

THE COST OF RECTIFYING OVER-APPROPRIATION OF GROUNDWATER IN DIAMOND VALLEY

Nevada Water Resources Association Conference

February 6, 2014

Outline

- ❑ Purpose of the Study
- ❑ Issue Summary
- ❑ Diamond Valley Hay Industry
- ❑ Water Rights Retirement Program
- ❑ GID Costs
- ❑ Revenue Collection
- ❑ Conclusions and Questions

Purpose

- ❑ Evaluate the financial feasibility of a General Improvement District (GID) to execute a water management program to enhance the sustainability of underground water supply and storage for Basin 153 (Diamond Valley)

Issue Summary

- ❑ Basin 153 Over-Appropriated
- ❑ Water Table declining at a rate of 1 to 3 feet per Year
- ❑ Unsustainable Future for Farming Irrigated Crops
- ❑ Long-term Must Retire Water Rights to reduce groundwater use
- ❑ If declared a Under Critical Management Area the State Engineer could curtail pumping, starting with most junior right holders

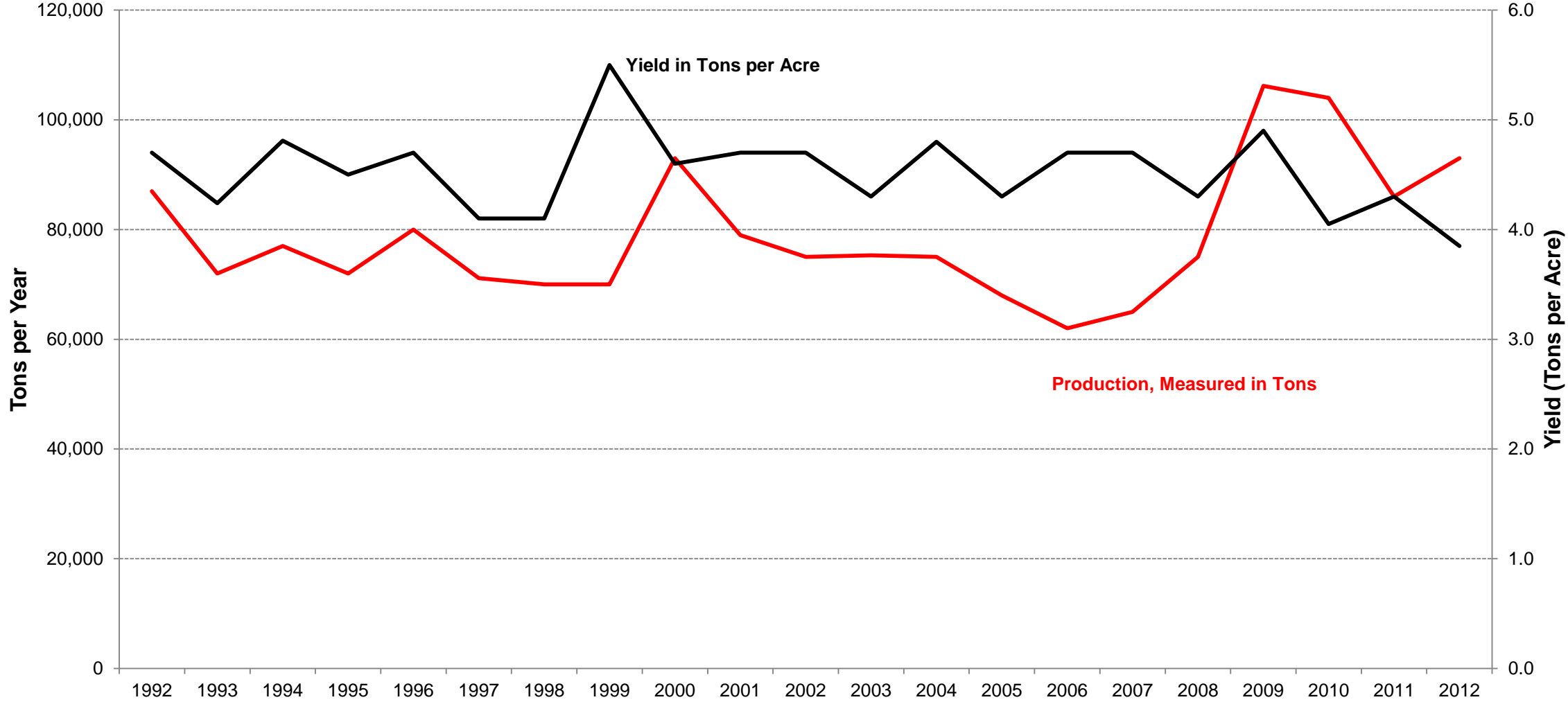
Idea of a GID

- ❑ GID provides a financing vehicle to manage a locally-controlled water management program to reduce groundwater consumption (NRS 318)
- ❑ Local control; voluntary action
- ❑ Ability to reduce irrigation pumping by some other means / not by seniority of water rights
- ❑ Compensation to farmers relinquishing water rights

Diamond Valley Hay Industry

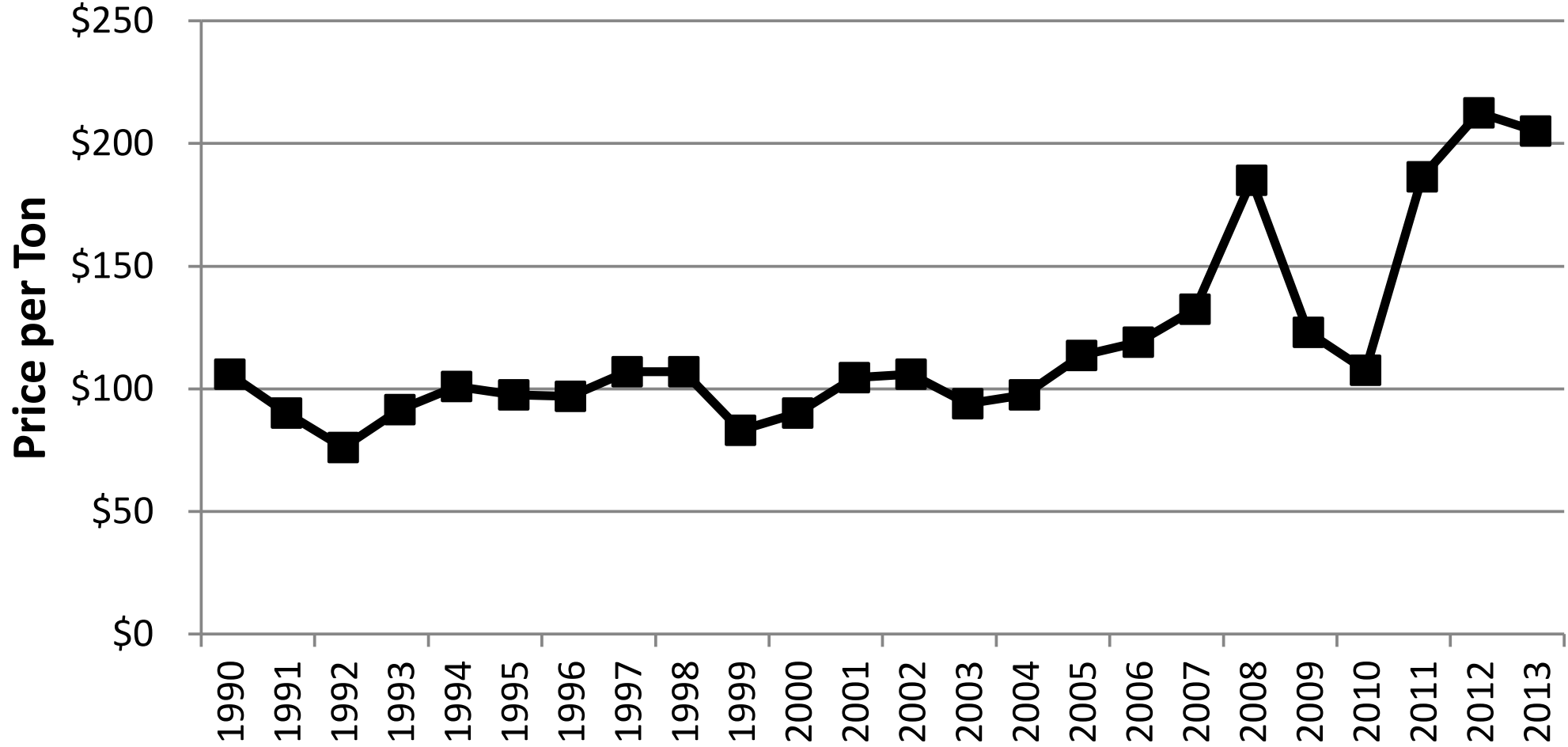
- Generates approximately \$22.4 million annual revenue in Diamond Valley
- Strong contributor to prosperity of Eureka County
- Economic outlook positive for Diamond Valley crops:
 - Continued strong demand for high quality hay
 - Hay prices on upward trend last few years

Eureka County Alfalfa Hay Annual Production and Yield



Median Alfalfa Price per Ton in Nevada 1990 to 2013

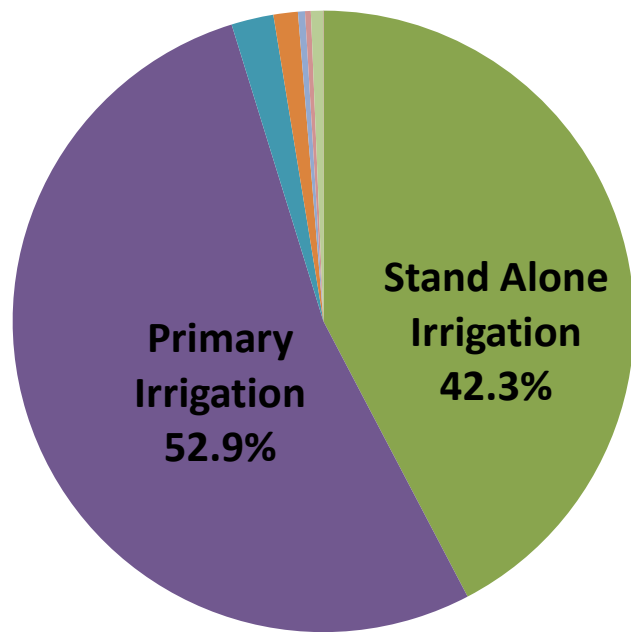
Unadjusted for Inflation



Water Rights Retirement Program

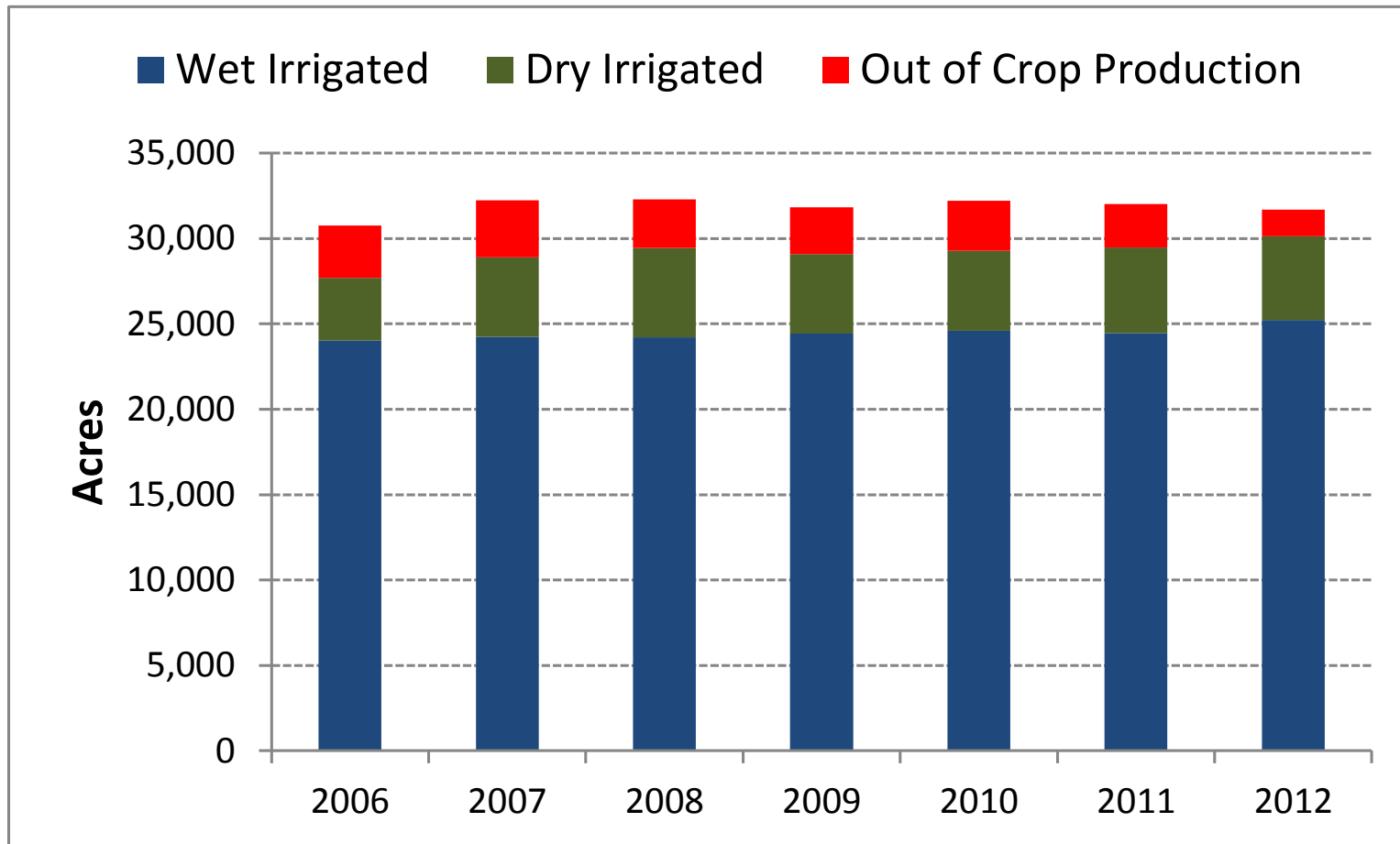
- GID purchases irrigation rights from farmers with permitted / certificated rights in Basin 153
- GID relinquishes rights to the State Engineer
- Occurs over a period of time (50 Years in the financial feasibility model)
- Farmers compensated by the GID for loss of ability to irrigate land in perpetuity

Committed Water Rights Basin 153 – April 10, 2013



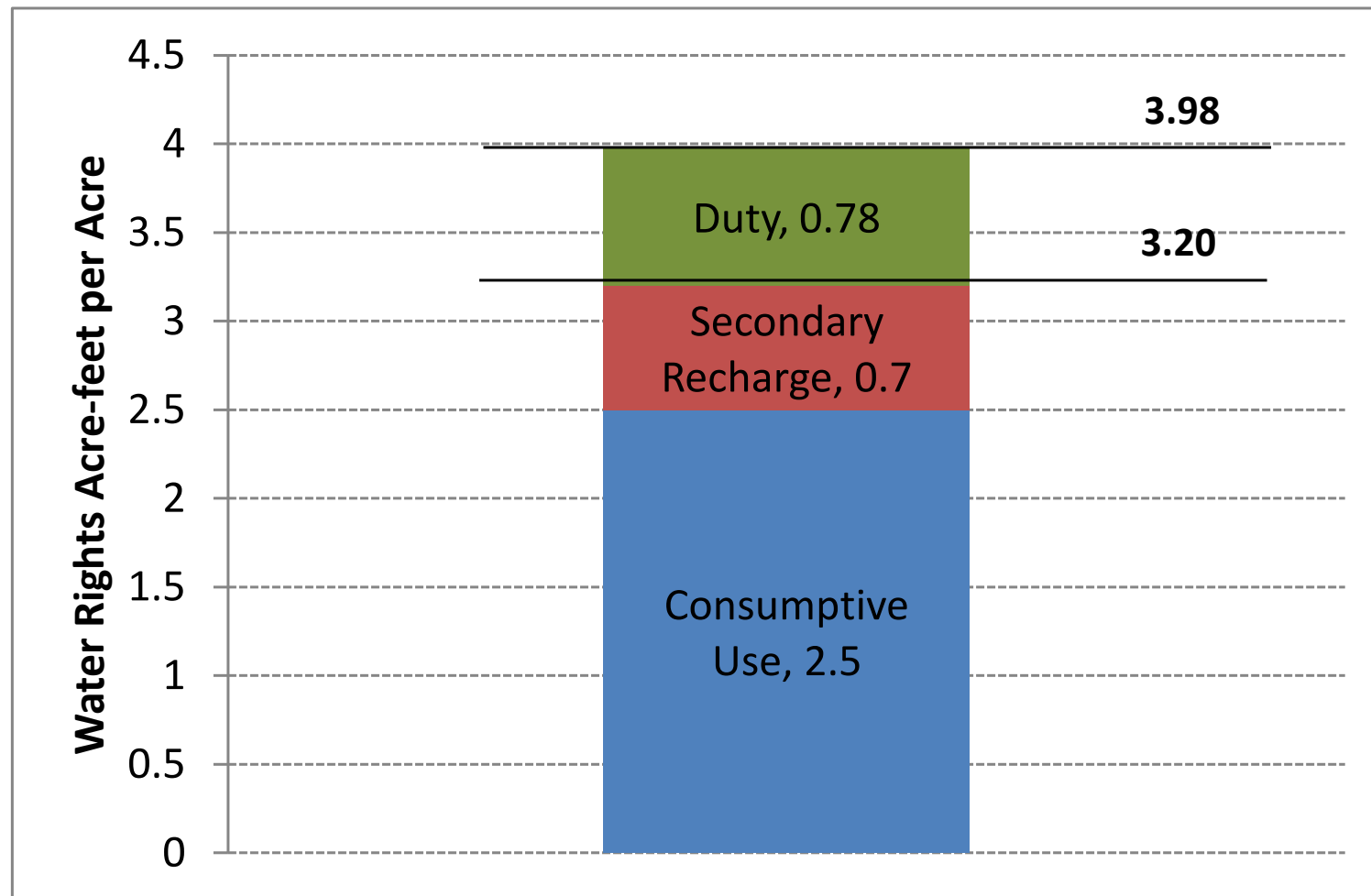
Manner of Use	Acre-Feet
Commercial	2.79
Domestic	33.60
Mining and Milling	3,307.43
Municipal / Quasi-Municipal	2,162.25
Stockwater	858.72
Stand Alone Irrigation	56,033.61
Primary with Supplemental Irrigation	70,087.58

Historic Use of Permitted Acres

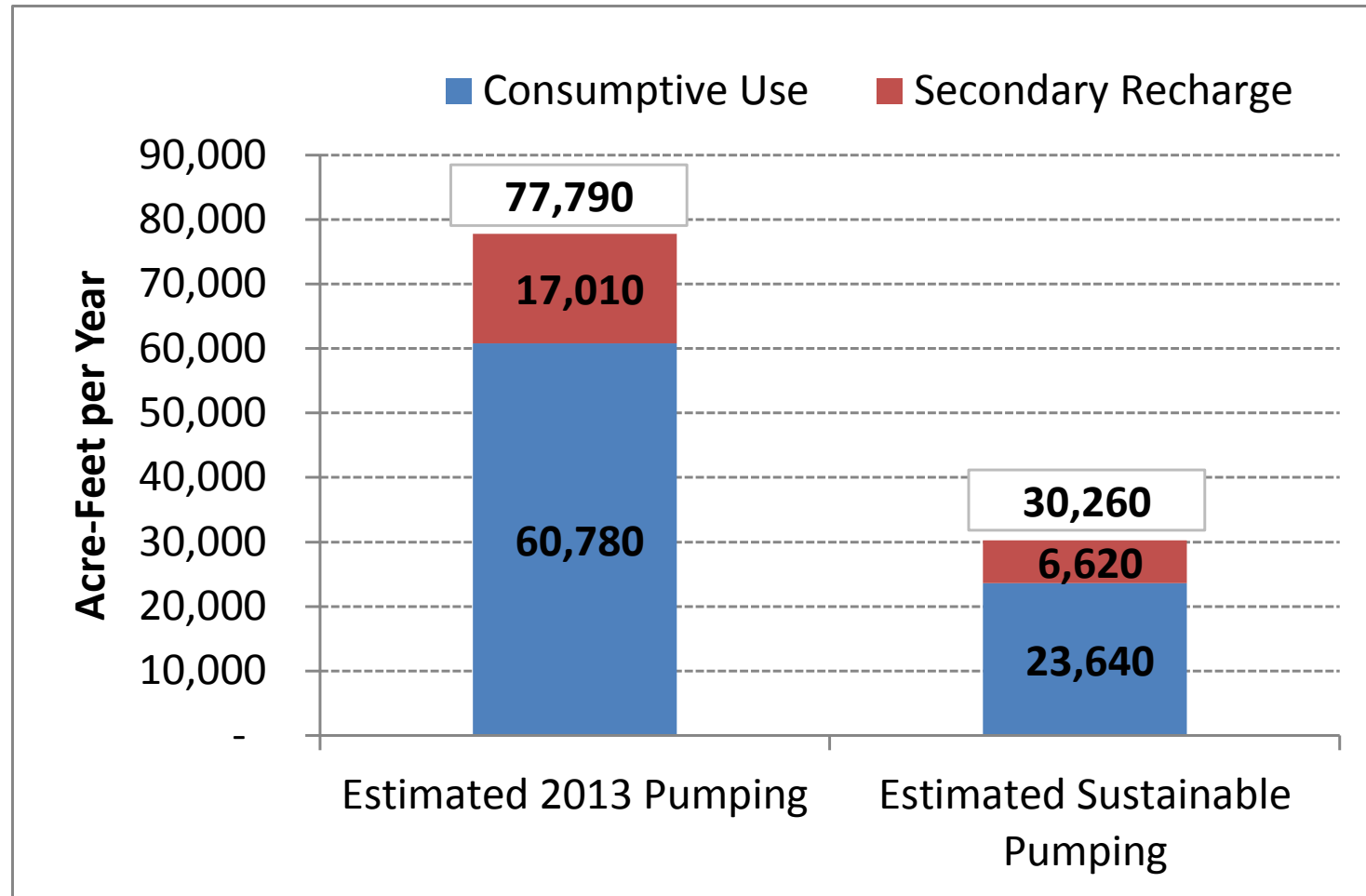


Land Use	%
Wet Irrigated	77%
Dry Irrigated	15%
Out of Crop Production	9%

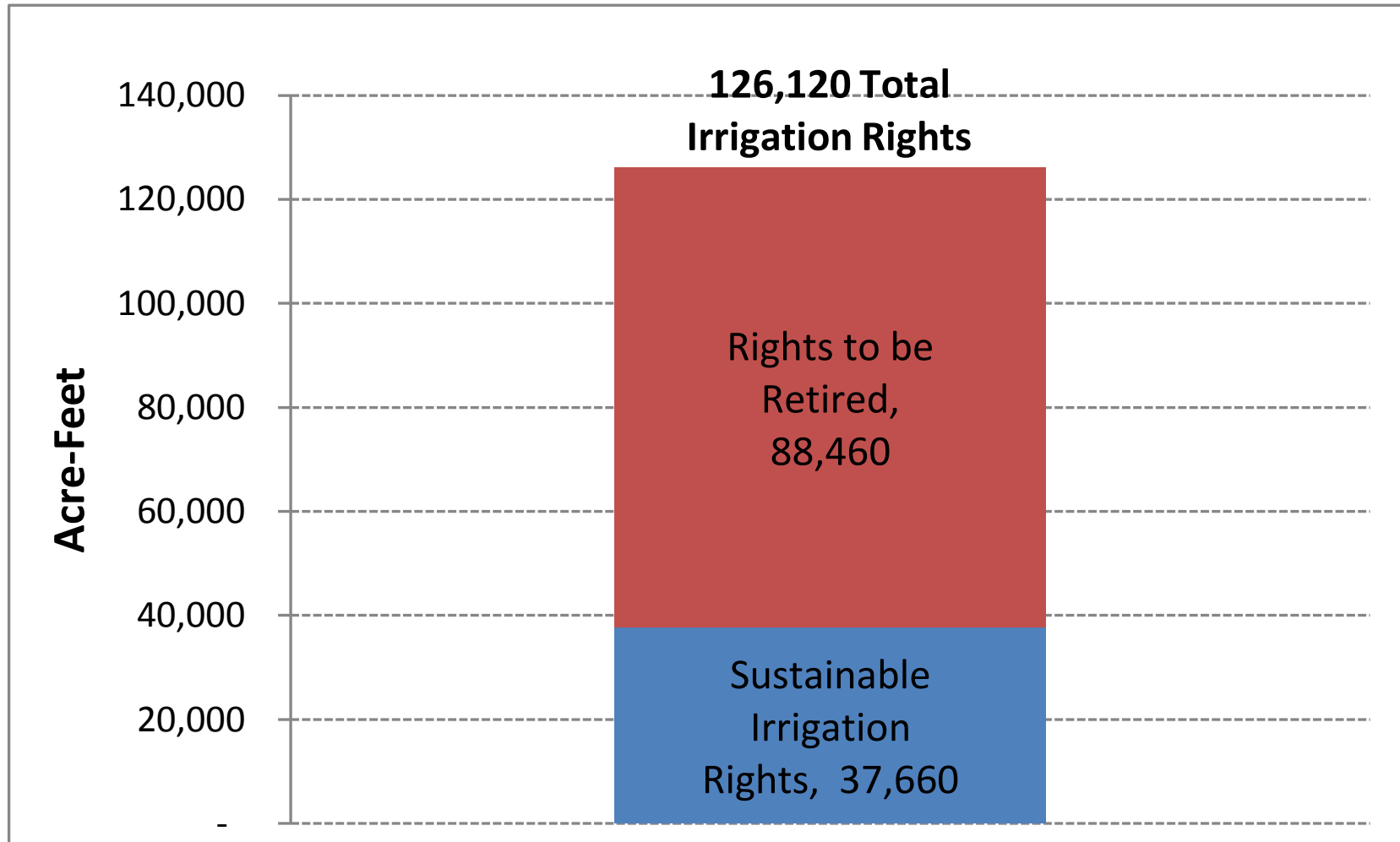
Irrigation Water Use



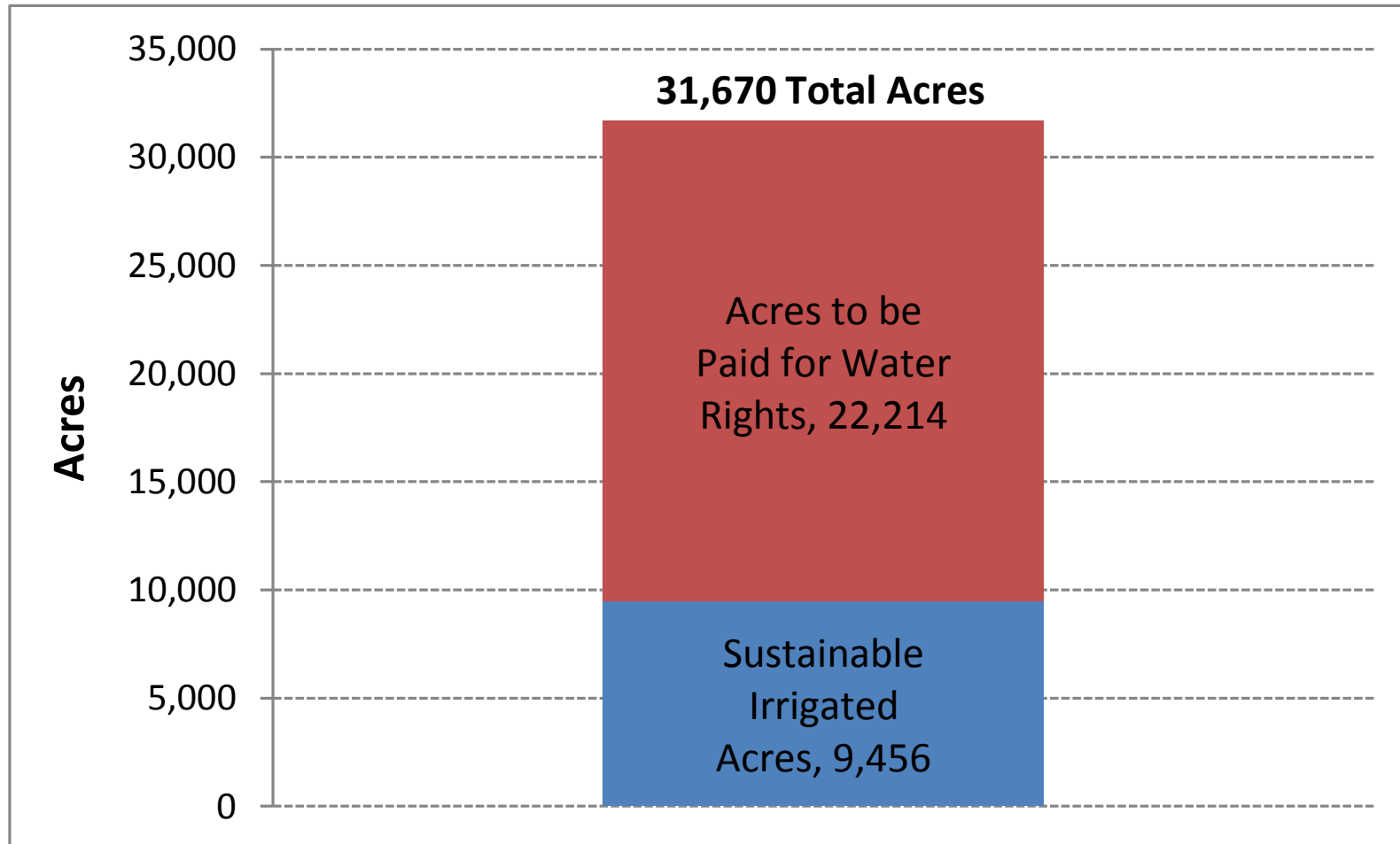
Estimated Current and Future Sustainable Annual Irrigation Pumping



Irrigation Right Retirement



Acres Retired from Irrigated Crop Production



50-Year Program Targets

Reduction in Annual Pumping from 2013 Level	Total Irrigation Rights Retired	Agricultural Land Compensated for Loss of Irrigation Water Rights
Acre-feet	Acre-feet	Acres
47,530	88,460	22,214

GID Total Costs

Only Agricultural Properties with Permitted/Certificated Irrigation Water Rights in Basin 153 Included in GID service territory (physical boundary)

- GID Formation and Operating Costs
- Water Rights Retirement Cost
- Financing Cost (if necessary for cash flow)
- Delinquency and Administration Charges

GID Formation and Operating Costs

- Formation Costs Estimated \$25,000
- Annual Operating Costs Estimated \$31,000
 - Model assumes the County absorbs all formation costs plus County staff time and materials costs to operate the GID
 - Costs reflect estimates of costs for professional (consultant) services such as a water rights and monitoring manager, planning, hydrology and other services and some basic supplies costs for the GID

Water Rights Retirement Cost

- Based on payment to farmers per acre of land that relinquishes water rights
- No collective market establishing the value of water per acre today; methodology developed for the analysis
- Methodology based on the economic value of each acre in irrigated crop production
- Economic value based on the estimated net farming income per acre of alfalfa hay

Key Income Assumptions

- Analysis assumes that all irrigated acres are in alfalfa hay production
 - \$204 per ton
 - 4.52 tons per acre (yield)
 - Average annual income of \$920 per acre
 - Average net annual income of \$144 per acre

Valuing Ability to Irrigate

- Each farmer values their water rights differently depending on their individual personal circumstances and farming operations
- The analysis establishes a range of price using different discount factors (3% to 8%) and time period within which farmers think they will maintain their rights (5 years to perpetuity)

Discount Factors

- Discount factor reflects both the interest rate the farmer's money could be earning in an alternative activity (such as in a bank account) AND the farming family's rate of time-preference for present versus future income. Discount factors reflect – for example:
 - Family circumstances (future generation to pass land onto),
 - Seniority of water rights (expectation junior rights may be curtailed by State Engineer)
 - Expectations of how quickly the water table will decline and investment in wells will be needed

Range of Price per Acre

Discount Factor	Time					
	5 years	10 years	15 years	25 years	50 years	perpetuity
	<i>Net Farm Operating Income per Acre [1] \$144</i>					
3%	\$660	\$1,229	\$1,720	\$2,509	\$3,707	\$4,803
4%	\$641	\$1,169	\$1,602	\$2,251	\$3,095	\$3,602
5%	\$624	\$1,113	\$1,496	\$2,031	\$2,630	\$2,882
6%	\$607	\$1,060	\$1,399	\$1,842	\$2,271	\$2,401
7%	\$591	\$1,012	\$1,312	\$1,679	\$1,988	\$2,058
8%	\$575	\$967	\$1,233	\$1,538	\$1,763	\$1,801
Median Value	\$615	\$1,087	\$1,447	\$1,936	\$2,451	\$2,642
Weight	0%	5%	15%	30%	10%	40%
Estimated Farmed Land Acre Value (Weighted Average of Median Values)						\$2,150
Average Acre-feet Duty per Acre						3.98
Calculated Value per Acre-Foot						\$540

Accounting for the Value of Land

- Average Price of \$2,150 per Acre assumes Land has \$0 value without irrigation
- Land could be used for alternative agricultural uses
- Methodology to estimate decrease in value of the land with loss of irrigation based on ratio of assessed value 4th class cultivated land to 1st class cultivated land

Estimated Water Retirement Program Cost

- Estimated Weighted Average Price per Acre to Retire Water Rights **\$2,150 per Acre**
- Reduction in Price to Account for Alternative Agricultural Activities Potential **\$500 per Acre**
- **Range of Price per Acre \$1,650 to \$2,150**
- **Acres to be paid for Water Rights – 22,214**
- Range of Total Estimated Cost **\$36.6 million to \$47.8 million**
- Feasibility Analysis uses mean of **\$42.2 million (\$1,900 per acre)**

50-Year GID Program Cost

Cost Element	Estimated Cost over 50 Years
Water Rights Retirement	\$42,207,000
Set-Aside Program	\$0
Financing Charges	\$0
GID Operation	\$1,550,000
Delinquency and Administration	\$1,210,000
Total	\$44,967,000

Total Cost of Program

- **County Cost Burden at 75% of Total Program Cost**
 - \$31.5 million
 - Approximately \$633,100 per year for 50 years
- **Participants Estimated Cost Burden**
 - \$420 to \$486 per participating acre
 - \$8.41 minimum per acre per year for 50 years

Conclusions

- Total Cost of Water Retirement Program is high – at least \$40 million
- Feasibility dependent on:
 - Timeframe to complete the program
 - Level of County or other (grants etc.) funding commitments / contributions
 - Prices paid to retire water rights
 - Farmers' willingness to participate
- GID can only reach program targets in a 50-year period with a per parcel charge, not with ad valorem taxes

Conclusions

- Feasibility analysis provides a framework to model a water management program for Basin 153. The model would have to be refined to project the more detailed program and be updated periodically for changing circumstances
 - The model assumes a linear pattern of water rights retirement (same number retired each year)
 - Debt financing likely to be needed for cash flow
 - There will likely be circumstances under which certain properties are paid more or less than the bracketed range of price per acre to relinquish water rights

Limitations

- This feasibility analysis only captures readily quantifiable costs and monetary benefits to participating farmers based on currently available data.
- The costs and benefits of a water retirement program to other County citizens is not quantified.

Questions?

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