



**Colorado's Water
Supply Future**



South Platte Basin Roundtable Meeting Weld County, Colorado

February 10, 2009

**Projects and Methods to Meet
Identified Water Supply Needs**

Basin-Wide Water Needs Assessments

- Identify Consumptive Water Needs (M&I and Agricultural)
- Identify Nonconsumptive Water Needs (Environmental and Recreational)
- Identify Available Water Supplies
- Identify Projects and Methods to Meet Consumptive and Nonconsumptive Water Needs

Path Forward – 2009

- Consumptive Needs Assessment done in Draft
- Nonconsumptive Priority Areas Identified

Focus of 2009:

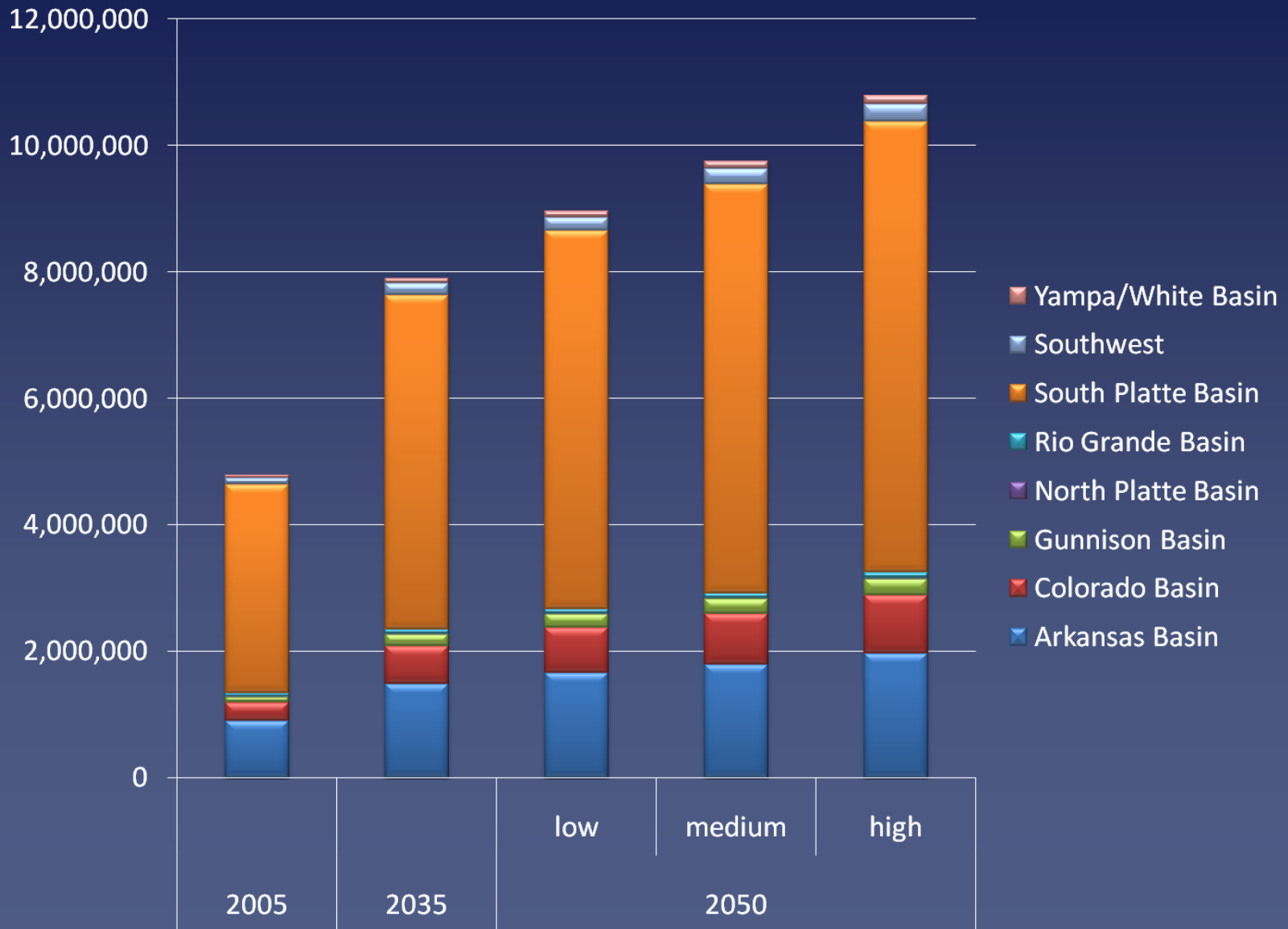
***Projects and Methods to Meet Identified Needs
(M&I and Nonconsumptive)***

Status of Basin Roundtable Needs Assessments

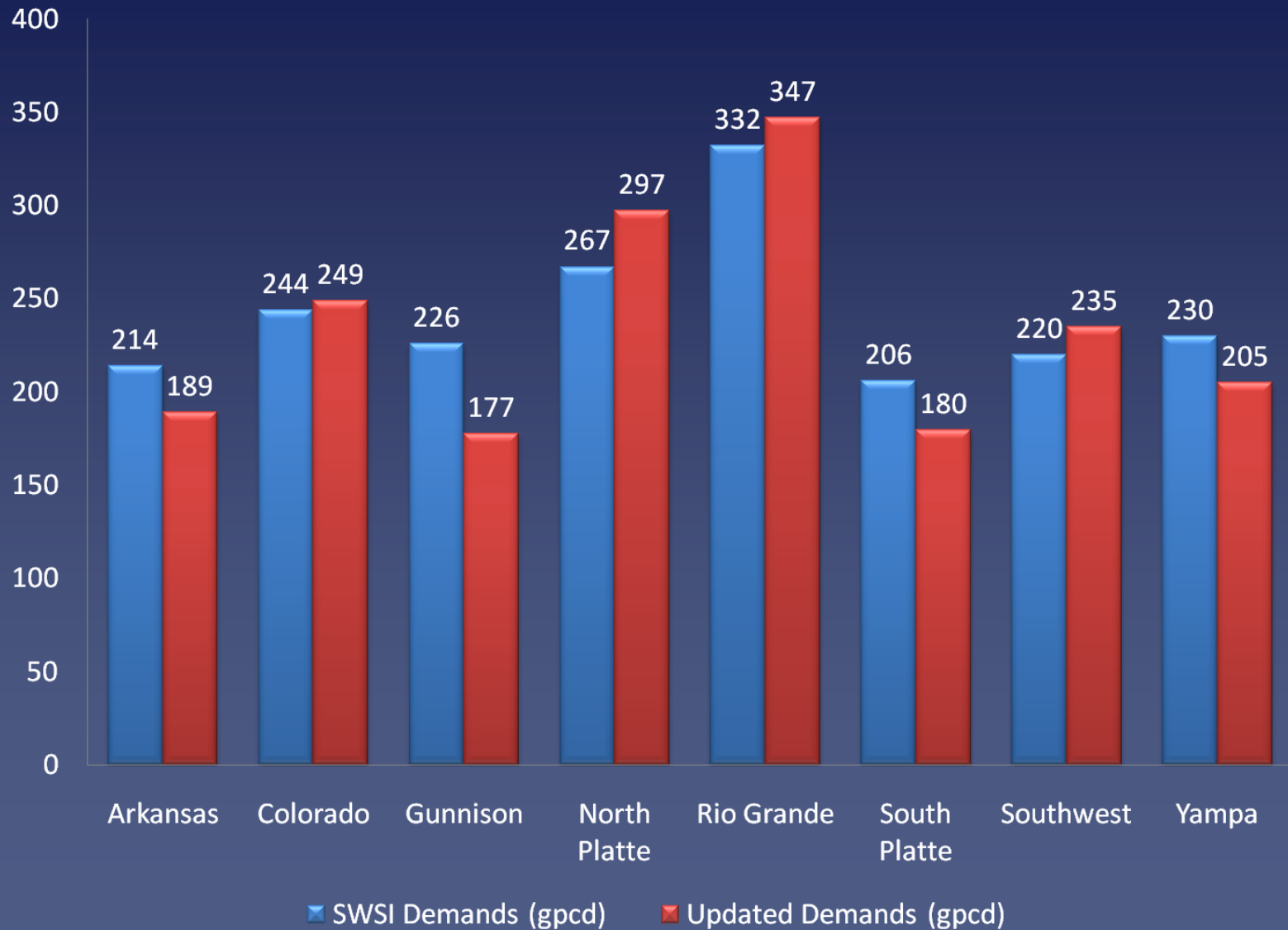
Basin	Consumptive Needs Assessment	Nonconsumptive Needs Assessment	Water Supply Availability Assessment
South Platte/ Metro	<ul style="list-style-type: none">• Augment SWSI 1 with Task Order requests• Demands to 2050	<ul style="list-style-type: none">• Developed preliminary priority mapping	<ul style="list-style-type: none">• SWSI 1• Task Order Request

*Visions and Strategies for
Colorado's Water Supply Future:
M&I Water Demands to 2050*

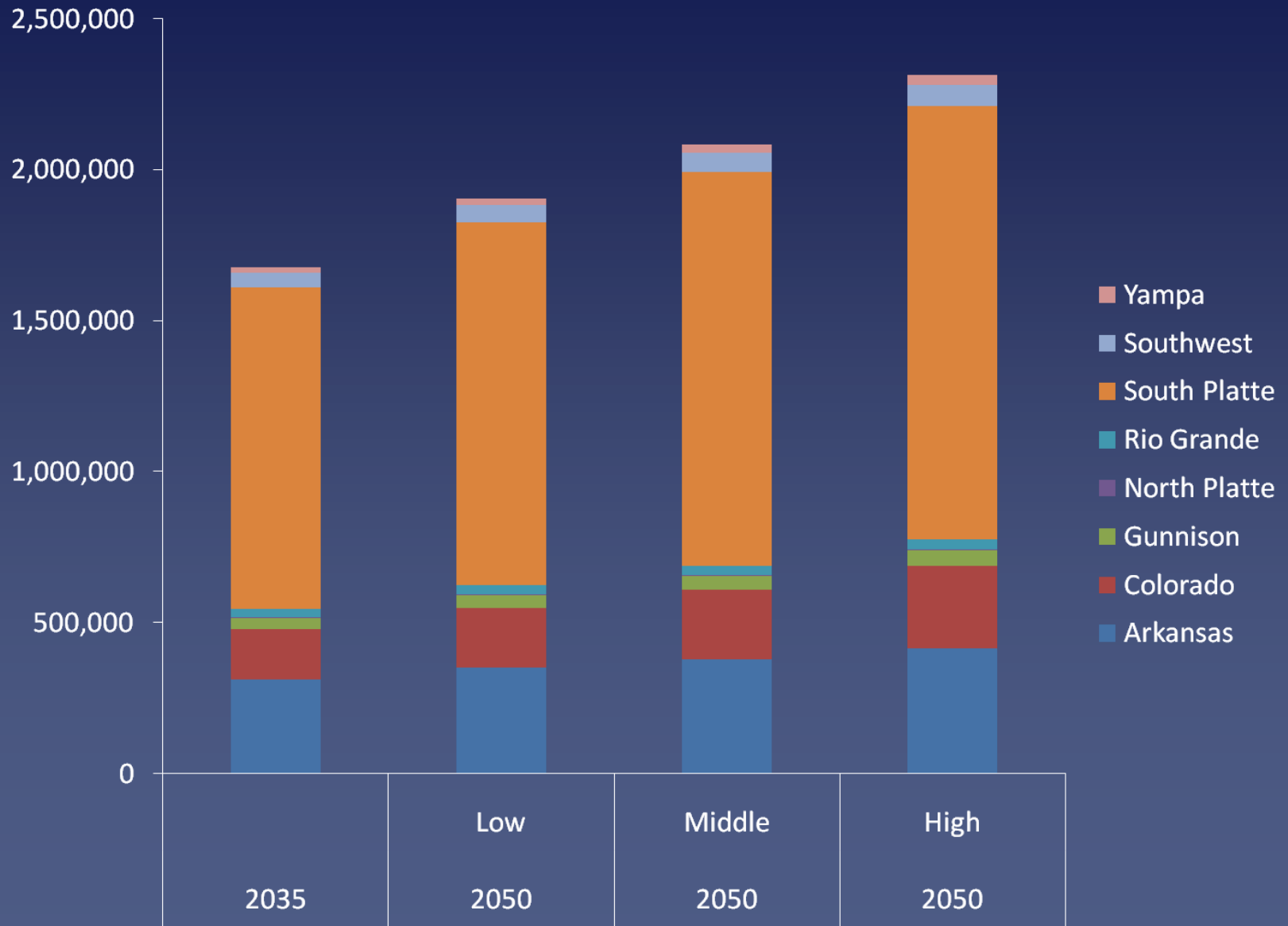
Population Projections



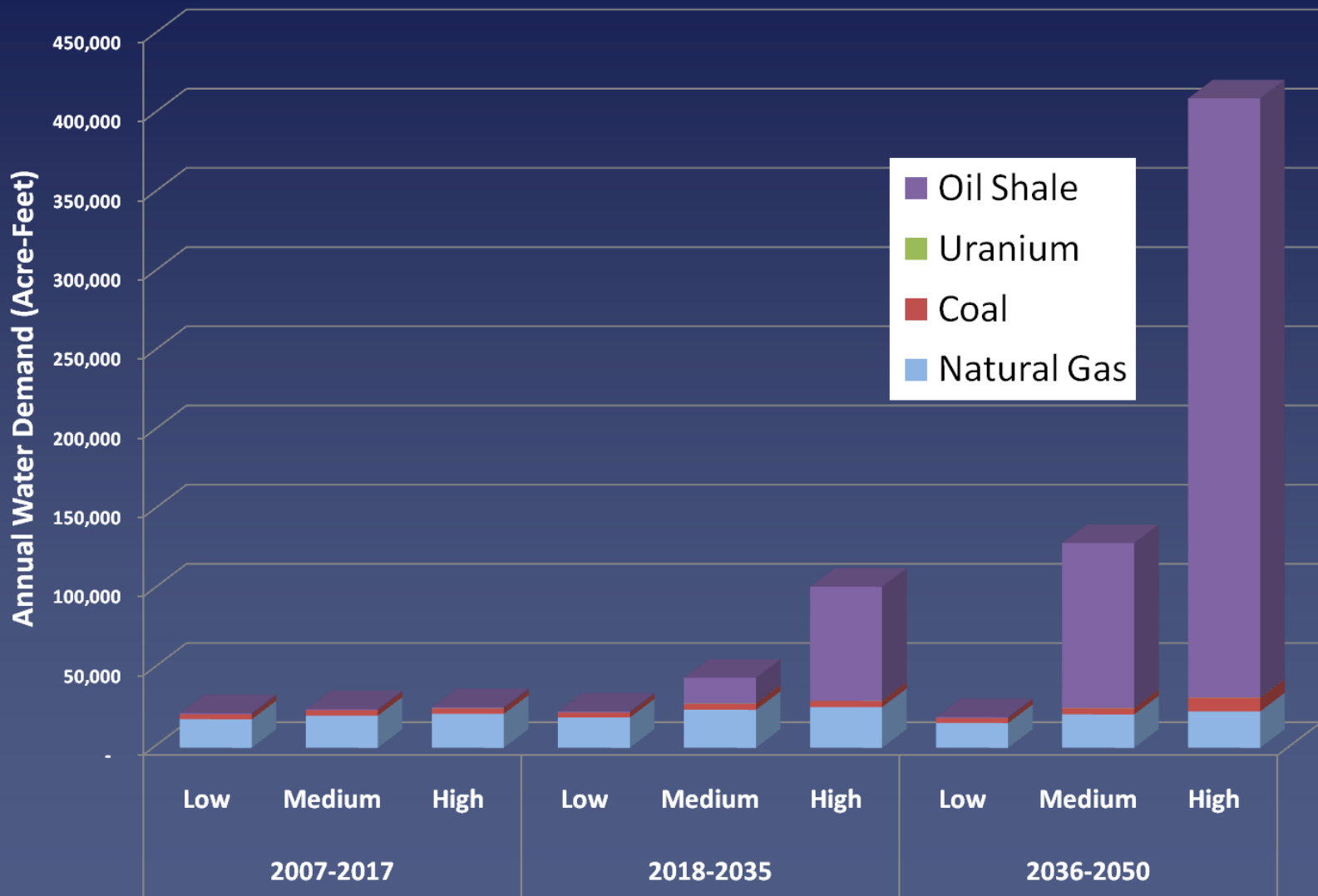
M&I Water Usage Rates by Basin



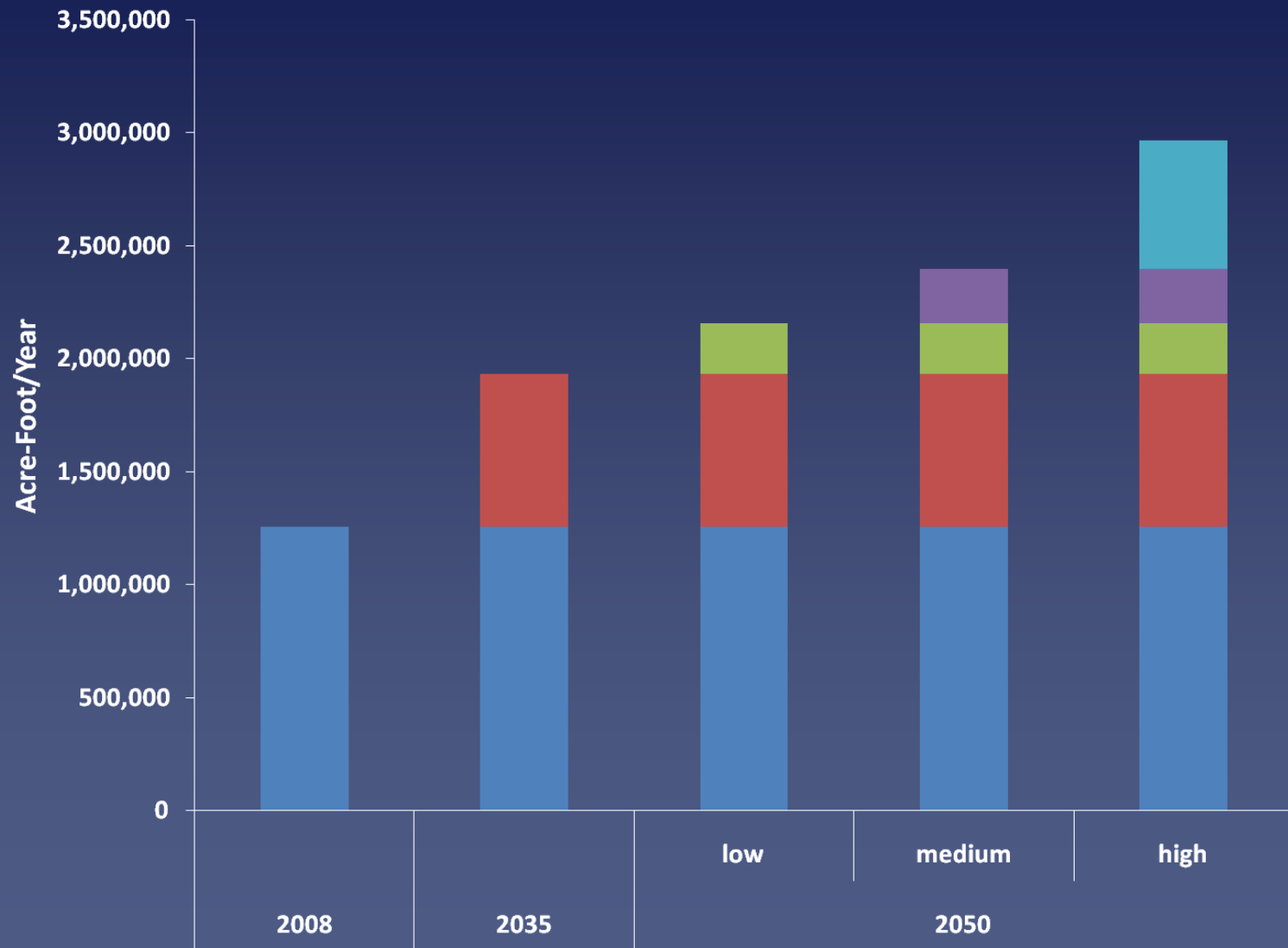
Municipal Water Demands by Basin



Colorado and Yampa/White Energy Demands

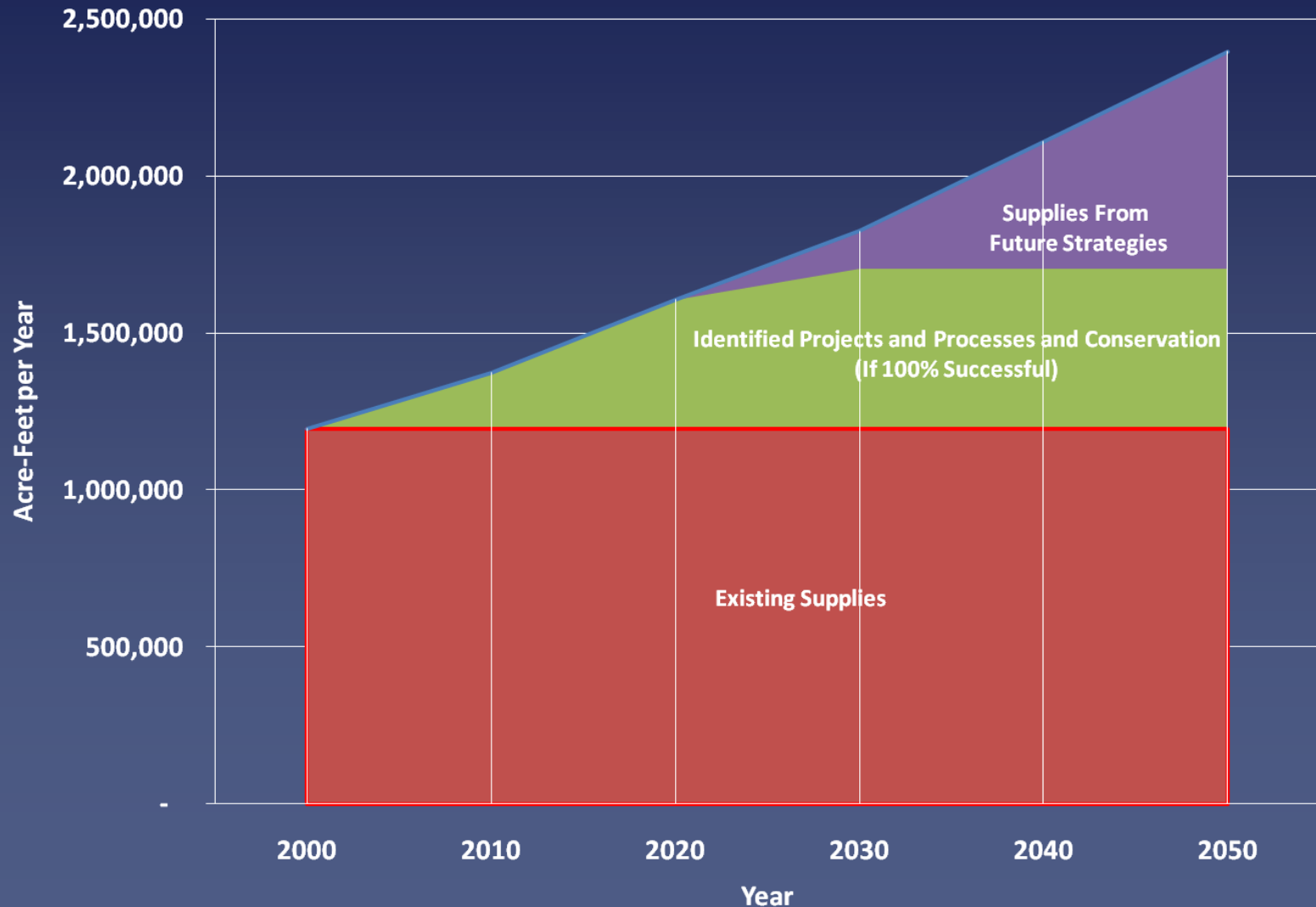


By 2050, Colorado will need up to 1.7 MAF to Meet M&I Demands*



*This does not take into account demand reductions from conservation for future demands

State of Colorado Projected Water Demands, Supplies, and Gaps



South Platte/Metro IPPs

Major Identified Projects and Processes in South Platte Basin Counties

County	Estimated Demand Met by Identified Projects and Processes and Additional Conservation (AFY)	Identified Projects and Processes
Denver Metro (Adams, Denver, Jefferson)	108,100	<ul style="list-style-type: none"> ■ Active Conservation ■ Existing supplies ■ Denver Northern Firming ■ Thornton Water Supply and Storage Company transfer ■ Agricultural transfers ■ New storage (including gravel lakes) and reservoir enlargements ■ Reuse for non-potable irrigation of parks and golf courses and other landscaping ■ Treating lower quality water sources
South Metro (Arapahoe, Douglas, Elbert)	38,300	<ul style="list-style-type: none"> ■ Active Conservation ■ Implementation of South Metro Conjunctive Use Plan or alternative ■ Reuter-Hess Reservoir ■ Aurora Long-range Plan ■ East Cherry Creek Plan ■ Agricultural transfers and reuse ■ Additional non-tributary groundwater ■ Reuse for non-potable irrigation of parks and golf courses and other landscaping ■ Indirect potable reuse by blending return flows with raw water supplies ■ Treating lower quality water sources

Major Identified Projects and Processes in South Platte Basin Counties (cont.)

County	Estimated Demand Met by Identified Projects and Processes and Additional Conservation (AFY)	Identified Projects and Processes
High Plains (Cheyenne, Kit Carson, Lincoln, Phillips, Washington, Yuma)	800	<ul style="list-style-type: none"> ■ Additional non-tributary groundwater
Northern (Boulder, Larimer, Weld)	146,500	<ul style="list-style-type: none"> ■ Active Conservation ■ Windy Gap FIRMing ■ Northern Integrated Supply Plan ■ Halligan and Seaman Reservoirs enlargement ■ New storage including gravel lakes ■ Agricultural transfers ■ CBT acquisition ■ Reuse for non-potable irrigation of parks and golf courses and other landscaping ■ Exchanges ■ Annexation policies ■ Treating lower quality water sources ■ Use of local ditch rights for landscape irrigation

Major Identified Projects and Processes in South Platte Basin Counties (cont.)

County	Estimated Demand Met by Identified Projects and Processes and Additional Conservation (AFY)	Identified Projects and Processes
Lower Platte (Logan, Morgan, Sedgwick)	8,900	<ul style="list-style-type: none"> ■ Augmentation of tributary groundwater with agricultural transfers ■ CBT acquisition
TOTAL	319,100	

Detailed Identified Projects and Processes for South Platte Basin

Subbasin	Major Provider	Notes	Source
Denver Metro	Arvada	Adding gravel lake storage to firm existing water rights and Denver raw water contract.	Dick Stenzel
	Aurora (Adams County portion)	Aurora Long range plan assumed to meet gap: Lower South Platte Project, Homestake II, Arkansas River ag transfers.	Lisa Darling, City of Aurora
	Brighton	Need additional augmentation water and building storage.	Dick Stenzel
	Consolidated Mutual	Building additional storage and transferring ag rights.	Dick Stenzel
	Denver Water	Denver IRP including North system (Moffat) firming and reclaimed water.	Denver IRP
	Golden	Has constructed Guanella Reservoir.	Response to CDM survey
	North Table Mountain W&SD	Has raw water contract with Denver Water.	Dick Stenzel
	Northglenn	Existing gap on firm yield, need storage to firm existing water rights. Would like to enlarge Standley Lake.	Dale Kralicek, City of Northglenn
	South Adams County W&SD	Constructing dual water system and has acquired augmentation and storage.	Jim Jones, South Adams County W&SD
	South Adams County W&SD	Constructing dual water system and has acquired augmentation and storage.	Jim Jones, South Adams County W&SD

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
Denver Metro (cont.)	Thornton	Will develop Water Supply and Storage water rights and advanced water treatment for its existing South Platte and Lower Clear Creek rights, including Aurora agreement.	response to CDM survey
	Unincorporated Adams County and other small eastern county towns	Existing and future developments reliant on non-trib groundwater and ability to irrigate lawns is limited. No reliable source of surface water immediately available.	Dick Stenzel
	Unincorporated Jefferson County and small towns	Existing and future mountain developments reliant on trib and non-trib groundwater. Small towns diverting from low headwater creeks and alluvial wells with poor drought yields.	Dick Stenzel
	Westminster	Building additional gravel storage to firm exchanges. Will expand reclaimed system and continue transferring ag rights.	response to CDM survey
South Metro	Arapahoe County WWA	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Aurora (Arapahoe County portion)	Aurora Long range plan assumed to meet gap.	Lisa Darling, City of Aurora
	Castle Pines North	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies .	South Metro Report

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
South Metro (cont.)	Castle Rock	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Centennial	Currently on both surface water and non-renewable groundwater. Implementing aquifer storage and recovery. Part of the South Metro effort to develop additional renewable water supplies.	South Metro Report
	Cottonwood	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	East Cherry Creek Valley	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Englewood	Service area near buildout. Has adequate existing supplies for buildout demands.	Response to CDM survey
	Franktown	Not in South Metro Group.	
	Inverness	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Meridian	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
South Metro (cont.)	Meridian	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Parker	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Pinery	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Roxborough	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Stonegate	Currently on non-renewable groundwater. Part of the South Metro effort to develop renewable water supplies.	South Metro Report
	Unincorporated Douglas County not in water district	Existing and future developments reliant on non-trib groundwater. No reliable source of surface water.	South Metro Report
	Eastern Arapahoe County	Existing and future developments reliant on non-trib groundwater. No reliable source of surface water.	South Metro Report
	Elbert County	Existing and future developments reliant on non-trib groundwater. No reliable source of surface water immediately available.	Dick Stenzel

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
Upper Mountain	Black Hawk	Decreed Aug Plan will meet needs. Could use additional raw water storage.	Dick Stenzel
	Central City	Decreed Aug Plan will meet needs.	Dick Stenzel
	Empire		Dick Stenzel
	Georgetown		Dick Stenzel
	Idaho Springs		Dick Stenzel
	Unincorporated Clear Creek County	Will need to acquire additional augmentation water. Source will be City of Golden agreement or ag transfers.	Dick Stenzel
	Unincorporated Gilpin County	Will need to acquire additional augmentation.	Dick Stenzel
	Park County	There are over 25,000 pre-1972 platted lots that will not require augmentation of wells. Decreed aug plans available for some post 1972 lots. Bargas Ranch water rights acquired with Centennial Water and Sanitation District and will provide additional augmentation source. Park County is in discussion with Denver Water on potential enlargement of Antero Reservoir.	Lynda James, Park County Land & Water Trust Fund
High Plains	Numerous small towns	High Plains aquifer assumed to meet future needs.	Dick Stenzel

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
Northern	Berthoud	Northern Integrated Supply Project, CBT and ag rights and annexation policies.	Dick Stenzel
	Boulder	Windy Gap Firming, CBT and ag rights.	Dick Stenzel
	Broomfield	Windy Gap Firming, CBT and ag rights and annexation policies. Constructing reclaimed system.	Dick Stenzel
	Calpine Power Plant	Aurora raw water lease expires in 2013 and will need a source of water. The plant has an estimated life of 40 years.	Dick Stenzel
	Central Weld County Water District (includes Johnstown, Kersey, LaSalle, Gilcrest, Frederick, Firestone, Dacono, Milliken and Platteville)	Northern Integrated Supply Project, reservoir enlargement, CBT and ag rights and annexation policies. There is expected to be a limitation on the ability to transfer water to its water treatment plant and non-potable systems using local ditch water may be required.	Dick Stenzel
	Tri-Districts (East Larimer, Fort-Collins Loveland and North Weld County Water Districts and includes Ault, Windsor and Eaton)	Northern Integrated Supply Project, Halligan Reservoir enlargement, CBT and ag rights and annexation policies. There is expected to be a limitation on the ability to transfer water to its water treatment plant and non-potable systems using local ditch water may be required.	Dick Stenzel

Detailed Identified Projects and Processes for South Platte Basin (cont.)

County	Major Provider	Notes	Source
Northern (cont.)	Loveland	Windy Gap firming, CBT and ag rights and annexation policies. Green Ridge Glade recently enlarged.	Dick Stenzel
	Lyons		Dick Stenzel
	Platte River Power Authority	Windy Gap firming.	Dick Stenzel
	Superior	Windy Gap firming, CBT and ag rights.	Dick Stenzel
	Xcel Fort St. Vrain Power Facility	Facility is not expected to increase capacity.	Dick Stenzel
	Unincorporated Boulder County (mountains and small towns)	Augmentation for growth in Nederland and mountain subdivisions.	Dick Stenzel
	Unincorporated Larimer County (mountains)	Will need augmentation for mountain subdivisions.	Dick Stenzel
Lower Platte	Brush	Will need well augmentation.	Dick Stenzel
	Fort Morgan	Buy CBT and well augmentation.	Dick Stenzel
	Julesburg	Will need well augmentation.	Dick Stenzel
	Sterling	Will need well augmentation.	Dick Stenzel
	Xcel Pawnee Power Facility	Will need consumptive use water for additional power generation.	Gary Thompson, W.W. Wheeler & Associates

Potential Future South Platte Basin Water Management Options

Project	Sponsor	Type of Project	Additional Storage (AF)	Additional Yield (AFY)	Project Purpose and Notes
Standley Lake Enlargement	City of Northglenn	Additional Storage	up to 18,000	up to 6,000	Purpose is to firm the water supply for M&I users. Northglenn has an existing gap that could be addressed through additional storage. Other parties may participate; Yield varies depending upon participants
Tamarack Plan	State of Colorado	Groundwater Recharge and Conjunctive Use	Not Available	10,000	Managed groundwater recharge projects to reregulate flows in a manner that is consistent with the flow-related goals of the Platte River Recovery Implementation Program.
Julesburg Enlargement	CWCB	Additional Storage	15,000	7,800	Addresses lower basin agricultural needs.
Johnson Reservoir	CWCB	Additional Storage	10,600	7,800	Addresses lower basin agricultural needs.
Harmony Ditch West	CWCB	Additional Storage	10,000	6,000	Addresses lower basin agricultural needs.
Groundwater Storage / Alluvial Storage	None	Conjunctive Use of Groundwater	Not Applicable	Not Available	Ongoing programs, new projects anticipated. Could benefit all users and M&I, agricultural, environmental, and recreational.

* Water Supply Reserve Account Grants in place

Potential Future South Platte Basin Water Management Options (cont.)

Project	Sponsor	Type of Project	Additional Storage (AF)	Additional Yield (AFY)	Project Purpose and Notes
Flow Control Program between Reservoirs	None	Re-operations	Not Applicable	Not Available	Provide for management of flows between reservoirs for recreational and environmental uses without impact yields to M&I and agricultural users.
Control of Non-Native Phreatophytes	None	Control of non-native phreatophytes	Not Applicable	Not Available	—
Reallocation of Storage in Chatfield Reservoir	Numerous Parties	Reallocation of flood control storage.	20,000	Not Available	Reallocation of flood control storage to allow storage for M&I purposes. Flow management in the South Platte through Denver.
Pawnee Creek Project/Storage Site	None	Additional Storage	Not Available	Not Available	Address agricultural shortages in Lower Platte.
South Metro Water Supply Project	South Metro Water Providers	Storage and non-tributary groundwater conjunctive use		\$2-4 billion	Development of new storage to capture South Platte and West Slope water and conjunctive use with non-tributary groundwater.

Roundtable Action Items

- Review and update IPPs and base options

Development of Water Supply Strategies

Elements of the Visioning Process



**Colorado's
Water Supply
Future Vision
Goals**

Meet M&I Demands

Meet Agricultural Demands

**Meet Colorado's Environment and
Recreation Demands**

**Promote Cooperation Between Water Supply
Planners and Land Use Planners**

**Promote More Cooperation Among All
Colorado Water Users**

Optimize Existing and Future Water Supplies

Promote Cost-Effectiveness

Minimize the Net Energy Used to Supply Water

**Protect Cultural Values Linked to
Water Resources**

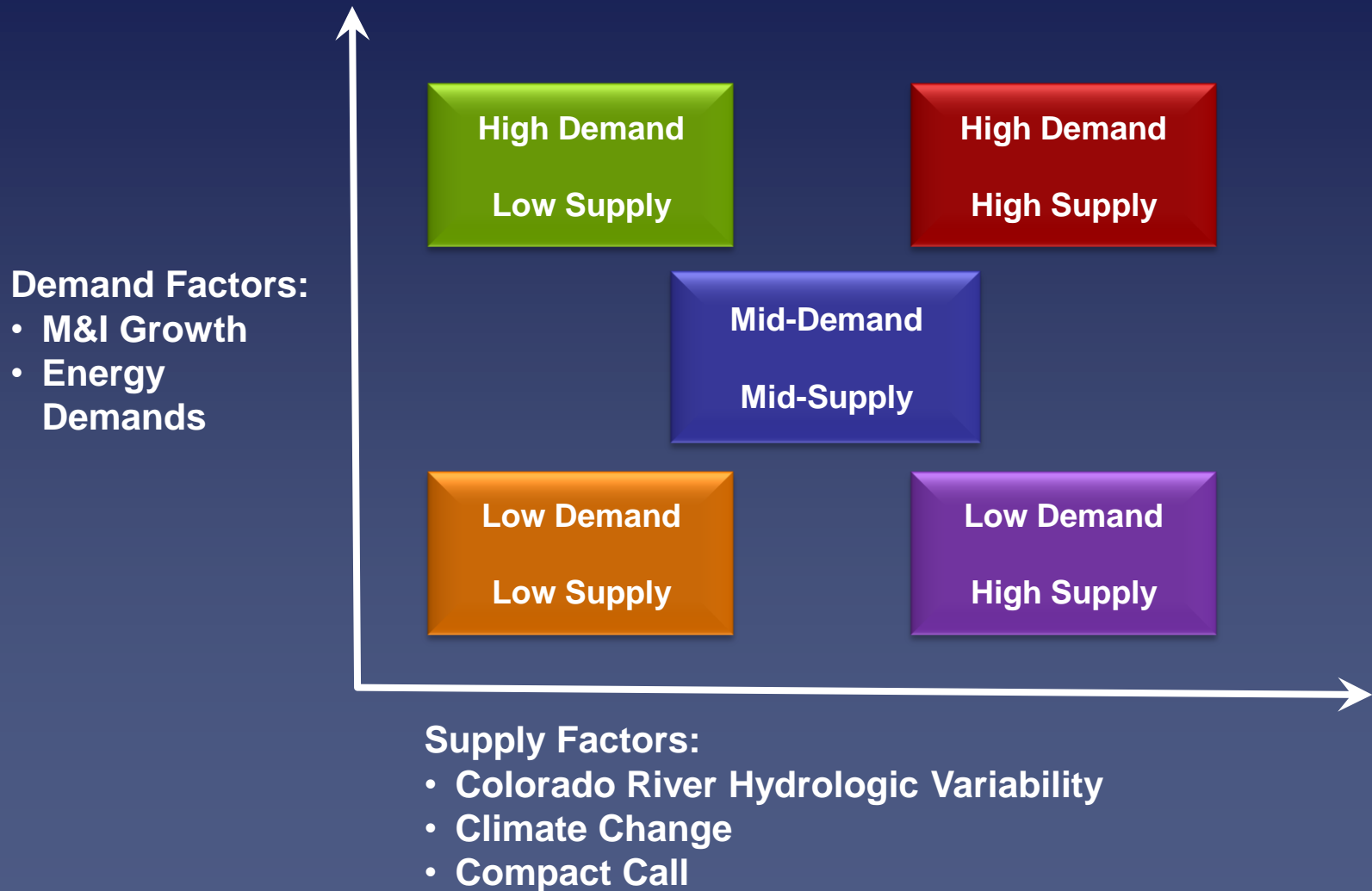
**Provide Operational Flexibility
and Coordinated Infrastructure**

**Promote Increased Fairness When
Water is Moved Between Areas**

**Comply With all Applicable
Laws and Regulations**

**Educate all Coloradoans on the
Importance of Water**

2050 Planning Horizon for Colorado's Water Supply Future



2050 Planning Horizon for Colorado's Water Supply Future

Demand Factors:

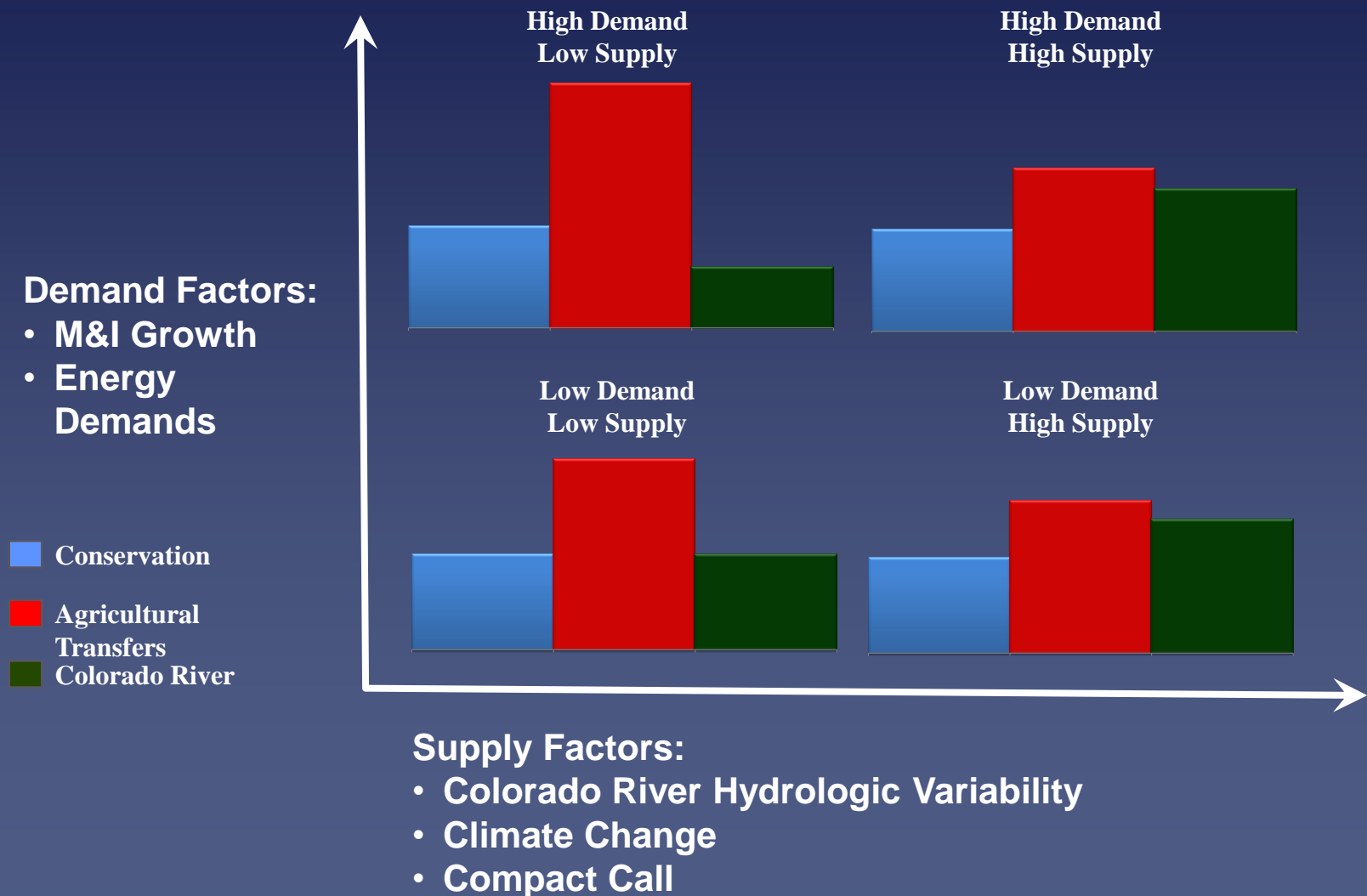
- M&I Growth
- Energy Demands



Supply Factors:

- Colorado River Hydrologic Variability
- Climate Change
- Compact Call

2050 Planning Horizon for Colorado's Water Supply Future

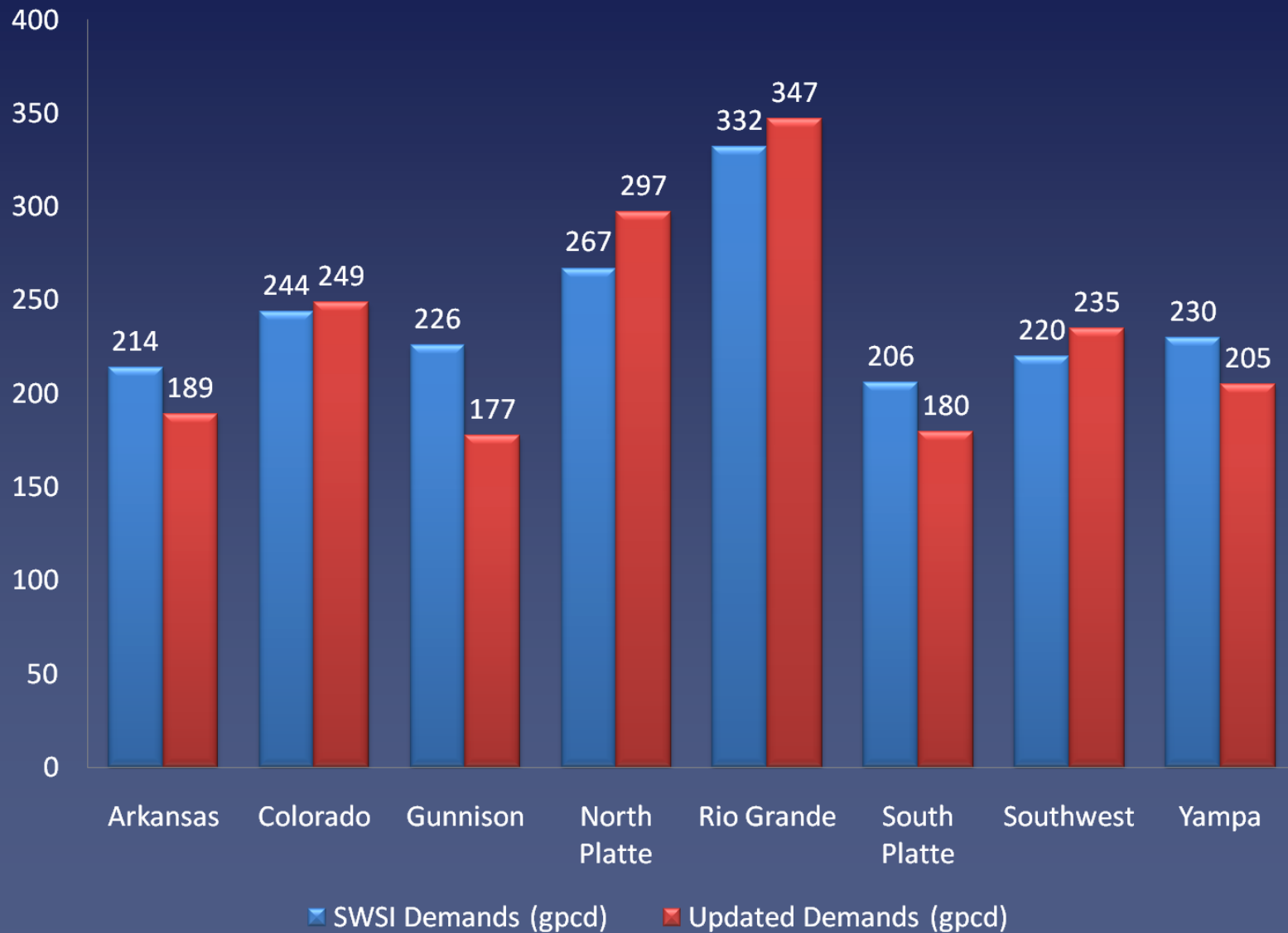


Water Supply Strategies

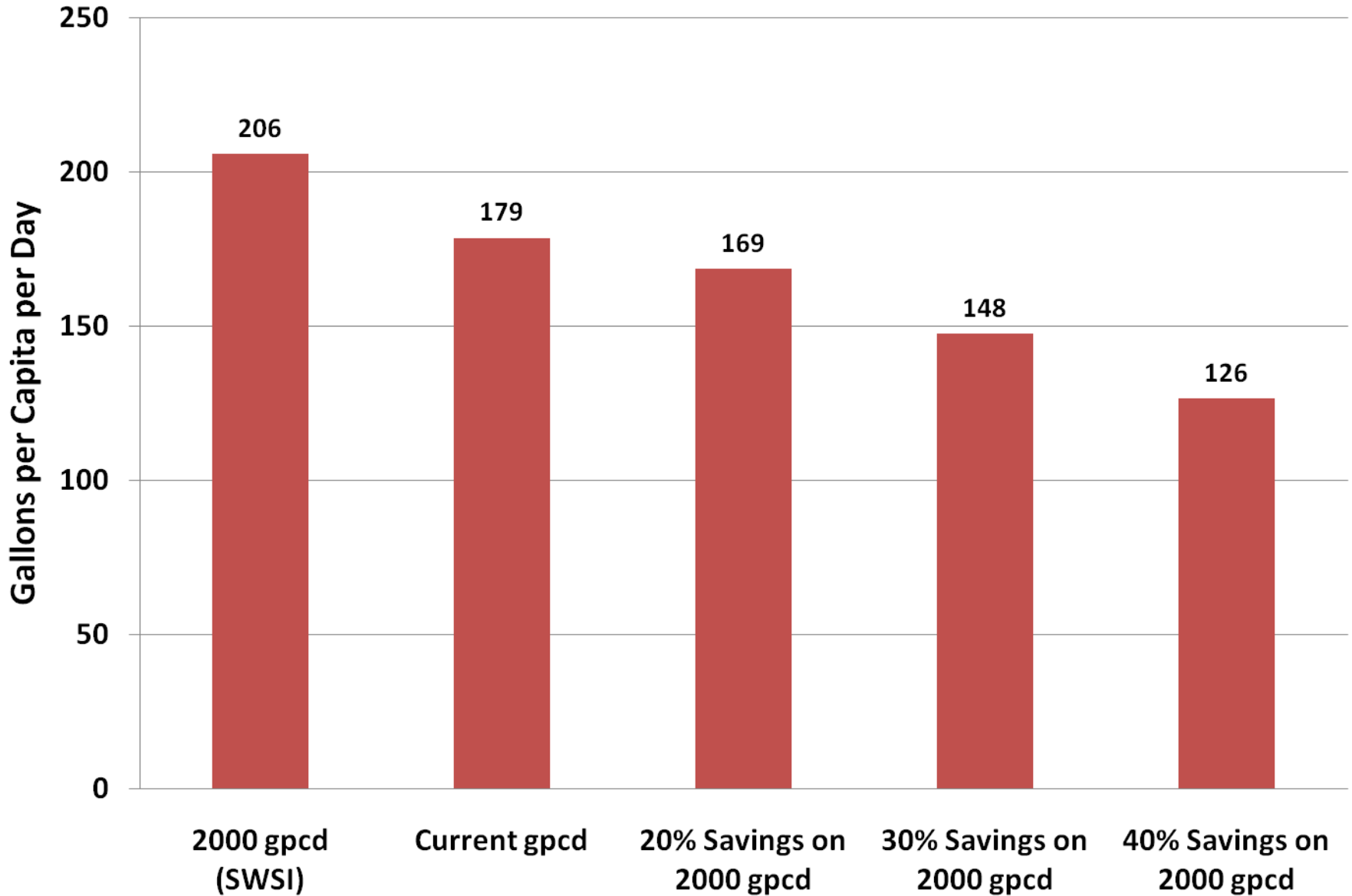
- Water Conservation
- Agricultural Transfers
 - Conventional and alternative transfers
- Development of New Supplies
 - New Storage
 - Transbasin

Water Conservation

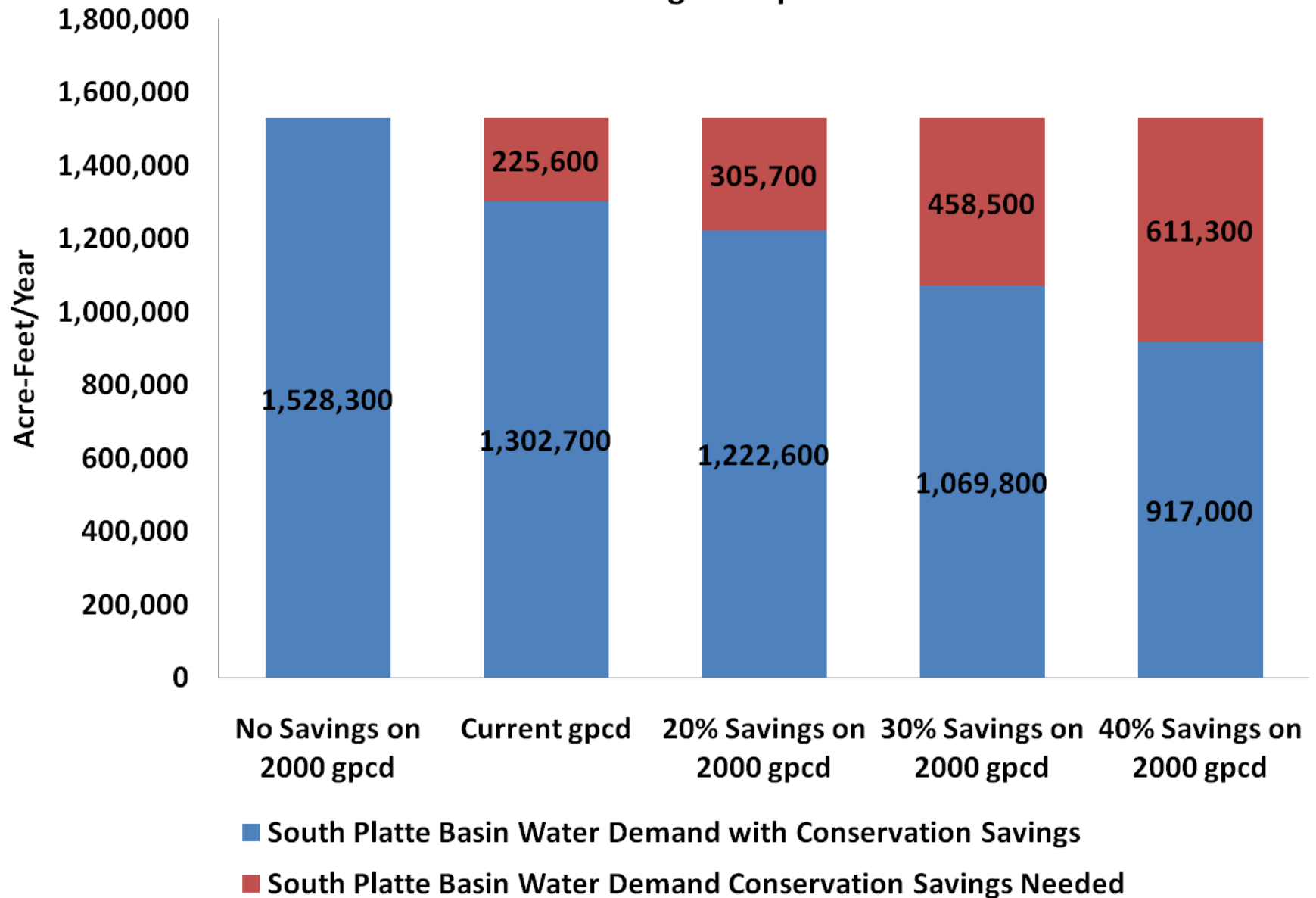
M&I Water Usage Rates by Basin



South Platte Basin Gallons per Capita per Day



South Platte Basin 2050 M&I Water Demand Forecast Potential Conservation Savings Compared to Current GPCD

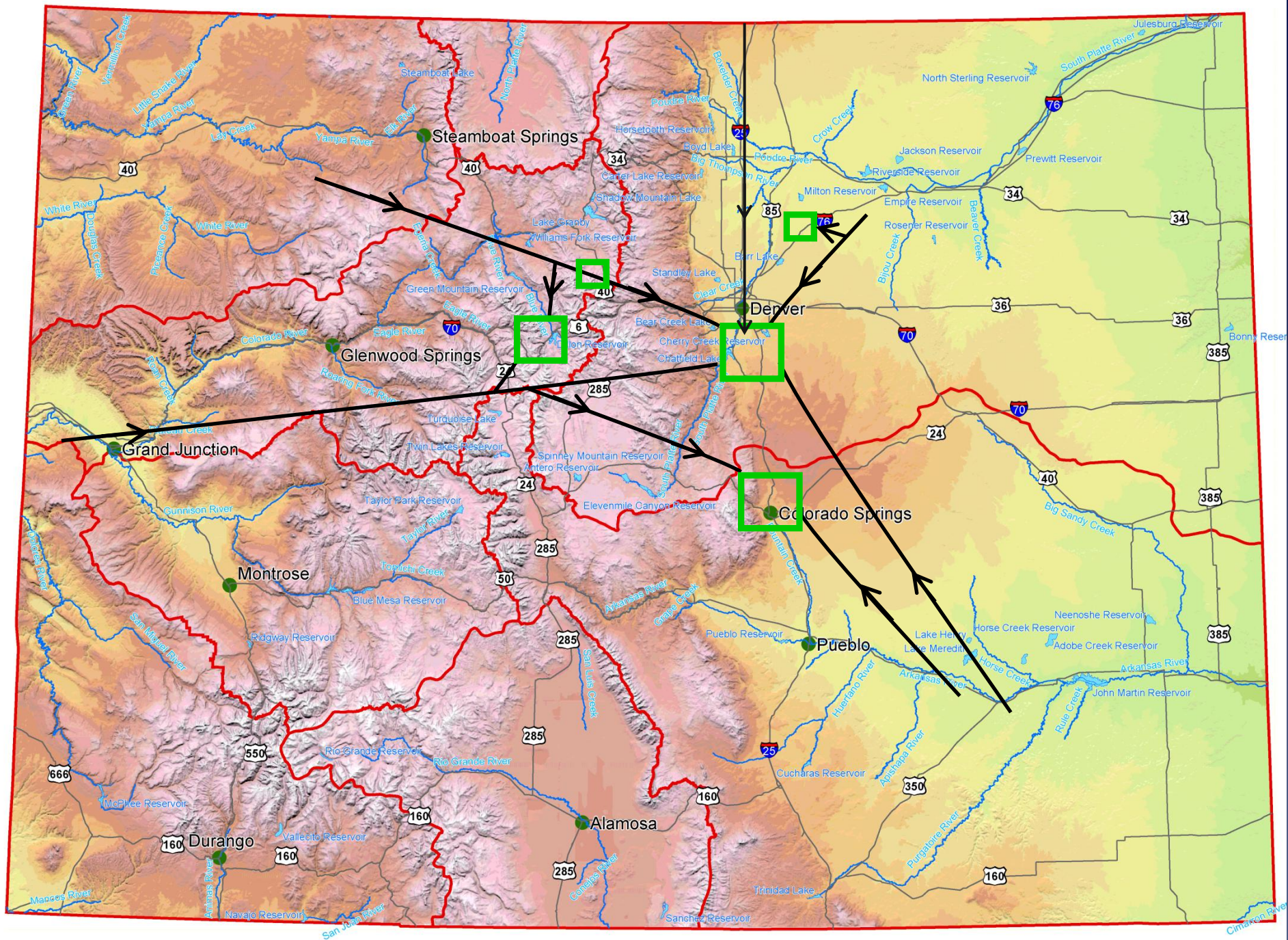


Ag Transfer Strategy

- Lower South Platte Transfer
- Lower Arkansas Transfer

Development of New Water Supplies

- Green Mountain Concept <100,000 acre-ft
- Yampa Concept >100,000 acre-ft
- Flaming Gorge Concept >100,000 acre-ft



Risk Management Strategies

- West Slope Water Bank
- Compact Delivery via Blue Mesa
- Conjunctive Use of Denver Basin Aquifer
- Timing/Phased Development

Proposed Technical Work – 2009

MEETING 1

- Present status of needs assessment (SWSI I, “Other appropriate sources,” task orders, WSRA studies)
- Present demands to 2050
- Discuss projects and methods for meeting in-basin needs (SWSI IPPs, SWSI base options, other projects identified since SWSI)
- Review nonconsumptive basin maps final product (attributes and priorities)
- Present approach to evaluating water supply strategies

Proposed Technical Work – 2009

MEETING 2

- Refine demands to 2050
- Screen projects and methods for meeting identified needs
- Discuss next steps on nonconsumptive priority areas (quantification and/or implementation strategies)
- Discuss progress on evaluation of water supply strategies

Proposed Technical Work – 2009

MEETING 3

- Discuss progress on nonconsumptive quantification and implementation strategies
- Discuss progress on projects and methods for meeting identified needs and evaluation of water supply strategies
- Discuss integrating needs assessments with Colorado River supply availability preliminary results

Proposed Technical Work – 2009

MEETING 4

- Present draft results of nonconsumptive quantification and implementation strategies
- Present draft results of projects and methods for meeting identified needs
- Present draft results of evaluation of water supply strategies