EXAMPLES OF ECONOMIC IMPACTS OF WATER REDUCTIONS TO AGRICULTURE IN THE WYOMING COLORADO RIVER BASIN

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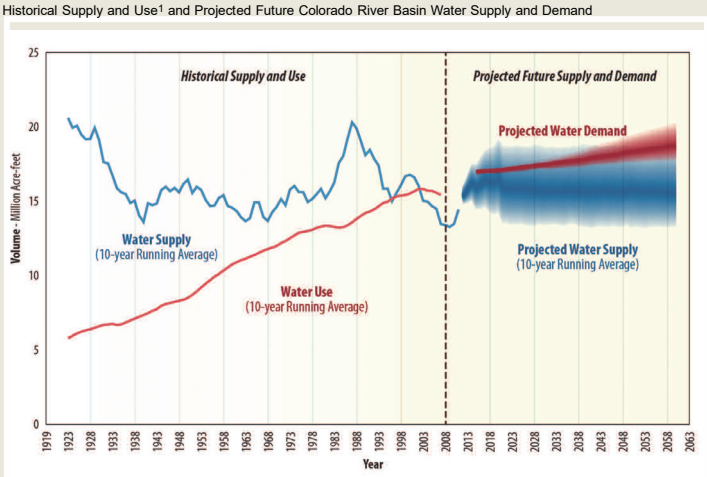
Water in the Colorado River Basin

- CO River Basin covers nearly 250,000 square miles
- Provides water to seven U.S. States and two Mexican States
- Supplies water to 40 million people and 5.5 million acres of irrigated lands.
- Served area has economic value of approx. $1.4 trillion annually.
- Capacity to store four years of average annual flow.

Water in the Colorado River Basin

Historical Supply and Use[1] and Projected Future Colorado River Basin Water Supply and Demand



[1] Water use and demand include Mexico's allotment and losses such as those due to reservoir evaporation, native vegetation, and operational inefficiencies.

Forecasted water demands are expected to exceed projected supplies.

Water in the Colorado River Basin

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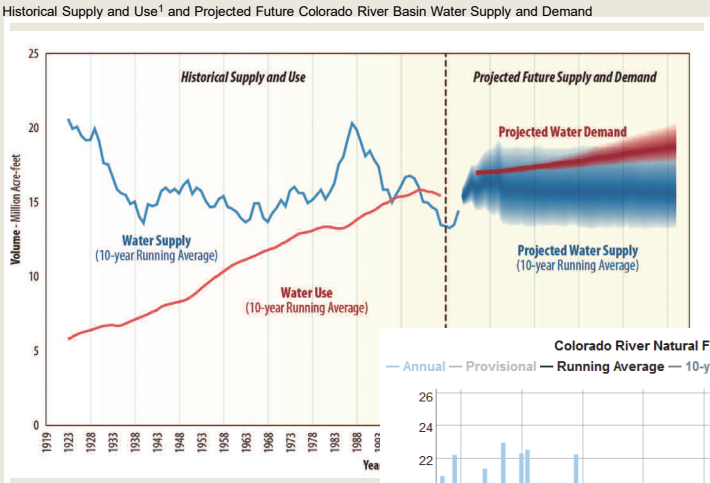

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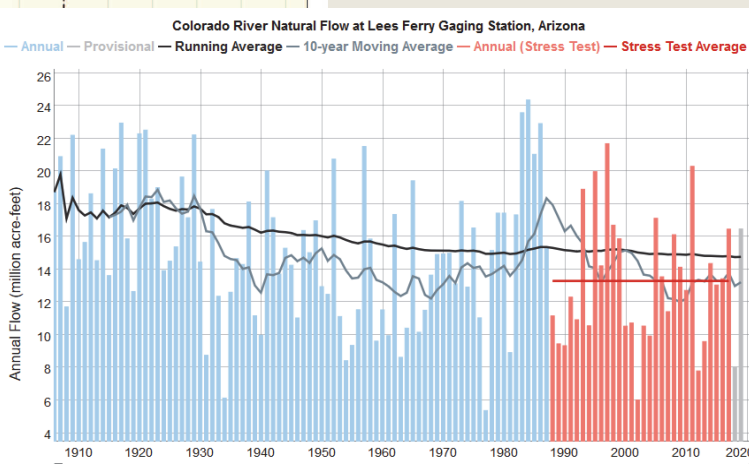


Water in the Upper Colorado River Basin

- Upper Basin States have been exploring ways to ensure they meet their obligations to downstream states under 1922 Colorado River Compact.

- One possible way:

  Demand Management

  - *Reduce consumptive water use*
  - *Store it in downstream reservoirs, to help the Upper Basin meet its Compact obligations.*
  - *Participation would be voluntary, temporary, and compensated*

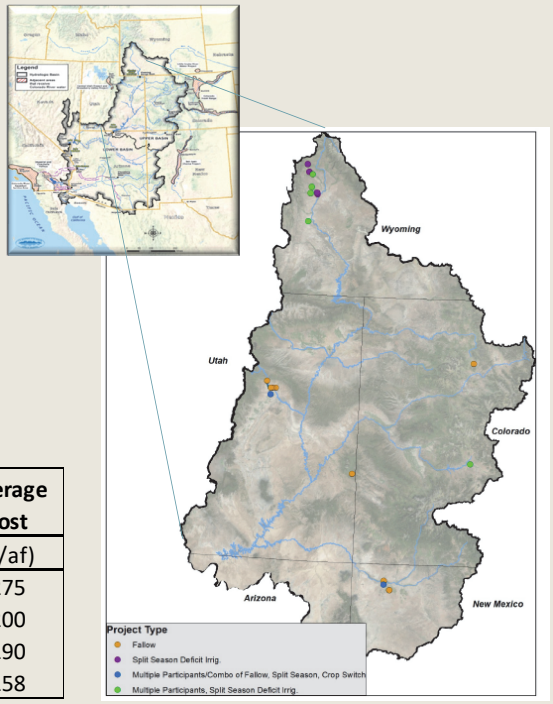
Water in the Upper Colorado River Basin

System Conservation Pilot Program

- Program Purpose: To assess the feasibility of voluntary, temporary, and compensated reductions in consumptive use (CU) of water.
- 2015 through 2018.
- Primarily fallow on alfalfa and split-season deficit irrigation on grass.

Upper Basin SCPP

	Enrolled Acreage	CU Reductions	Total Cost	Average Cost
	(acres)	(af)	($)	($/af)
2015	2,646	3,227	888,693	275
2016	6,670	7,475	1,494,342	200
2017	6,336	11,408	2,172,855	190
2018	20,445	25,097	3,965,491	158



Location of projects implemented in 2018. Source: UCRC (2019).

SCPP Producer Participation

Survey Respondent Experiences with the System Conservation Pilot Program*

Impact of SCPP on Ranch Operation			
	Response	#	%
1	Positive impact	8	57%
2	Negative impact		0%
3	Both positive and negative	2	14%
4	No impact	2	14%
5	Missing response	2	14%
	Total responses	14	

- Overall, survey respondents reported being satisfied with the program.

- Respondents generally reported that their household and county was about the same or better off as a result of the program and that the county would be about the same or better of with an expanded version of the program in the future.

Positive and Negative Impacts Reported

Positive	Negative
-Financial benefits of participation	-Early drying up of hay fields
-Brought the community together	-Negative yield impacts in the following year
-Helped people to realize the value of the region's natural resource base	-Concern about the long-term impacts of participation on water rights

* From a survey of agricultural water users in the WY portion of the CO River Basin.

Impacts of Temporary Reduction in Water Use?

(…if the consumptive use reductions came from the agricultural sector)

- Agronomic How crops respond to water and so how yield quantity and quality are affected.
- Downstream Impacts on neighboring fields, from changes in quantity and timing of return flows.
- Ecological Impacts related to quantity and timing of flows.
- On-Farm Economic How farm operations are altered when yields are reduced (livestock operations).



Photos: Melanie Purcell, Sublette County Conservation District

Impacts of Temporary Reduction in Water Use?

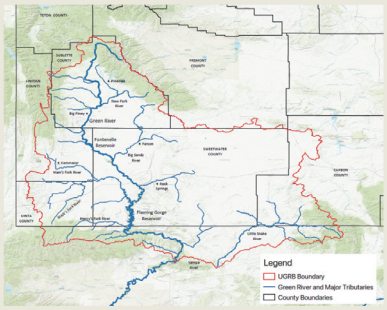
(…if the consumptive use reductions came from the agricultural sector)

- **Regional Economic** How would reduced water use affect the local economy?
  - *Participating producer receives a check for reducing water use*
    - Buys a new truck or other equipment (positive impact)
    - Equipment dealer hires more employees (positive impact)
  - *Participating producer grows less hay*
    - Reduce custom harvest services (negative impact)
    - Reduces equipment repair purchases (negative impact)



Photos: Melanie Purcell, Sublette County Conservation District

CRB Water in Colorado and Wyoming



Wyoming
- ~300,000 irrigated acres
- ~550 KAF water use (80% ag)
- Regional Economic Impacts study by University of Wyoming (TNC).

Colorado
- ~ 770,000 acres of irrigated land on the Western Slope
- Regional Economic Impacts study by BBC Consulting (Colorado Water Bank Working Group)

B. Producer Participation

How would these consumptive use reductions be achieved?

B. Producer Participation

Survey Question: If there was a voluntary program available to compensate producers for a reduction in irrigation would you be interested in any of the following demand management practices?

	Practice	Yes	No	% Yes
1	Split season (do not turn water back on after last cutting)	57	56	39%
2	Earlier harvest than normal (and then turn off water)	15	87	10%
3	No irrigation on some fields for the whole year	15	90	10%
4	No irrigation on the same fields for multiple years	7	95	5%
5	Forego the use of any stored water	17	79	12%
6	Investments that reduce water use by enhancing delivery systems	85	22	58%
7	Everyone on a tributary (or irrigation district) agrees to implement specified management practices (e.g., above programs)	47	58	32%
8	Everyone on a tributary (or irrigation district) agrees to save a certain amount of water (no specification of management practices)	28	60	19%
	Number of responses			147

NOTE: This question asks producers about their general interest in these practices; no hypothetical compensation information was provided.

B. Producer Participation

Survey Question: If there was a voluntary program available to compensate producers for a reduction in irrigation would you be interested in any of the following demand management practices?

	Practice	Yes	No	No Response	% Yes
1	**Split season (do not turn water back on after last cutting)**	**57**	**56**	**34**	**39%**
2	Earlier harvest than normal (and then turn off water)	15	87	**45**	10%
3	**No irrigation on some fields for the whole year**	**15**	**90**	**42**	**10%**
4	No irrigation on the same fields for multiple years	7	95	**45**	5%
5	Forego the use of any stored water	17	79	**51**	12%
6	Investments that reduce water use by enhancing delivery systems	85	22	**40**	58%
7	Everyone on a tributary (or irrigation district) agrees to implement specified management practices (e.g., above programs)	47	58	**42**	32%
8	Everyone on a tributary (or irrigation district) agrees to save a certain amount of water (no specification of management practices)	37	62	**48**	25%
	Number of respondents				147

Practice 1 is popular BUT consumptive use savings are difficult to track.
Practice 3 is less popular but easier to track (and model).
Practice 6 is more popular but may not fit in the consumptive use framework of a DM program.

B. Producer Participation

How would these consumptive use reductions be achieved?

- **Flooded grass hay** acres are enrolled (not alfalfa or pivot grass).
  - *Producers expressed reluctance to give up pivot fields.*
- Management practice: No irrigation for the **entire season.**
  - This practice is less popular than others might be.
  - Consumptive use reductions for this practice are significantly easier to track and quantify in a DM program framework than partial-season reductions or irrigation investments.
- Assume **70% yield reduction in enrollment year** and a **residual yield impact** of 50% in next year.
- Participation payment is assumed to be approx. $200-250/AF.
- **Temporary and rotational**: No acre is enrolled two seasons in a row.
  - *Thus abandonment of water rights is not an issue.*

Water in the Lower Colorado River Basin

Intentionally Created Surplus (ICS)

- Voluntary reduction in water use which creates ICS credits stored in Lake Mead, in individual water user accounts.
- Formally created in 2007 under the Interim Guidelines.
- 2.8 maf of ICS credits have been created in Lake Mead since 2007
- 2.3 maf of ICS currently stored in Lake Mead

Under ICS (relative to DM):

- Storage is upstream of uses.
- Greater diversity of projects is allowed.
- ICS has individual accounts.

Source: U.S. Geological Survey

Back to the UB: Demand Management Tradeoffs

Farm-Level Considerations:

- Mix of junior and senior priority rights.
- Temporary leasing opportunities may be appealing
- Land/soil/operation characteristics
- Management practices available through a DM

Region-Level Considerations

- Perceptions of curtailment risk
- Regional economic and ecological impacts
- Program size
- Transaction costs under DM versus curtailment

Discussion

Key Points/Questions

- Who would pay for a Demand Management program?
- Regional and farm-level tradeoffs vary by location
- Demand Management feasibility investigations are underway in all four Upper Basin states.

Thank you

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