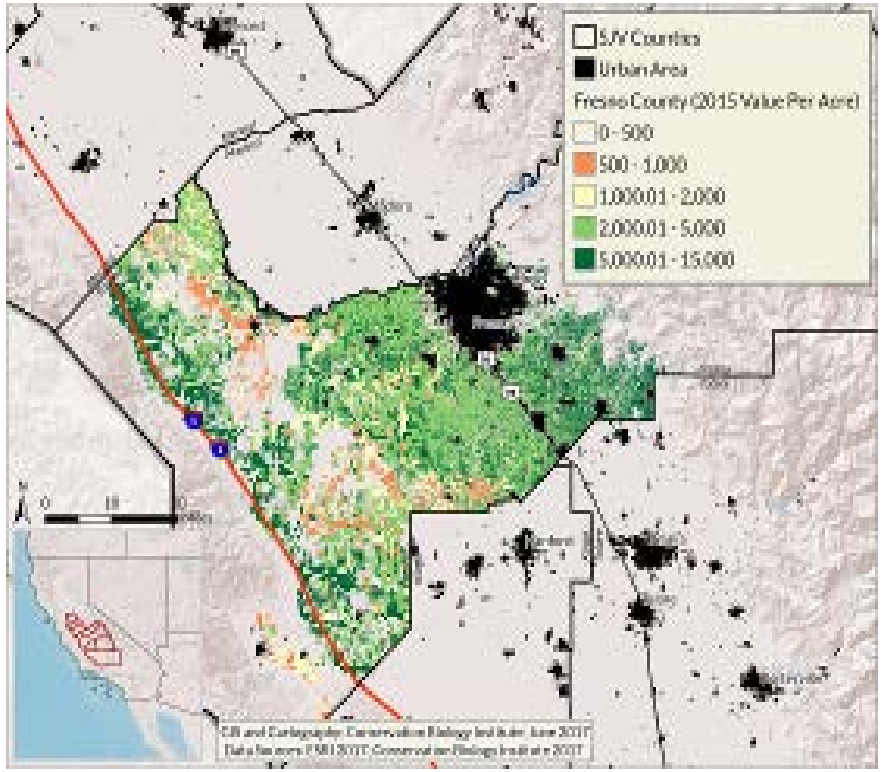
A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

American Farmland Trust
Saving the Land that Sustains Us

Comparison of Land Quality Logic Model to High Value Crop Pattern



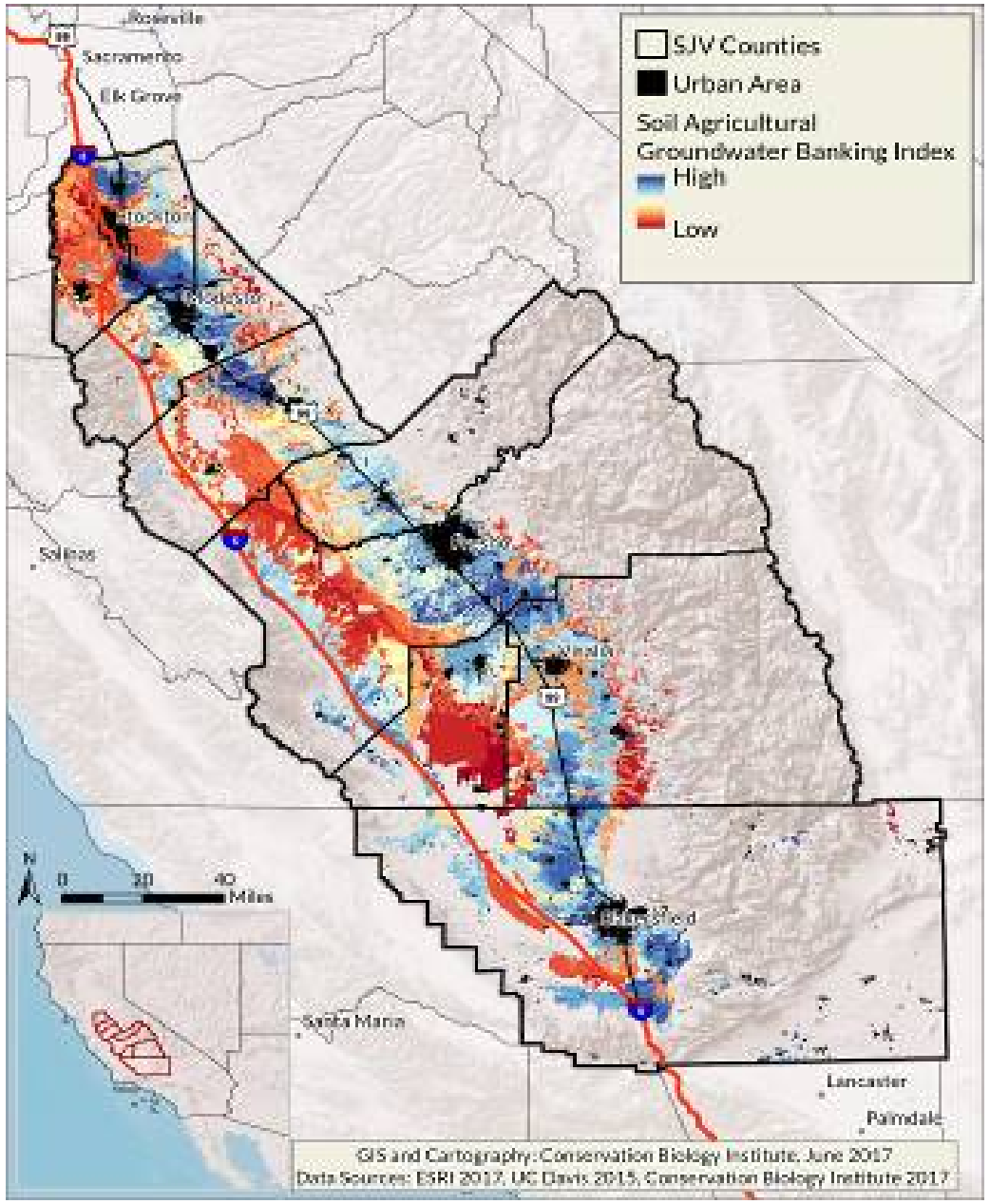
Land Quality Logic Model Results



Highest Value Crops

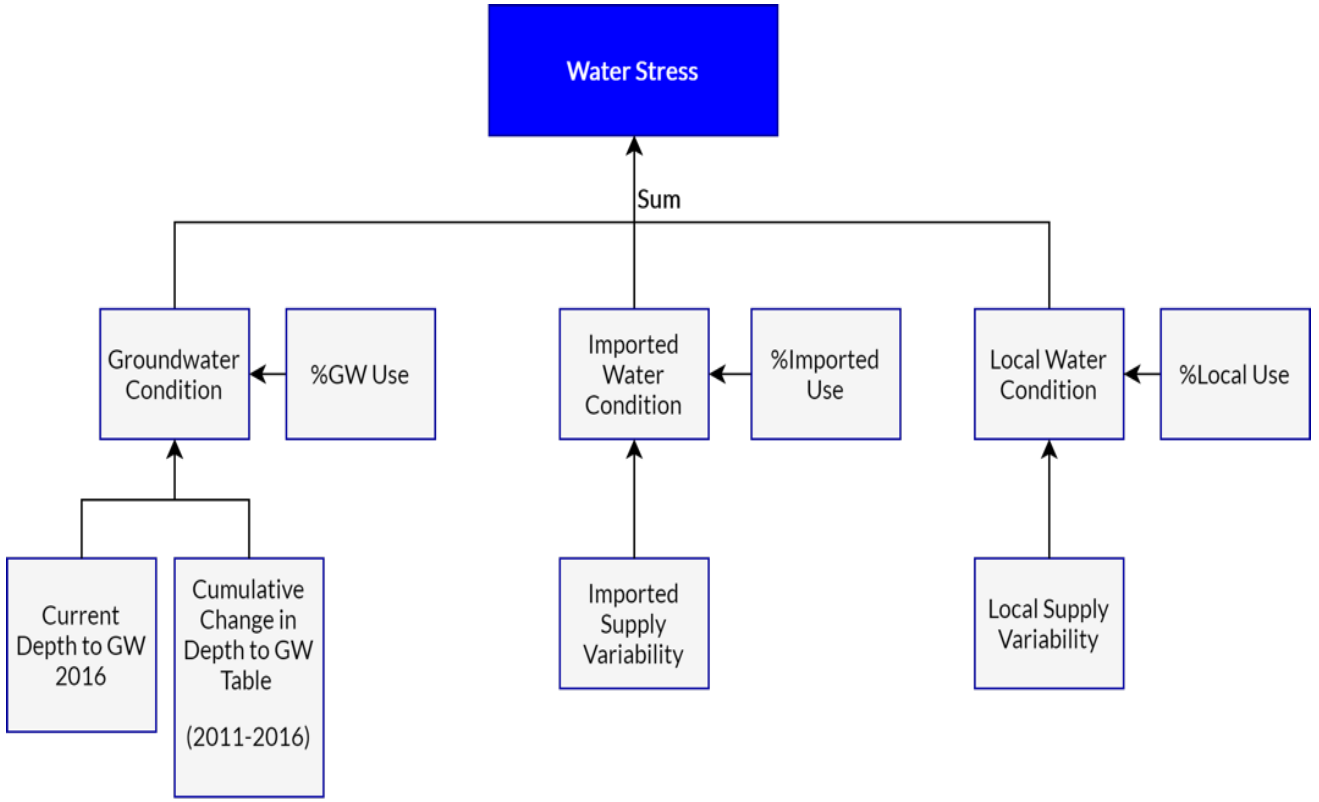
Most important groundwater recharge areas also located around cities

Direct linkage to water supplies

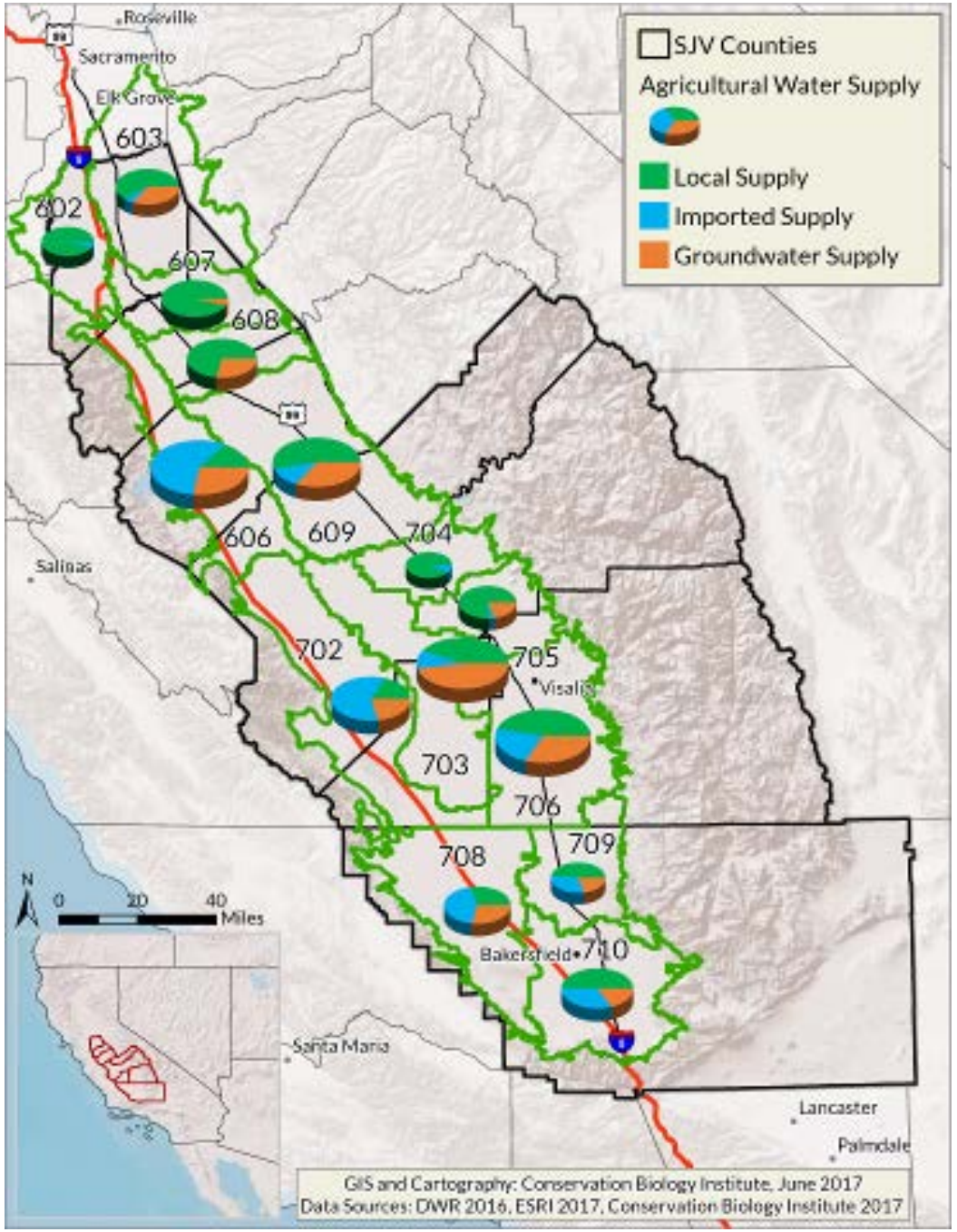


Water Stress

Water Stress Logic Model



Mix of Water Sources in San Joaquin Valley



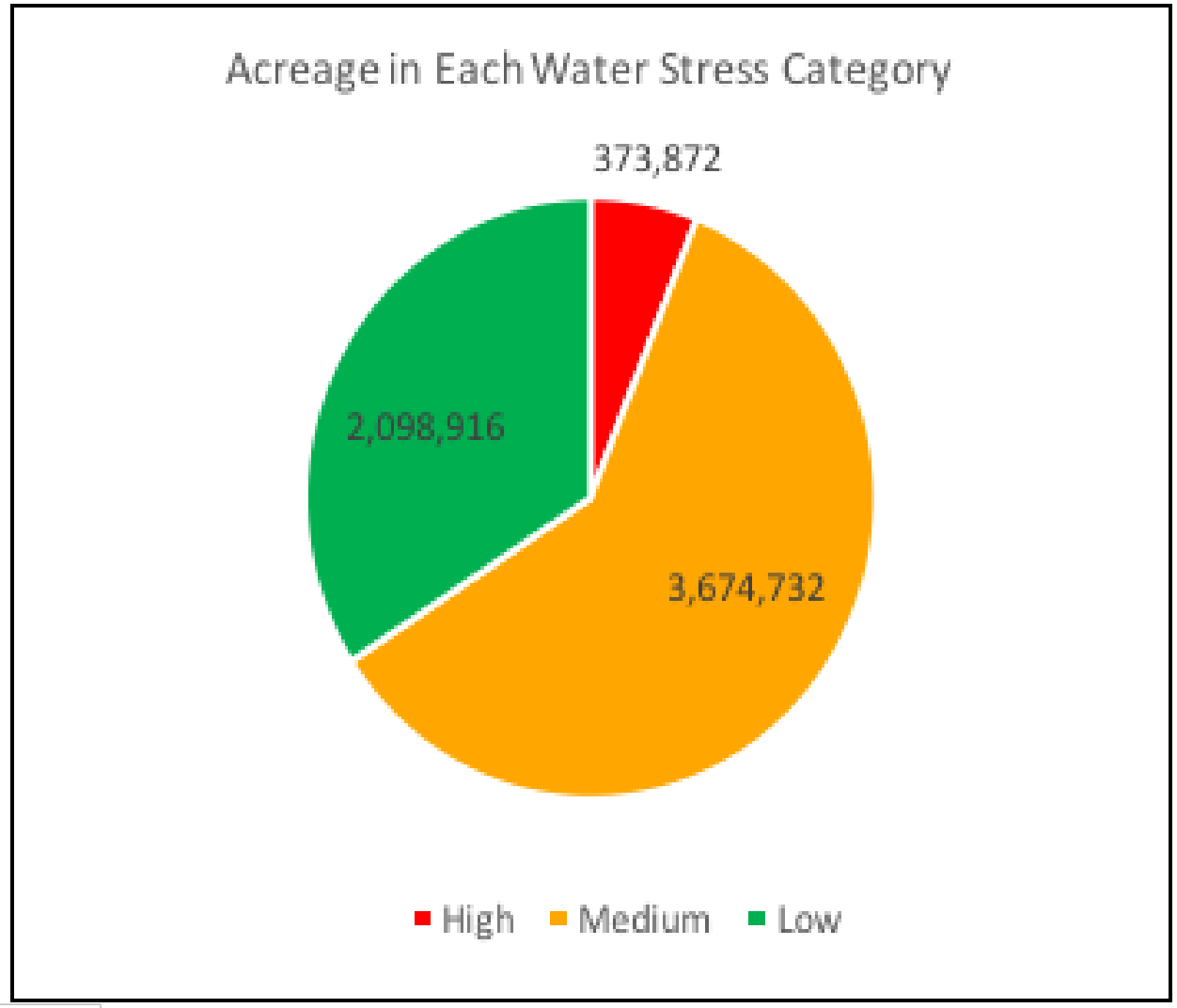
A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

American Farmland Trust
Saving the Land that Sustains Us

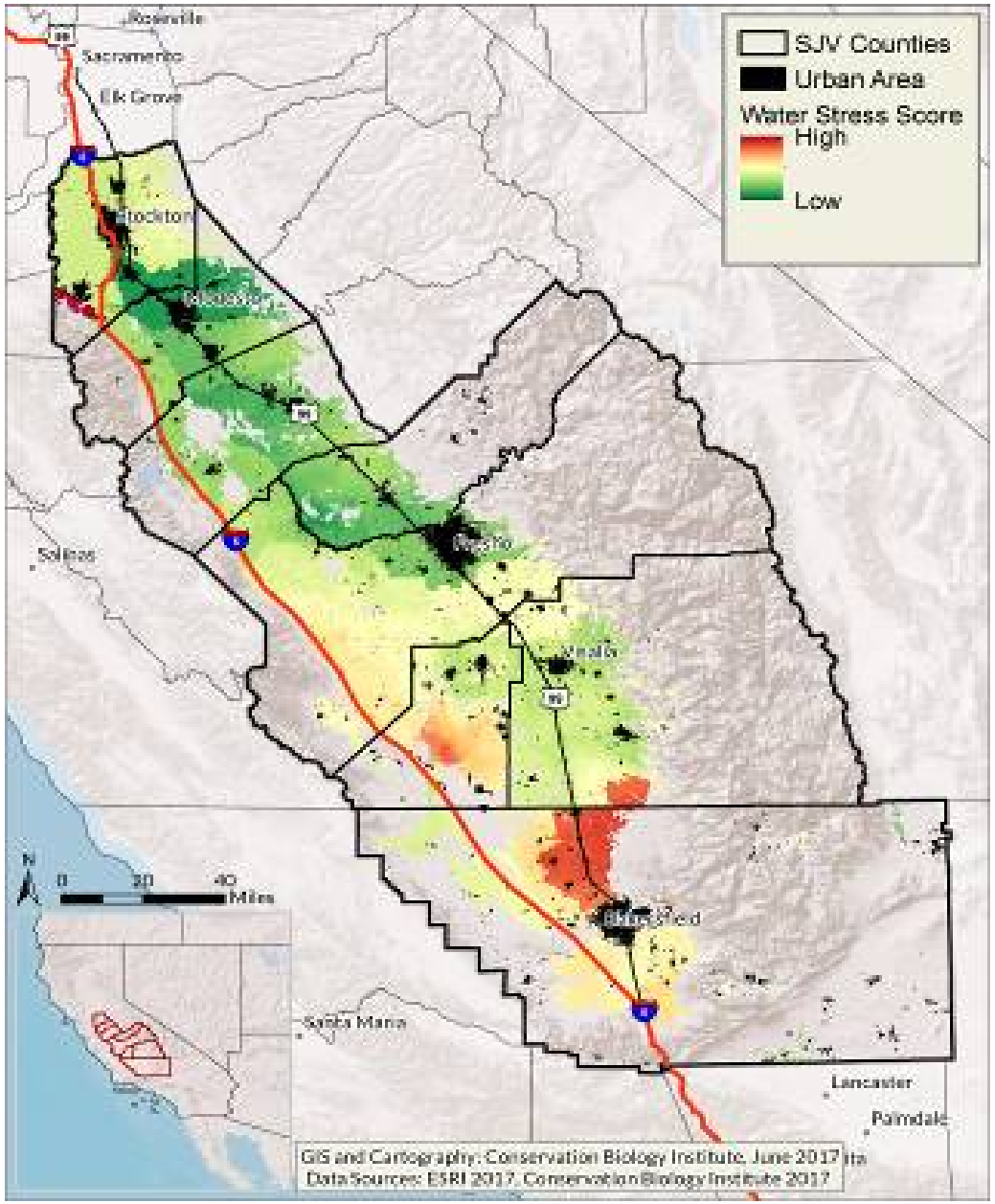
Water Stress Profile

Only 1/3 of acreage has low water stress levels

High-medium-low stress determined by Jenks method



Geography of water stress



Intersection

Intersection of Agricultural Land & Water Resources

Land Quality	Water Stress				% Low Water Stress	% High Water Stress
	Low	Medium	High	Total		
High	727,493	1,457,726	209,326	2,394,545	30%	9%
Medium	1,034,920	1,425,622	82,564	2,543,106	41%	3%
Low	336,503	791,384	81,982	1,209,869	28%	7%
Total	2,098,916	3,674,732	373,872	6,147,520	34%	6%
% High Land Quality	35%	40%	56%	39%		

Intersection of Agricultural Land & Water Resources

Land Quality	Water Stress				% Low Water Stress	% High Water Stress
	Low	Medium	High	Total		
High	727,493	1,457,726	209,326	2,394,545	30%	9%
Medium	1,034,920	1,425,622	82,564	2,543,106	41%	3%
Low	336,503	791,384	81,982	1,209,869	28%	7%
Total	2,098,916	3,674,732	373,872	6,147,520	34%	6%
% High Land Quality	35%	40%	56%	39%		

Only 12% of acreage is high quality land with low water stress

A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

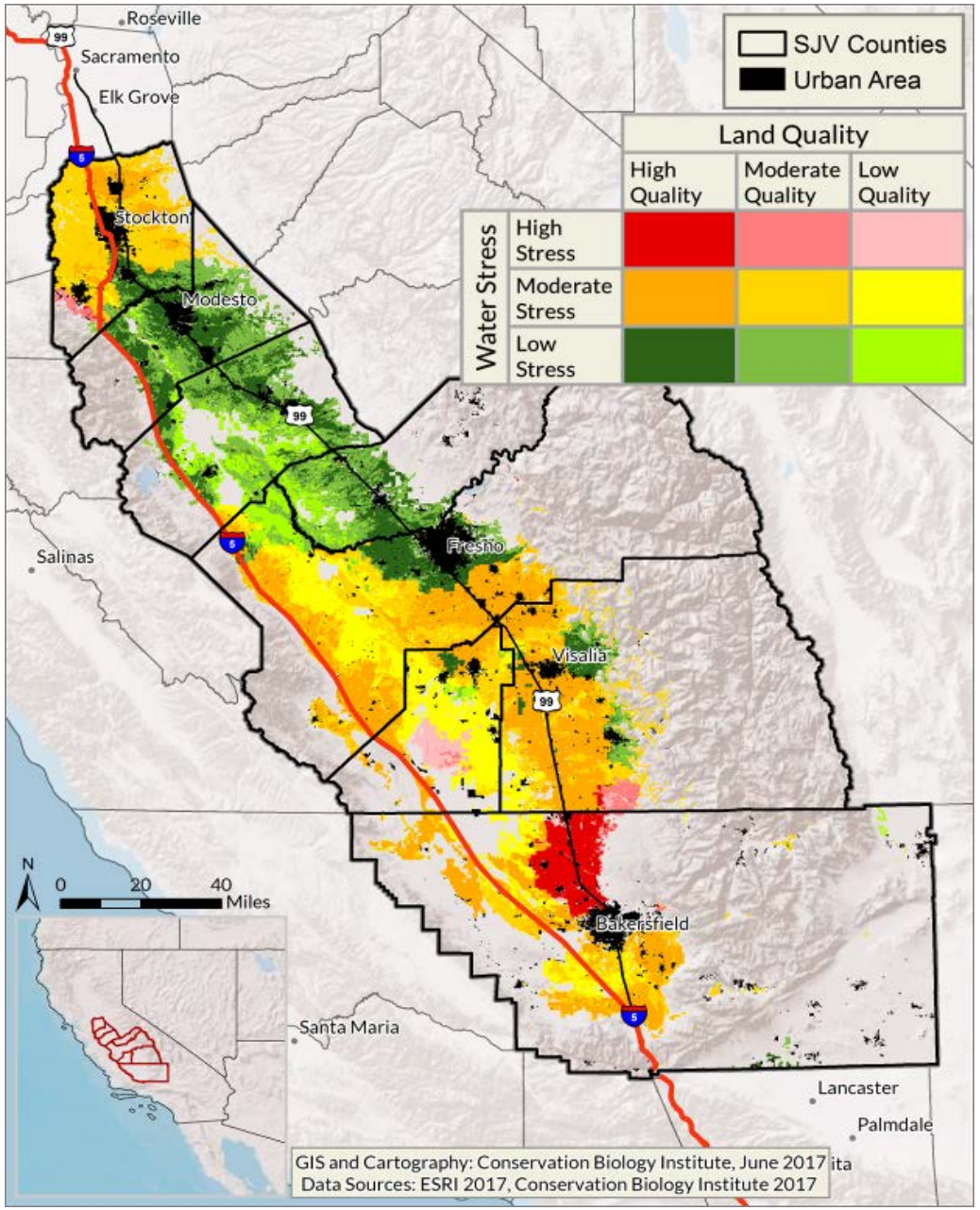
American Farmland Trust
Saving the Land that Sustains Us

Intersection of Agricultural Land & Water Resources

Land Quality	Water Stress				% Low Water Stress	% High Water Stress
	Low	Medium	High	Total		
High	727,493	1,457,726	209,326	2,394,545	30%	9%
Medium	1,034,920	1,425,622	82,564	2,543,106	41%	3%
Low	336,503	791,384	81,982	1,209,869	28%	7%
Total	2,098,916	3,674,732	373,872	6,147,520	34%	6%
% High Land Quality	35%	40%	56%	39%		

24% of acreage is either low quality land and/or has high water stress

Intersection of Agricultural Land & Water Resources



Colors indicate water stress level

Intensity indicates land quality

A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

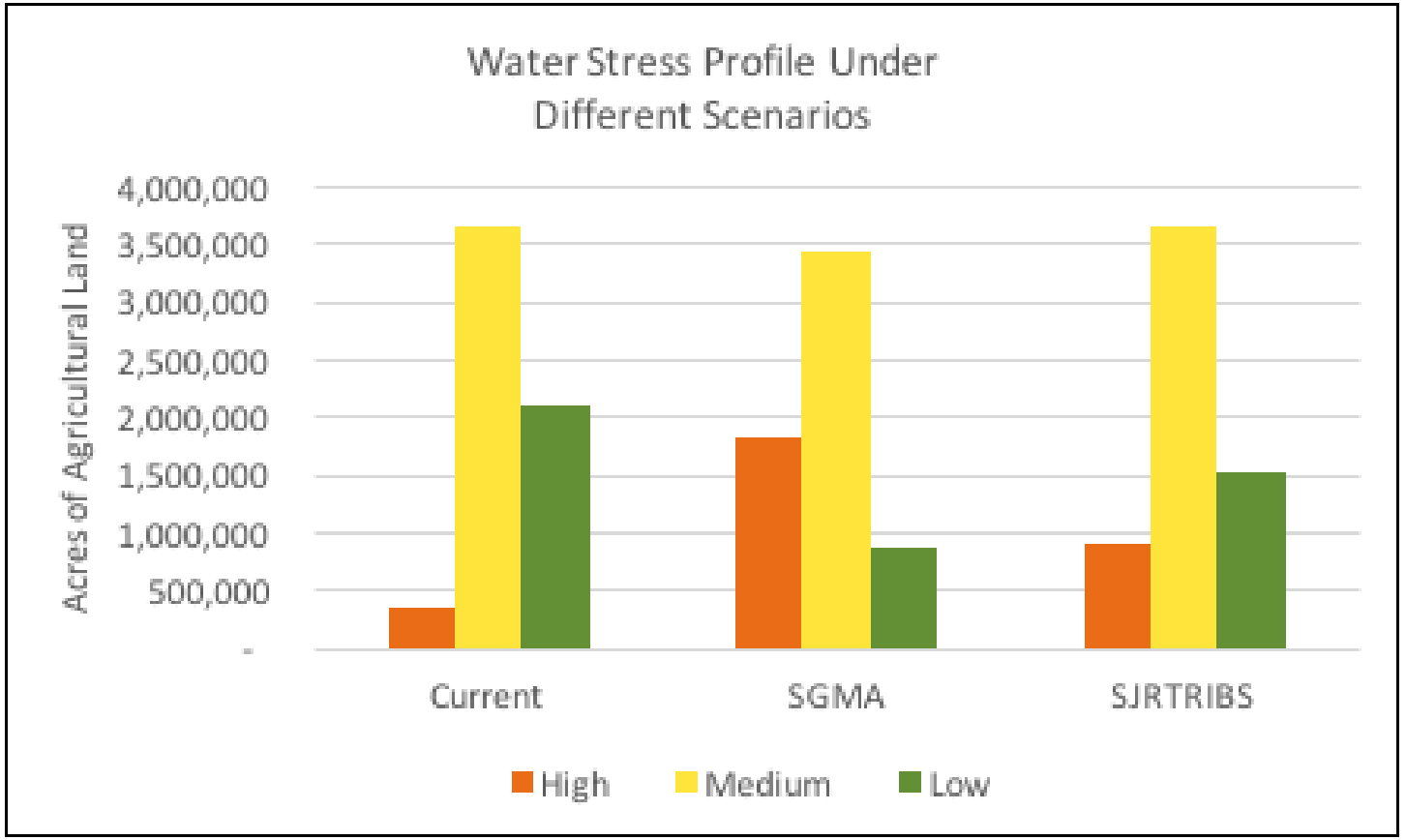
American Farmland Trust
Saving the Land that Sustains Us

Future Scenarios

Assessing Impact of Potential Future Water Scenarios

- Implementation of Sustainable Groundwater Management Act
- Reduction in Withdrawals from Stanislaus, Merced & Tuolumne Rivers

Official DWR & WRCB data used to estimate reduction in supplies

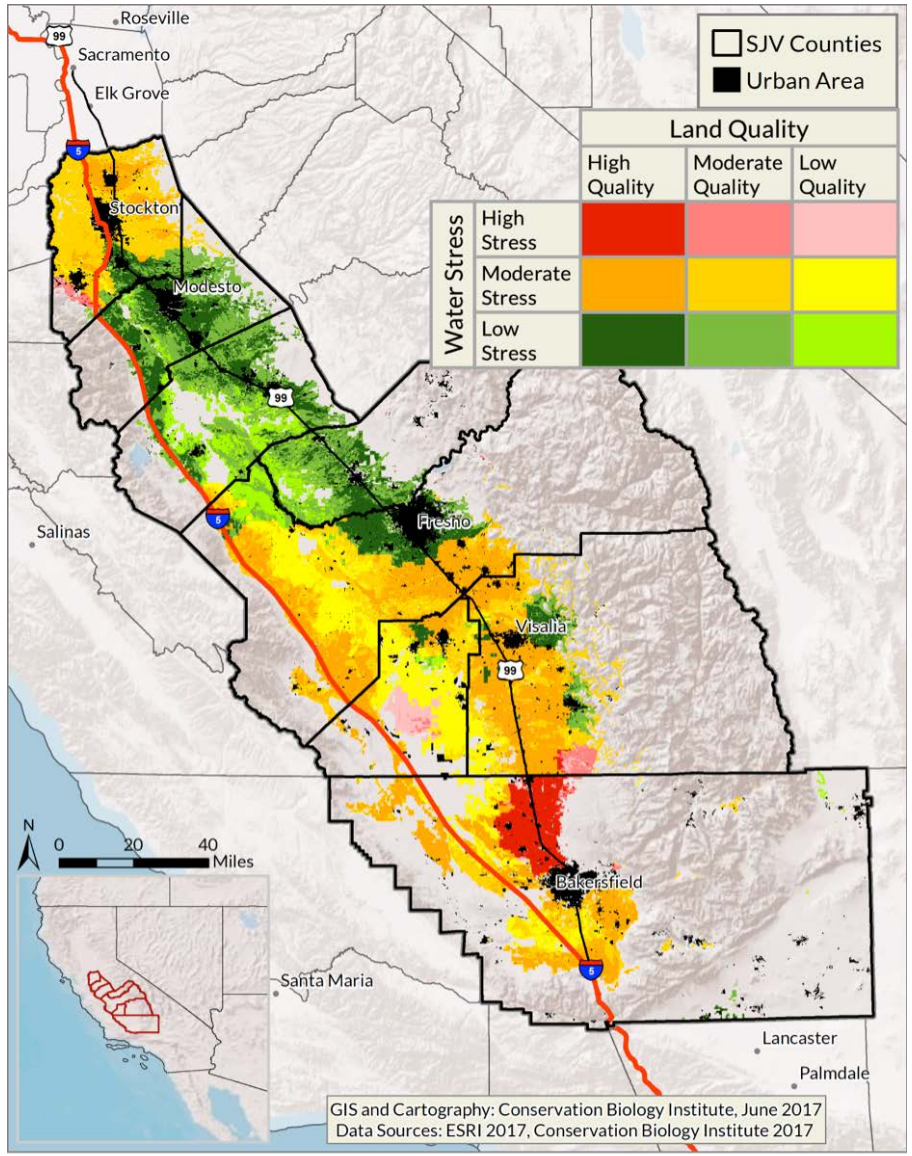


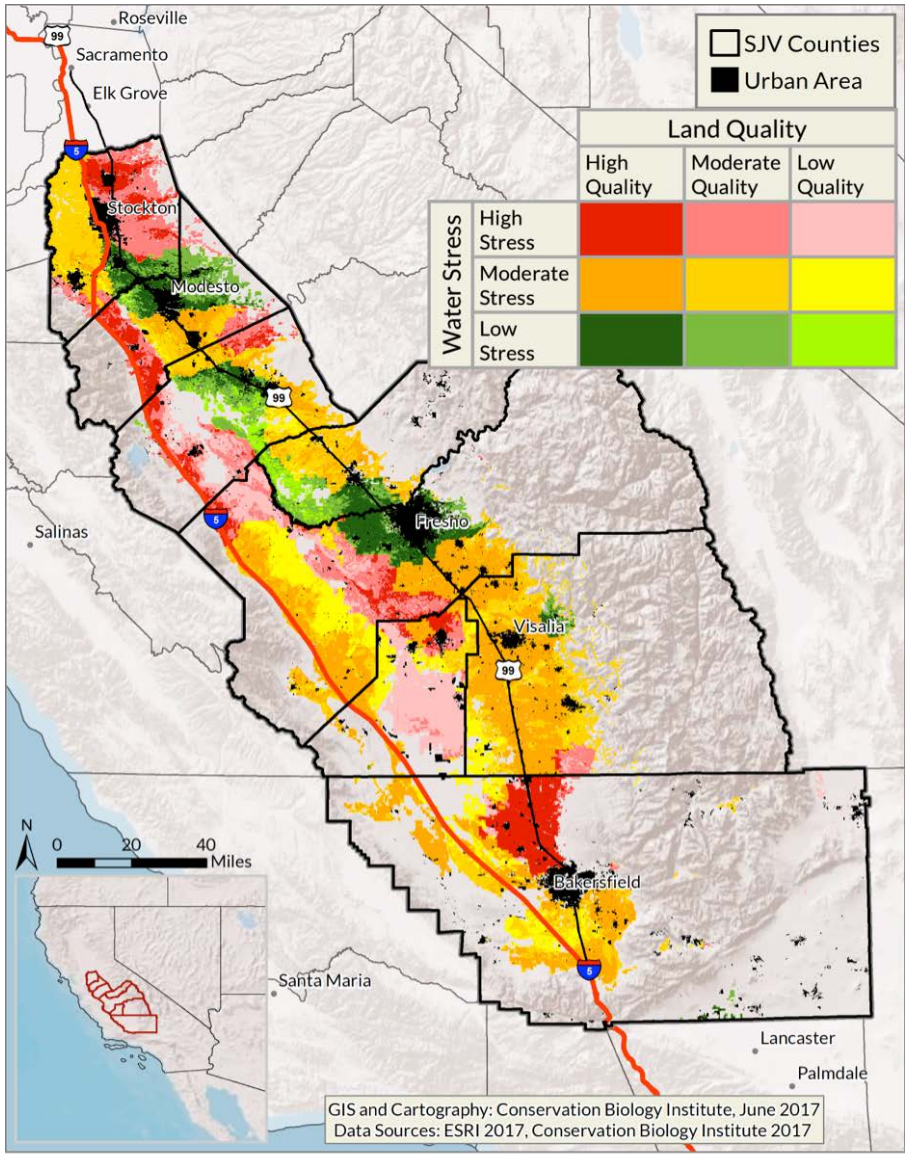
A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

American Farmland Trust
Saving the Land that Sustains Us

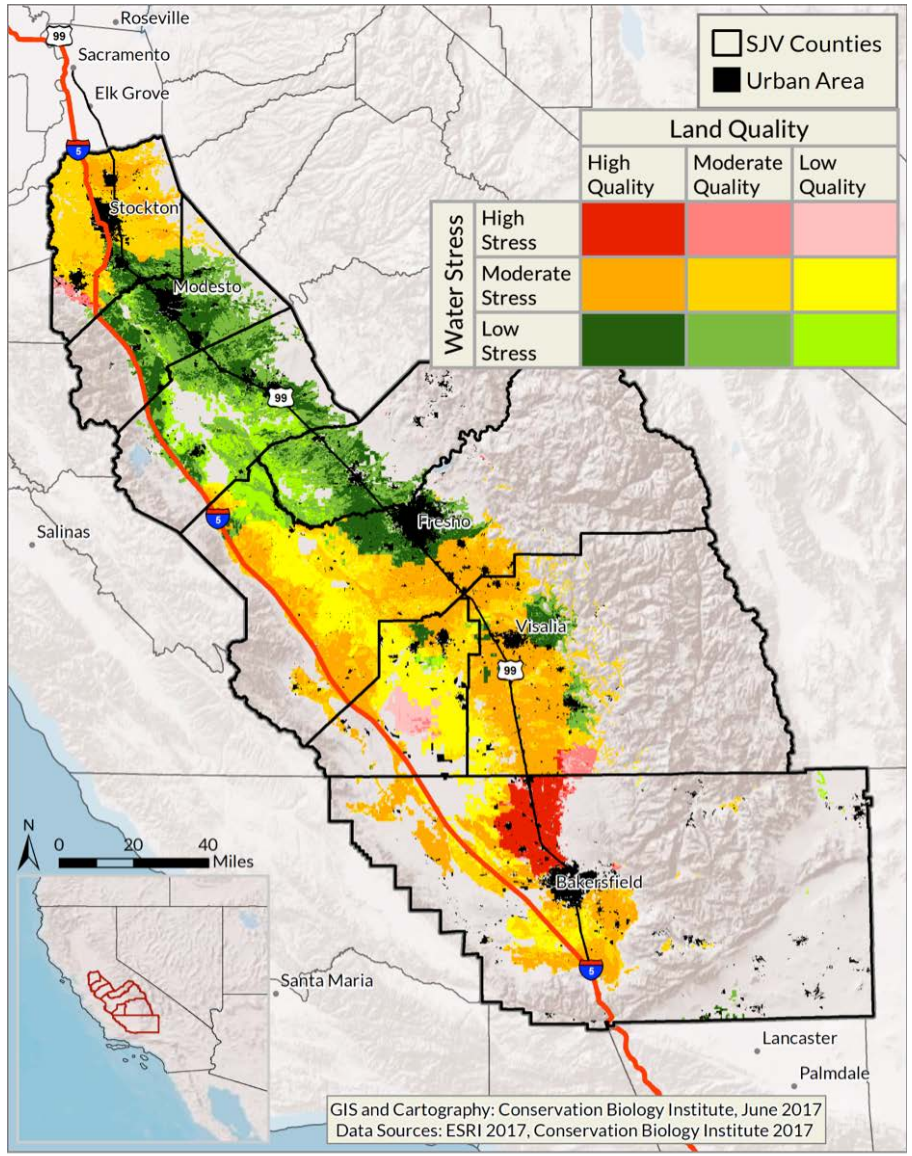
Percentage of Land in Water Stress Categories Under Different Scenarios			
Water Stress Level	Current	SGMA	NSJR-TRIBS
High	6%	30%	15%
Medium	60%	56%	60%
Low	34%	14%	25%

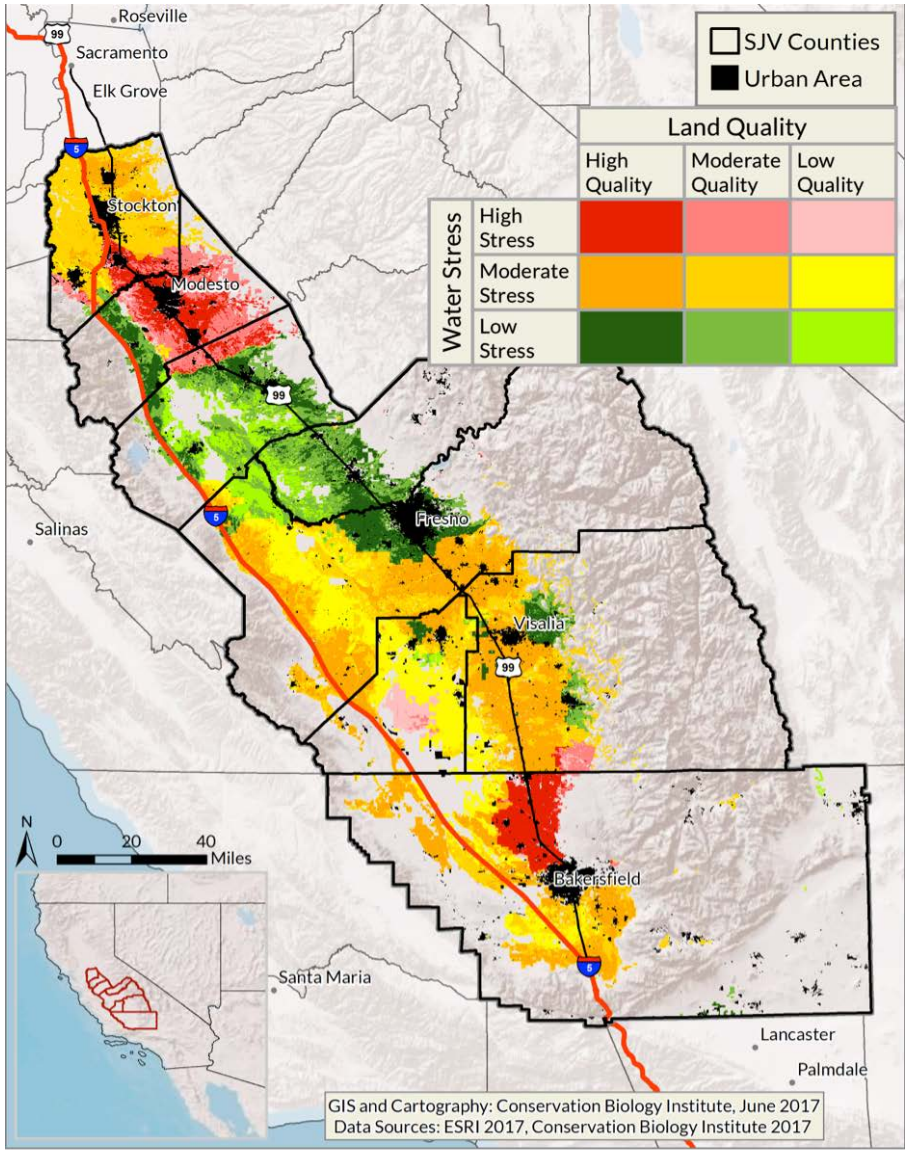
Impact of Water Scenarios on Land-Water Intersection			
	Current	SGMA	NSJR-TRIBS
High Quality and Low Stress	12%	6%	9%
Low Quality or High Stress	24%	41%	33%





SGMA Scenario

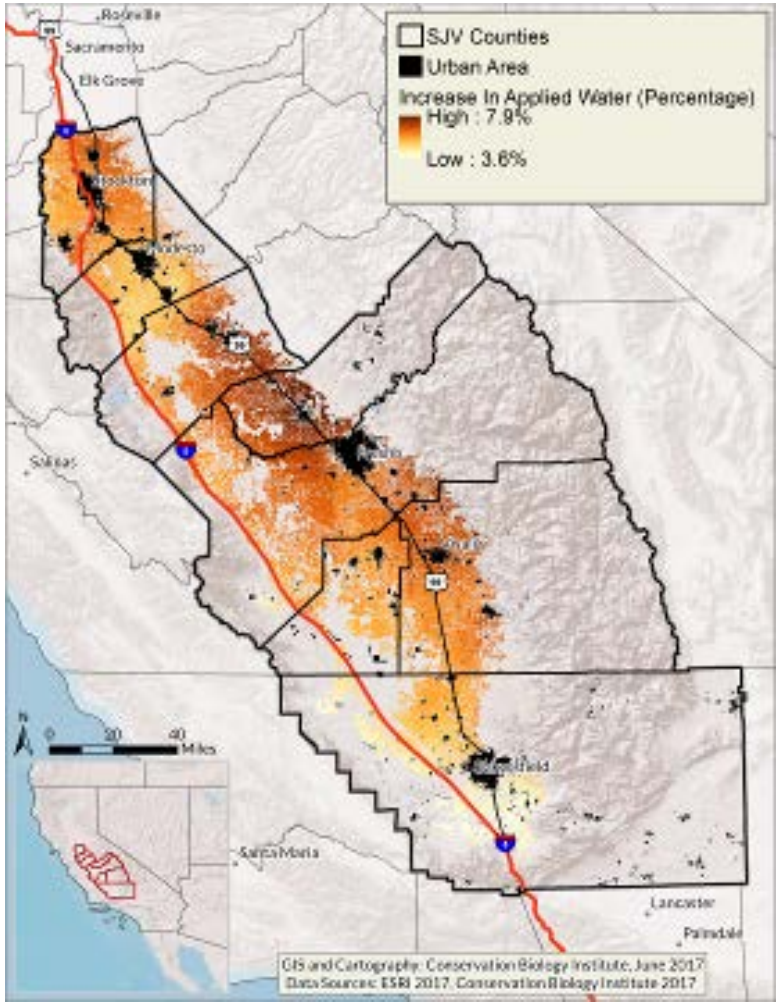




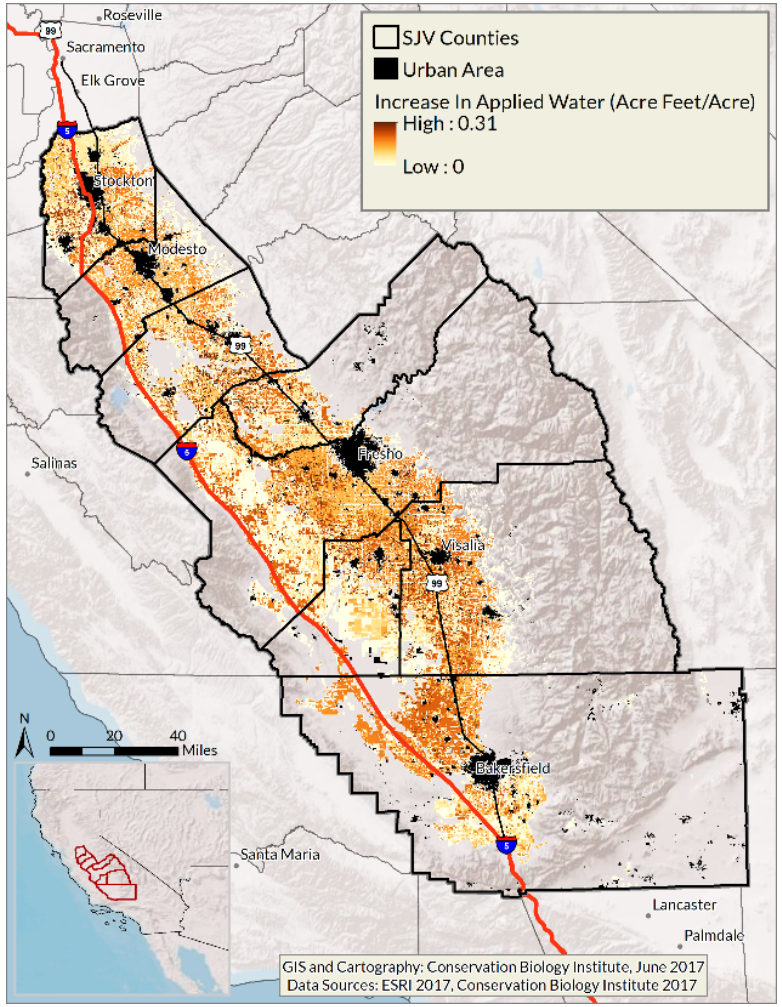
WRCB Lower San Joaquin River Tributaries Scenario

Climate Change

Climate Change: Additional Water Demand Due to Increase in Crop Evapotranspiration



Percentage



Volume

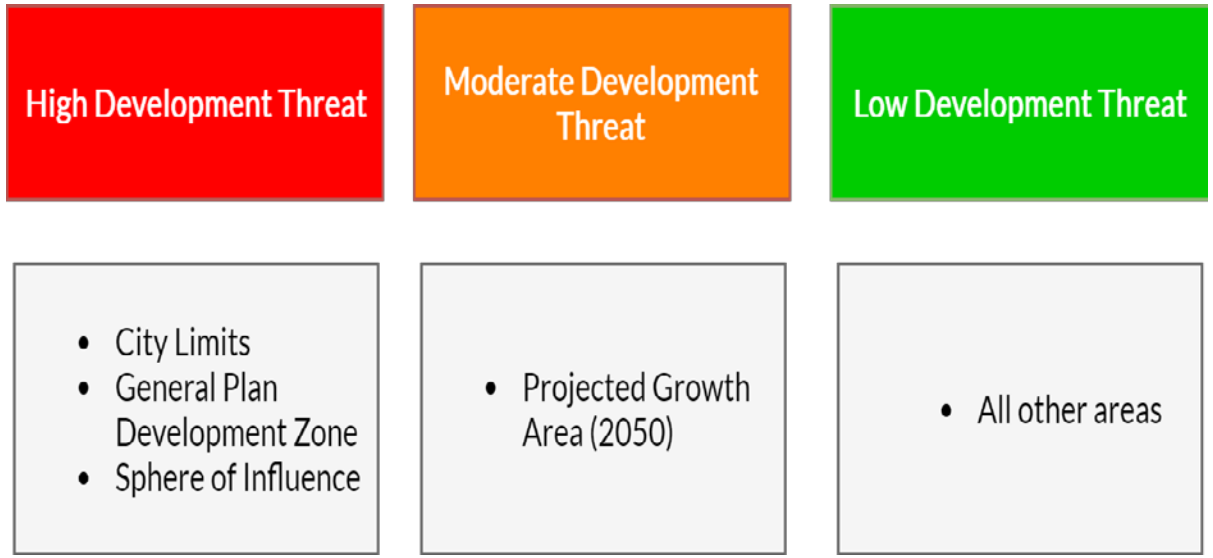
600,000+ acre-feet per year

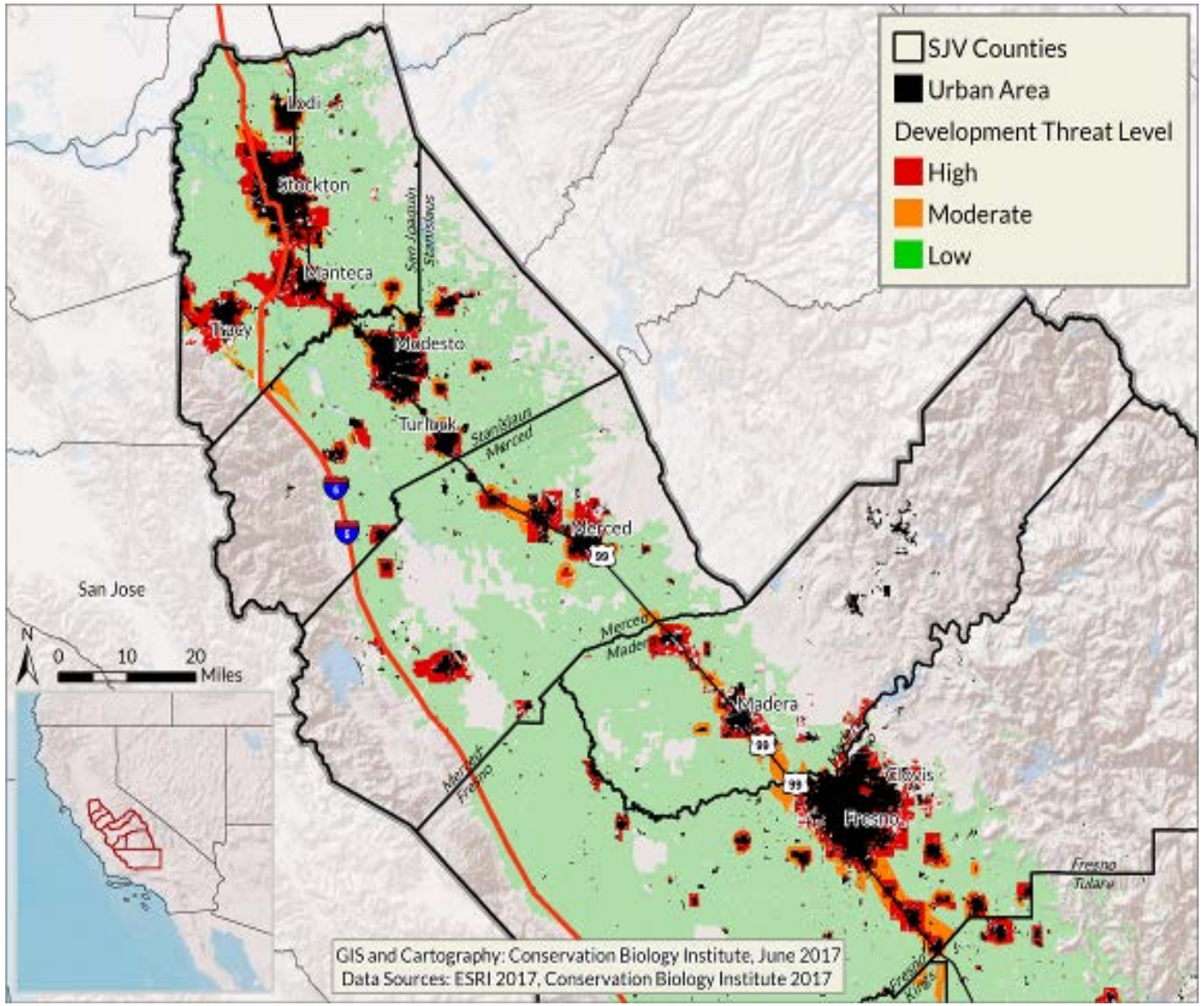
A Research Report of the
HELEN K. CAHILL CENTER FOR
FARMLAND CONSERVATION POLICY INNOVATION

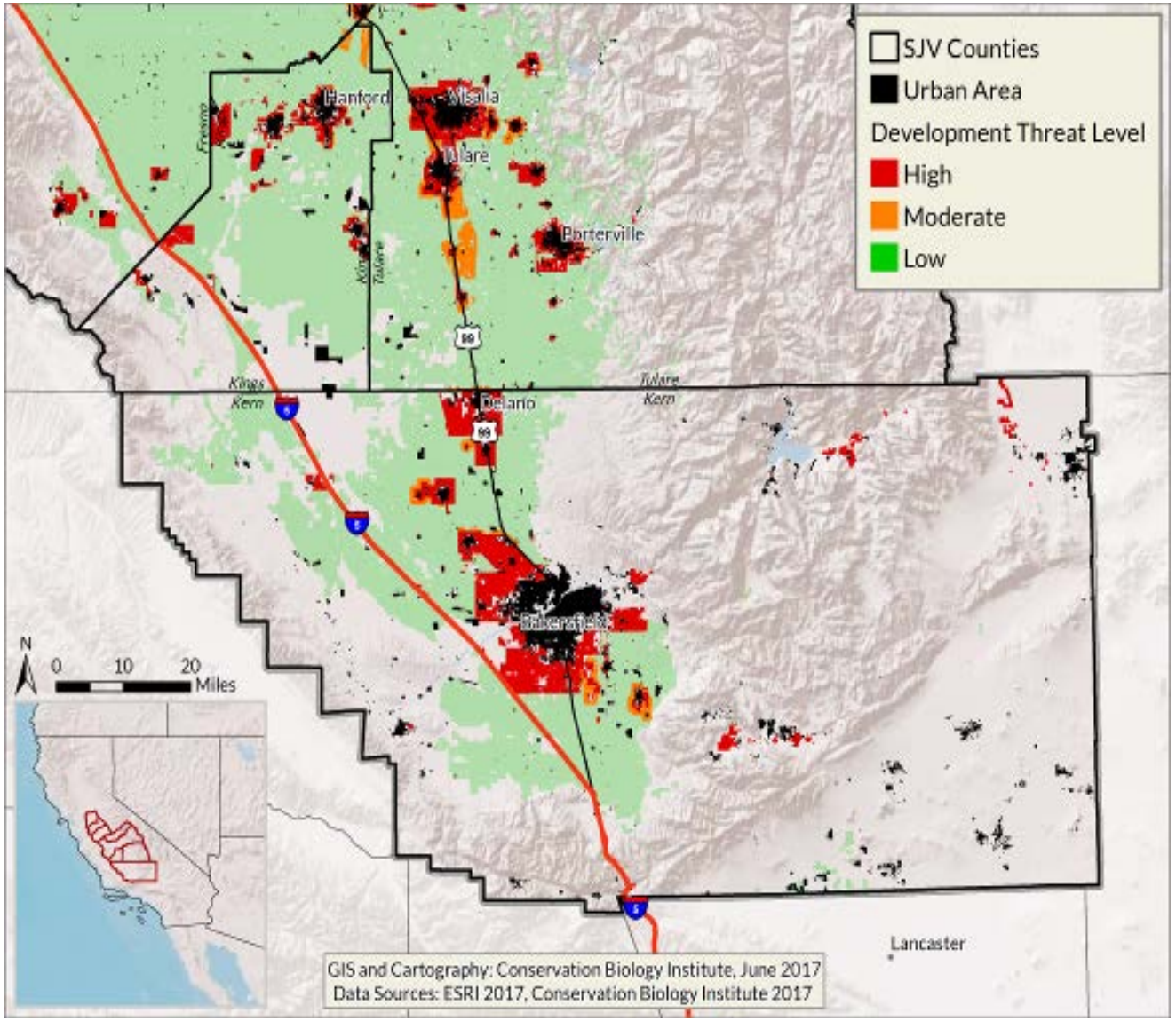
American Farmland Trust
Saving the Land that Sustains Us

Development Risk

Development Risk Logic Model

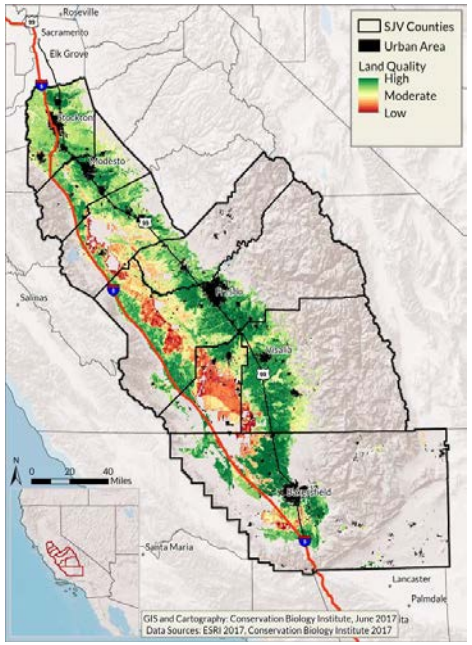



SJV Counties
Urban Area
Development Threat Level
High
Moderate
Low
Lodi
Stockton
Manteca
Tracy
Modesto
Turlock
Merced
San Jose
Madera
Fresno
Kings
Tulare
N
0
10
20
Miles
GIS and Cartography: Conservation Biology Institute, June 2017
Data Sources: ESRI 2017, Conservation Biology Institute 2017


SJV Counties
Urban Area
Development Threat Level
High
Moderate
Low
Hanford
Visalia
Tulare
Porterville
Delano
Bakersfield
Lancaster
Fresno
Kings
Tulare
Kern
N
0
10
20
Miles
GIS and Cartography: Conservation Biology Institute, June 2017
Data Sources: ESRI 2017, Conservation Biology Institute 2017

High quality land is subject to greater development risk than lower quality land

Development Risk	Land Quality			
	High	Medium	Low	Total
High	274,149	210,605	60,180	544,934
Medium	113,160	59,373	7,169	179,702
Low	2,007,236	2,273,128	1,142,520	5,422,884
Total	2,394,545	2,543,106	1,209,869	6,147,520
Pct High & Med	16%	11%	6%	12%



Intersection of Water Stress & Development Risk

	All Land	High Quality Land
High/Medium Dev Risk	724,636	387,309
High Water Stress	373,872	209,326
Both	90,458	69,649
Total Risk & Stress	1,008,050	526,986
All Valley Agricultural Land	6,147,520	2,394,545
Pct of Valley Agricultural Land	16%	22%

1/6 of all acreage and
> 1/5 of high quality land
subject to high/medium
development risk and/or
high water stress

Alternative Compact Development Scenario

	All Agricultural Land		High Quality Land		High Quality Land & Low Water Stress	
Development Risk	Status Quo	Compact	Status Quo	Compact	Status Quo	Compact
High	544,934	362,552	274,149	181,059	81,189	64,991
Moderate	179,702	0	113,160	0	50,135	0
Low	5,422,884	5,765,979	2,007,236	2,213,493	596,169	662,502
Total	6,147,520	6,128,531	2,394,545	2,394,552	727,493	727,493
% High & Med Risk	12%	6%	16%	8%	18%	9%

What are the planning & policy implications?