

# Irrigation in the Idaho Economy

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Treasure Valley Irrigation Conference

9am Nampa Civic Center

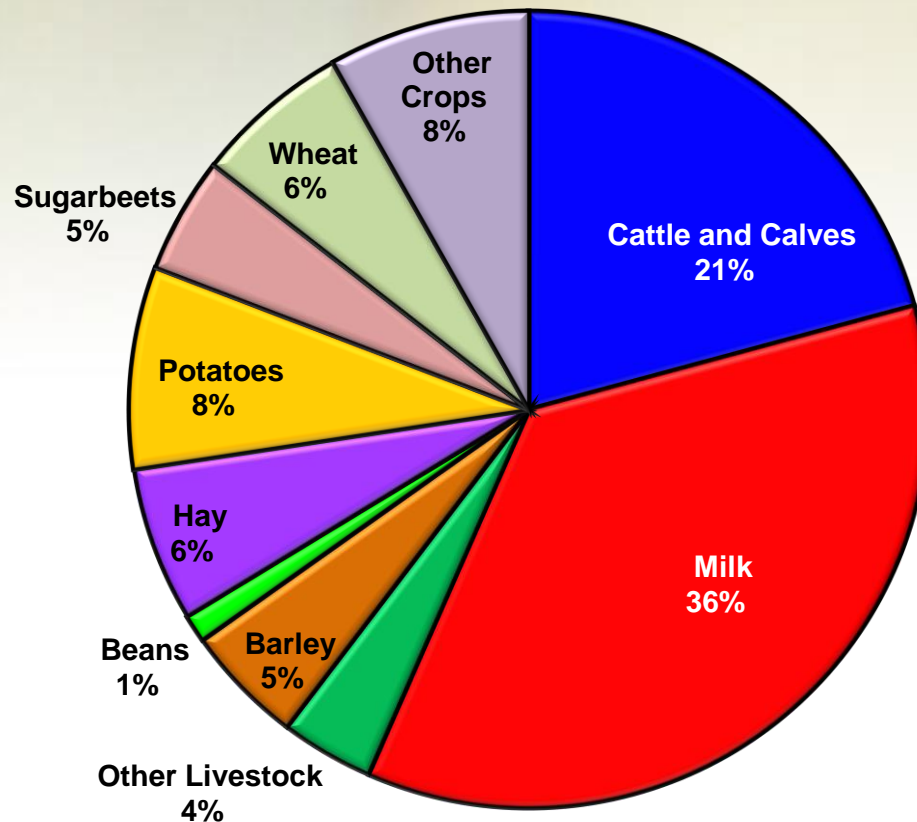
December 15, 2016

**University of Idaho**

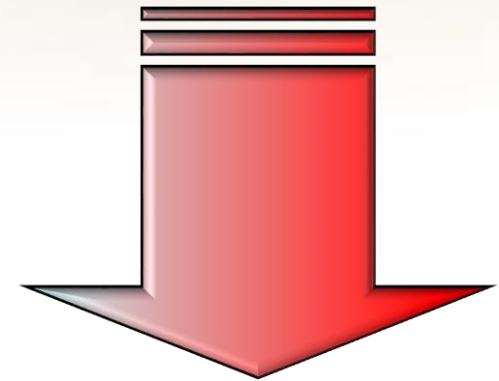
College of Agricultural *and* Life Sciences

# Back to 2011 -- 2016 cash receipts drop 4%

## Idaho Cash Receipts, 2016



**\$7.5 billion, 2015**

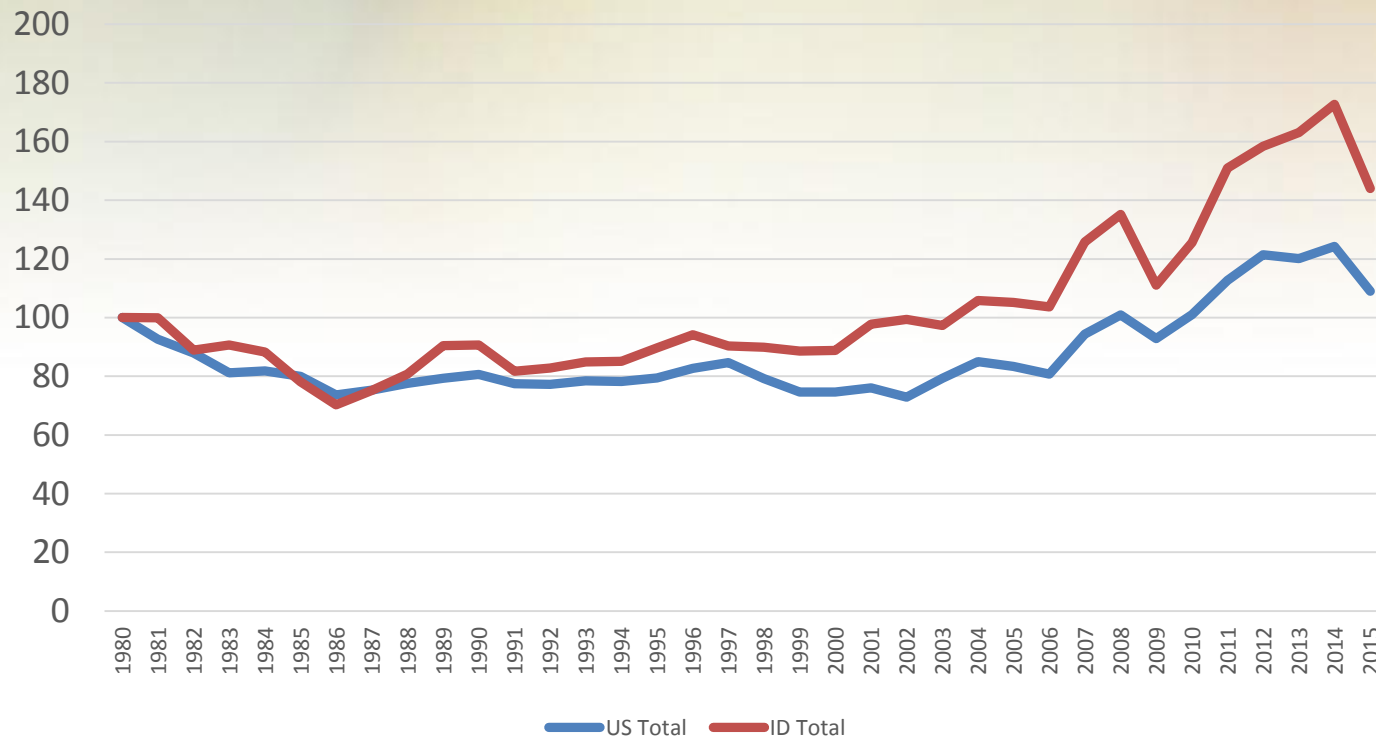


**\$7.2 billion, 2016**

Source: 2016 University of Idaho

# US vs Idaho indexed real cash receipts... Idaho out strips US over 30%

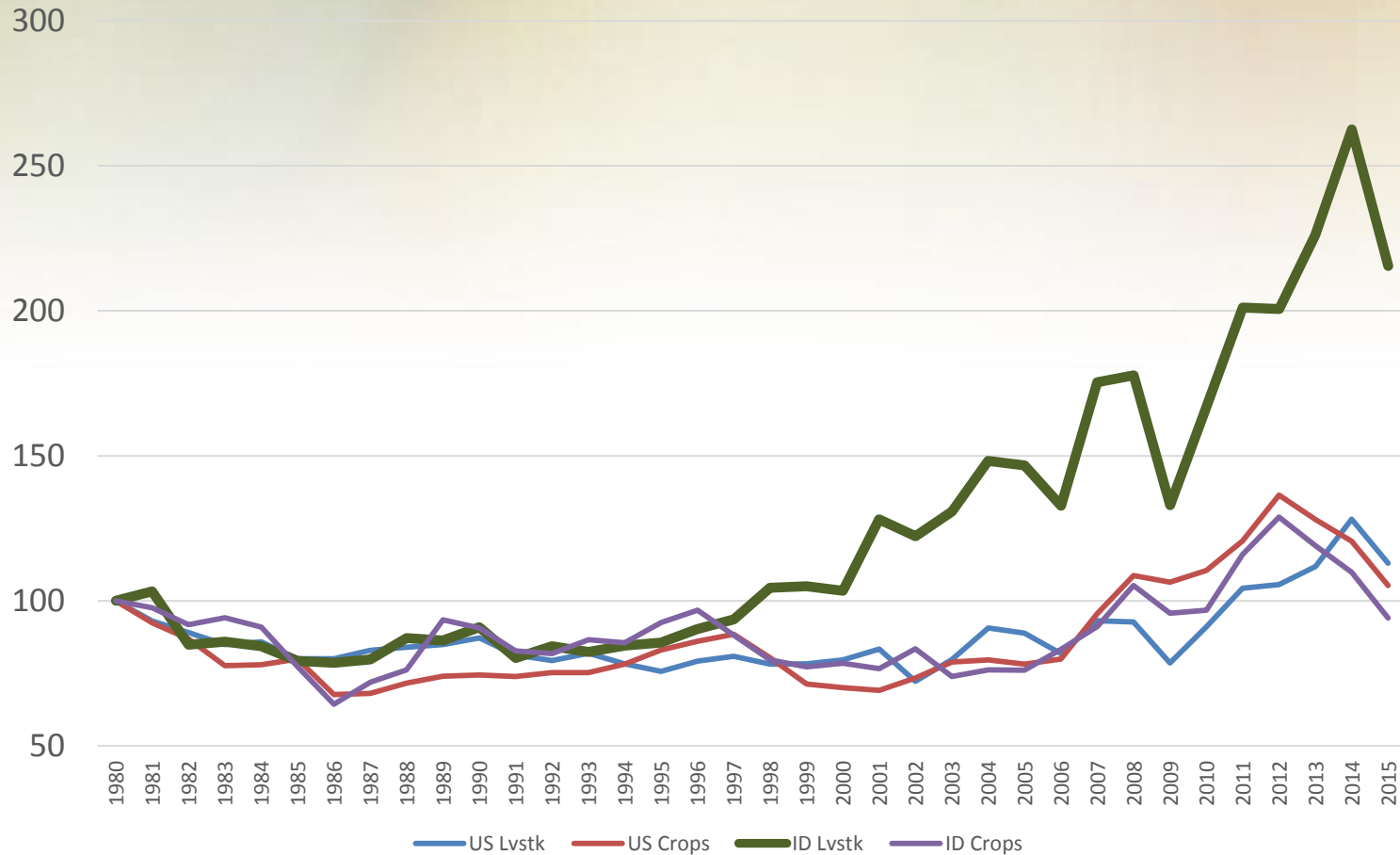
US vs. Idaho Real Indexed Cash Receipts (1980 to 2015)



Source: USDA-ERS, 2016 University of Idaho

# US vs Idaho indexed real cash receipts... Idaho livestock is the super star!

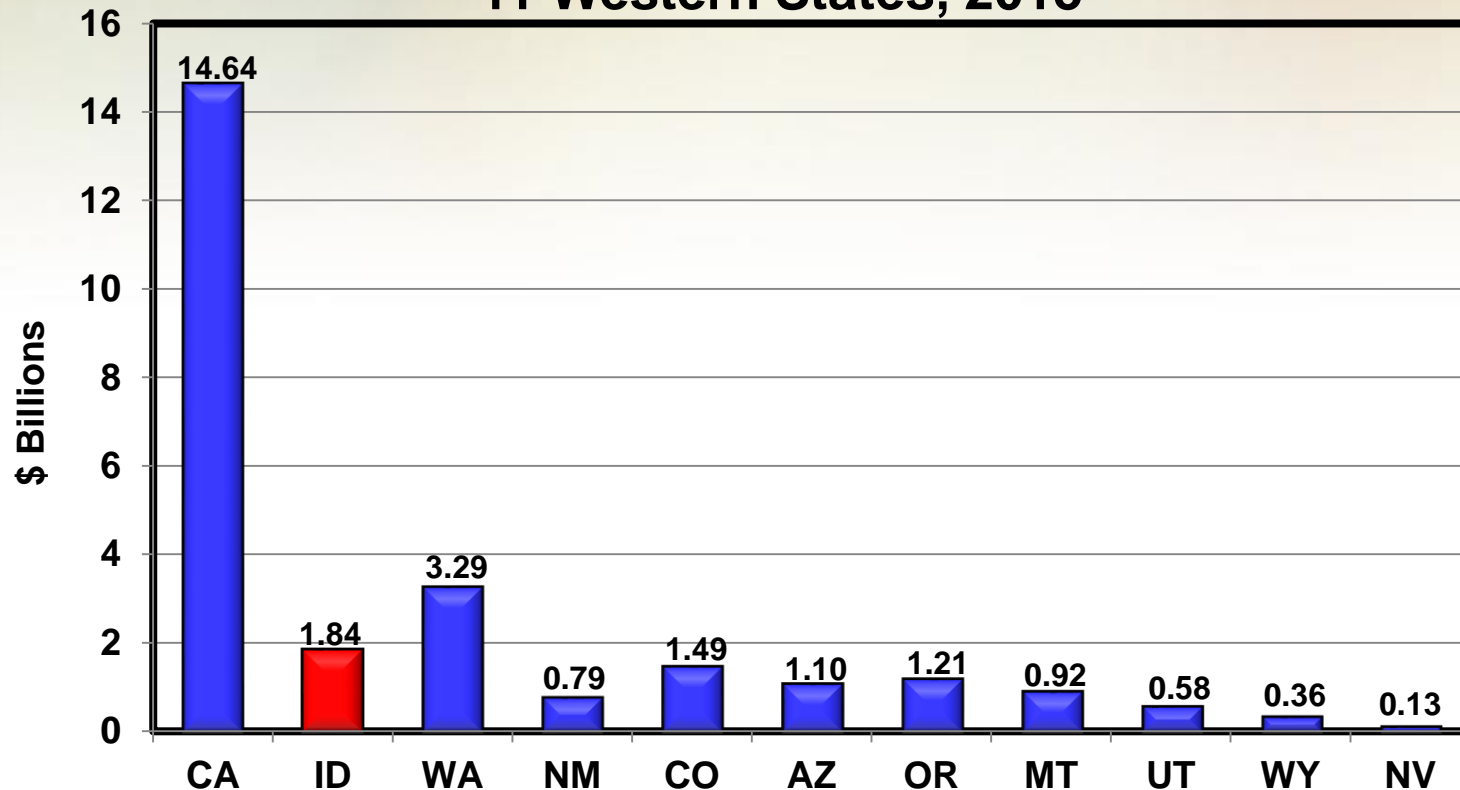
US versus Idaho Real Indexed Livestock and Crop Cash Receipts (1980 to 2015)



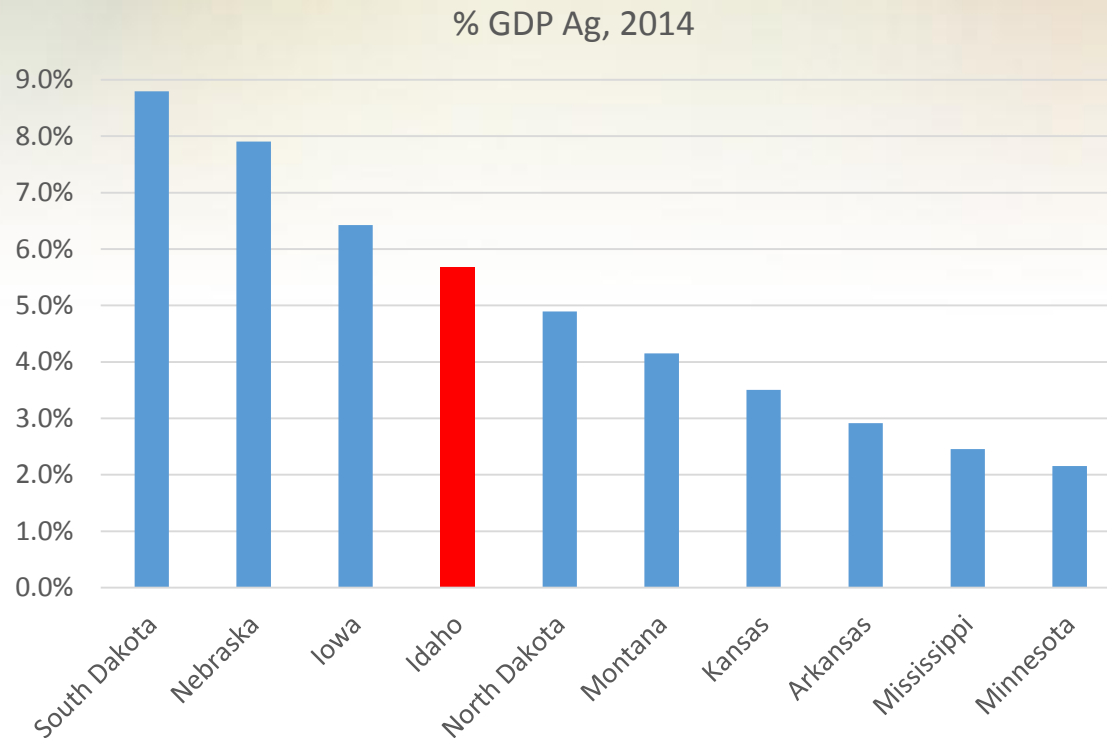
Source: USDA-ERS, 2016 University of Idaho

# Idaho ranks 3<sup>rd</sup> of 11 West states

Net Farm Income  
11 Western States, 2015

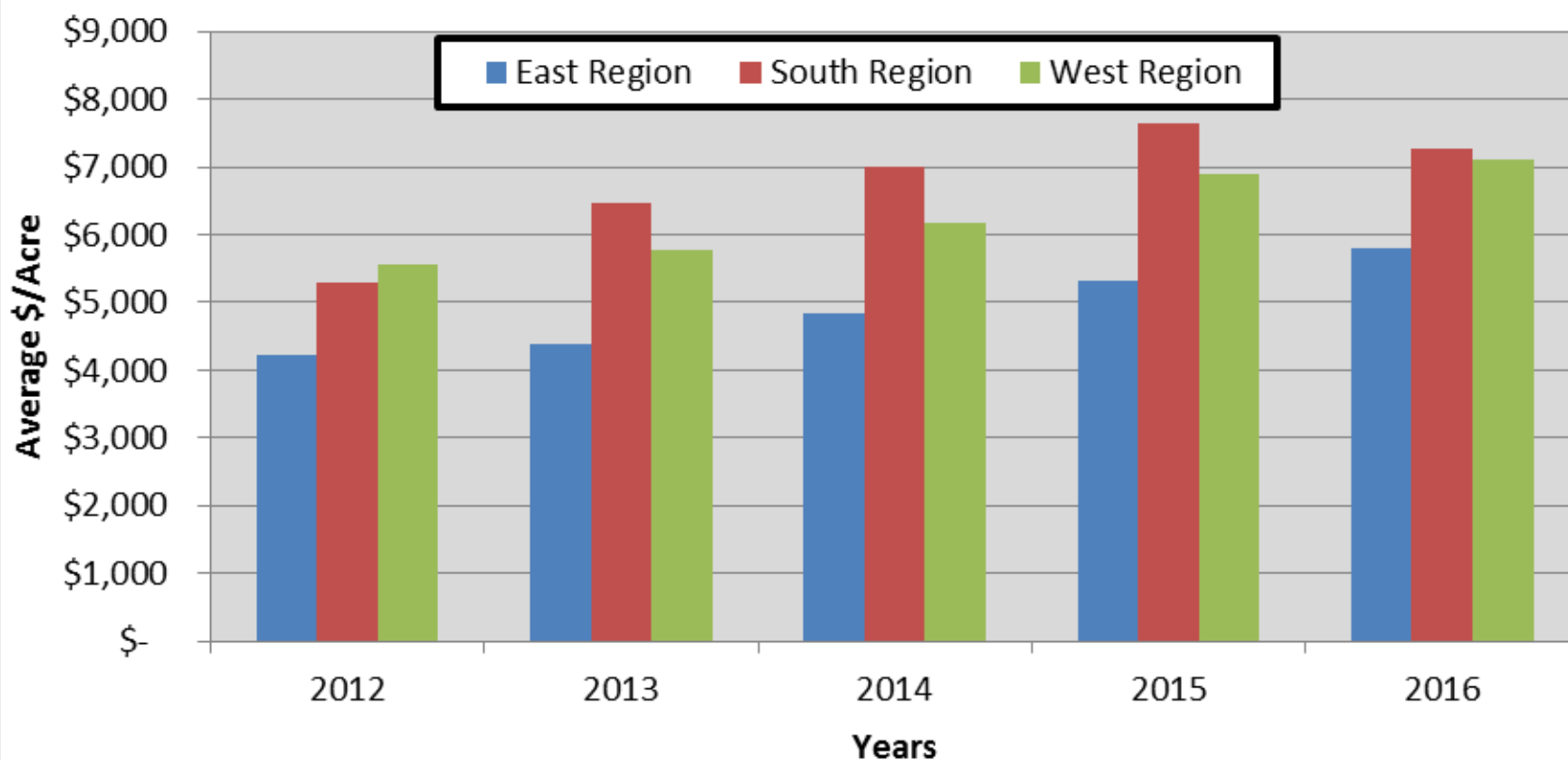


# Idaho ranks 4th largest in Ag's contribution to the state's economy



# Land Value Trends – Regions in Idaho

**Idaho Land Value Trends by Region**  
Average dollar per acre of irrigated croplands



# Water Use Metrics

**Example: Irrigation withdrawals (35%) vs consumptive use (82%)**

Definitions



Withdrawals: surface and groundwater diversions

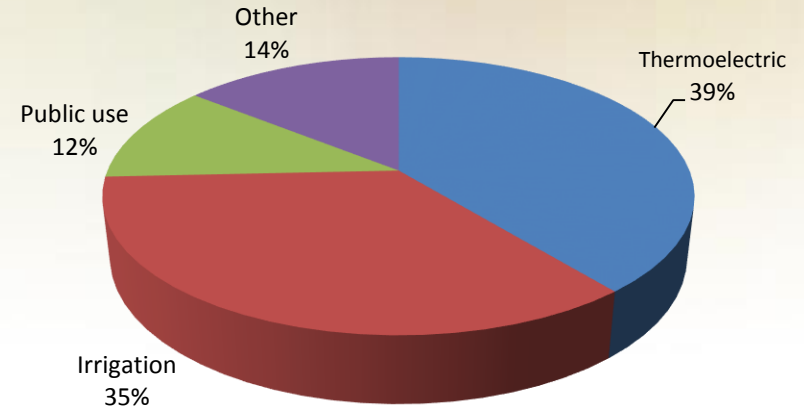


Consumptive: evapotranspiration

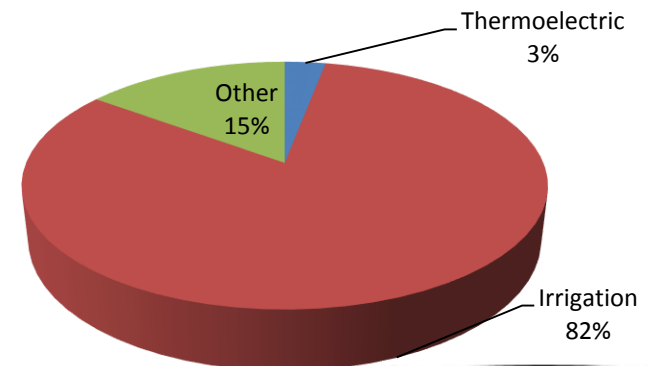


Applied: applied to field or tap

**US Withdrawals, 1995**



**US Consumptive Use, 1995**



Source: USGS



# US Water Withdrawals, 2010

Livestock



1%

Self-Supplied Domestic



1%

Public Supply

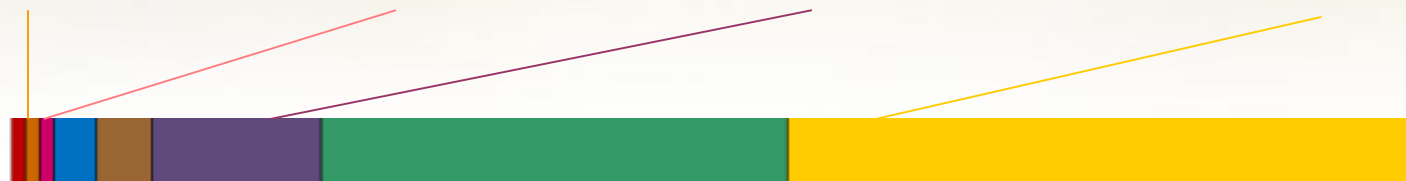


12%

Thermoelectric Power



45%



1%



Mining

3%



Aquaculture

4%



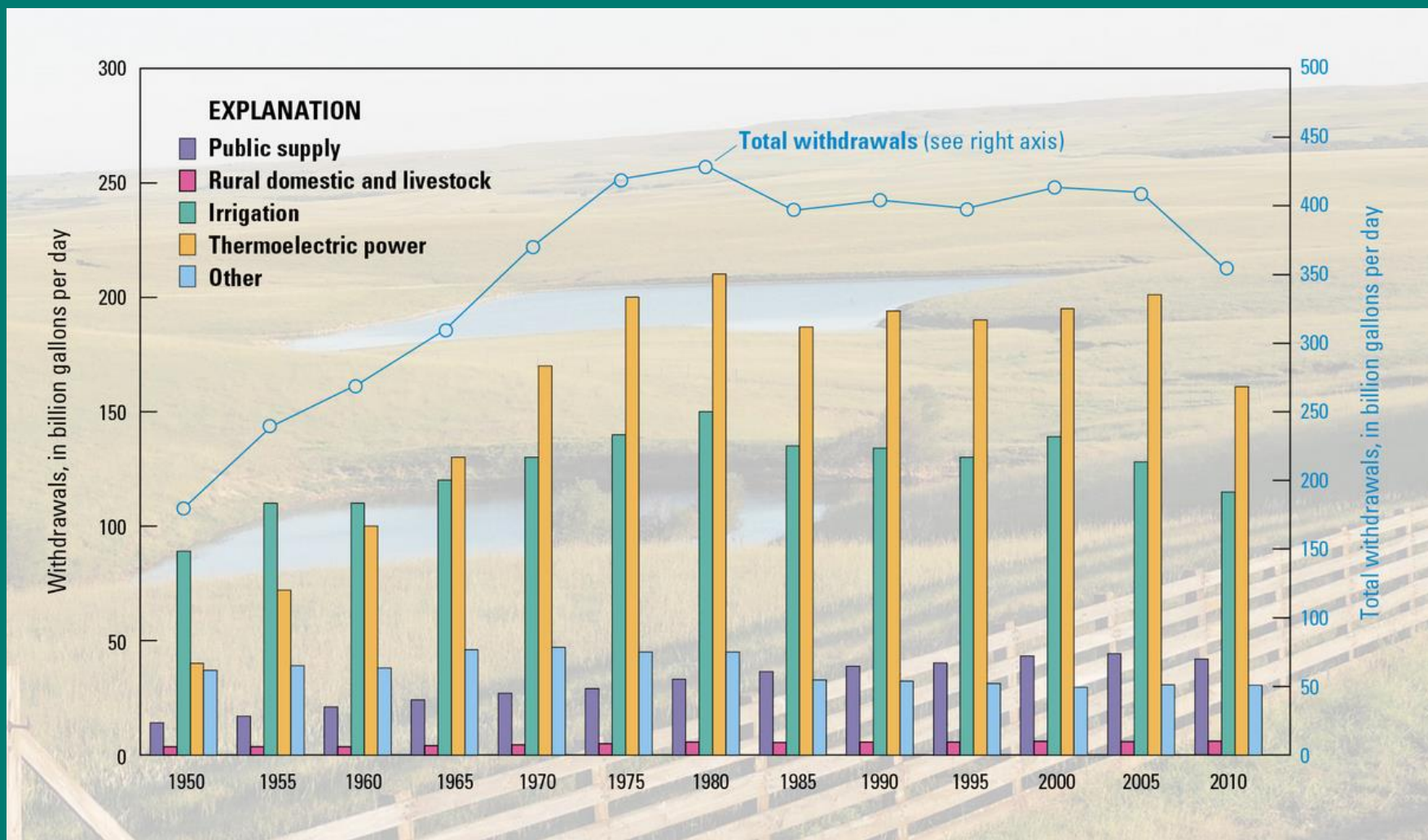
Industrial

33% percent

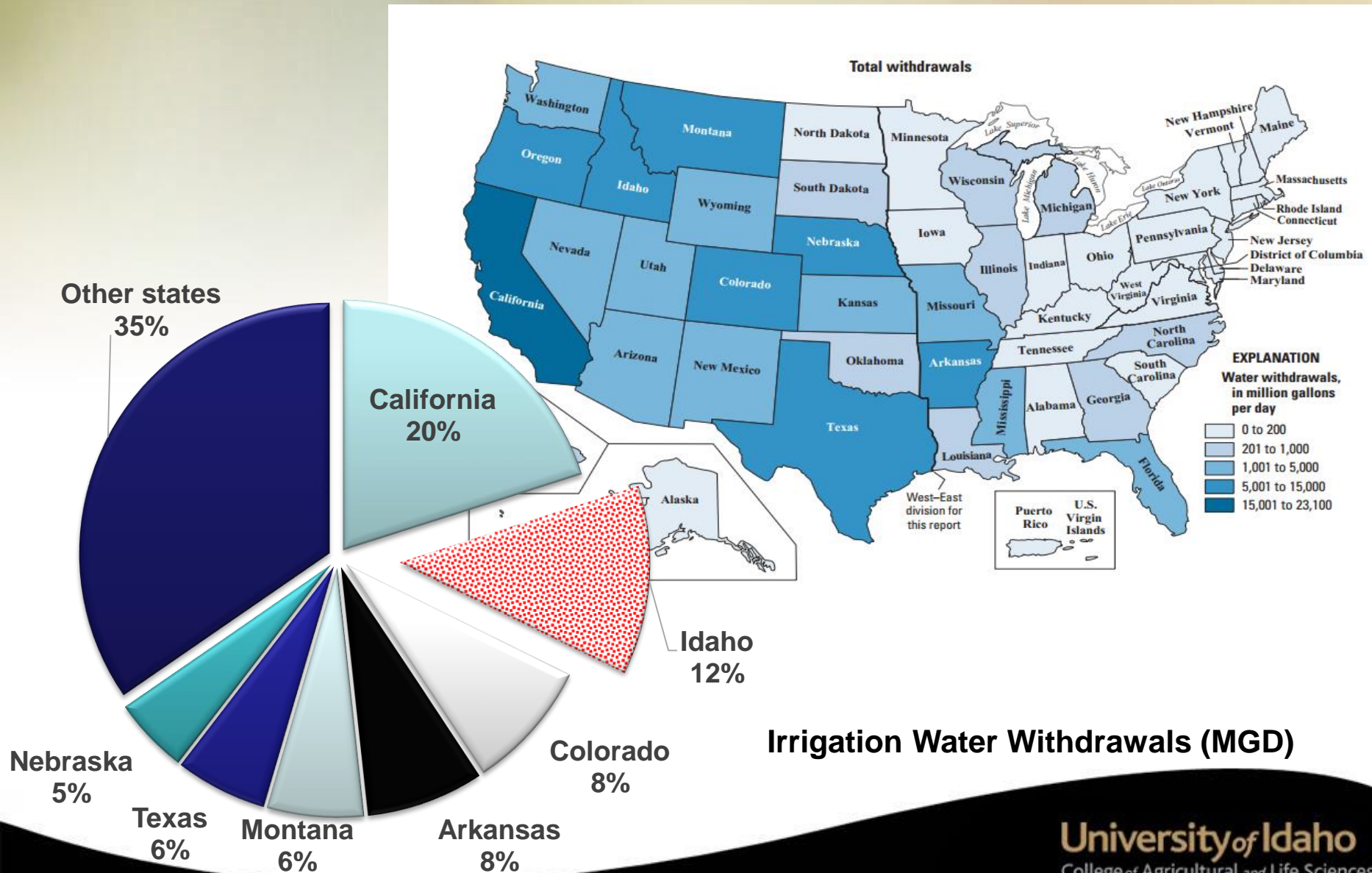


Irrigation

# US water withdrawals by water-use category, 1950-2010



# Idaho, 2<sup>nd</sup> in irrigation withdrawals

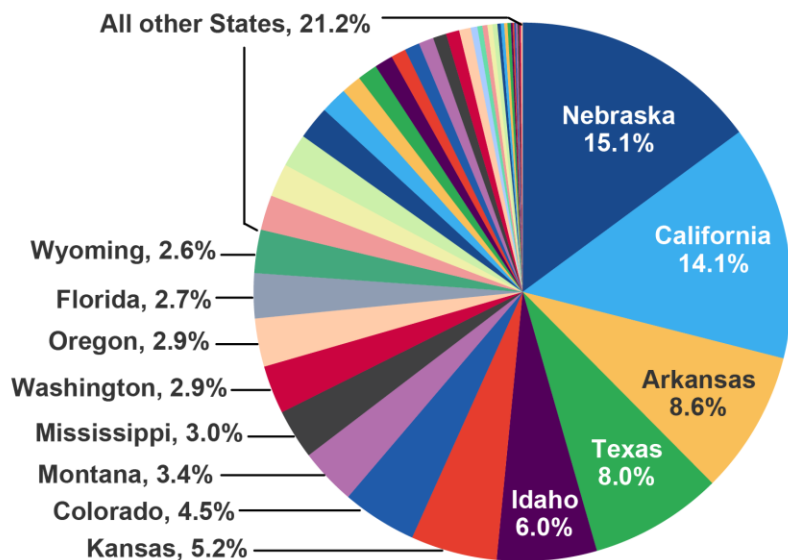


Source: Estimated Use of Water In the United States in 2010, USGS Circular 1405



# Idaho, 5<sup>th</sup> in irrigated acres

## State shares of total U.S. irrigated acres, 2012



Note: The thirteen leading States (10 Western, and Arkansas, Mississippi, and Florida) accounted for 78.8 percent of U.S. irrigated acres, including harvested cropland, pasture, and other lands (but excluding horticulture under protection).

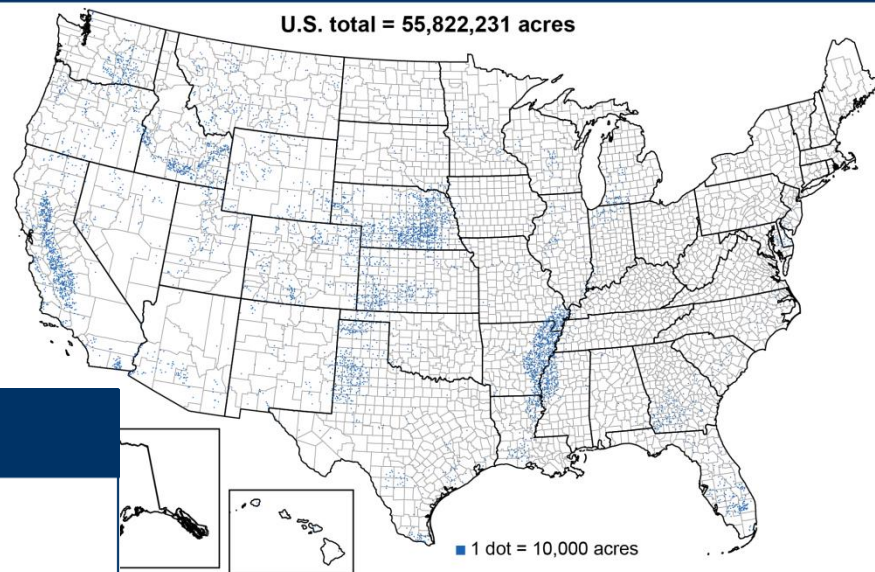
Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service, 2012 Census of Agriculture, State data.



United States Department of Agriculture, Economic Research Service

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## Acres of irrigated land, 2012



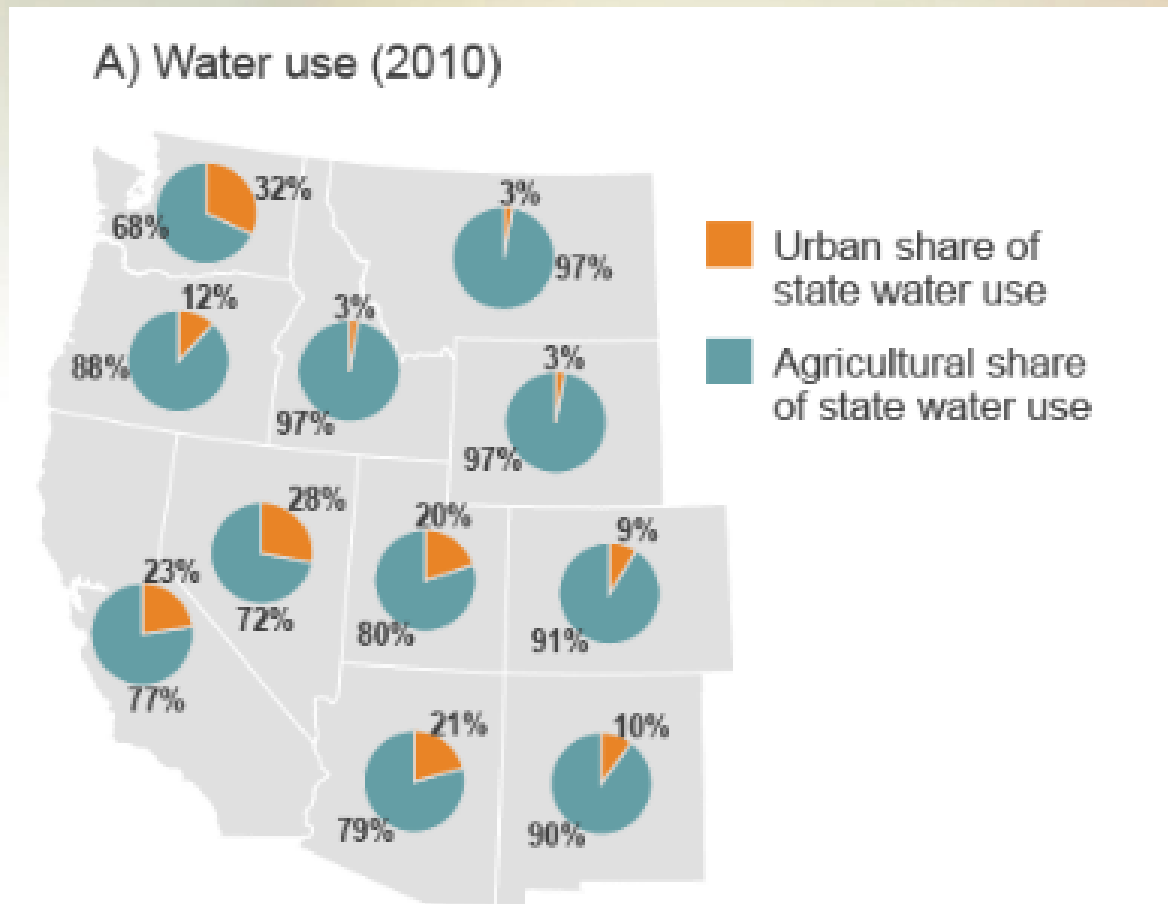
U.S. National Agricultural Statistics Service, Map Atlases for the Census of Agriculture

73% (41M acres) of U.S. irrigated acres are in 17 Western States

From 2007 to 2012, irrigated acres declined by 777,000 acres

Decreases OR 215,000; CA 154,000; NM 150,000; TX 521,000; CO 351,000; NE 262,000

# Western States Water Withdrawals



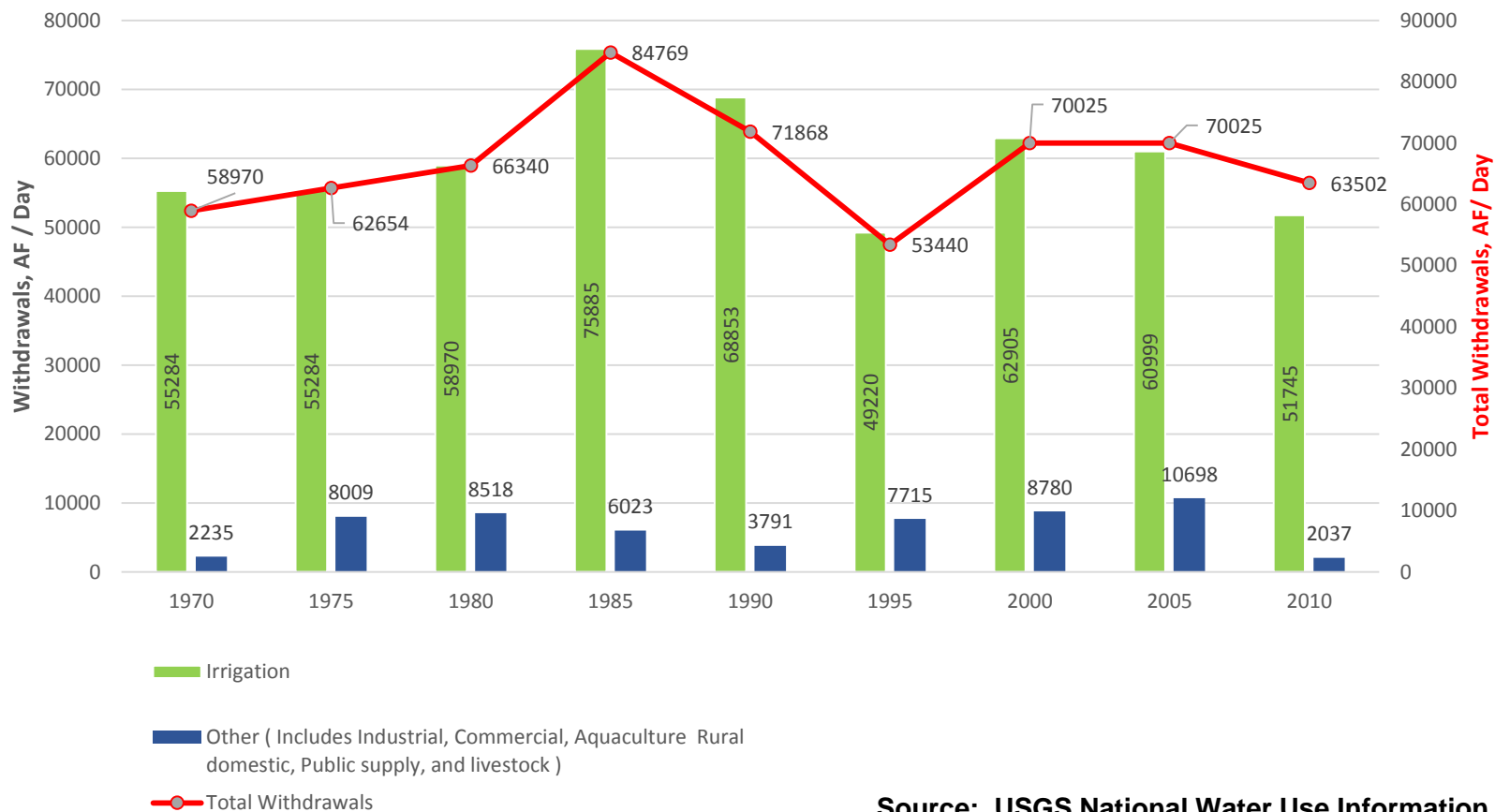
3 crop value are NOT California

6 of top irrigated counties are Idaho

Crop Production Value		Irrigation Water Volume	
Top Counties	Crop Production (\$Million)	Top Counties	Water Use (1,000 AF)
1 Fresno CA	\$3,700	1 Fresno CA	2,788
2 Kern CA	\$3,232	2 Tulare CA	2,752
3 Monterey CA	\$2,935	3 Kern CA	2,014
4 Tulare CA	\$1,671	4 San Joaquin CA	1,772
5 San Joaquin CA	\$1,659	5 Stanislaus CA	1,679
6 Ventura CA	\$1,430	6 Jefferson ID	1,561
7 Grant WA	\$1,333	7 Merced CA	1,539
8 Imperial CA	\$1,310	8 Kings CA	1,402
9 Merced CA	\$1,273	9 Jerome ID	1,347
10 Madera CA	\$1,240	10 Yuma AZ	1,252
11 Santa Barbara CA	\$1,129	11 Imperial CA	1,218
12 Yakima WA	\$1,069	12 Pinal AZ	1,171
13 Stanislaus CA	\$1,063	13 Grant WA	1,152
14 Kings CA	\$855	14 Maricopa AZ	1,134
15 Riverside CA	\$745	15 Twin Falls ID	1,076
16 Yuma AZ	\$697	16 Bingham ID	1,056
17 San Diego CA	\$648	17 Colusa CA	928
18 San Luis Obispo CA	\$618	18 Cassia ID	894
19 Sonoma CA	\$606	19 Ada ID	839
20 Benton WA	\$582	20 Mesa CO	830

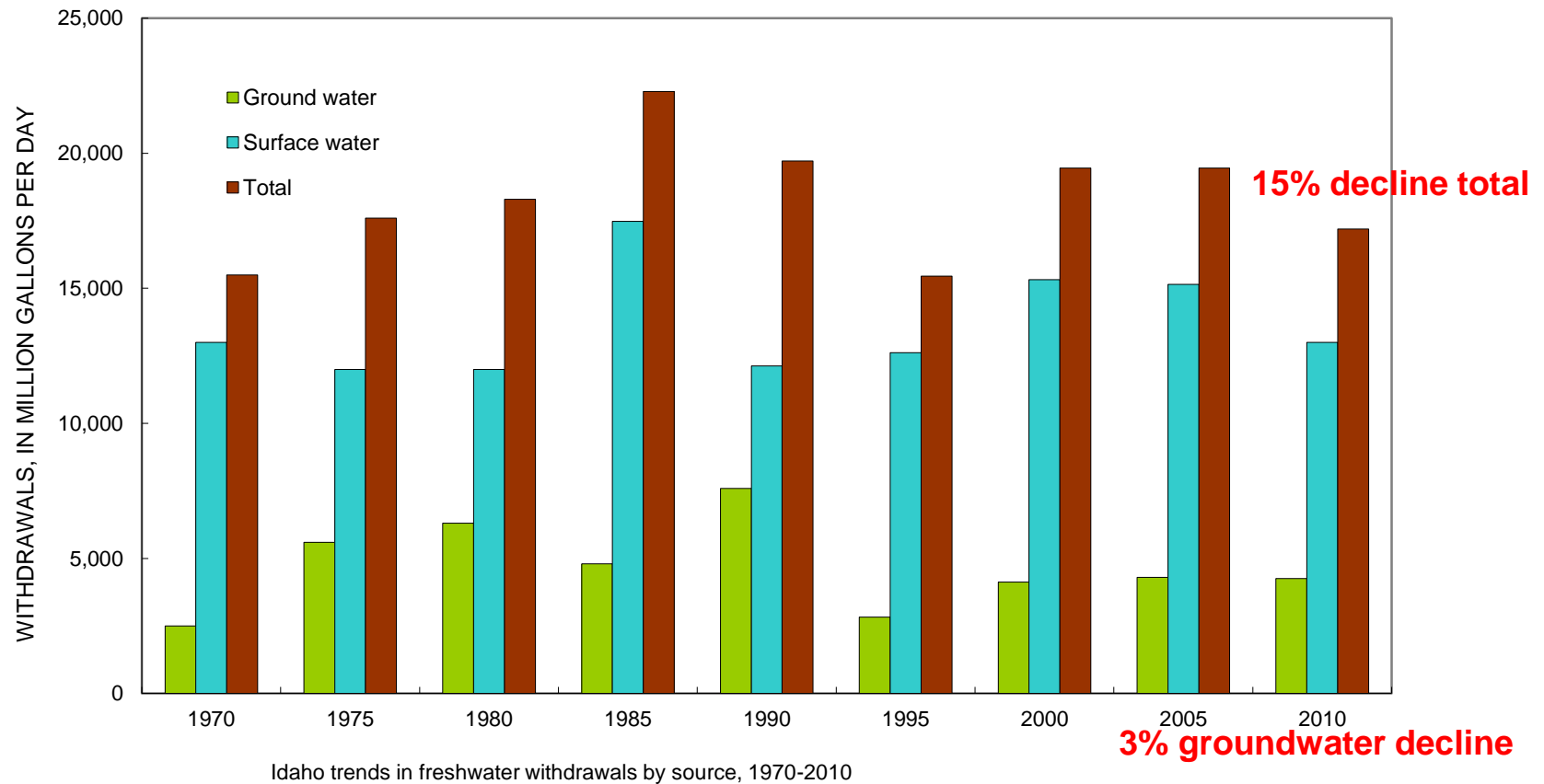
Source: WestWater Research Inc. using USGS and USDA data

### Trends in total water withdrawals by water - use category, Idaho 1970-2010



**Source: USGS National Water Use Information Program, Molly Maupin, Hydrologist, Idaho Water Science Center**

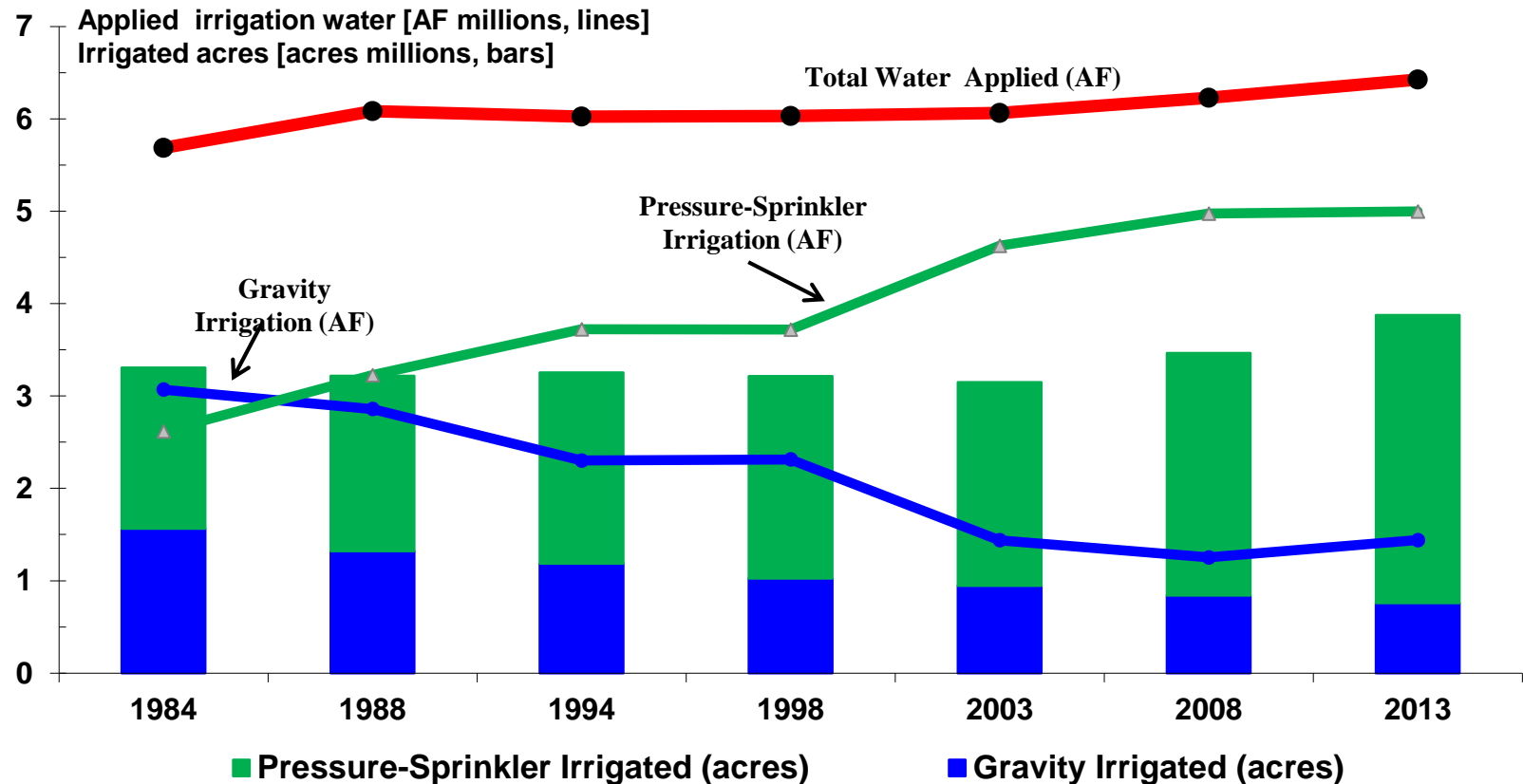
# Idaho withdrawals by source, 1970-2010





# Idaho switches from gravity to sprinklers

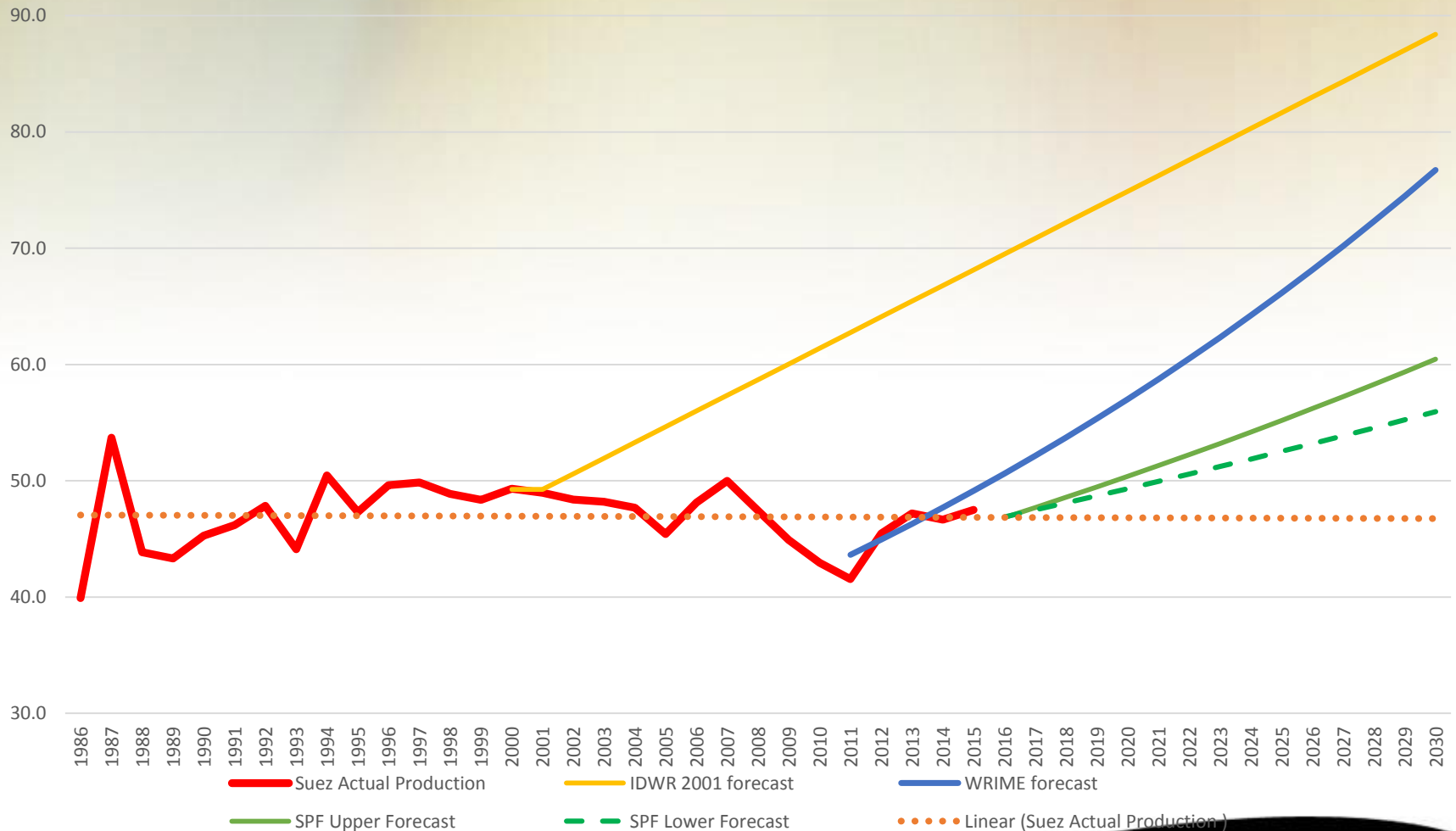
Trends in irrigated acres and applied irrigation water, Idaho 1984-2013



Source: USDA, Economic Research Service calculations based on USDA, National Agricultural Statistics Service, 1984,

# Suez DCM&I water use has been level for 30 years

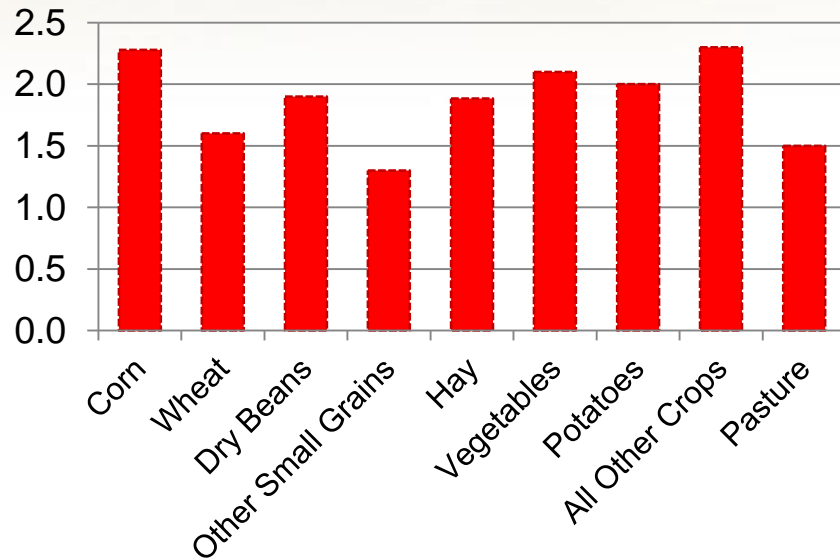
Forecast vs Actual Production 1986 to 2030 (1,000 AF)



# Idaho Applied Water Average and Total

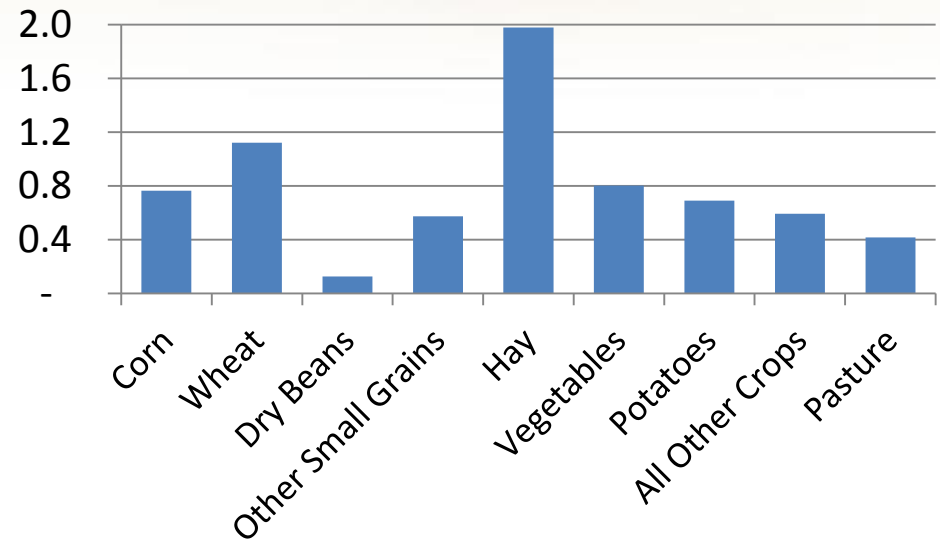
## Corn #1

### Average Applied (AF/acre)



## Hay #1

### Total Applied (millions AF)

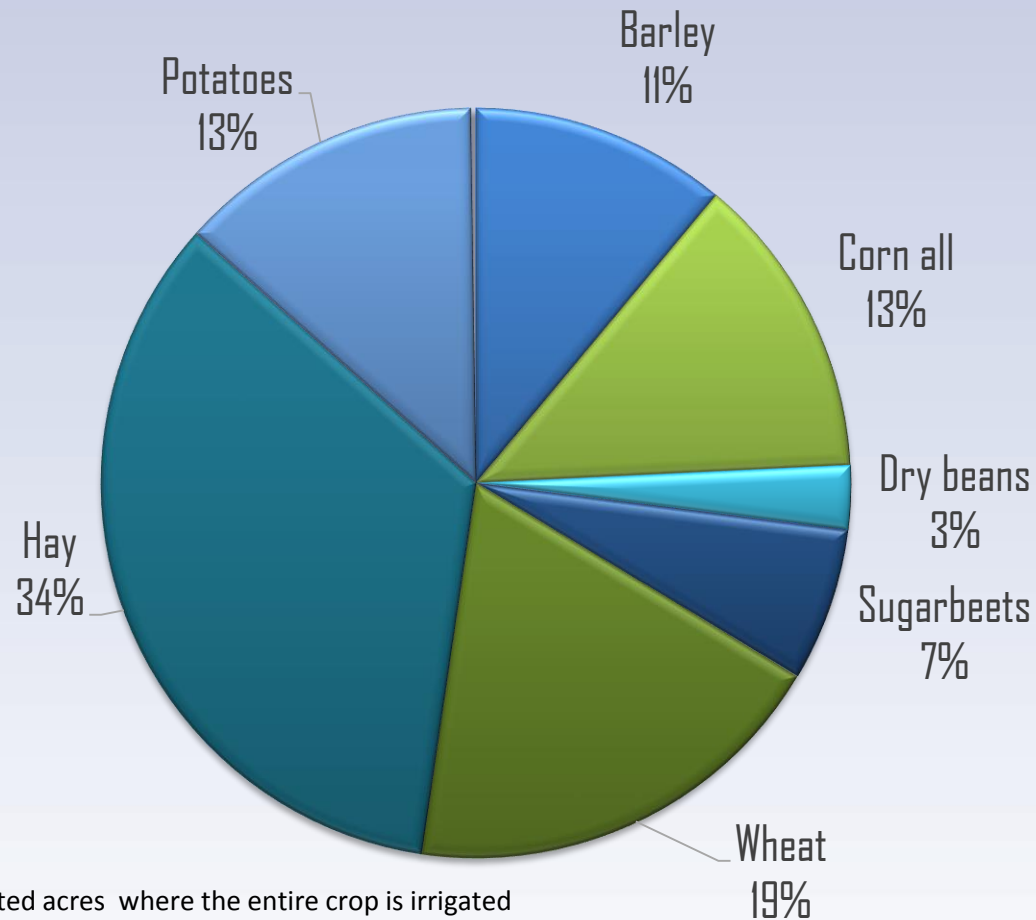


Source: USDA-ERS

# Consumptive use: Alfalfa and lawns guzzle water

Crop	ET (inches per acre)
Dry beans	13
Potatoes	25
Silage corn	26
Grain corn	27.7
Winter grain	29.8
Spring grain	26
Sugar beets	35.5
Pasture	41.8
Turf grass	42.6
Alfalfa	42.75
Evapotranspiration (ET) is evaporated from soil plus transpiration from plant. Source: METRIC Rick Allen U. of Idaho	

# Idaho 2.8 million irrigated crop acres, 2012

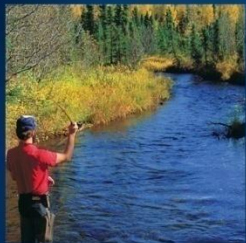
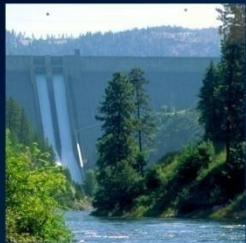


2.8 million irrigated acres where the entire crop is irrigated  
Source: 2012 Census of Agriculture



United States Department of Agriculture, Economic Research Service

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### Recap

- Ag water is big in Idaho and US
- Ag big is in Idaho and West

### Why are water withdrawals declining?

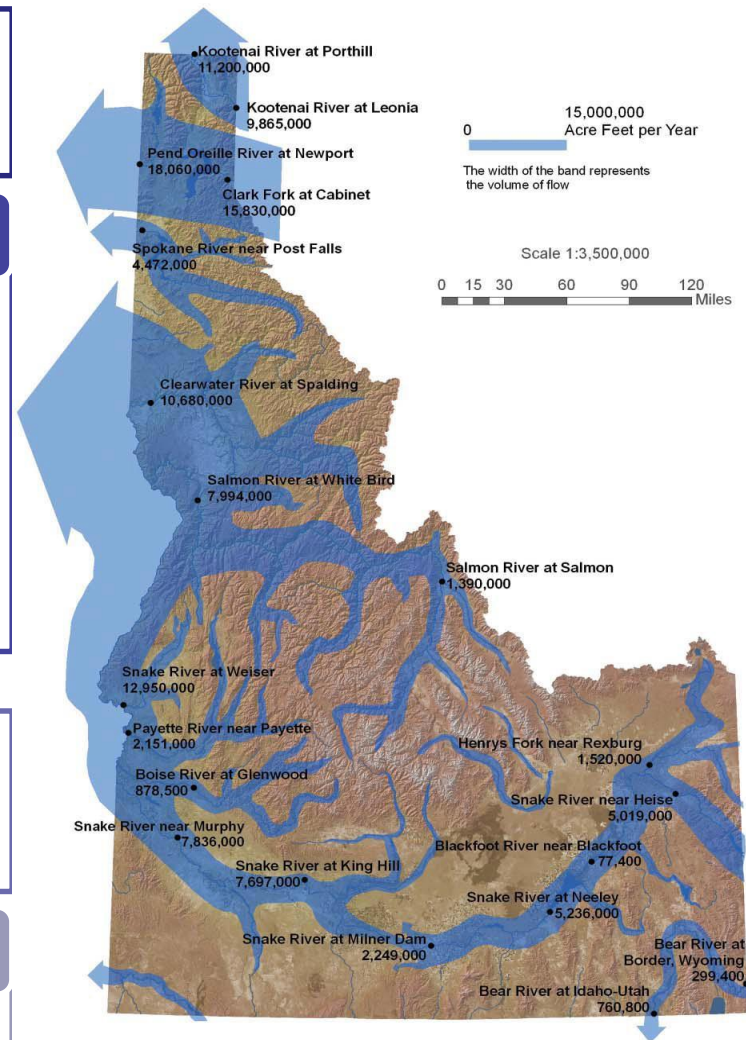
- Demand increases:
  - Increased sprinklers = less withdrawals?
  - Increased in-stream demands (fish, hydropower, flood control)
- Supply decreases:
  - Switch to groundwater pumping increases supply costs
  - Sprinklers = increased consumptive use
  - More droughts?

consumptive) do NOT measure competing uses (fish, flood

- Example : Of the water leaving Idaho (Milner, Heise etc.) how much water is Ag versus competing uses?

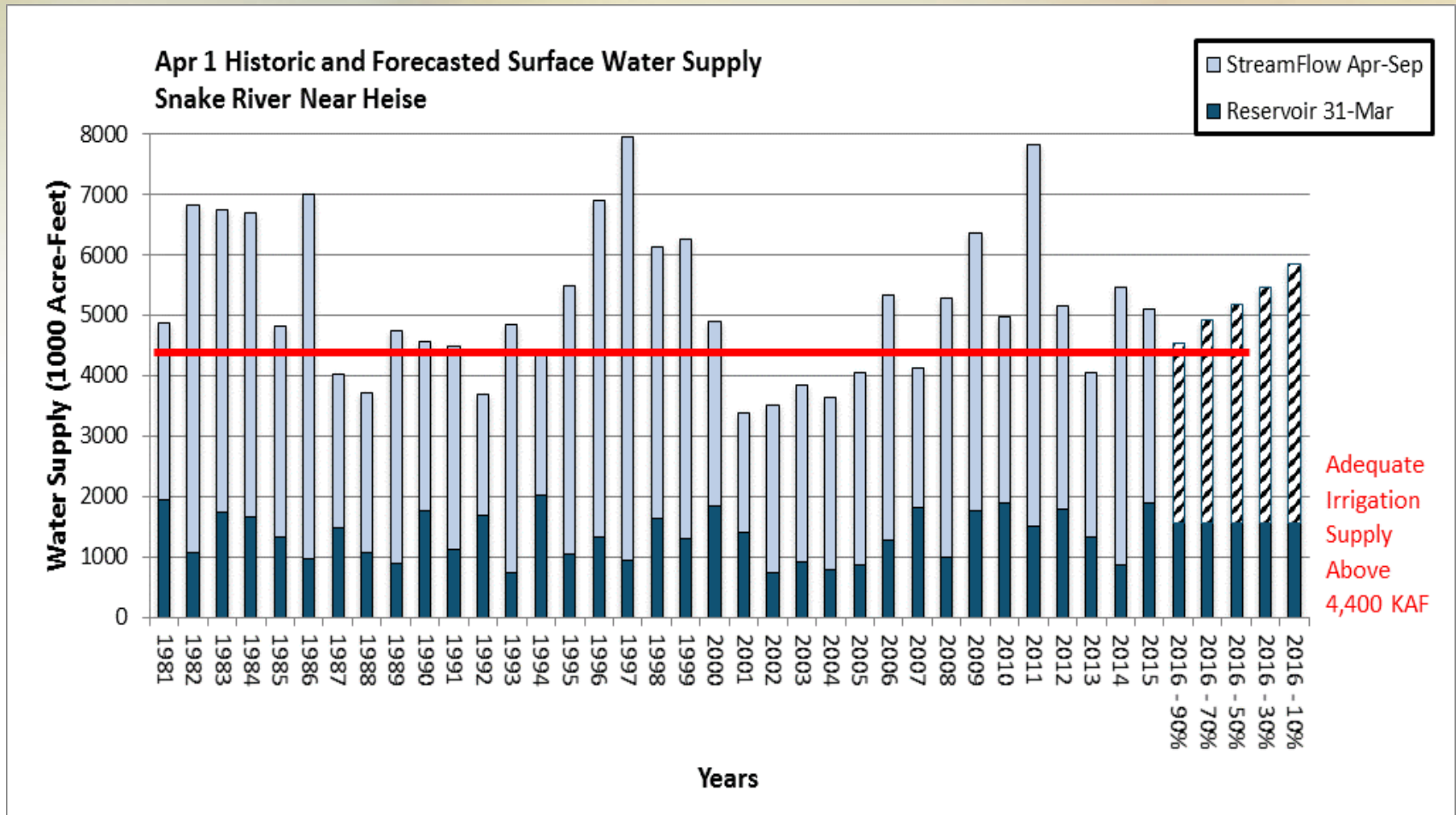
### Big water management question

- How much water leaving Idaho can be economically used?





# Surface water supply index (SWSI) for the Snake River



# Boise and Owyhee basin water target is 51% and 47% of normal

**Summary Table: Amount of streamflow needed in 2017 for adequate surface irrigation supplies.**

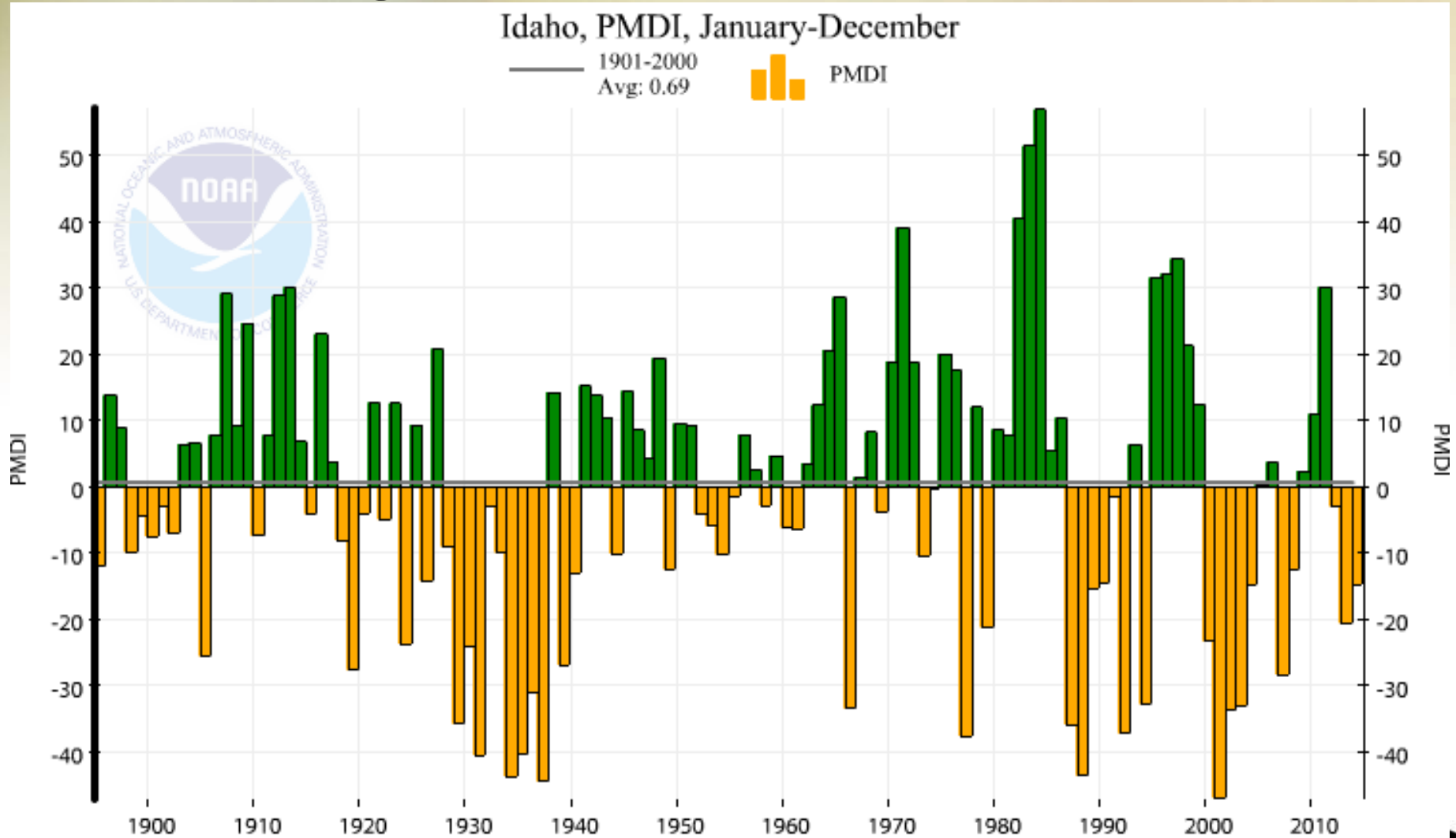
Created November 8, 2016

Fall reservoir carryover storage is used to project spring reservoir storage levels based on current conditions and recent trends. Then, by knowing the adequate irrigation water supply needed in your basin, the projected spring reservoir volumes are subtracted from the adequate irrigation supply to determine the volume of streamflow to marginally meet adequate surface irrigation supplies in 2017.

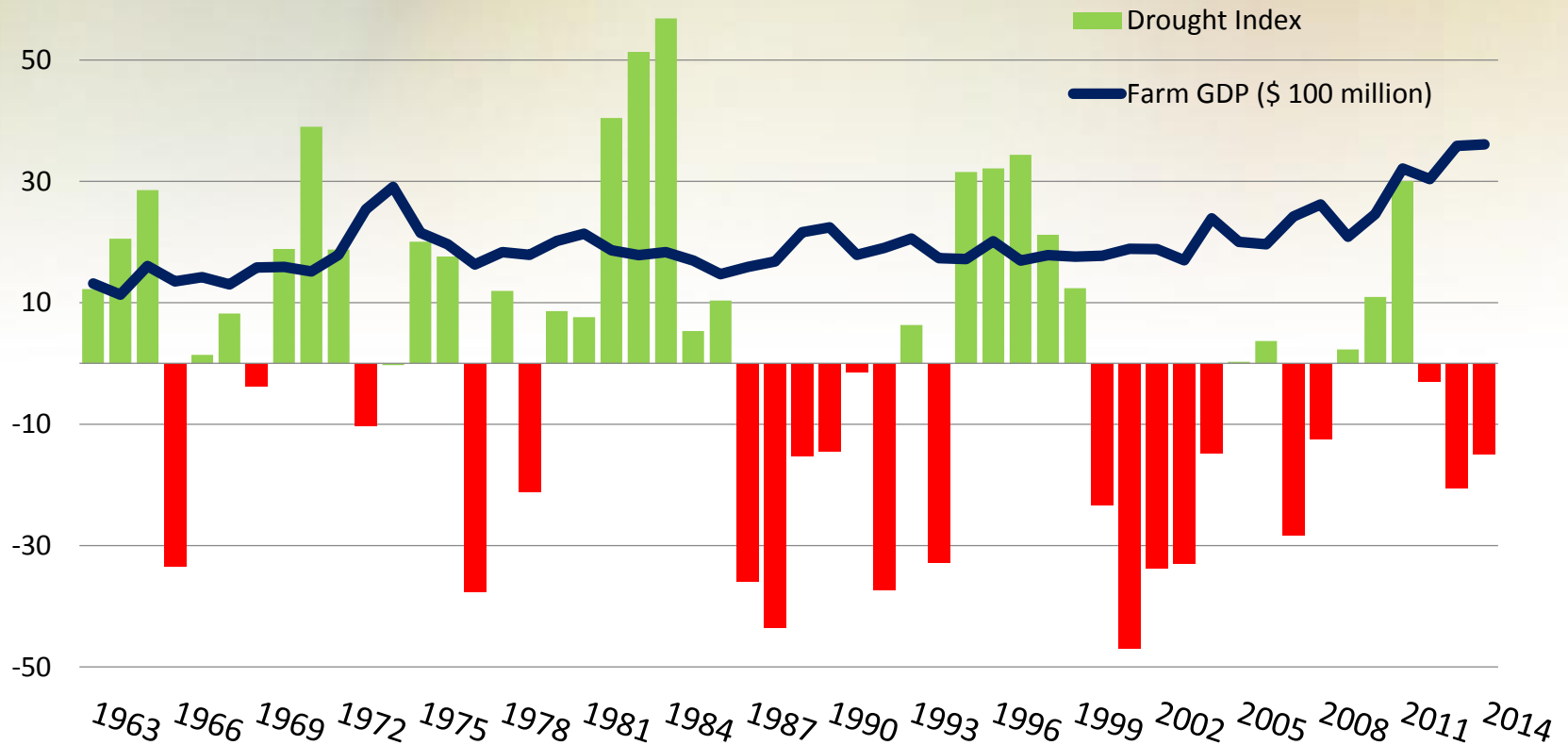
Column 2 - Column 3 = Column 4 Col4/Col6 X 100 = Col 5								
Column 1 Basin	2 Amount needed for adequate irrigation water supply KAF	3 Projected end of month reservoir storage (Jan, Feb or Mar) KAF	4 2017 streamflow volume needed for adequate water supply KAF	5 % of average streamflow to meet adequate supply in 2017 KAF	6 1981-2010 average streamflow KAF	7 Streamflow runoff period used in the analysis	9 2016 Streamflow Runoff  KAF / % of average	
Boise	1500	800	700	51%	1360	Apr-Sep	1255	92%
Big Wood	275	105	170	64%	265	Apr-Sep	186	70%
Little Wood	60	24	36	39%	92	Mar-Sep	66.4	72%
Big Lost	180	40	140	93%	150	Apr-Sep	119.4	80%
Little Lost	40	---	40	118%	34	Apr-Sep	26.9	79%
Teton	85	---	85	44%	193	Apr-Sep	140	73%
Snake (Heise)	4,400	1300	3100	82%	3,780	Apr-Sep	3000	79%
Oakley	50	22	28	90%	31	Mar-Sep	27.4	88%
Salmon Falls	110	50	60	71%	85	Mar-Sep	109	128%
Owyhee	575	260	315	47%	665	Feb-Sep	545	82%
Bear River	280	500	0	0%	205	Apr-Sep	145.5	71%



# Drought Index 1895 to 2014



# Idaho Drought Index versus Idaho Farm Real GDP (2009\$)



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# 17 western states: sprinkler acreage has increased but applied water and irrigated acres are stable

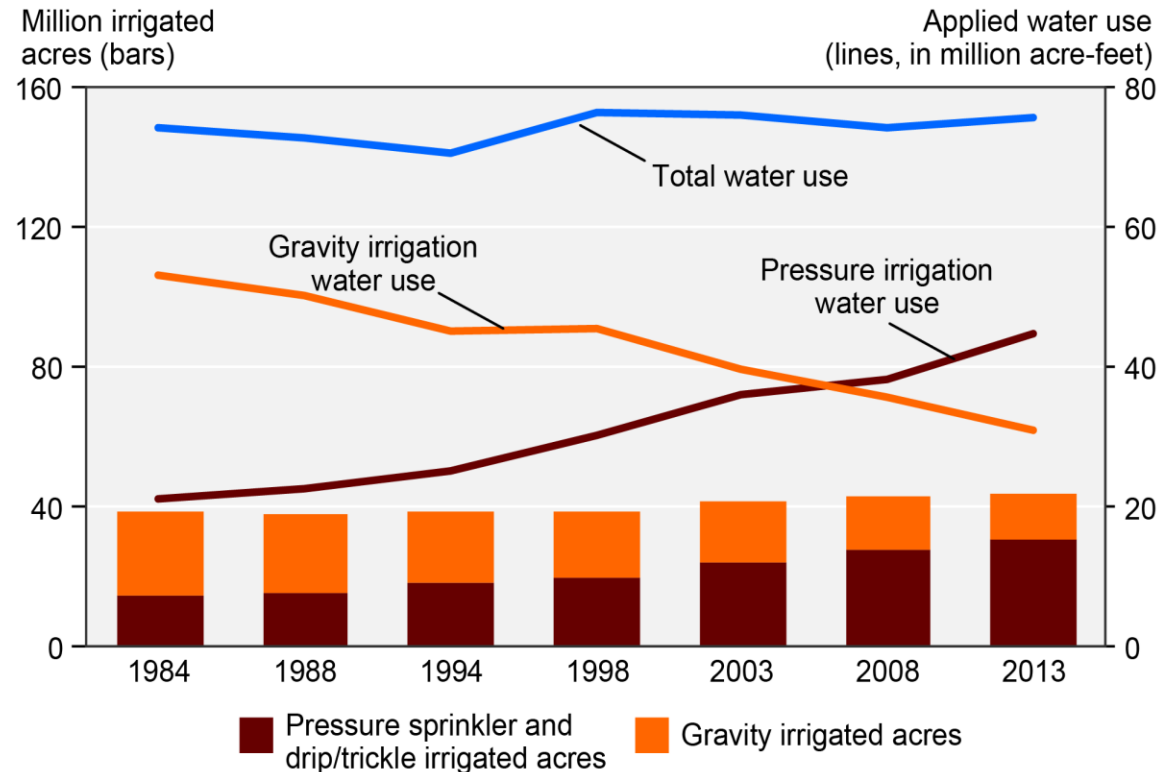
Irrigated acres, 39.1 (1984) to 39.6M acres (2013)

Applied water, 74 (1984) to 76 maf (2013)

Gravity acres declined from 62% (1984) to 34% (2013)

Sprinkler water increased from 28% (1984) to 59% (2013)

Irrigated acres and applied water use, 17 Western States, 1984-2013



Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service, Farm and Ranch Irrigation Survey (FRIS) data. Note that FRIS reports onfarm water applied, not withdrawn; this chart excludes irrigated horticulture crops under protection.

# Impact Analysis

## Drought or calls

- Water calls cut acres - NOT water, crops, or cows.
- Drought cuts water

## Farmer and processor adaption

- Alternate water sources – wells or drains
- Crops -- flexibility in contracts, alternative crops, exporting acres and rotations
- Dairy – importing feed versus cutting herd
- Processor adaptation – importing beets, spuds, or milk

## Translate farmer and processor output to decreased export

- Exports (new money) drives the economy
- Example cut in hay to cut in cows to cut in cheese exports

## Apply multipliers

- Dairy processing multiplier: \$2.50 per \$1 exports
- Crop multipliers: \$1.50 per \$1 exports
- Job multipliers: 7.5 jobs per \$1million exports
- State budget coefficient: \$5,200 per job

## Economic Impact of Rangen Call Upon the Magic Valley: Less Flexible

	Immediate Sales Reduction (\$ millions)	Long-term Sales Reduction (\$ millions)	Total Sales Reduction ( \$ millions)
<b>Crops</b>	\$77	\$36	\$113
<b>Dairy Processing</b>	\$103	\$84	\$186
<b>Total Impact</b>	\$179	\$120	<b>\$300</b>

	Immediate Job Reduction	Long-term Job Reduction	Total Job Reduction
<b>Crops</b>	259	330	589
<b>Dairy Processing</b>	82	646	769
<b>Total Impact</b>	341	976	<b>1,400</b>

	Immediate Tax Reduction (\$ millions)	Long-term Tax Reduction (\$ millions)	Total Tax Reduction (\$ millions)
<b>Crops</b>	\$1.3	\$1.7	\$3.1
<b>Dairy Processing</b>	\$0.4	\$3.4	\$3.8
<b>Total Impact</b>	\$1.8	\$5.1	<b>\$7</b>