

# Water in the Idaho Economy

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*Idaho Water Users Association Seminar*  
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# Water Use Metrics

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

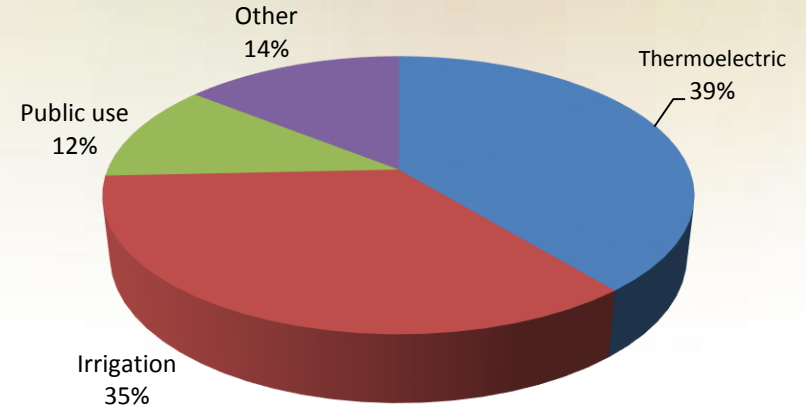
Definitions

Withdrawals: surface and groundwater diversions

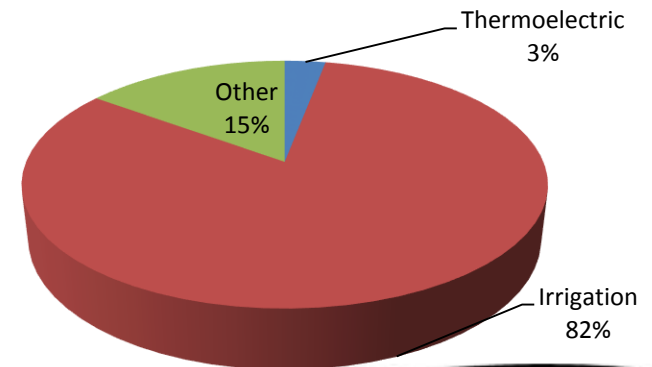
Consumptive: evapotranspiration

Applied: applied to field

**US Withdrawals, 1995**



**US Consumptive Use, 1995**



Source: USGS

# US Water Withdrawals, 2010

Livestock



1 %

Self-Supplied



1 %

Public Supply

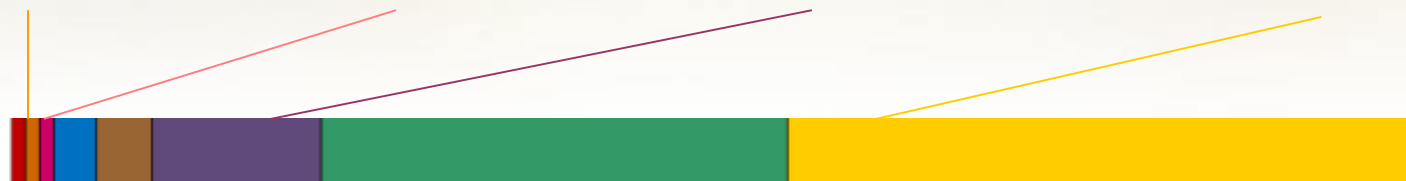


12 %

Thermoelectric Power



45 %



1 %



Mining

3 %



Aquaculture

4 %



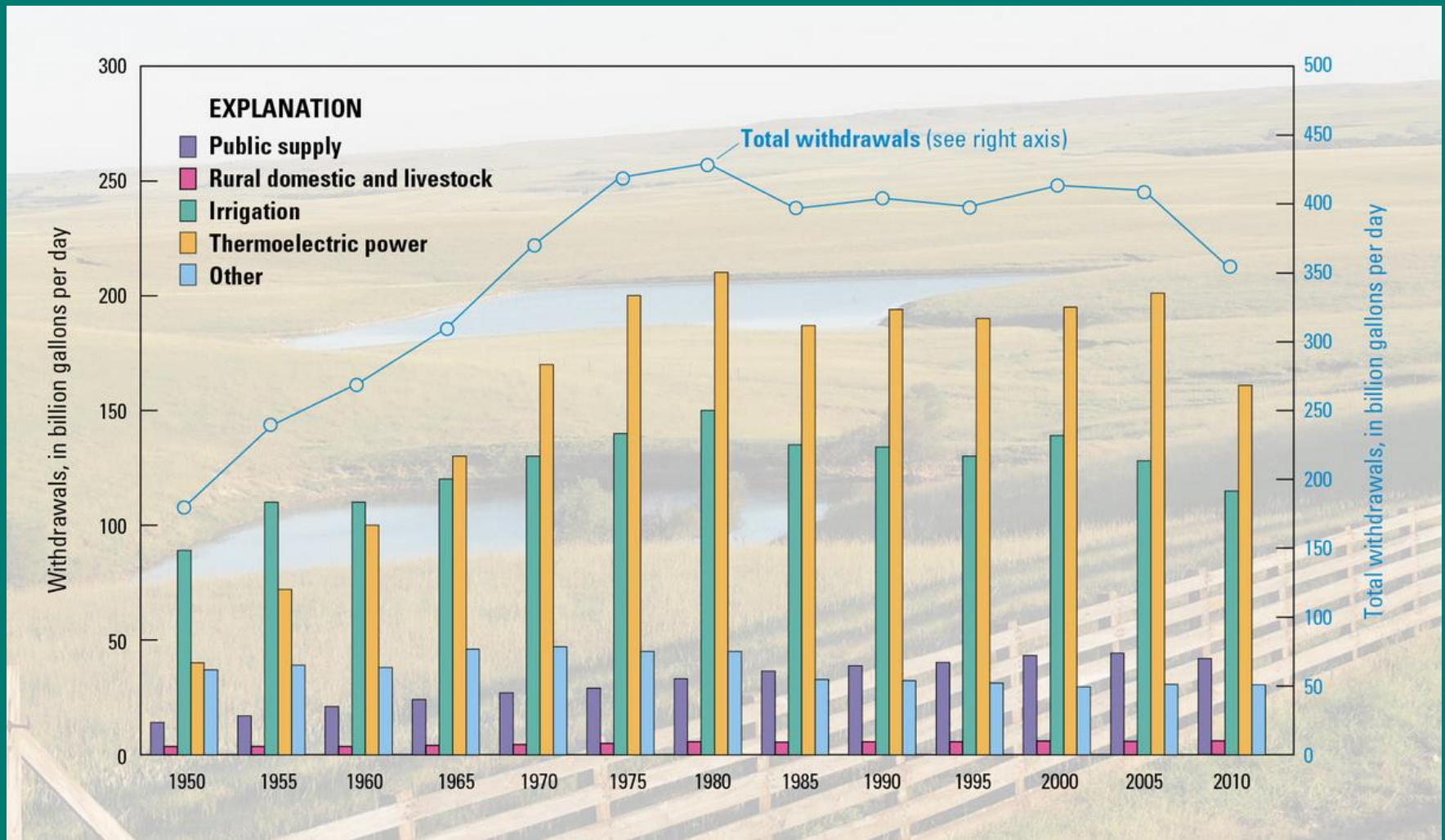
Industrial

33 %



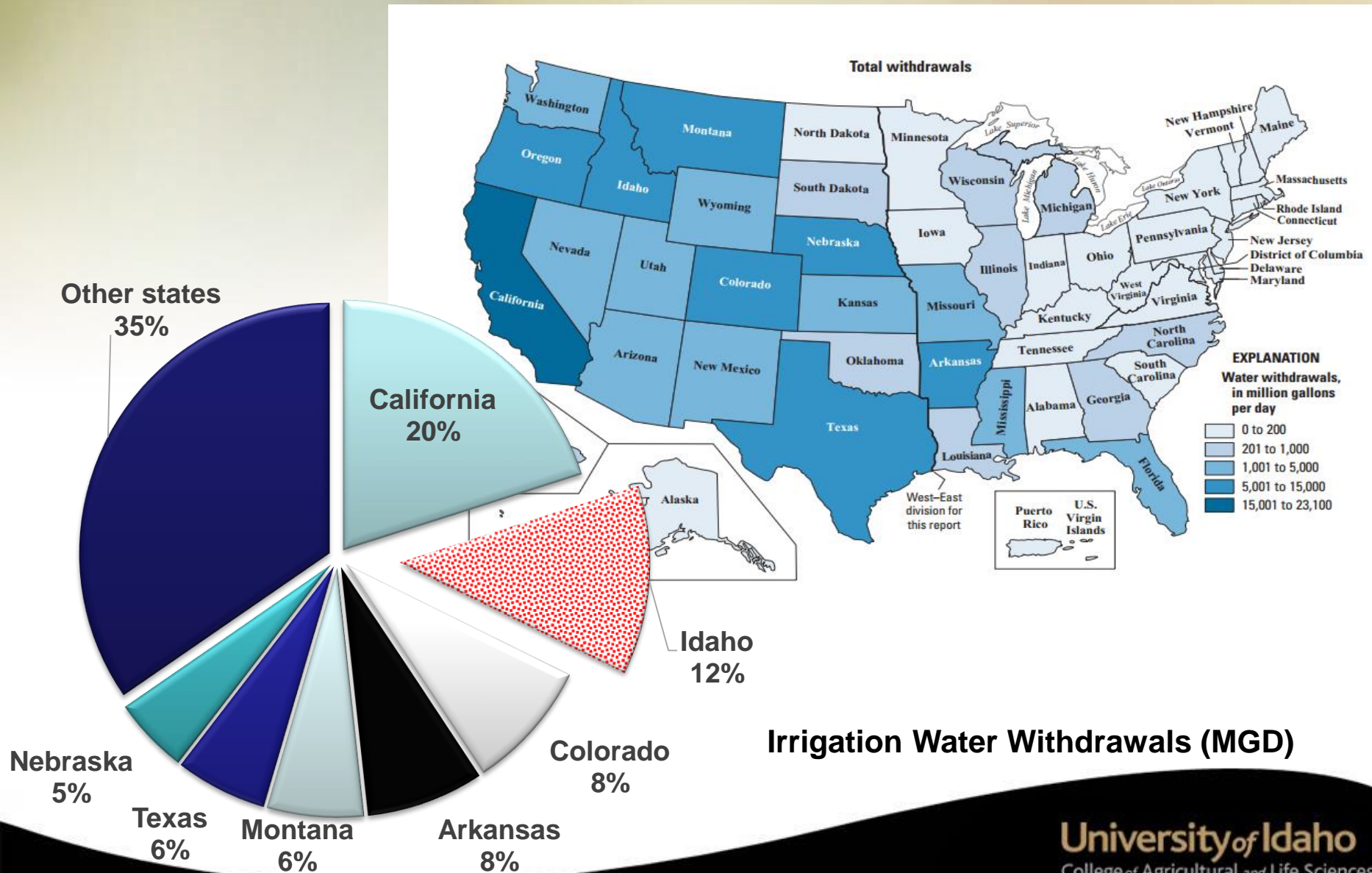
Irrigation

# 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

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

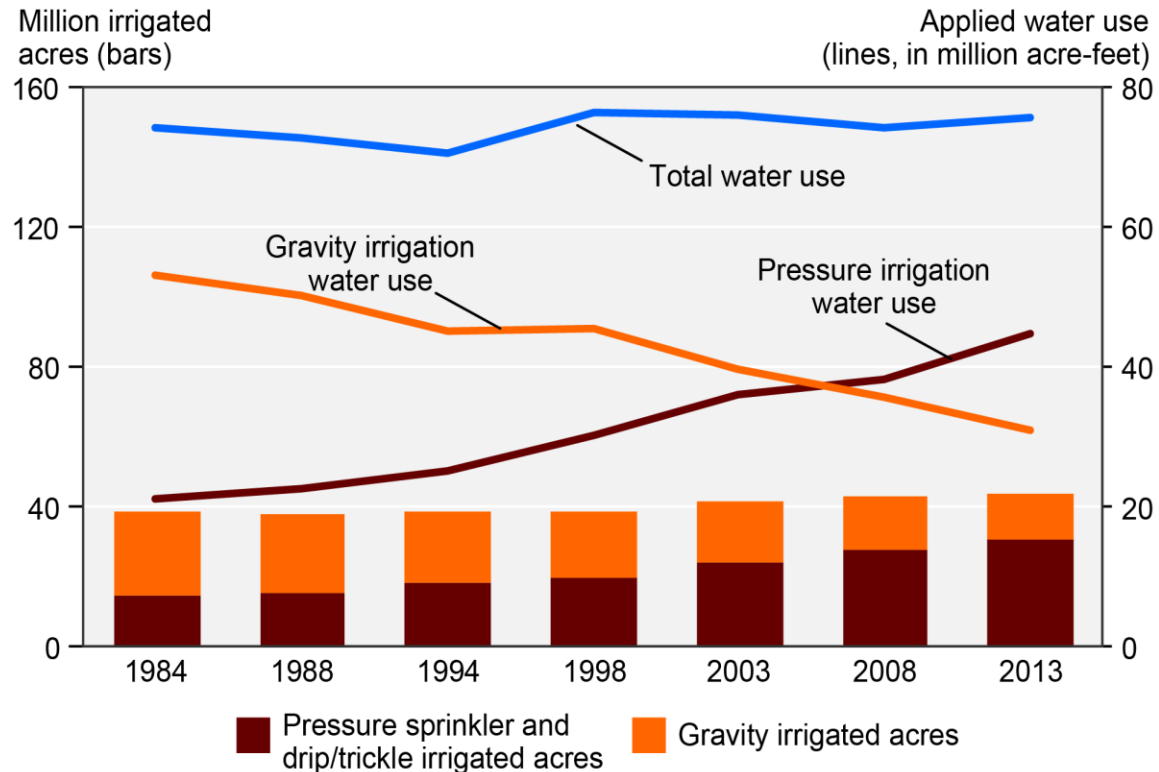
Irrigated acres, 39.1 (1984) to 39.6M acres (2013)

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)

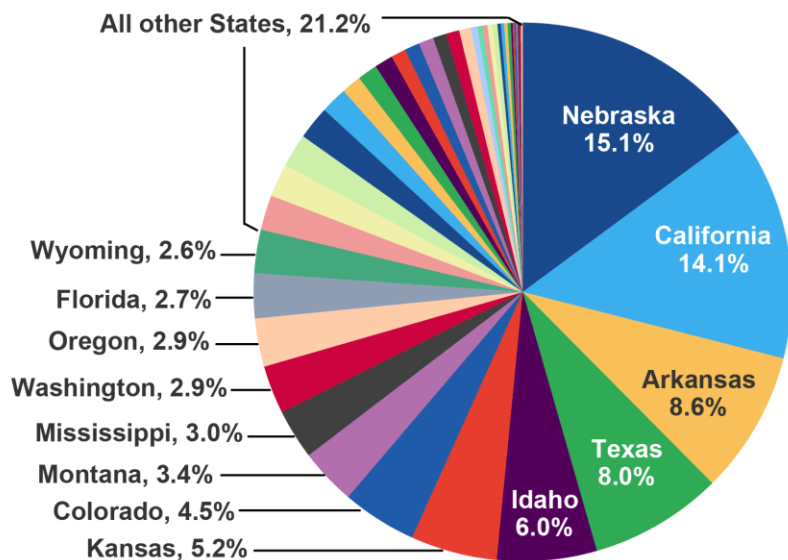
Irrigated acres and applied water use, 17 Western States, 1984-2013



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.

# 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).

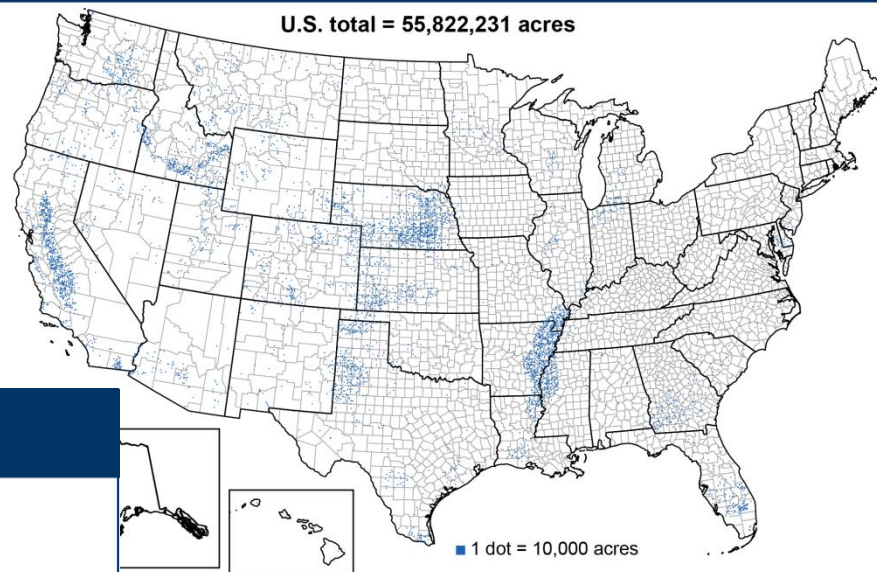
Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service, 2012 Census of Agriculture, State data.



United States Department of Agriculture, Economic Research Service

The views expressed are those of the author(s) and should not be attributed to the Economic Research Service or USDA.

## 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

Only 3 value of crop production 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



# Idaho Ag Quick Facts

2014 record farm receipts (\$8.7B) and income (\$1.9B)

Livestock receipts exceed 60% of total

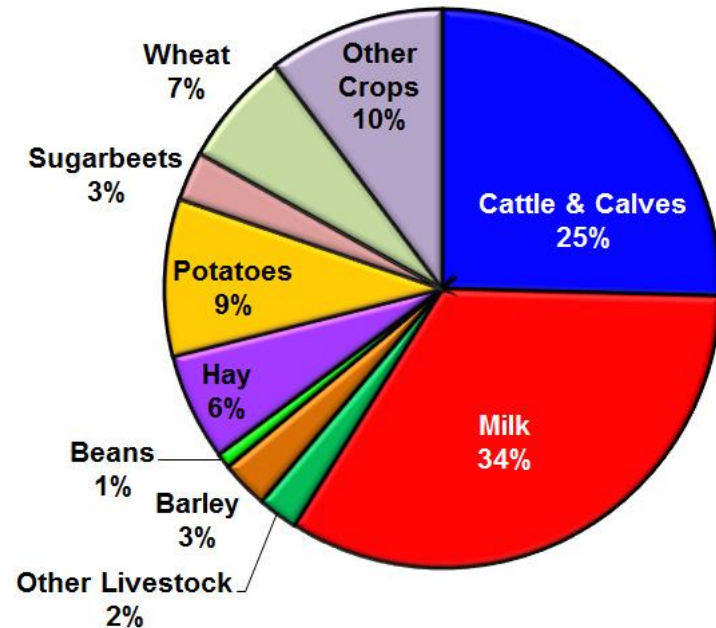
Farming is Idaho's fastest growing industry (GDP)

Multiplier: AgBiz is Idaho's largest industry (2013)

- 20% of output
- 14% of jobs
- 16% of GDP

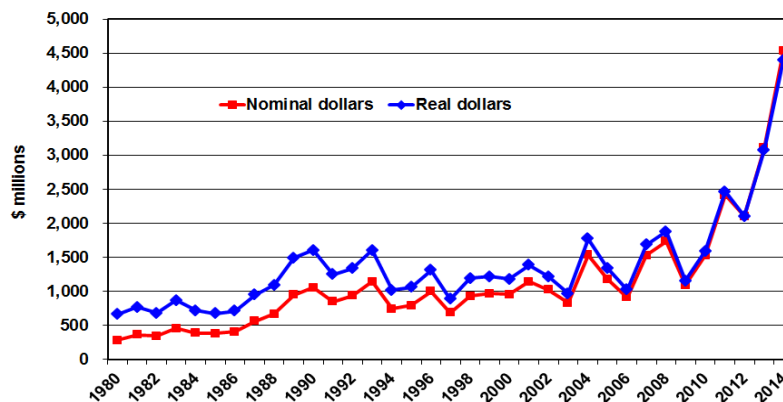
Idaho Ag, 2<sup>nd</sup> largest of 11 western states

## Idaho Cash Receipts, 2014



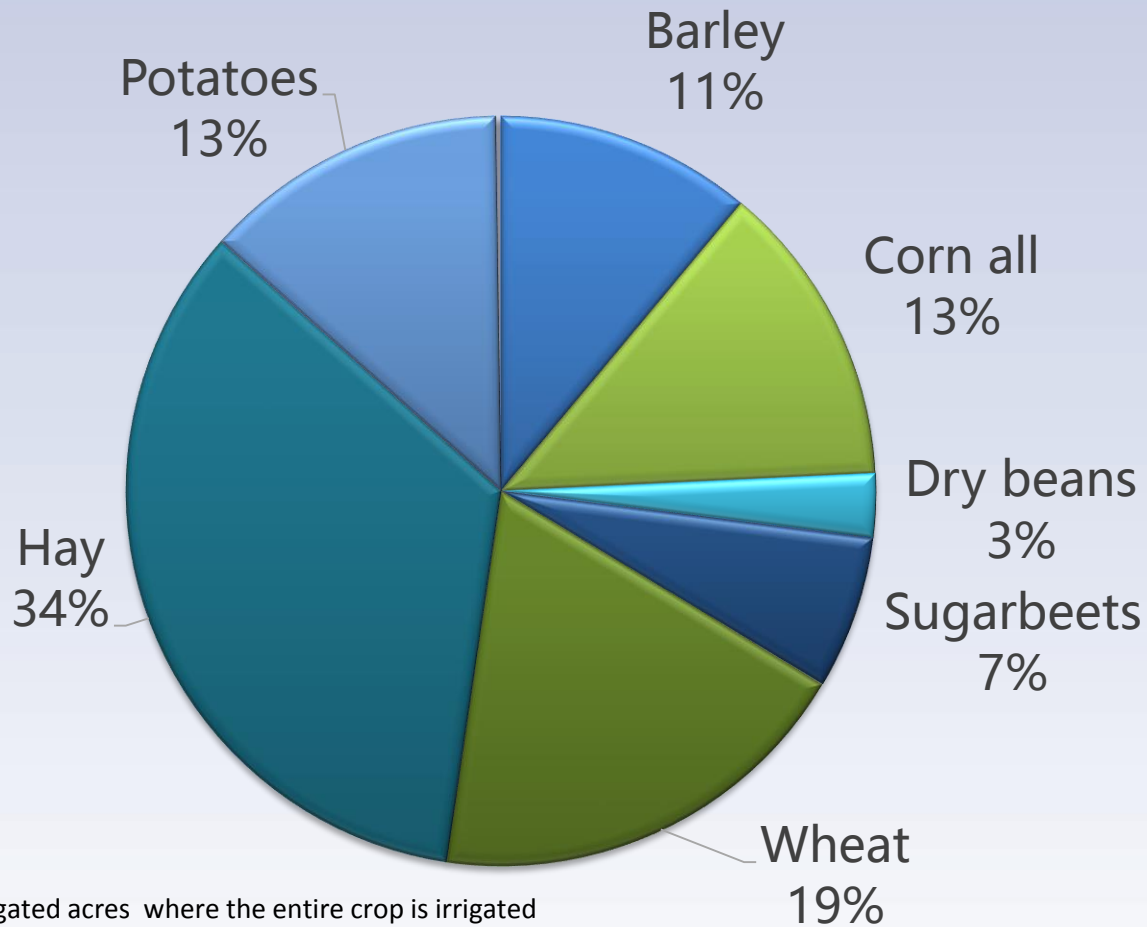
## Idaho Net Farm Income, 1980-2014

Real dollars - 2012 base



Source: University of Idaho

# Idaho 2.8 million irrigated crop acres, 2012



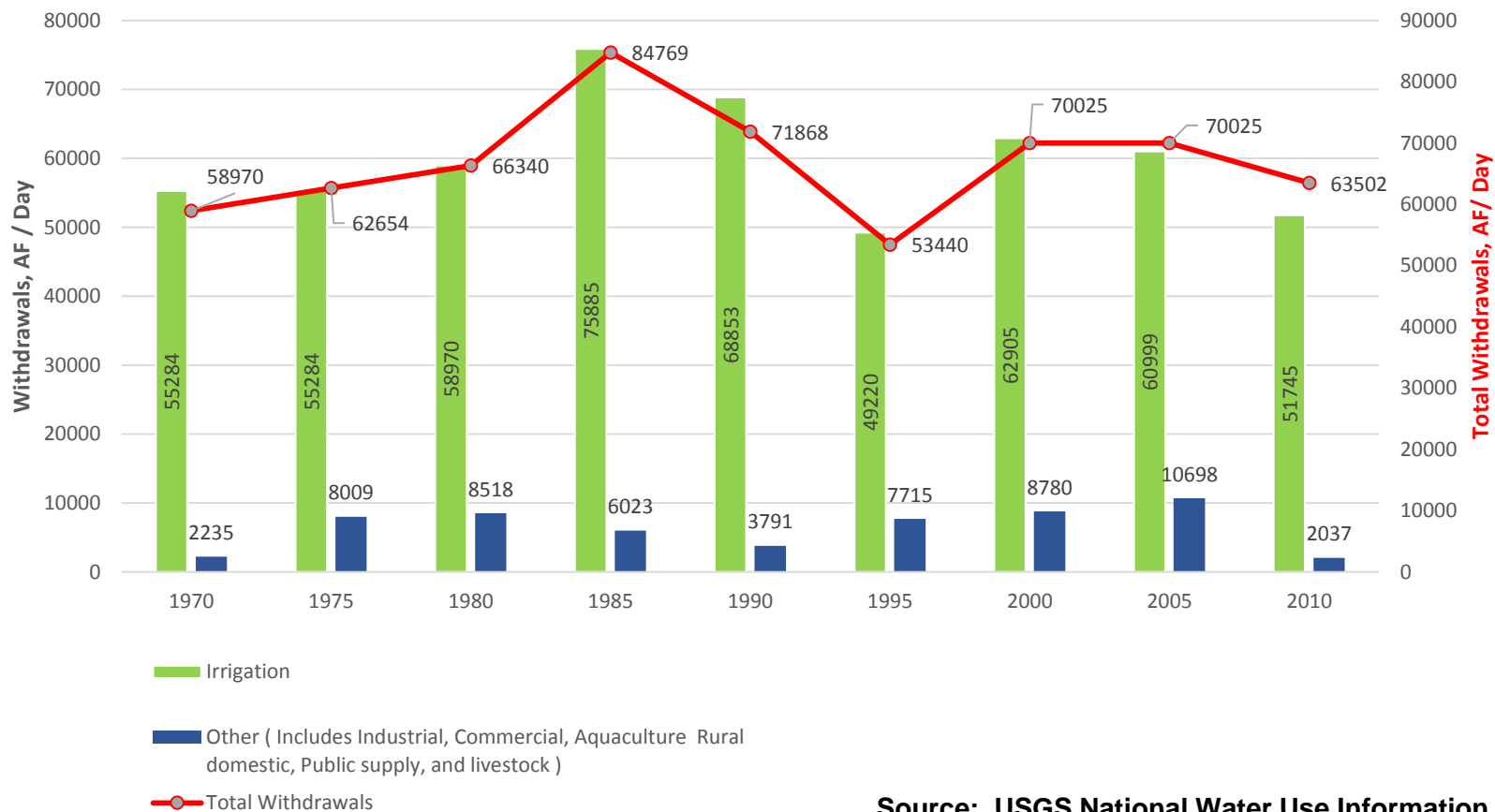
2.8 million irrigated acres where the entire crop is irrigated  
Source: 2012 Census of Agriculture



United States Department of Agriculture, Economic Research Service

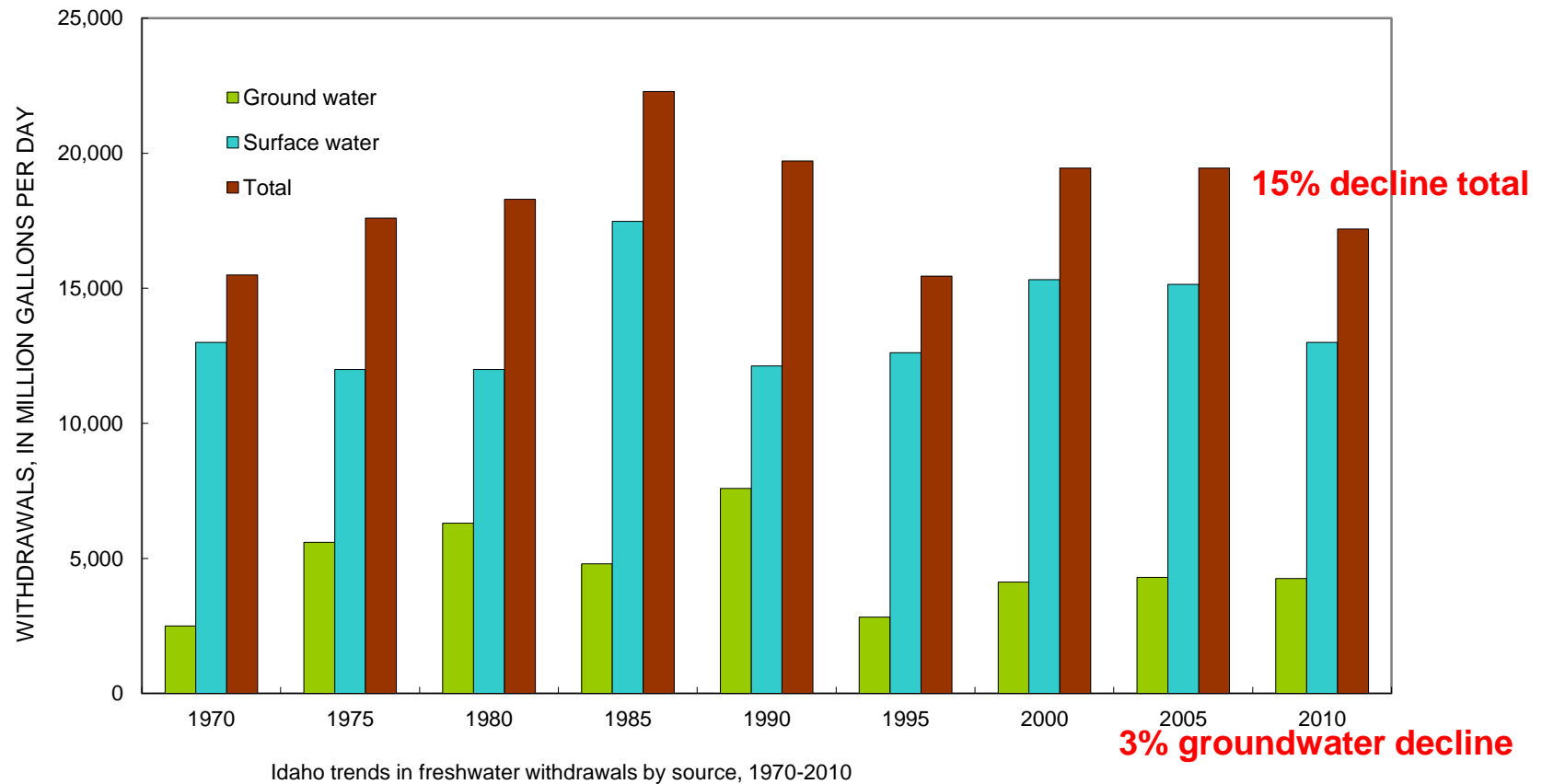
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### Trends in total water withdrawals by water - use category, Idaho 1970-2010



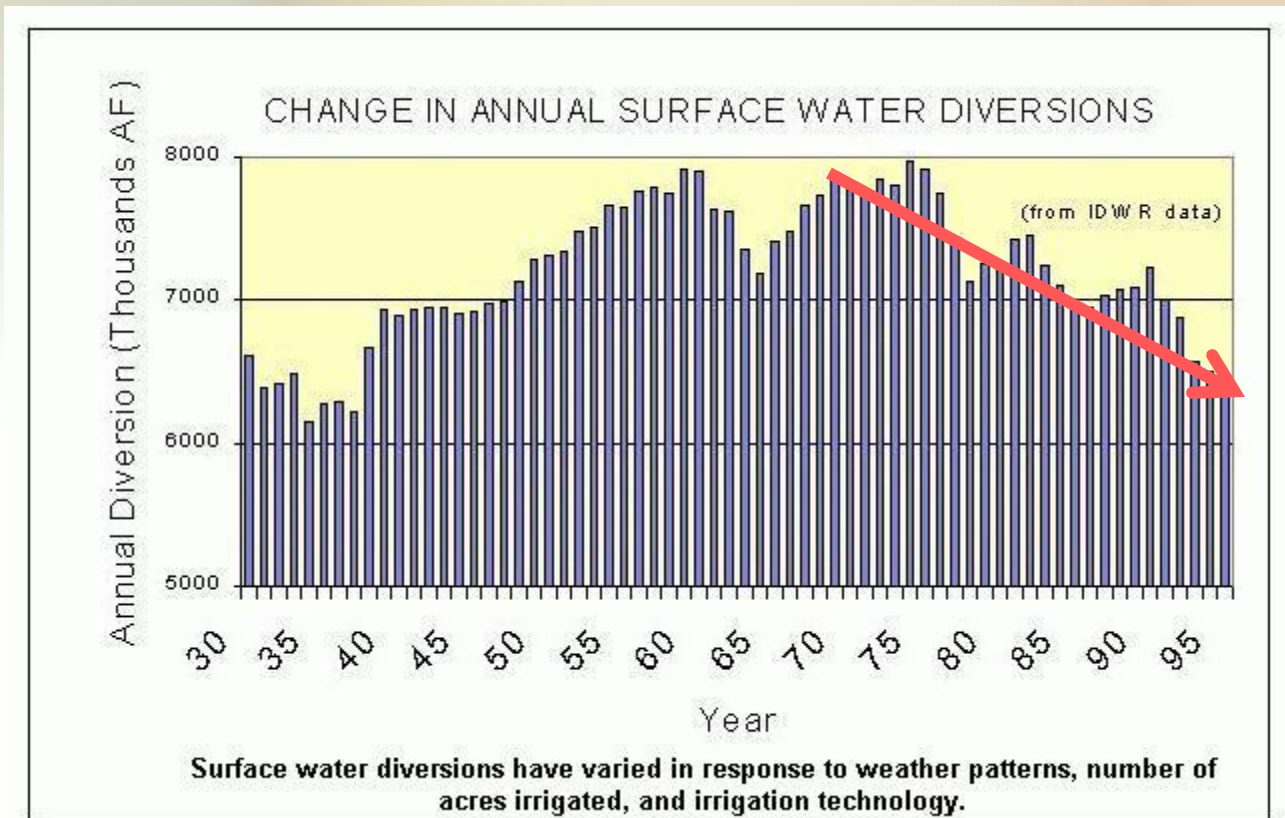
**Source: USGS National Water Use Information Program, Molly Maupin, Hydrologist, Idaho Water Science Center**

# Idaho withdrawals by source, 1970-2010





Surface water diversions have been declining since the 1970's



Source: IDWR

Since 1980, groundwater acres have been steady and surface water acres are declining

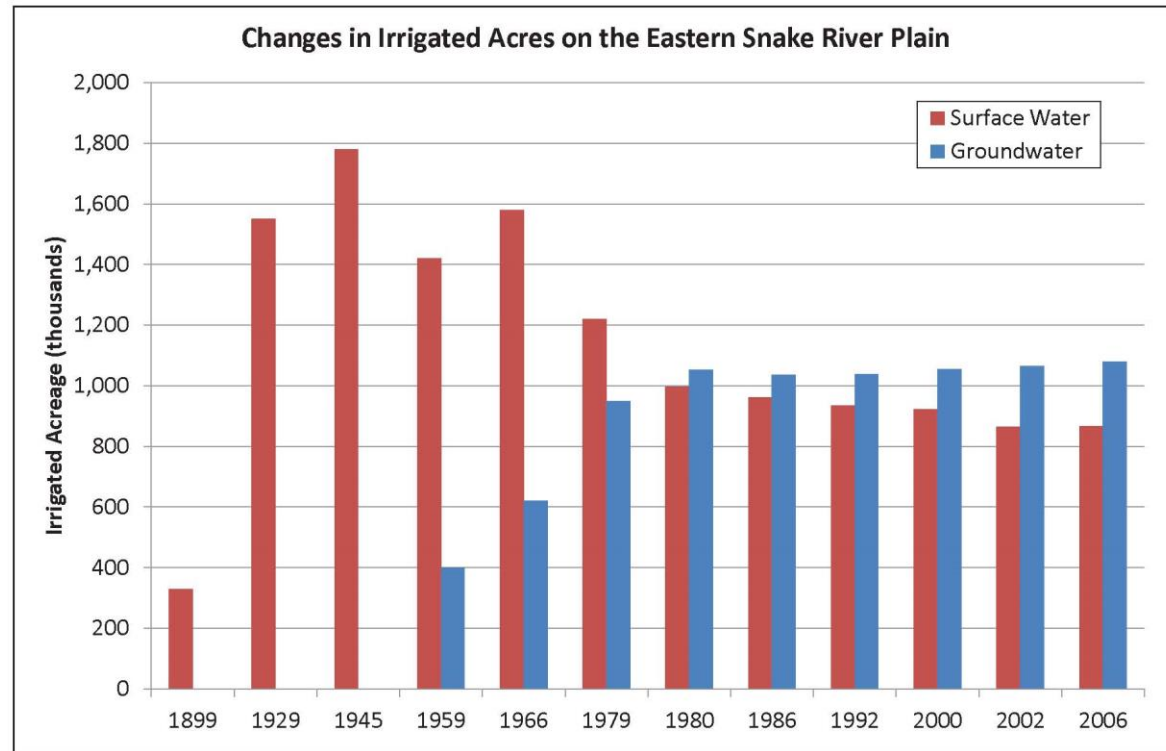
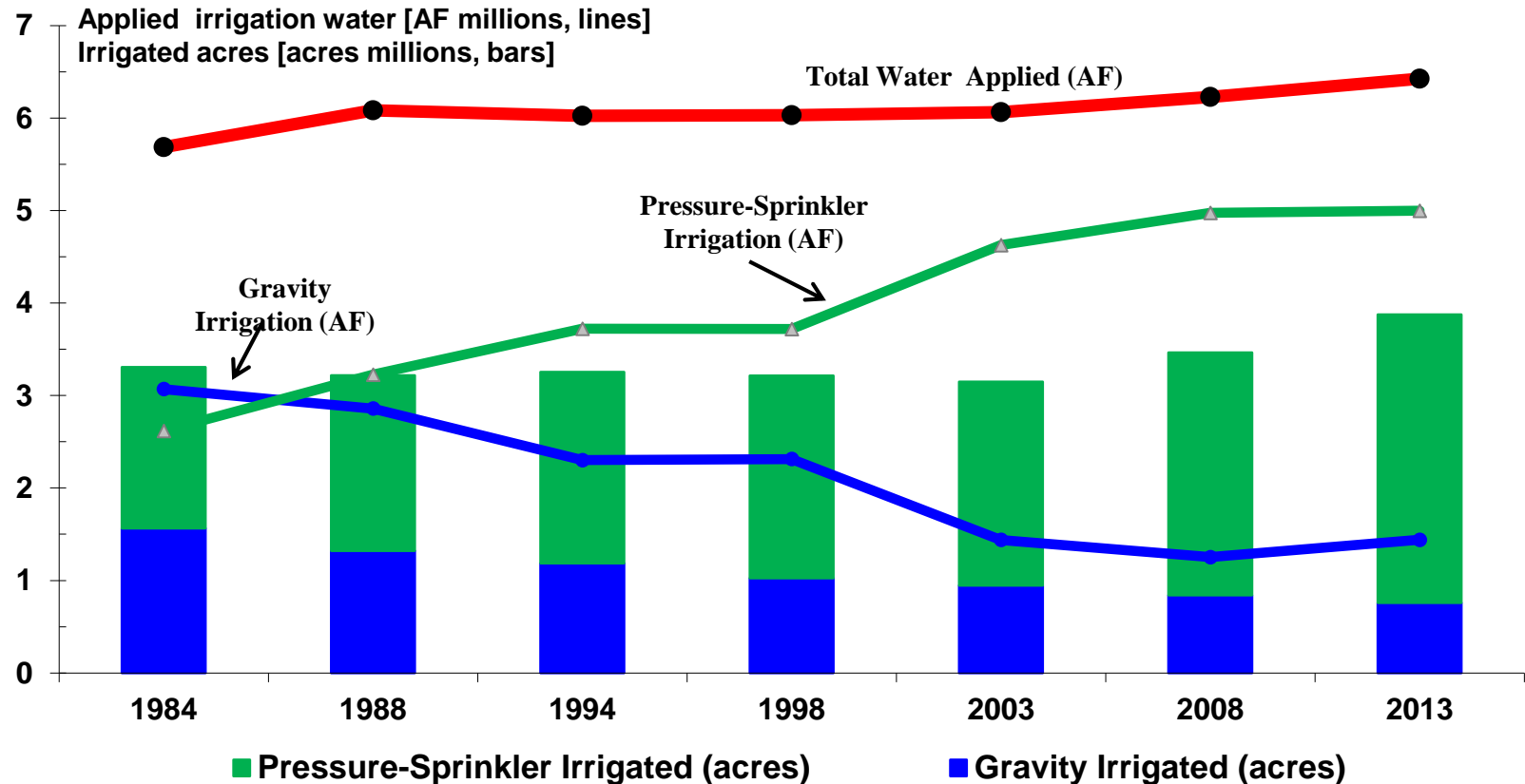


Figure 2. Surface-water and groundwater irrigated acres on the eastern Snake Plain (after Garabedian, 1992 and IDWR GIS shapefiles). The years 1899 through 1979 are represented in Garabedian (1992). The years 1980 – 2006 were acquired from IDWR GIS shapefiles.

Source: IDWR

# Idaho switches from gravity to sprinklers

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

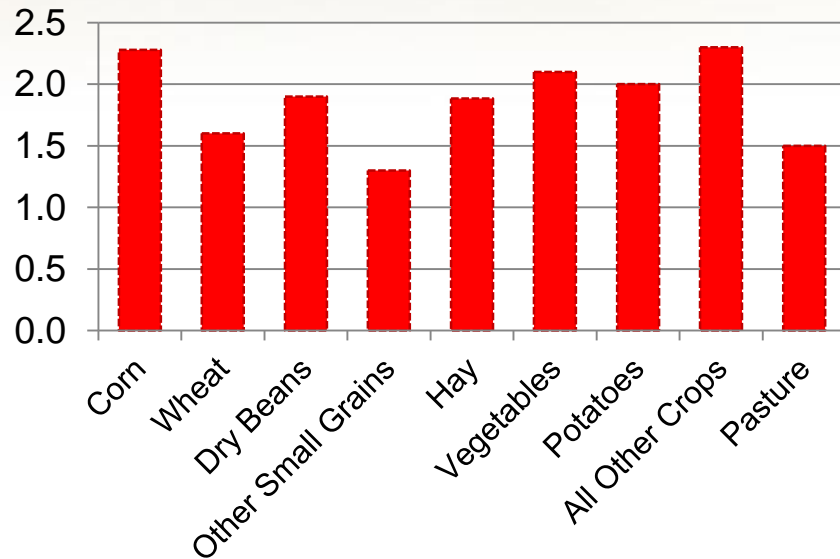


Source: USDA, Economic Research Service calculations based on USDA, National Agricultural Statistics Service, 1984,

# Idaho Applied Water Average and Total

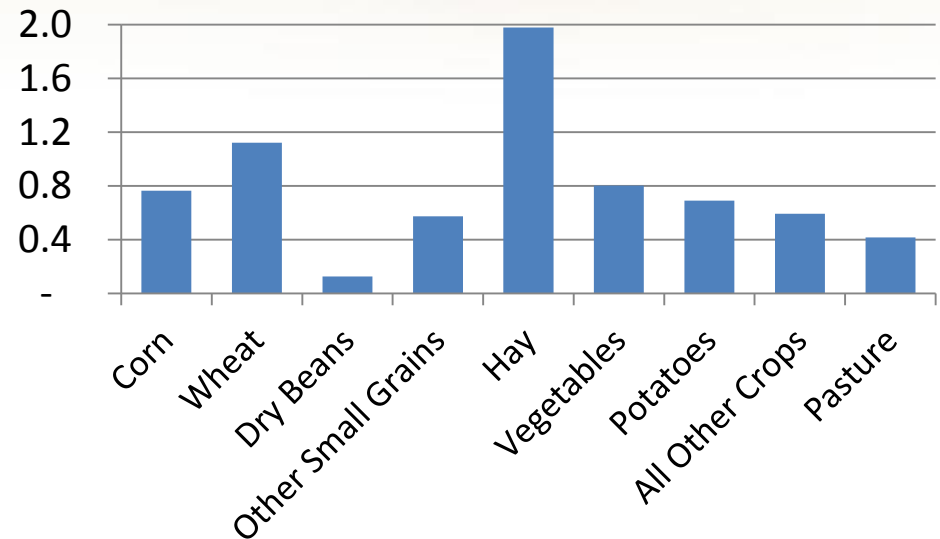
## Corn #1

### Average Applied (AF/acre)



## Hay #1

### Total Applied (millions AF)

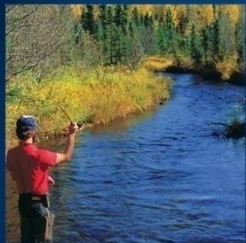
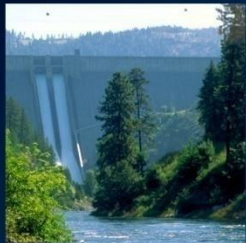


Source: USDA-ERS



# 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	



### Recap

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

### Why are water withdrawals declining?

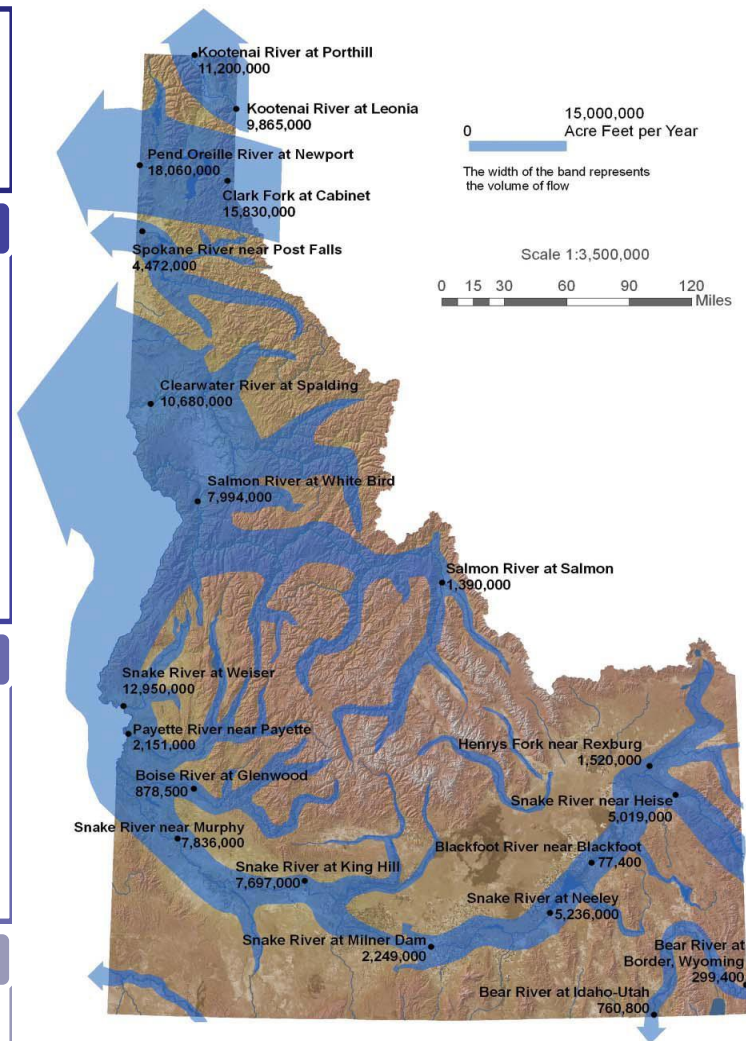
- Demand increases:
  - Increased sprinklers = less withdrawals?
  - Increased in-stream demands (fish, hydropower, flood control)
- Supply decreases:
  - Switch to groundwater pumping increases supply costs
  - Sprinklers = increased consumptive use
  - More droughts?

### Water metrics are NOT adequate to manage water

- Metrics (withdrawals, applied, consumptive) do NOT measure competing uses (fish, flood control, hydropower)
- 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?





**What are the state & local economic  
implications of decreasing Ag water USE?**

# Magic Valley Ag Quick Facts

- Over 50% of Idaho's farm gate cash receipts.
- More than  $\frac{1}{4}$  of Idaho's GDP
- 70% of Idaho's dairy herd
- 2.5 dairy cows for every person
- Top four Ag counties (Cassia, Gooding, Twin Falls, Jerome)
- Multiplier effects
  - AgBiz creates over  $\frac{1}{3}$  of 89,000 MV jobs.
  - AgBiz 2/3 sales of MV businesses
  - Dairy processing accounts for 1-of-7 MV jobs





# 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

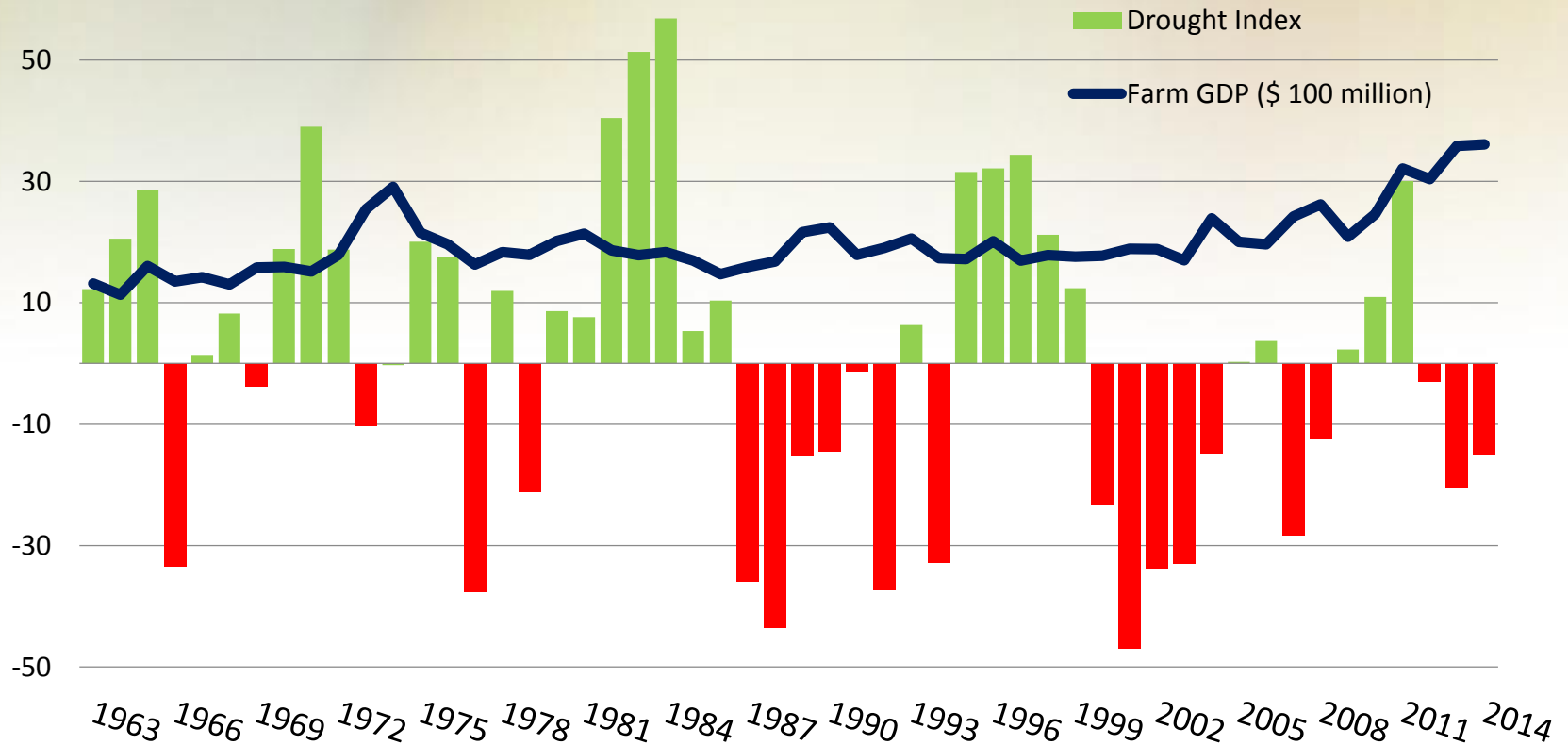
## Economic Impact of Rangen Call Upon the Magic Valley: Less Flexible

	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	\$299

	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	1,358

	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	\$6.9

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



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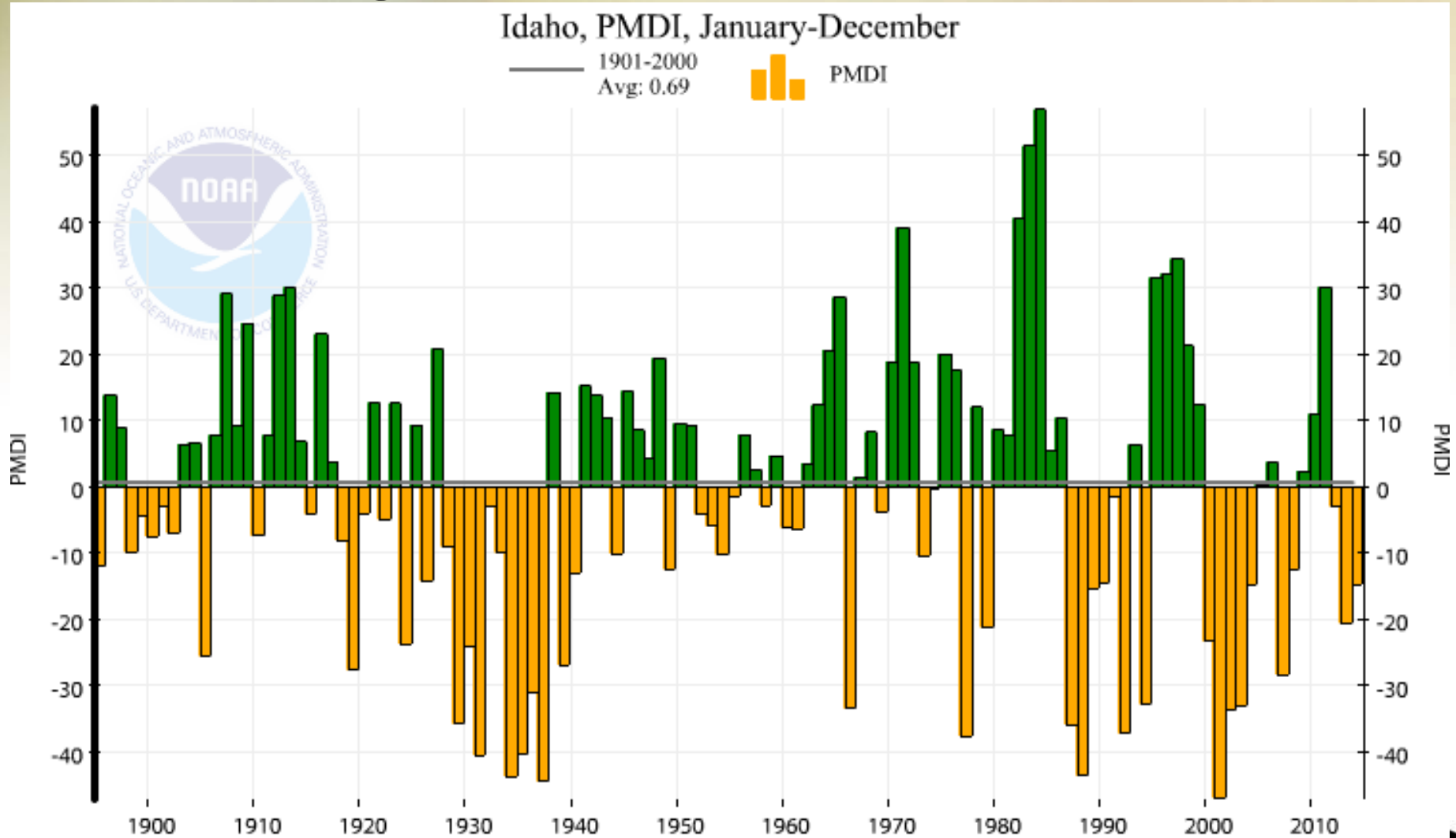
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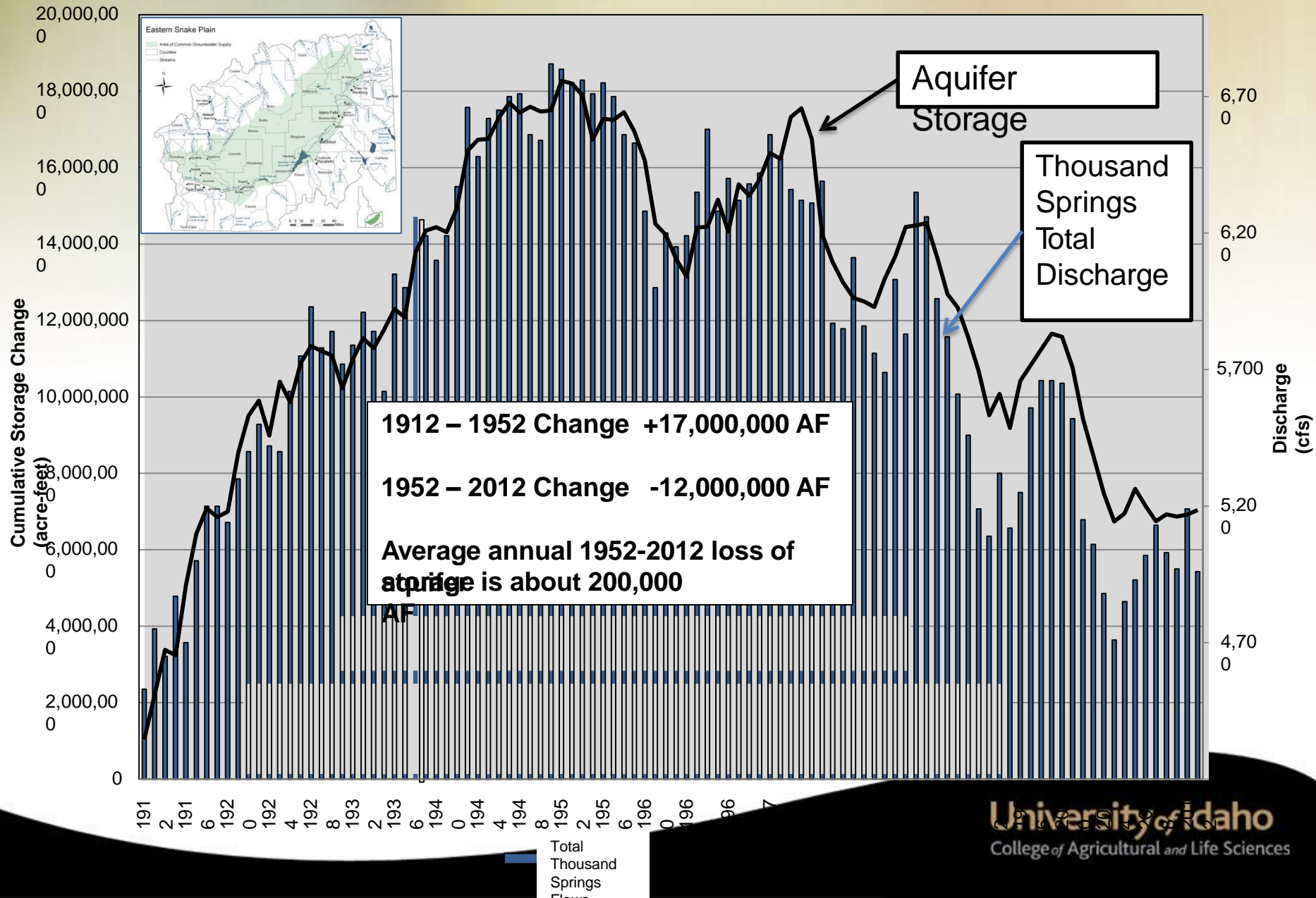
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# Drought Index 1895 to 2014



# Cumulative Volume Change of Water Stored Within ESPA and Thousand Springs Discharge



## Modeled Annual Average Aquifer Water Budget for Water Years 1981-2008

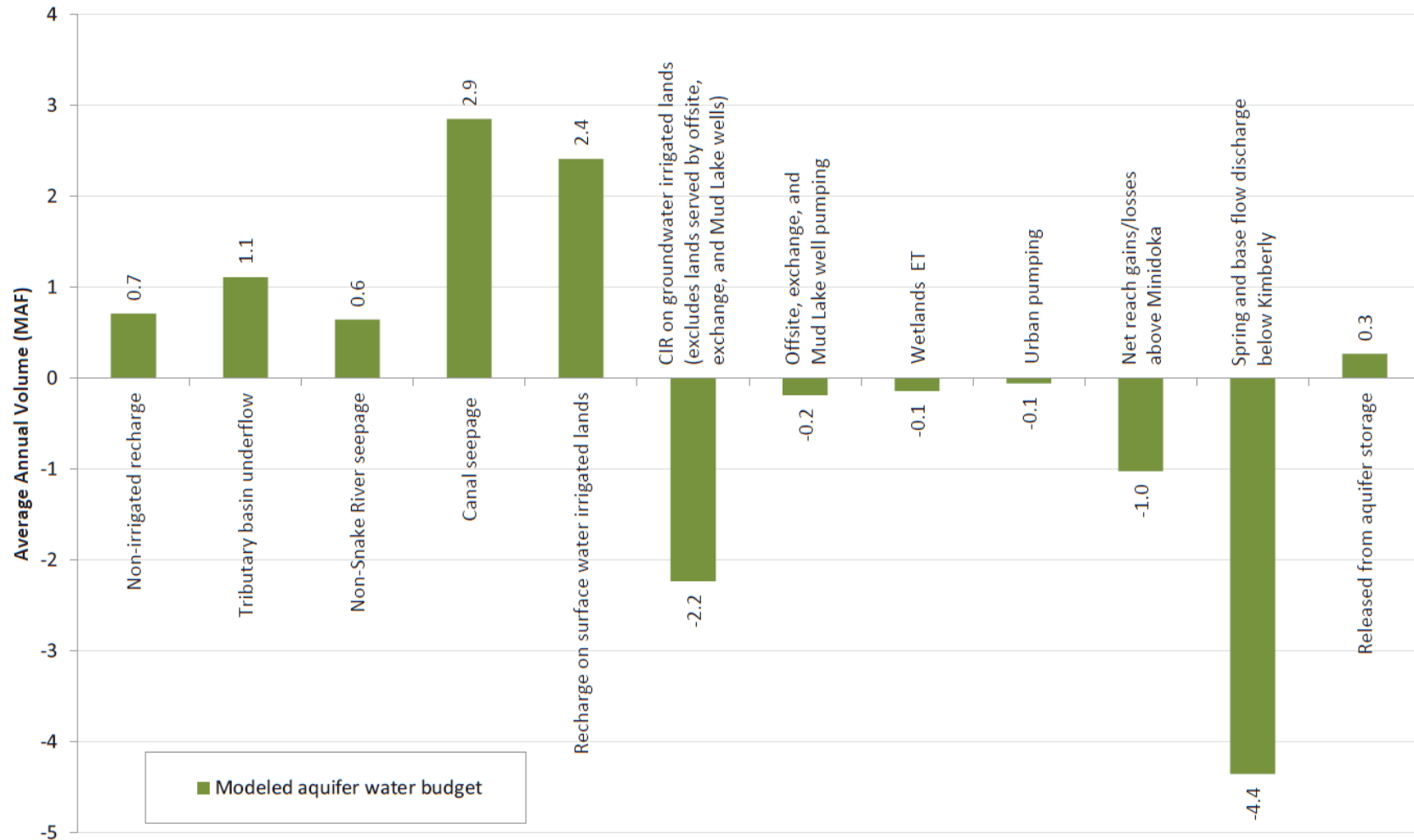


Figure 8. Enhanced Snake Plain Aquifer Model 2.1 average annual aquifer water budget. Positive values of aquifer storage represent water released from storage into the aquifer flow system. Negative values of aquifer storage represent water placed into storage.

# Economic Impact of Water Calls Upon the Magic Valley: Flexible

	Immediate Sales Reduction (\$ millions)	Long-term Sales Reduction (\$ millions)	Total Sales Reduction (\$ millions)
<b>Crops</b>	\$163	\$76	\$239
<b>Dairy Processing</b>	\$0	\$0	\$0
<b>Total Impact</b>	\$163	\$76	\$239

	Immediate Job Reduction	Long-term Job Reduction	Total Job Reduction
<b>Crops</b>	534	691	1,225
<b>Dairy Processing</b>	0	0	0
<b>Total Impact</b>	534	691	1,225

	Immediate Tax Reduction (\$ millions)	Long-term Tax Reduction (\$ millions)	Total Tax Reduction (\$ millions)
<b>Crops</b>	\$2.8	\$3.6	\$6.4
<b>Dairy Processing</b>	\$0.0	\$0	\$0.0
<b>Total Impact</b>	\$2.8	\$3.6	\$6.4

# World water withdrawals ...Idaho looks like India

