Colorado's Water Supply Future

CWCB Meeting

Agenda Item #10

Colorado Water Supply Future Update

Denver, CO

January 26, 2010

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Presentation Overview

- Review Statewide Planning Efforts and Portfolio Tool
- Common Portfolio Elements of the Mid-Demand/Mid-Supply Scenario
- Planned Portfolio Tool Enhancements and Next Steps
- Draft Report Outline and Schedule
- Board Input and Feedback

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Planning Efforts and Portfolio Tool

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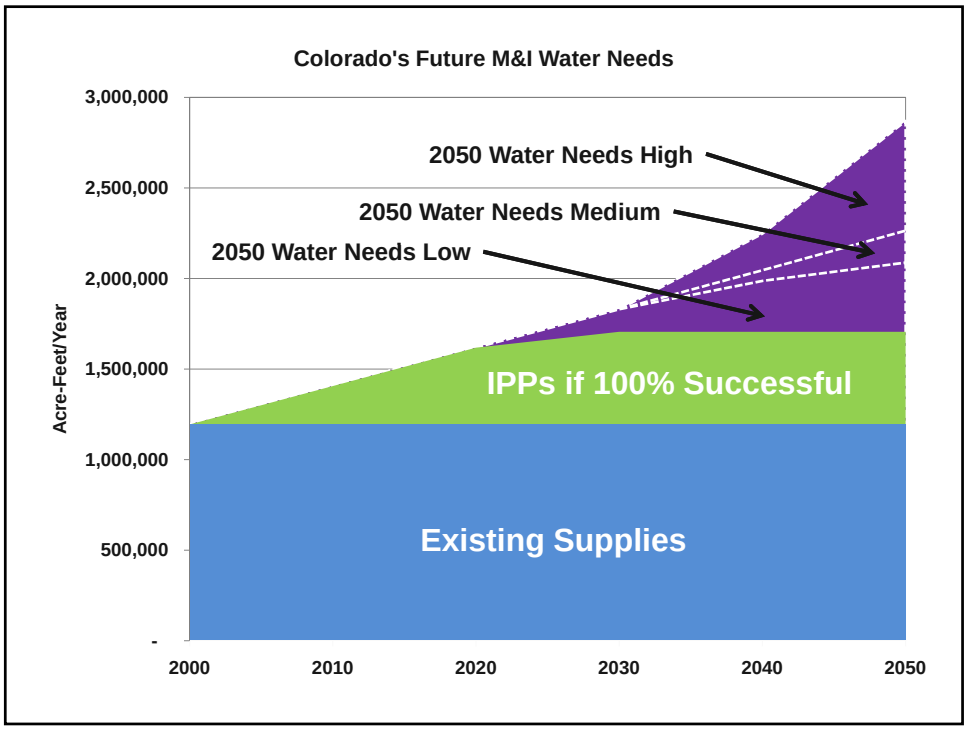
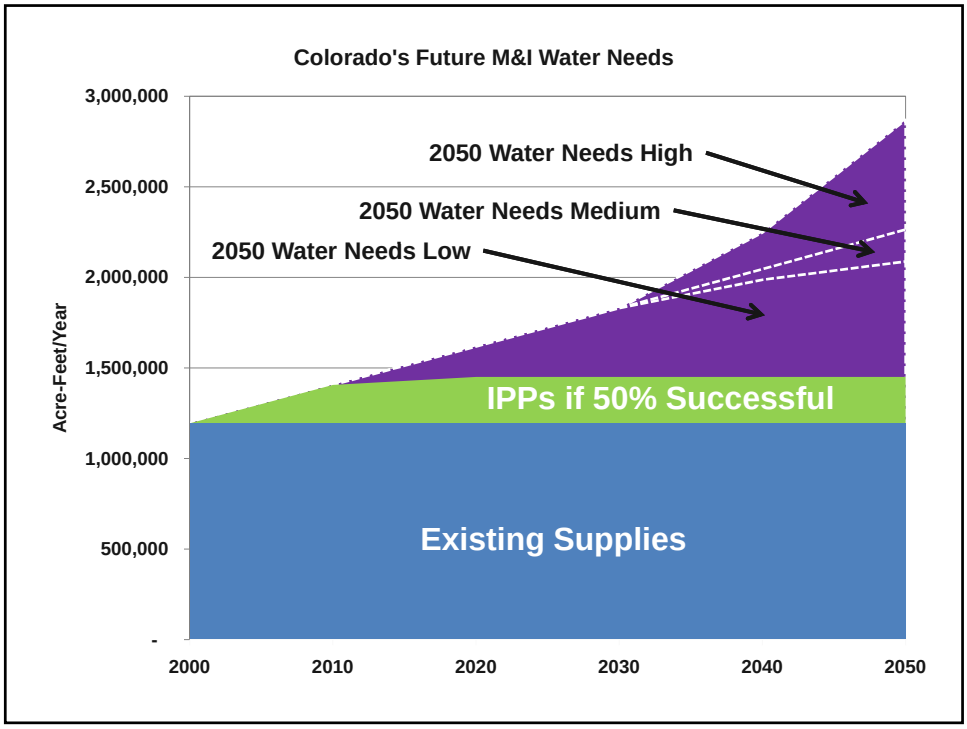
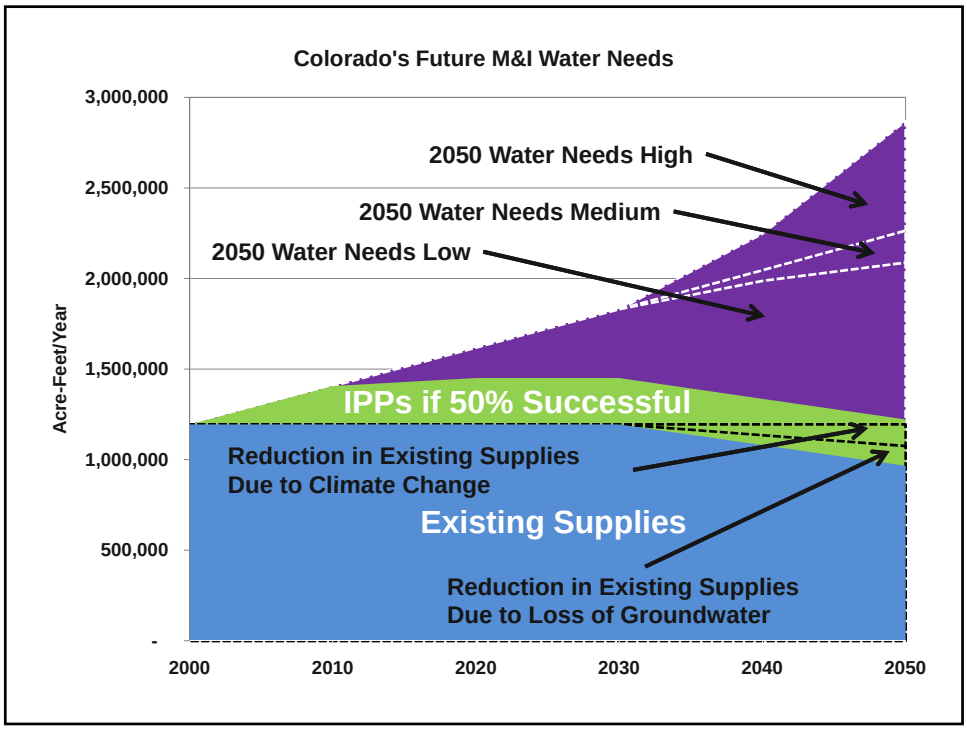



Colorado's Future M&I Water Needs
Acre-Feet/Year
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
2000
2010
2020
2030
2040
2050
2050 Water Needs High
2050 Water Needs Medium
2050 Water Needs Low
IPPs if 50% Successful
Existing Supplies


Colorado's Future M&I Water Needs
Acre-Feet/Year
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
2000
2010
2020
2030
2040
2050
2050 Water Needs High
2050 Water Needs Medium
2050 Water Needs Low
IPPs if 50% Successful
Reduction in Existing Supplies
Due to Climate Change
Existing Supplies
Reduction in Existing Supplies
Due to Loss of Groundwater

Development of Portfolios and Evaluation of Water Supply Strategies

- During 2008 and 2009, Colorado's water community embarked on a visioning process to address the following questions:
  - If we let Colorado's water supply continue to evolve the way it is now, what will our state look like in 50 years?
  - Is that what we want it to look like?
  - If not, what can and should we do about it?

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IBCC/CWCB Visioning Process Basic Conclusions

- The status quo approach to water supply will not lead to a desirable future for Colorado.
  - Status Quo = Significant loss of irrigated acres
  - If not the Status Quo then what?
- Colorado will need of range of demand side and supply side strategies.
- We need to work together to examine the trade-offs, risks, and uncertainties associated with different strategies and combination of strategies.

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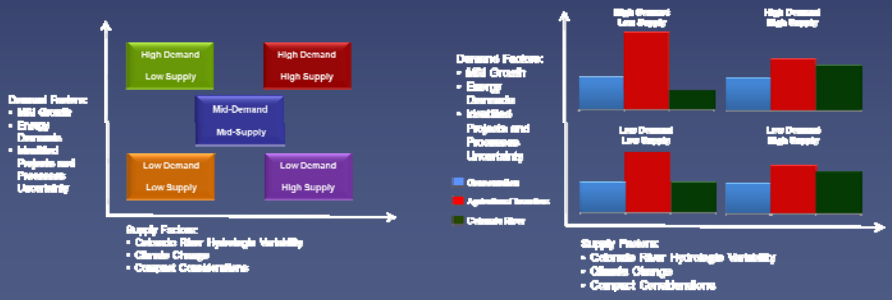
Building combinations of strategies or “portfolios” for meeting Colorado’s future water needs. Different mixes of:

-- IPPs
-- Conservation
-- New Supply Development
-- Ag Transfers
-- Reuse



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Strategies	Projects and Methods
Agricultural Transfer	• Agricultural Transfers (Traditional and Alternative) • South Platte Basins • Arkansas Basin
Colorado River System	• Yampa • Flaming Gorge • Green Mountain
Conservation	• 10% to 25% savings off 2006-2008 water usage
IPPs	• Providers current conservation plans and optimization of existing infrastructure • Southern Delivery System, Arkansas Valley Conduit, Wolcott Reservoir, Elkhead Enlargement, Moffat Collection System, Rueter Hess Enlargement, Thornton Northern Project, Prairie Waters, Chatfield Reallocation, Northern Integrated Supply Plan (NISP), Windy Gap Firming, Halligan Enlargement, Seaman Enlargement

Portfolio

Portfolio Tool Overview

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Purpose of Portfolio Tool

- Examine future scenarios based on varying demand and supply
- Create water management portfolios to address future scenarios
- Examine high level trade-offs associated with future scenarios
- Tool has been updated significantly since May 2009 and has been used by IBCC during September 2009 and December 2009 meetings

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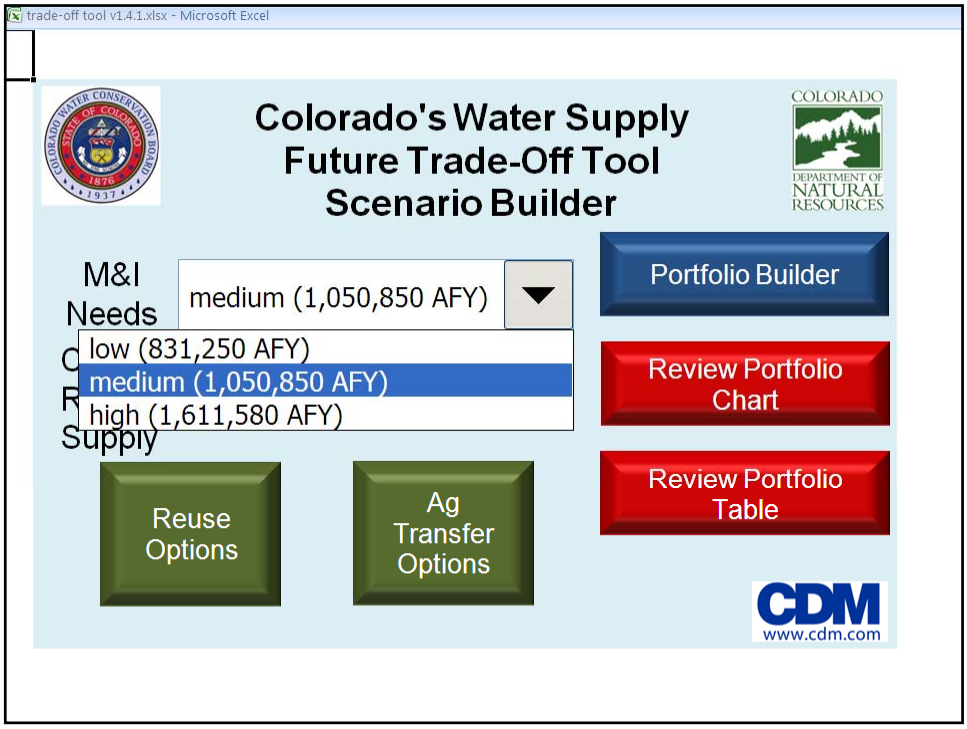
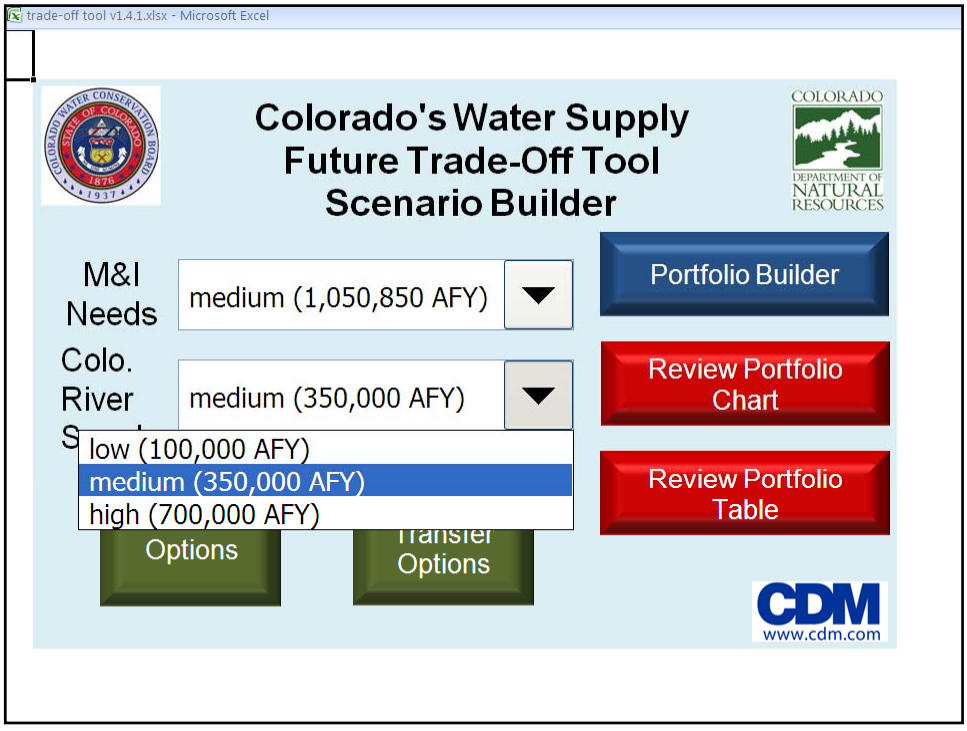
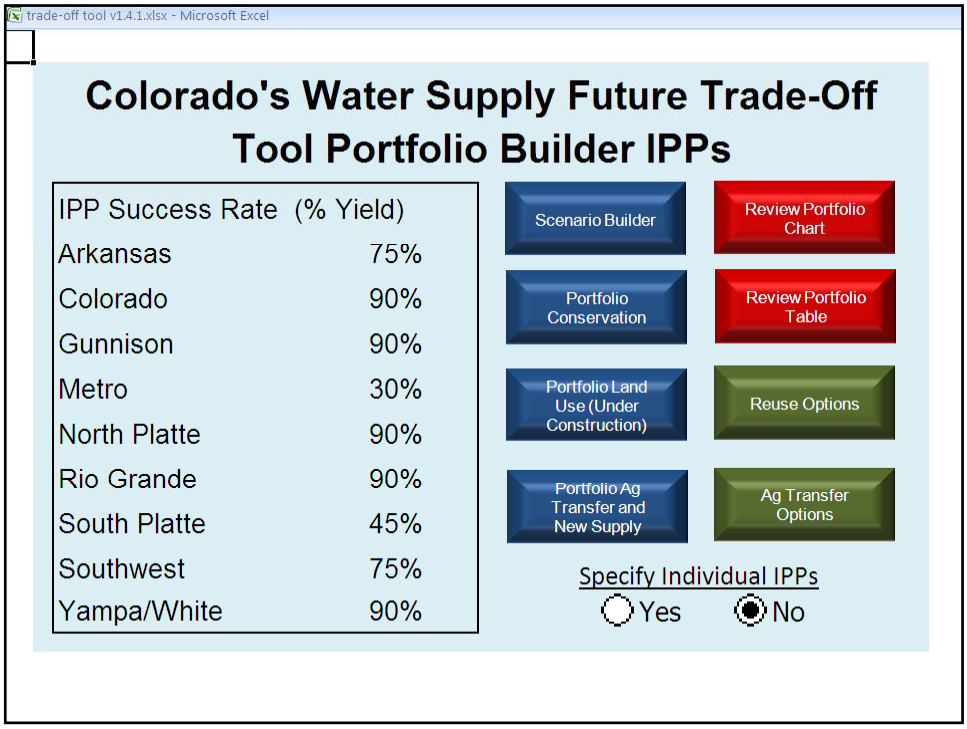
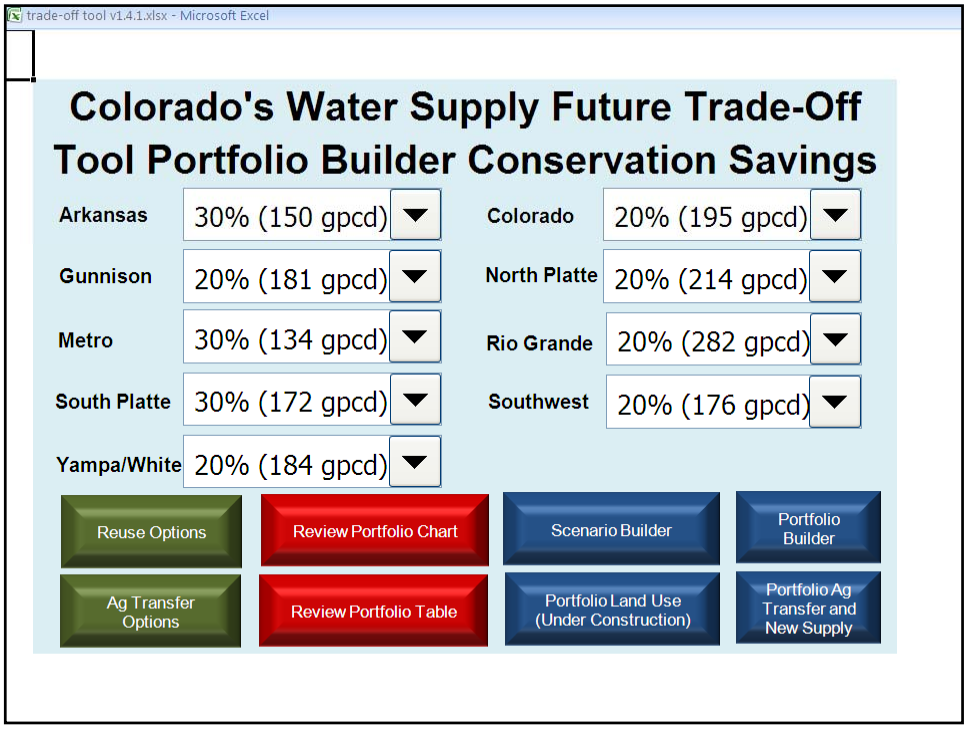
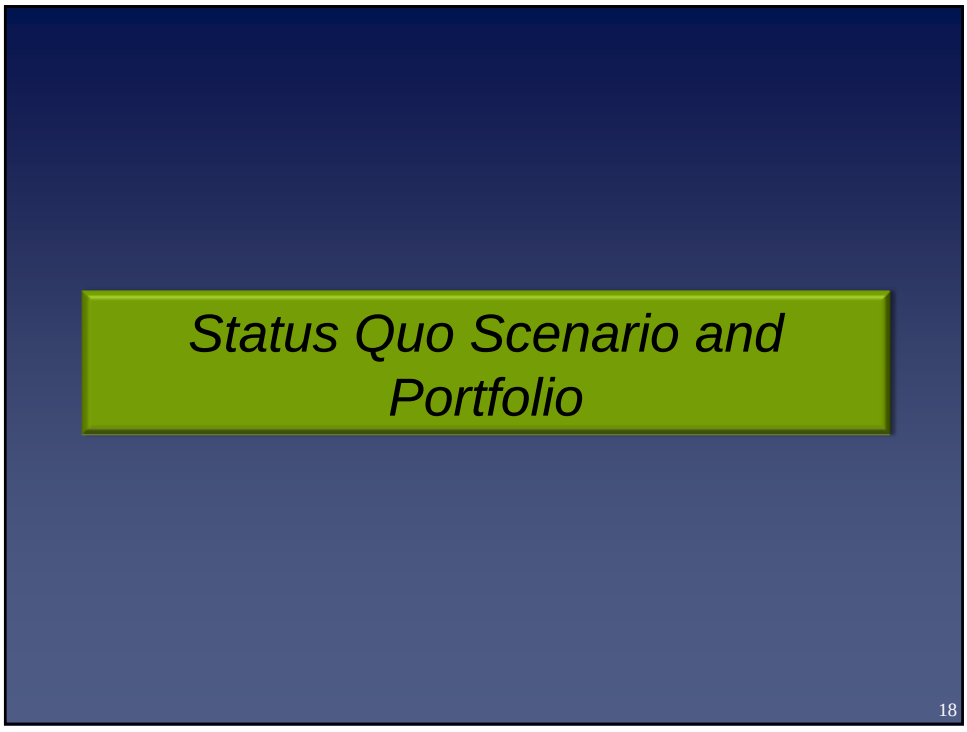

trade-off tool v1.4.1.xlsx - Microsoft Excel
Colorado's Water Supply
Future Trade-Off Tool
Scenario Builder
COLORADO
DEPARTMENT OF NATURAL RESOURCES
M&I Needs
medium (1,050,850 AFY)
low (831,250 AFY)
medium (1,050,850 AFY)
high (1,611,580 AFY)
Supply
Portfolio Builder
Review Portfolio Chart
Review Portfolio Table
Reuse Options
Ag Transfer Options
CDM
www.cdm.com


trade-off tool v1.4.1.xlsx - Microsoft Excel
Colorado's Water Supply
Future Trade-Off Tool
Scenario Builder
COLORADO
DEPARTMENT OF NATURAL RESOURCES
M&I Needs
medium (1,050,850 AFY)
Colo. River
medium (350,000 AFY)
low (100,000 AFY)
medium (350,000 AFY)
high (700,000 AFY)
Portfolio Builder
Review Portfolio Chart
Review Portfolio Table
Options
Transfer Options
CDM
www.cdm.com


trade-off tool v1.4.1.xlsx - Microsoft Excel
Colorado's Water Supply Future Trade-Off Tool Portfolio Builder IPPs
IPP Success Rate (% Yield)
Arkansas 75%
Colorado 90%
Gunnison 90%
Metro 30%
North Platte 90%
Rio Grande 90%
South Platte 45%
Southwest 75%
Yampa/White 90%
Scenario Builder
Review Portfolio Chart
Portfolio Conservation
Review Portfolio Table
Portfolio Land Use (Under Construction)
Reuse Options
Portfolio Ag Transfer and New Supply
Ag Transfer Options
Specify Individual IPPs
Yes
No


trade-off tool v1.4.1.xlsx - Microsoft Excel
Colorado's Water Supply Future Trade-Off Tool Portfolio Builder Conservation Savings
Arkansas 30% (150 gpcd)
Colorado 20% (195 gpcd)
Gunnison 20% (181 gpcd)
North Platte 20% (214 gpcd)
Metro 30% (134 gpcd)
Rio Grande 20% (282 gpcd)
South Platte 30% (172 gpcd)
Southwest 20% (176 gpcd)
Yampa/White 20% (184 gpcd)
Reuse Options
Review Portfolio Chart
Scenario Builder
Portfolio Builder
Ag Transfer Options
Review Portfolio Table
Portfolio Land Use (Under Construction)
Portfolio Ag Transfer and New Supply


trade-off tool v1.4.1.xlsx - Microsoft Excel
Colorado's Water Supply Future Trade-Off Tool
Portfolio Builder Ag Transfer and New Supply
Remaining M&I need met first through:
Agricultural Transfer
Colorado River
Specifiy Ag Acres
If remaining Colorado River System Allocate to East Slope:
Yes
No
Reuse Options
Review Portfolio Chart
Scenario Builder
Portfolio Builder
Ag Transfer Options
Review Portfolio Table
Portfolio Land Use (Under Construction)
Portfolio Conservation


Status Quo Scenario and Portfolio
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Status Quo Scenario and Portfolio

- IPP - Success rate varied by basin
- Conservation - 20% reduction from 2000 water usage rates by basin
- New Supply – Future development of CO River water beyond IPPs will occur for uses on the West Slope
- Ag Transfer – Remaining East Slope M&I Demands will be met through ag transfers

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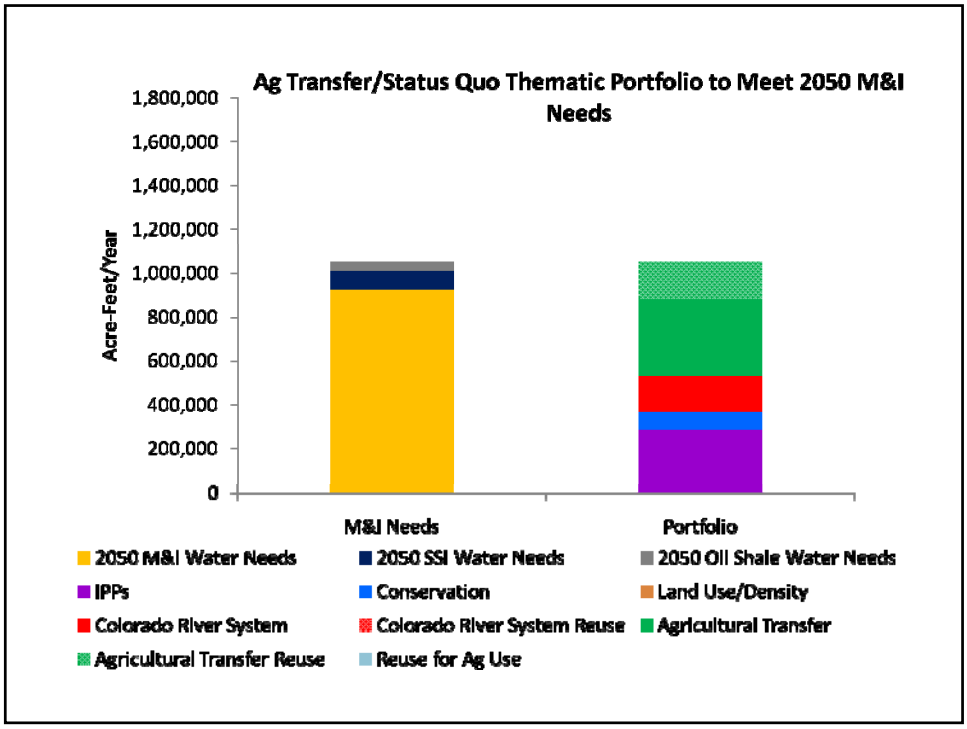
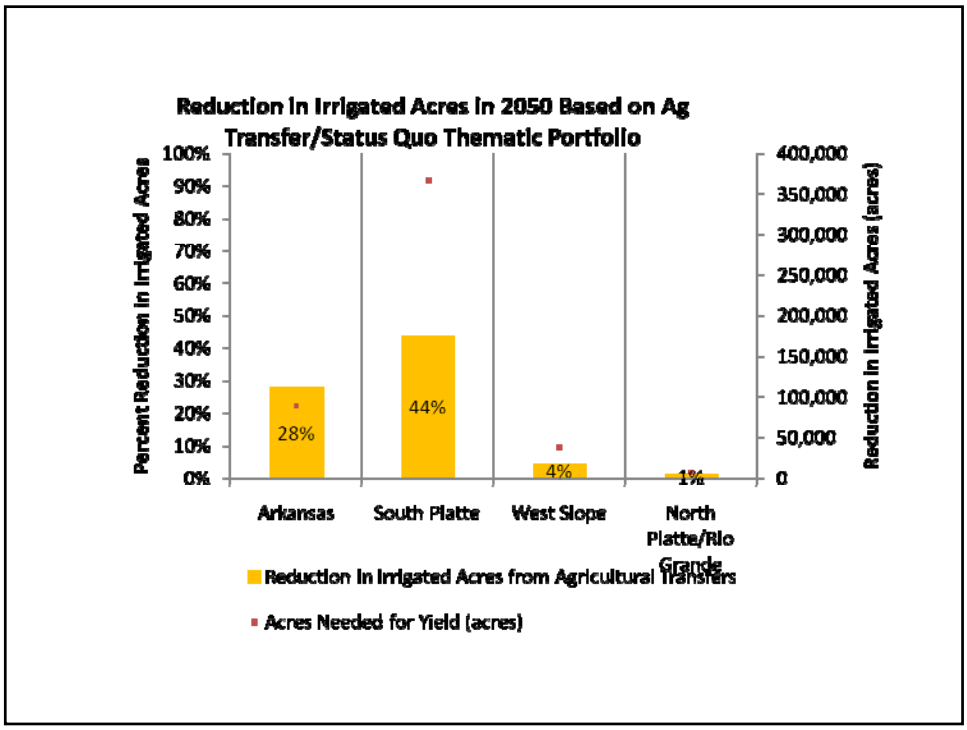
M&I Needs	Statewide	West Slope	East Slope	North Platte/ Rio Grande
M&I Water Needs (AFY)	922,800	203,100	708,500	11,200
SSI Water Needs (AFY)	84,400	45,300	39,100	0
Oil Shale Water Needs (AFY)	43,700	43,700	0	0
Total M&I Needs (AFY)	1,050,900	292,100	747,600	11,200
Strategies				
IPPs (AFY)	281,000	94,800	182,300	3,900
Conservation (AFY)	85,400	34,100	49,000	2,300
New Supply Development (AFY)	163,200	163,200	0	0
Reuse (AFY)	0	0	0	0
New Supply Development Sub-Total (AFY)	*163,200*	*163,200*	*0*	*0*
Ag Transfer (AFY)	349,300	0	344,200	5,100
Reuse (AFY)	172,100	0	172,100	0
Ag Transfer Sub-Total (AFY)	*521,400*	*0*	*516,300*	*5,100*
Reduction in Irrigated Acres (percent)	19%	4%	39%	1%
			28% Arkansas 44% South Platte	
Reduction in Irrigated Acres (acres)	501,100	38,667	455,600	6,800
			88,200 Arkansas 367,400 South Platte	


Ag Transfer/Status Quo Thematic Portfolio to Meet 2050 M&I Needs
Acre-Feet/Year
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
M&I Needs
Portfolio
2050 M&I Water Needs
2050 SSI Water Needs
2050 Oil Shale Water Needs
IPPs
Conservation
Land Use/Density
Colorado River System
Colorado River System Reuse
Agricultural Transfer
Agricultural Transfer Reuse
Reuse for Ag Use


Reduction in Irrigated Acres in 2050 Based on Ag Transfer/Status Quo Thematic Portfolio
Percent Reduction in Irrigated Acres
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Reduction in Irrigated Acres (acres)
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
28%
44%
4%
1%
Arkansas
South Platte
West Slope
North Platte/Rio Grande
Reduction in Irrigated Acres from Agricultural Transfers
Acres Needed for Yield (acres)

Common Portfolio Elements of the Mid-Demand and Mid-Supply Scenario

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Example Portfolios from December Meeting

Portfolio Element	Group 1	Group 2	Group 3
Identified Projects and Processes	322 KAF	382 KAF	367 KAF
Agricultural Transfers	15 KAF (22 KAF W/ Reuse)	60 KAF(88 w/ Reuse)	3 KAF
Colorado River System	350 KAF (480 KAF w/ Reuse)	316 KAF (404 KAF w/ Reuse)	350 KAF (461 KAF w/ Reuse)
Conservation	227 KAF (40% off 2000 East Slope and 20% for remainder of State)	177 KAF (30% Statewide)	223 KAF (35% Statewide)

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During December 2009 meeting the IBCC develop several portfolios for the mid-demand & mid-supply portfolio. Common themes included:

- Promote success of Identified Projects and Processes
- Minimize agricultural transfers to meet future needs on the East Slope and West Slope
- Increase conservation
- Increase reuse of consumable supplies
- Utilize Colorado River System supplies on West Slope and East Slope

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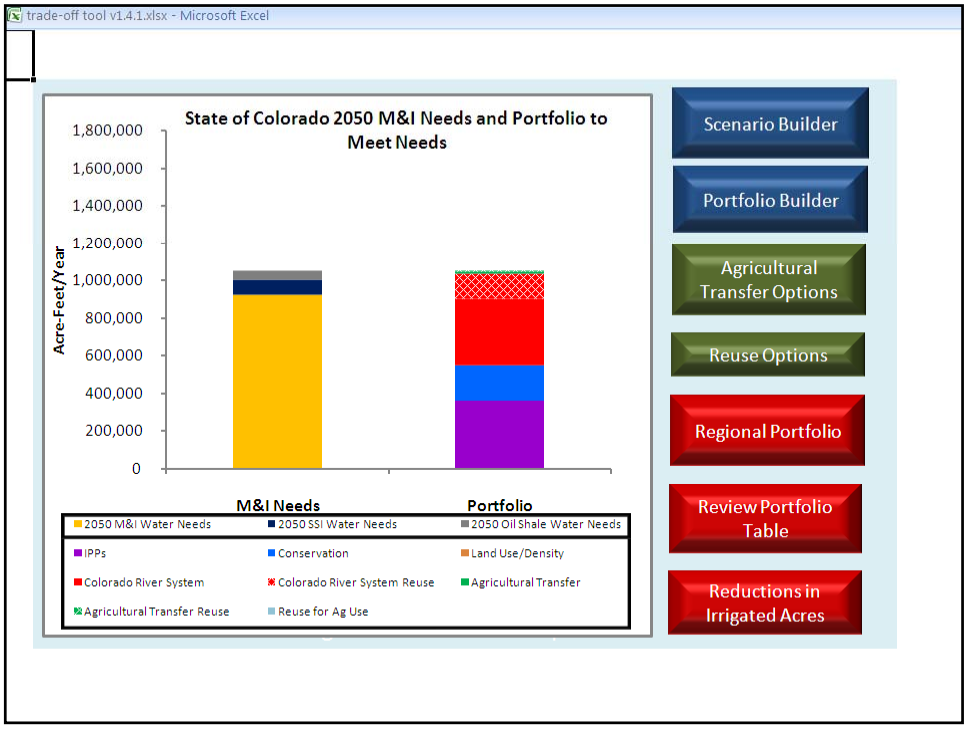
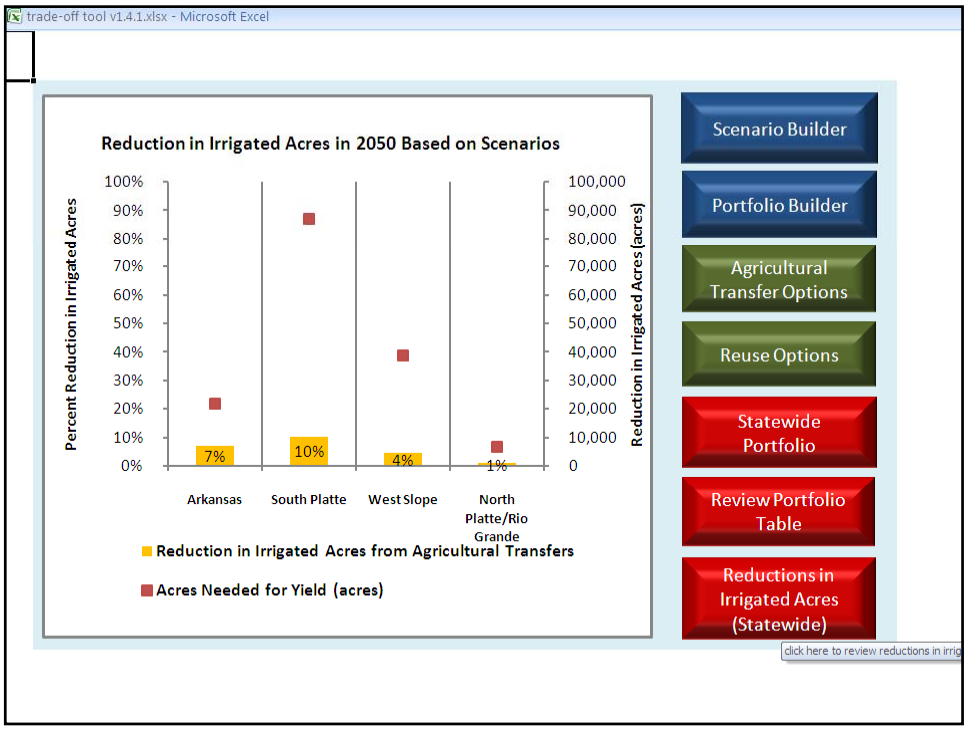
M&I Needs	**Statewide**	**West Slope**	**East Slope**	**North Platte/ Rio Grande**
M&I Water Needs (AFY)	922,800	203,100	708,500	11,200
SSI Water Needs (AFY)	84,400	45,300	39,100	0
Oil Shale Water Needs (AFY)	43,700	43,700	0	0
Total M&I Needs (AFY)	1,050,900	292,100	747,600	11,200
Strategies				
IPPs (AFY)	362,900	94,800	264,200	3,900
Conservation (AFY)	191,700	34,100	155,300	2,300
New Supply Development (AFY)	350,000	163,200	186,800	0
Reuse (AFY)	130,800	0	130,800	0
New Supply Development Sub-Total (AFY)	*480,800*	*163,200*	*317,600*	*0*
Ag Transfer (AFY)	11,200	0	6,200	5,000
Reuse (AFY)	4,300	0	4,300	0
Ag Transfer Sub-Total (AFY)	*15,500*	*0*	*10,500*	*5,000*
Reduction in Irrigated Acres (percent)	6%	4%	9%	1%
			7%Arkansas 10%South Platte	
Reduction in Irrigated Acres (acres)	154,300	38,667	108,900	6,700
			21,900Arkansas 87,000South Platte	
Colorado River Depletions (MAF)	3.088	MAF		

NOTE: There may be some discrepancies in totals due to rounding.


trade-off tool v1.4.1.xlsx - Microsoft Excel
State of Colorado 2050 M&I Needs and Portfolio to Meet Needs
Acre-Feet/Year
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
M&I Needs
Portfolio
2050 M&I Water Needs
2050 SSI Water Needs
2050 Oil Shale Water Needs
IPPs
Conservation
Land Use/Density
Colorado River System
Colorado River System Reuse
Agricultural Transfer
Agricultural Transfer Reuse
Reuse for Ag Use
Scenario Builder
Portfolio Builder
Agricultural Transfer Options
Reuse Options
Regional Portfolio
Review Portfolio Table
Reductions in Irrigated Acres


trade-off tool v1.4.1.xlsx - Microsoft Excel
Reduction in Irrigated Acres in 2050 Based on Scenarios
Percent Reduction in Irrigated Acres
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Reduction in Irrigated Acres (acres)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
7%
10%
4%
1%
Arkansas
South Platte
West Slope
North Platte/Rio Grande
Reduction in Irrigated Acres from Agricultural Transfers
Acres Needed for Yield (acres)
Scenario Builder
Portfolio Builder
Agricultural Transfer Options
Reuse Options
Statewide Portfolio
Review Portfolio Table
Reductions in Irrigated Acres (Statewide)
click here to review reductions in irrig

Portfolio Tool Enhancements

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Future Portfolio Tool Enhancements

- Include other trade-offs
  - Environmental
  - Cost
- Update with new Energy Study demands
- Update with South Metro and El Paso County existing groundwater supplies a future need
- Include passive conservation in demands
- Update conservation to reflect 2009 baseline
- Include reductions in demand due to potential land use/density considerations

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Future Portfolio Tool Enhancements (con't)

- Refine Colorado River System supply scenarios based on CRWAS results
- IPPs - Separate structural/new supply project from other IPPs (conservation, growing into existing systems, etc.)
- Reflect the number of acres that would need to be included in an Alt. Ag Transfer Program
- Refine reuse component of tool

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Draft Report Outline and Schedule

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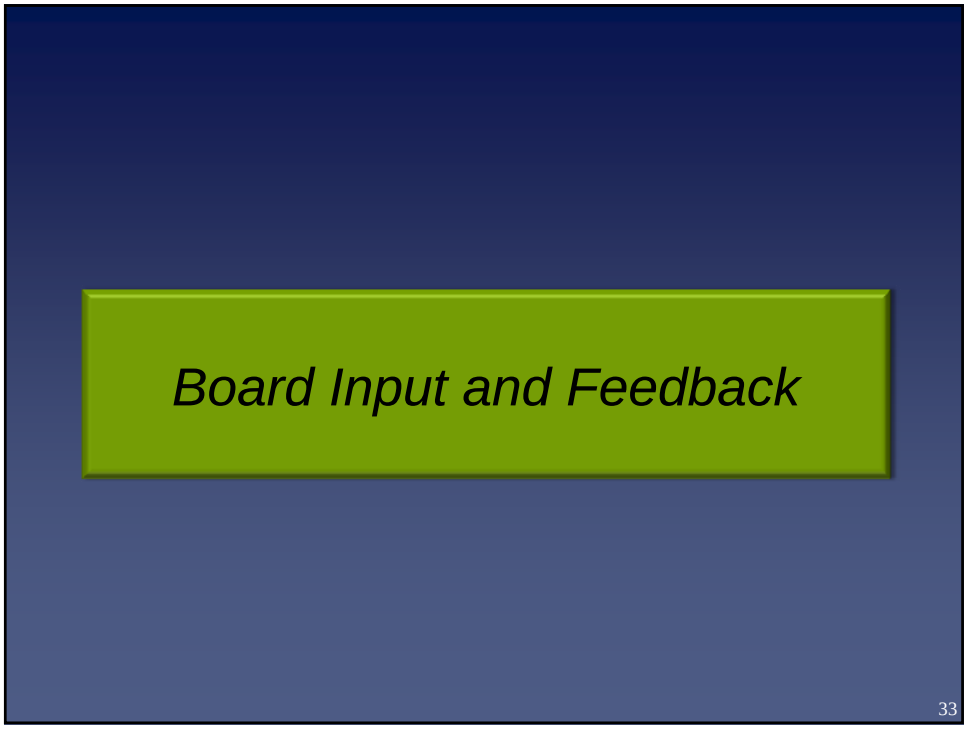
Board Input and Feedback
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