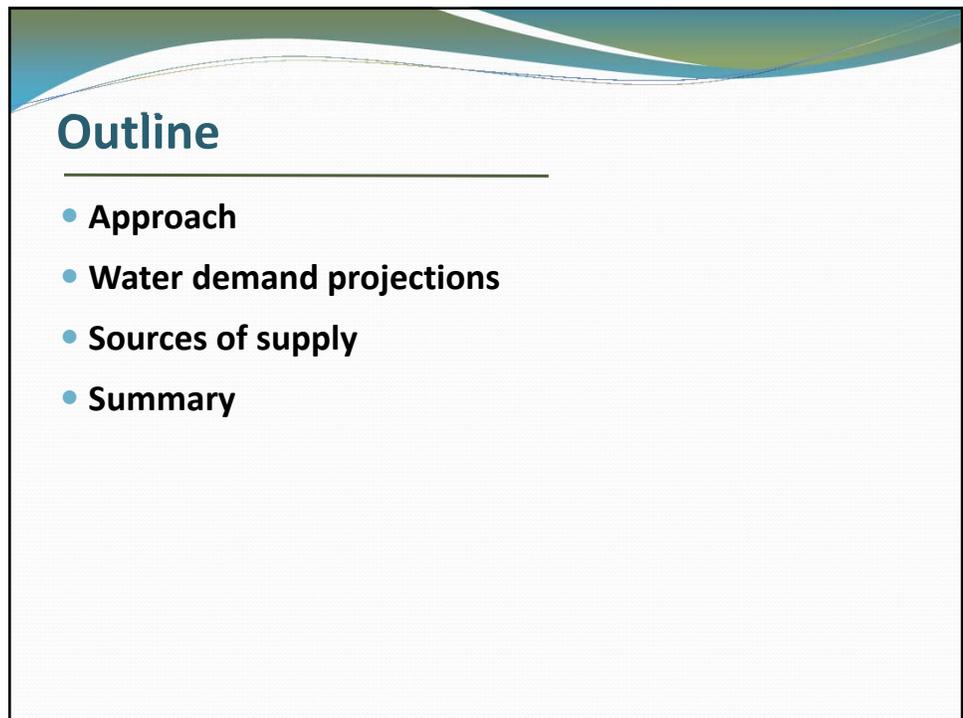




**Treasure Valley DCMI
Water-Demand Projections**

Idaho Water Resource Board
January 17, 2016

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Outline

- **Approach**
- **Water demand projections**
- **Sources of supply**
- **Summary**

Overview of Water Demand Projections

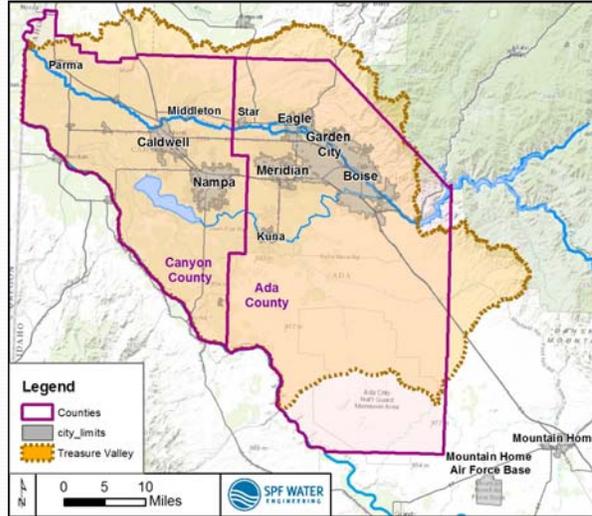
DCMI Water Demand Forecast (AF/yr)					
	2015	2065		% Increase	
		Low	High	Low	High
DCMI Use (AF/yr)	110,000	270,000	393,000	245%	357%
Increase in Net DCMI Demand		160,000	283,000		
Population	624,000	1,573,000		252%	

Approach

- Estimate current DCMI water use (calculate per capita water use)
- Project population, household, and employment growth
- Project *indoor* water use based on current per capita use and projected population growth
- Project *outdoor* water use based on household growth and irrigated-area assumptions
- Adjust for:
 - Increasing evapotranspiration as a result of climate change
 - Reduce per capita demand through conservation
 - Water availability (surface water and groundwater)

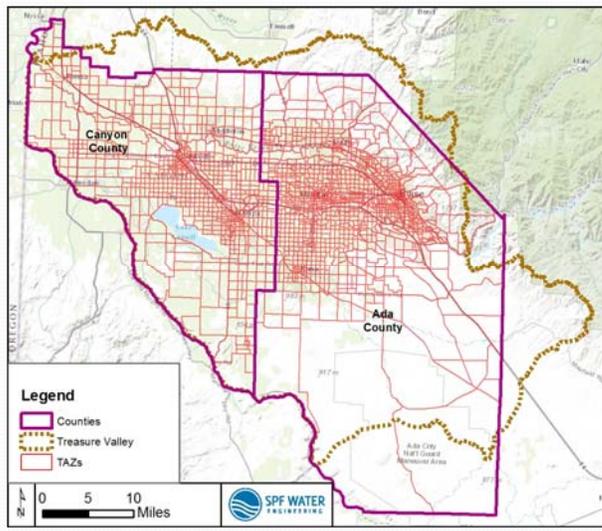
Primary Study Area

- Ada County
- Canyon County



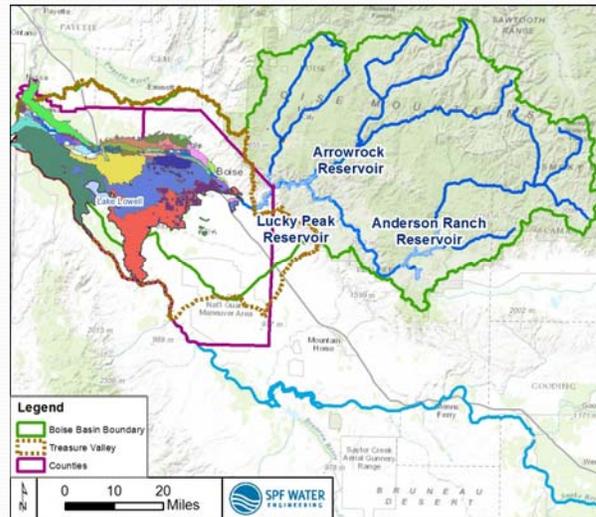
Transportation Analysis Zones (TAZs)

- Used for
 - Existing population estimates (e.g., COMPASS)
 - Population growth projections
 - Water demand projections



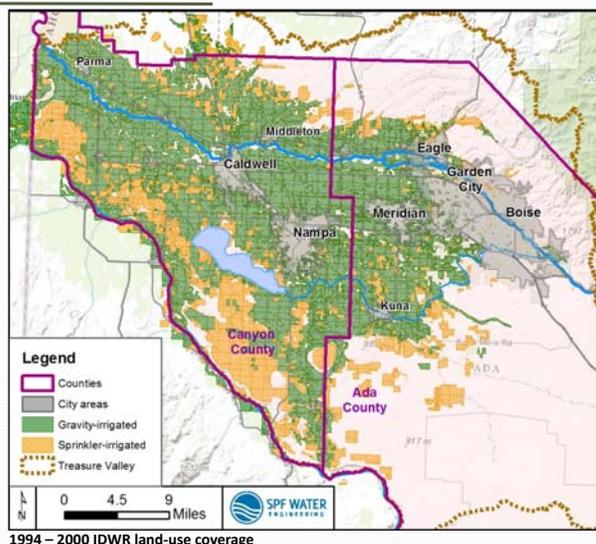
Water Availability

- Water availability influences current and future water use



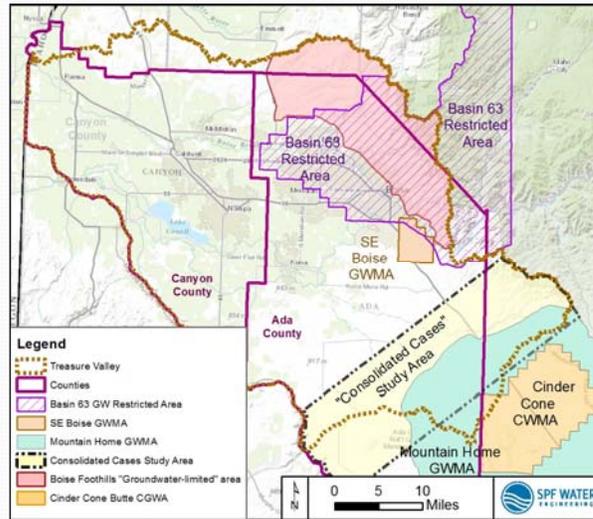
Water Supply (continued)

- Assume that
 - Surface water will be used for DCMI irrigation on previously irrigated agricultural land
 - Existing groundwater supplies will meet indoor and outdoor DCMI demand on land where groundwater is currently used for agricultural irrigation

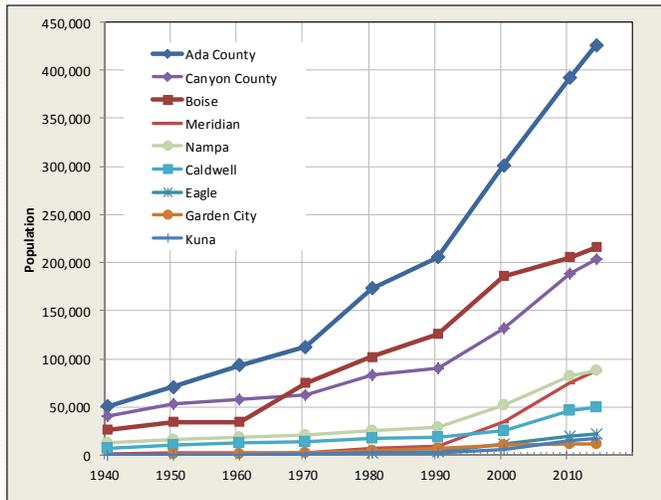


“Water-Limited” Areas

- Assume per-unit DCMI irrigation will be less in areas of limited supply



Historical Population Growth



Average annual growth:

Ada: 2.9%

Canyon: 2.2%

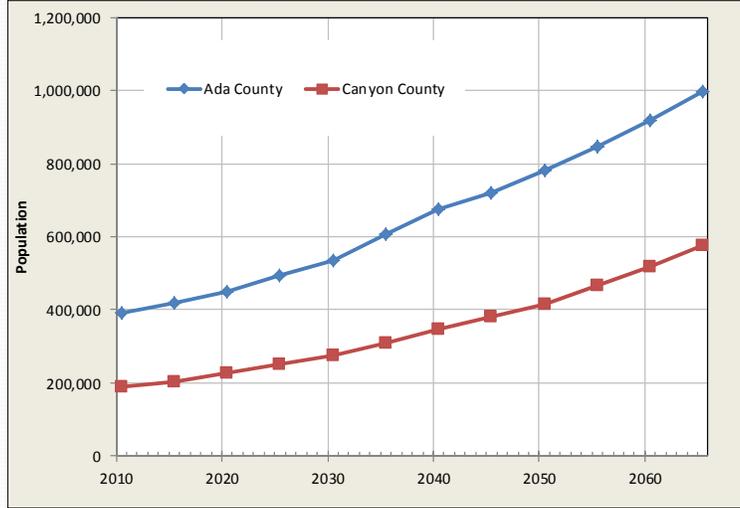
10-yr ranges:

1.4% in 1960-1970

4% in 1970-1980

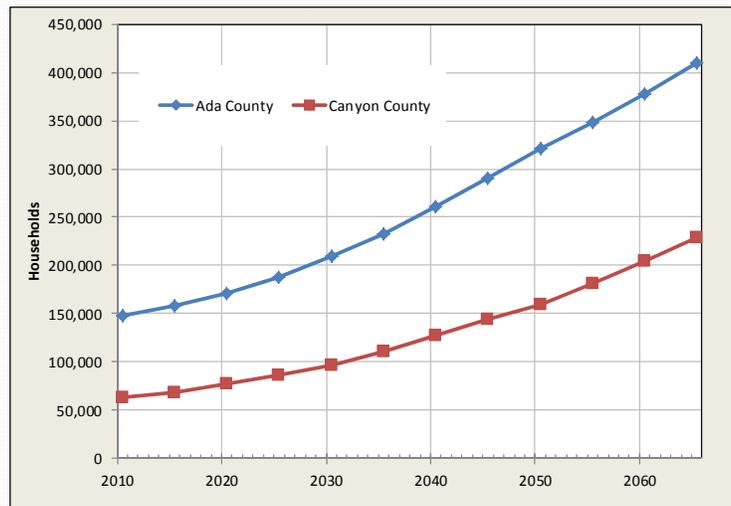
Projected Population Growth

- **2015:**
624,000
- **2065:**
1.6 million
- **Average increase:**
~1.9%/yr

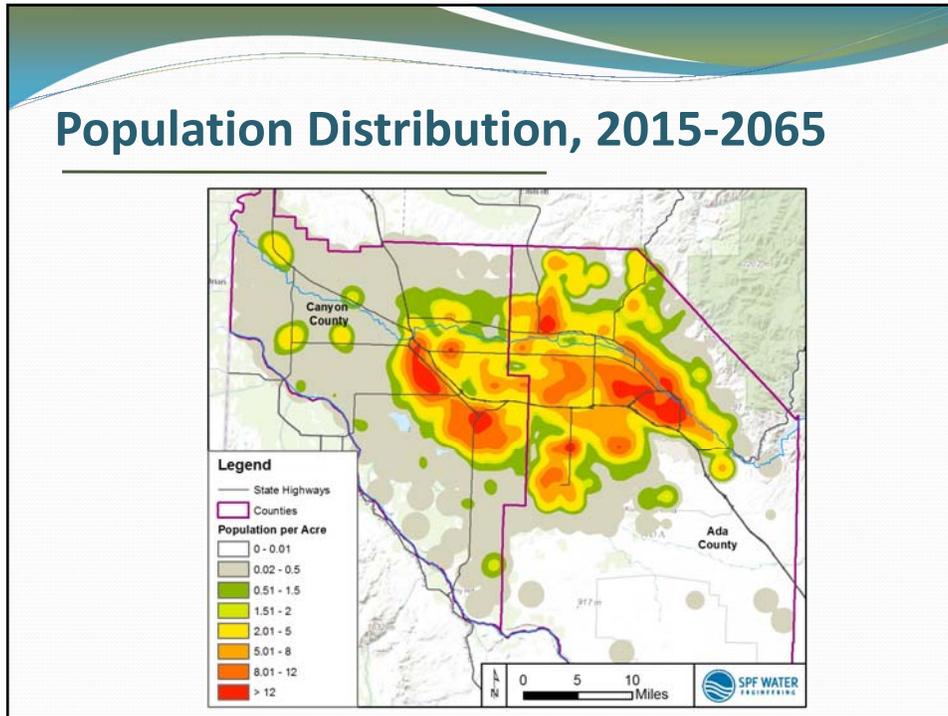


Household Growth

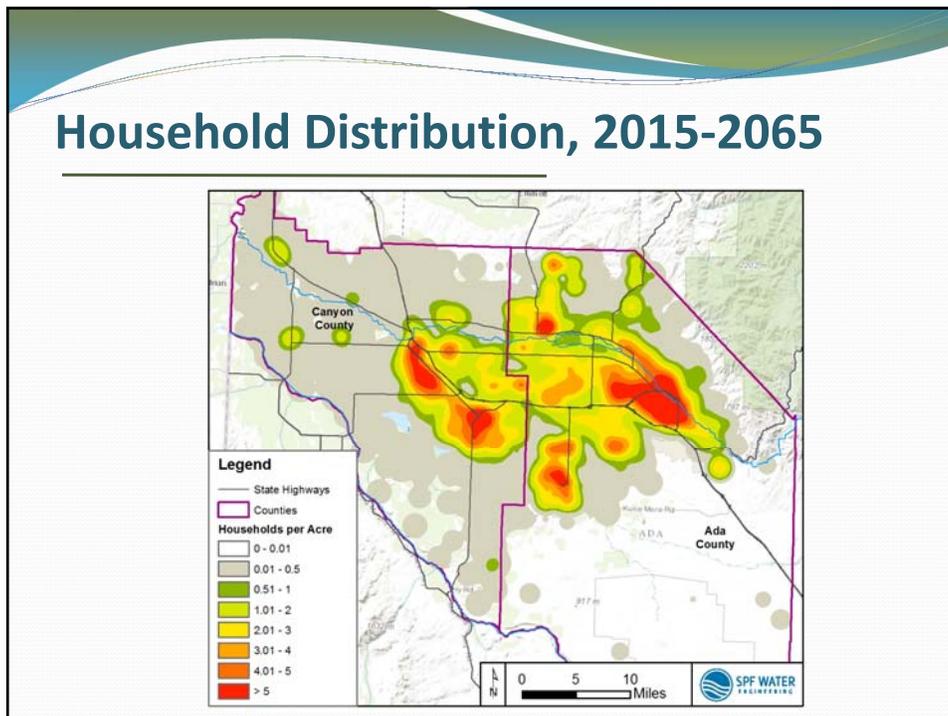
- **2015:**
212,000
- **2065:**
639,000
- **Average increase:**
~2.1%/yr



Population Distribution, 2015-2065

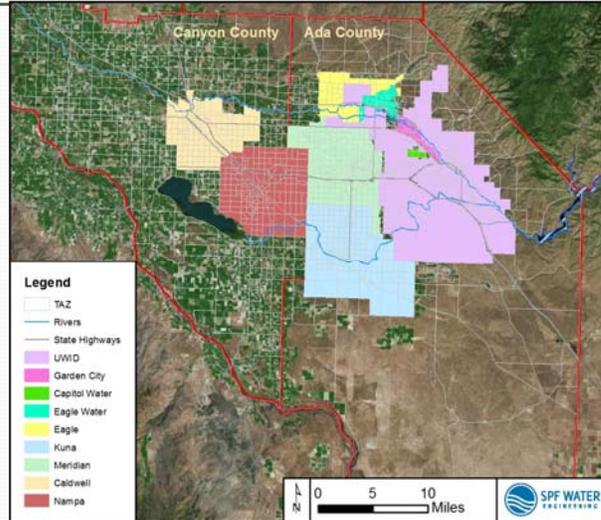


Household Distribution, 2015-2065



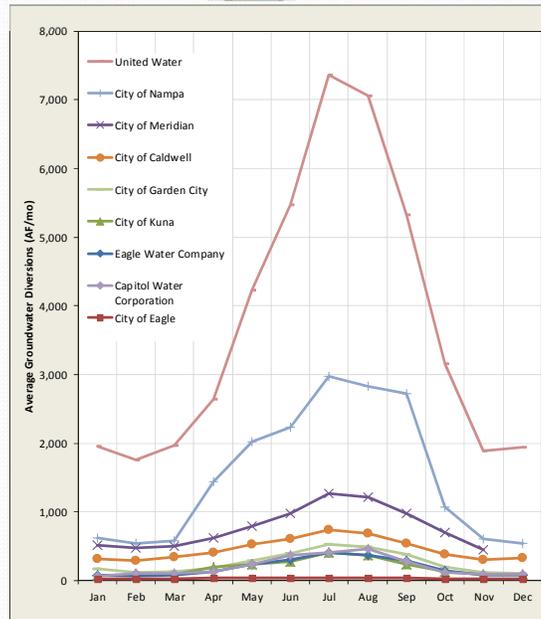
Primary Providers

- Primary DCMI providers supply approximately 90% of DCMI water use



Current Municipal Use

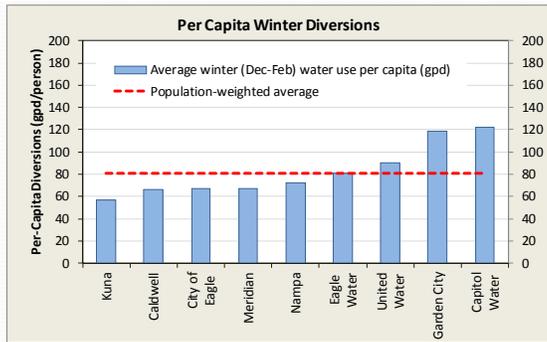
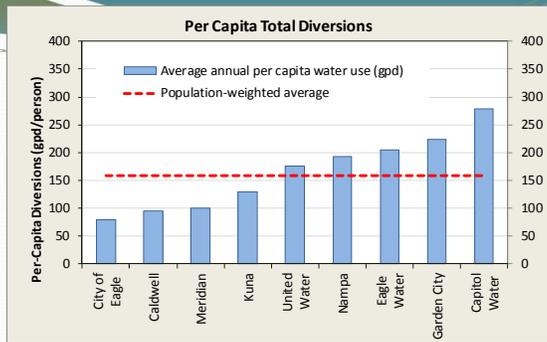
- Variability in summer demand reflects surface-water availability



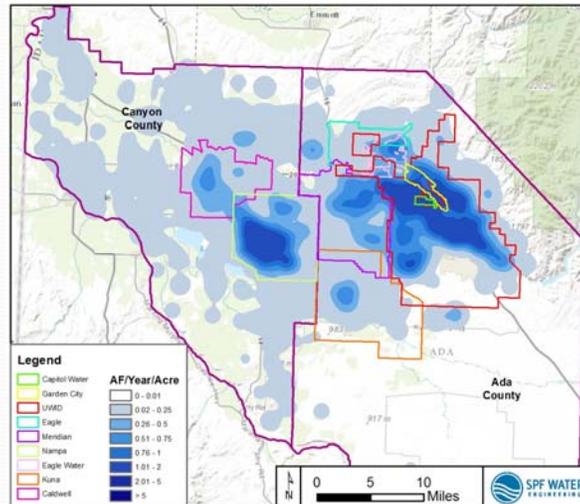
Per Capita Use

Population-weighted, per capita averages:

- Annual: 158 gpd (80-278 gpd)
- Indoor: 80 gpd (57-122 gpd)
- Irrigation: 79 gpd (15-158 gpd)



Distribution of Estimated 2015 DCMI Use



Project Future DCMI Water Demand

4 Scenarios

- Indoor use based on population
- Outdoor use based on irrigated area
- Different levels of conservation and irrigation

Scenario Descriptions				
Scenario →	1	2	3	4
Primary Assumptions	Partial Irrigation (assume that either 75% of irrigable area is fully irrigated or 100% of irrigable land is irrigated with 75% of the water needed for fully-irrigated turf)			Full Irrigation (assume 100% of DCMI land is irrigated with 100% of the water needed for turf)
	No Conservation (Baseline)	Moderate Conservation	More Aggressive Conservation	Moderate Conservation
	No conservation	20% reduction in indoor use in new construction 10% reduction in outdoor use in existing and new construction	30% reduction in indoor use in existing and new construction 30% reduction in outdoor use in existing and new construction	Full water use 20% reduction in indoor use in new construction 10% reduction in outdoor use in existing and new construction

Density – Irrigation Assumptions

Assumed DCMI Irrigated Area (Non-Water-Limited Areas)				Assumed DCMI Irrigated Area (Water-Limited Areas)			
Density (units per acre)	Assumed Irrigated Area per Household (ac/unit)	Assumed Irrigated Area per Household (ft ² /unit)	Total Irrigated Area per Acre (ac)	Density (units per acre)	Assumed Irrigated Area per Household (ac/unit)	Assumed Irrigated Area per Household (ft ² /unit)	Total Irrigated Area per Acre (ac)
0	—	—	—	0	—	—	—
0 - 1.99	0.15	6,530	0.30	0 - 1.99	0.075	3,270	0.15
2 - 3.99	0.15	6,530	0.45	2 - 3.99	0.05	2,180	0.15
4-5.99	0.07	3,050	0.35	4-5.99	0.03	1,310	0.15
6+	0.02	870	0.16	6+	0.015	650	0.12

- Assume that 75% of irrigable urban land is irrigated, or that 100% is irrigated with 75% of necessary water for turf

Climate Change

- Assume 10% increase in precipitation deficit by 2065 (reflecting increased ET)

Projected Average Temperature and Precipitation Changes in the Pacific Northwest		
Period	Temperature Change (F°)	Precipitation Change (%)
2021-2050	+2.5 (+1.1 to +3.6)	+1.5 (-5 to +8)
2041-2070	+4.0 (+1.9 to +6.1)	+3.0 (-5 to +11)
2070-2099	+6.5 (+2.9 to +10.9)	+5.0 (-7 to +20)

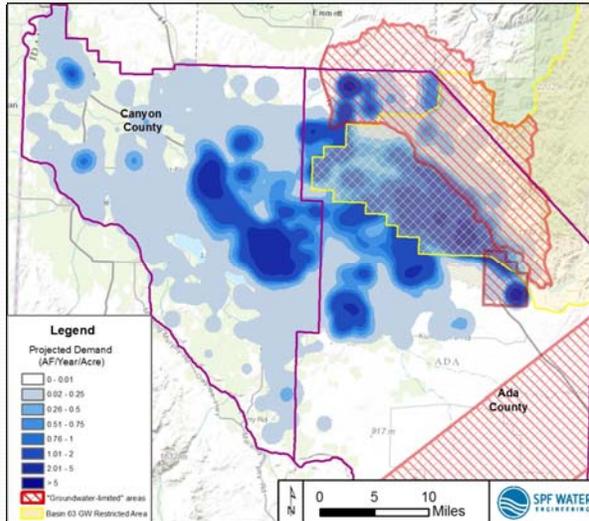
Source: Interpreted from maps presented in Kunkel et al., 2013.

Projected Increase in Water Demand

Projected Water Demand Increases, 2015-2065 (AF/yr)					
Component	Scenario →	1	2	3	4
	2015	Partial Irrigation, No Conservation	Partial Irrigation, Moderate Conservation	Partial Irrigation, More Aggressive Conservation	Full Irrigation, Moderate Conservation
Net DCMI indoor	55,700	76,600	61,300	37,500	61,300
Net DCMI irrig.	54,500	189,200	166,800	122,100	221,700
Net DCMI Total	110,200	265,800	228,100	159,600	283,000

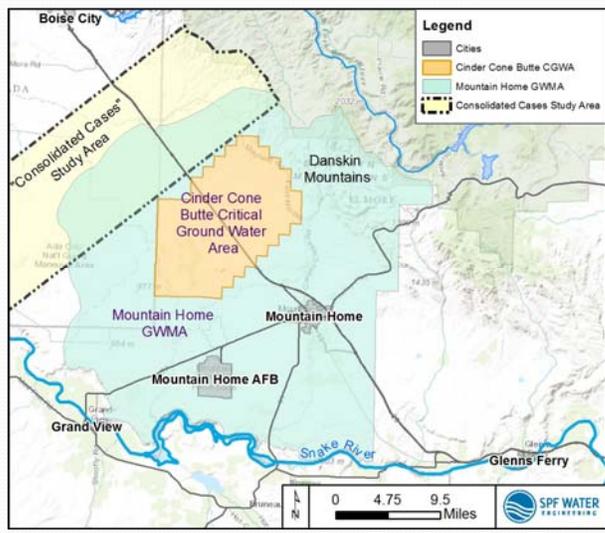
Water Demand Distribution

- 2015 (with current water-provider areas)
- 2065
- 2065 (with “groundwater-limited” areas)



Mountain Home

- Water supply is constrained
- Absent changes, Elmore County population may decrease, with associated water-demand decrease
- Expansion of MHAFB or other economic activity could lead to increases in water demand



Factors Influencing Demand Projections

- Population and households different than those projected
- Average irrigated area per new household different than projected
- Surface-water availability constraints (e.g., consecutive drought years could lead to increased DCMI irrigation)
- Surface-water delivery-system constraints
- Higher than projected summer temperatures
- Conservation assumptions not realized
- Substantial increases in the cost of water

Future Sources of Supply

- Groundwater
 - 20% increase simulated with TVHP model
 - Impact to groundwater levels of less than 10 feet in many places
 - Primary impact: reduce discharge to drains, Boise River, Snake River
- Diversions from Boise River
 - Use of increased surface-water storage
 - Use of flood flows for aquifer storage and recovery
 - Direct diversions below Star Bridge
 - Use of existing surface water supply
- New diversions from Snake River
- Re-use of treated municipal effluent
- Conservation

Summary

- **Water demand could increase by 160,000 to 283,000 AF per year by 2065, depending on**
 - **Actual population increase (currently projected to increase from 624,002 approximately 1.6 million)**
 - **Location of population growth**
 - **Density**
 - **Water availability**
 - **Cost of water and other conservation incentives**
 - **Future climate conditions**