AGRICULTURAL OPTIMIZATION

Preserving Agriculture While Reducing Depletions

2024 GREAT SALT LAKE POLICY SUMMARIES

The Great Salt Lake Strike Team analyzed ten policy options and created summaries for each. The strike team does not endorse individual policies but rather evaluated the most-discussed options to address Great Salt Lake.

Policy summaries fall into four categories:

Water Shepherding

Economic Incentives

Agriculture Optimization

Engineered Options

For more information on policy summaries, please scan the QR code above or visit: https://gardner.utah.edu/great-salt-lake-strike-team/policy-summaries/

Strategic combinations of on-farm water optimization could maintain production while reducing depletions. These optimization efforts will also enhance resiliency during periods of drought.

IMPORTANCE

Feasible depletion reductions that promote agriculture resiliency will be crucial for increasing flow to the lake. These changes will require increasing the ability of water users to actively control both diversions to and depletions on farms.

CONSIDERATIONS

- **Crop production is frequently related to depletions.** Reducing depletion often reduces crop yield – resulting in economic loss to farmers.
- **Converting surface irrigation to sprinklers or drip irrigation likely results in no depletion reductions.** However, automation of these systems can result in reductions.
- **Certain irrigation improvements can reduce depletion while maintaining crop production levels.** This includes replacing wheel lines with pivots, advanced irrigation sprinklers for pivots, and conversions to drip irrigation.
- **Most agriculture optimization projects increase water monitoring and grower control.** This allows reductions in depletion to be tracked through the system when incentives for conservation are established via water leasing and markets.
- **Changing crop types and deficit irrigation could reduce depletions by up to 50%** but new market development for crops is often required.
- **Several optimization options are cheaper than fallowing.** Advanced sprinkler systems cost less than $150 per acre-foot per year, while fallowing land costs approximately $350 per acre-foot per year.
- **Large depletion reductions would occur from widespread agriculture optimization.** An estimated 67,000 acre-feet reduction in depletion would occur from converting wheel lines to pivots on 75% of fields. An estimated 27,000 acre-feet reduction in depletion would occur from 75% conversion from pivot to LEPA/LESA sprinklers (though this is not suitable everywhere)

WHAT IS NEEDED:

- **Prioritization** - Prioritize irrigation system changes that reduce depletion and increase controls that will enable future reductions. This includes low-elevation sprinklers, changing wheel-lines to pivots, and changing to drip irrigation.
- **Consider tradeoffs** - Use caution when converting from surface irrigation to other distribution methods that increase depletion or have extremely high costs. Improved automation of surface systems (e.g., surge irrigation) can be a preferred alternative. These conversions should be considered carefully to weigh the tradeoffs.
- **Market Infrastructure** - Prioritize, incentivize, and develop market infrastructure for crop changes that will further reduce depletion.
- **On-farm testing** - Develop additional on-farm testing in various parts of Utah to validate and refine depletion savings and crop production impacts.

Impacts, costs, and effectiveness of optimization and irrigation practices on decreasing water depletion

Water Optimization Practice	Likely to Reduce Depletion	Likely to Increase Irrigation Control to Enable Reductions	Annual Cost Per Acre	Estimated Depletion Change (ac-ft / acre)	Annual Cost Per Acre-Foot Water Saved
Irrigation Method Conversion					
Reduce Sprinkler Evaporation and Drift	Yes	No	$6	0.36	$17
Convert Wheel-Line to Pivot	Yes	Yes	$34	0.50	$68
Convert Pivot to Subsurface Drip	Yes	No	$250	0.67	$373
Convert Surface to Subsurface Drip	Possibly	Yes	$195	0.01	$15,000
Automated surge irrigation	No	Yes	$181	NA	NA
Convert Surface to Pivot	No	Yes	($51)	-0.66	No savings
Convert Surface to Wheel-Line	No	Possibly	$40	-1.16	No savings
Irrigation and Crop Management					
Deficit Irrigation	Yes	No	$89	<1.0	$90
Soil Health Practices (no-till)	Possibly	No	($28)	NA	NA
Scientific Irrigation Scheduling	Possibly	No	$22	NA	NA
Crop Type Changes	Possibly	No	Variable	<1.0	NA
Crop Genetics	No	No	$12	$0	No savings

Notes: N/A = not available yet. The values in this table are based on the best, currently available research. Negative costs indicate increased profits with conversions. However, extrapolating from individual studies to the entire basin requires assumptions regarding the representativeness of existing data. For additional information, please refer to these reports: https://water.utah.gov/wp-content/uploads/2020/11/Final-Report-11-25-2-LiteratureReviewofCurrentUpcomingIrrigationTechnologiesandPracticesApplicabletoUtah.pdf; http://irrigation.wsu.edu/Content/CostBenefit.php; http://irrigation.wsu.edu/Content/ConversionCalculator.php