Rio Grande Roundtable

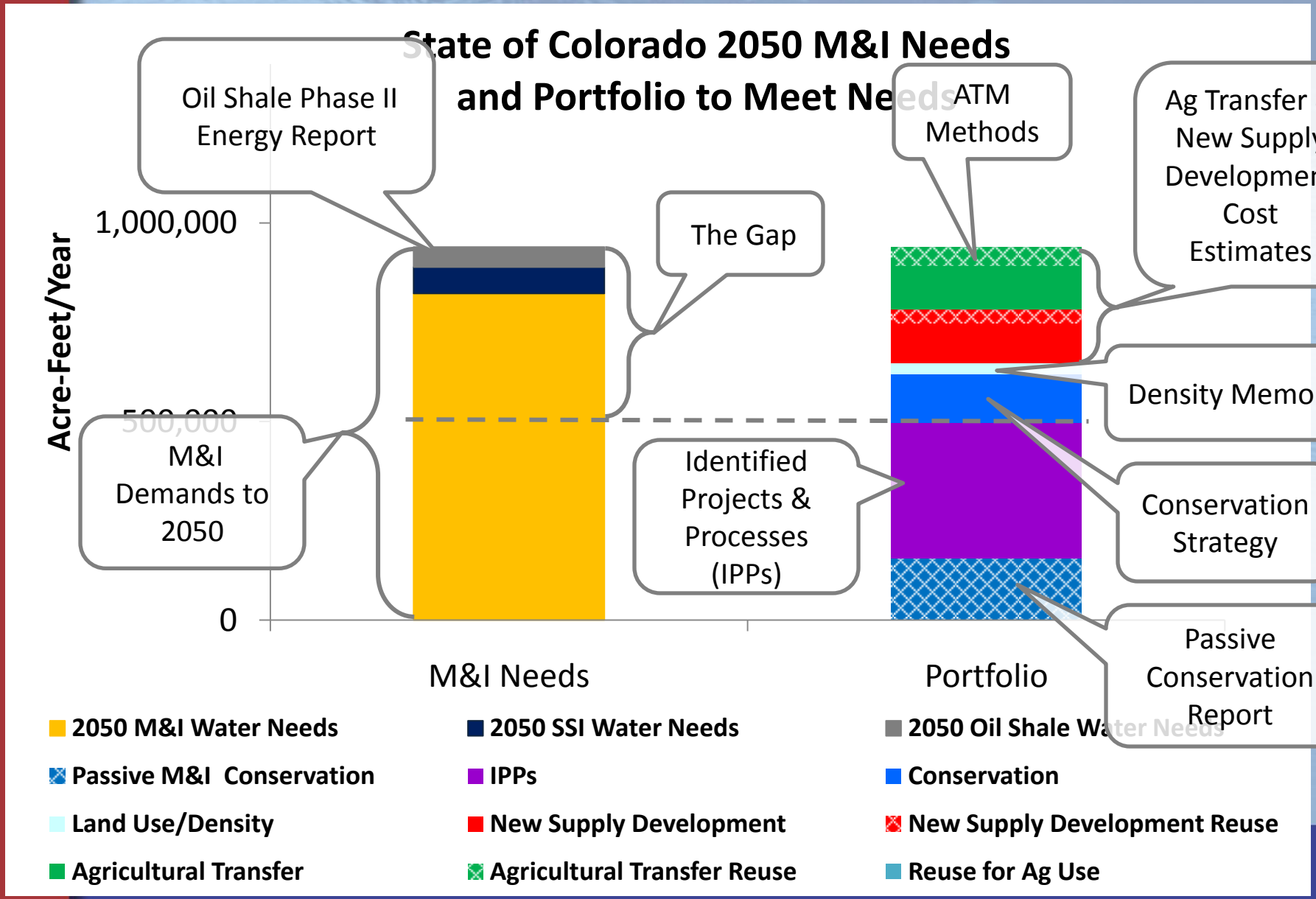
Colorado's Water Supply Future: Updates and Schedule

August 10, 2010

Overview and Purpose

- Provide a brief overview of major technical reports and their conclusions
- Discuss report schedule:
  - Timeframe for finalizing remaining components
  - Statewide Water Needs Assessment scheduled for: January 2011
  - Basin-specific Reports 1st Quarter 2011
- Solicit feedback from roundtable

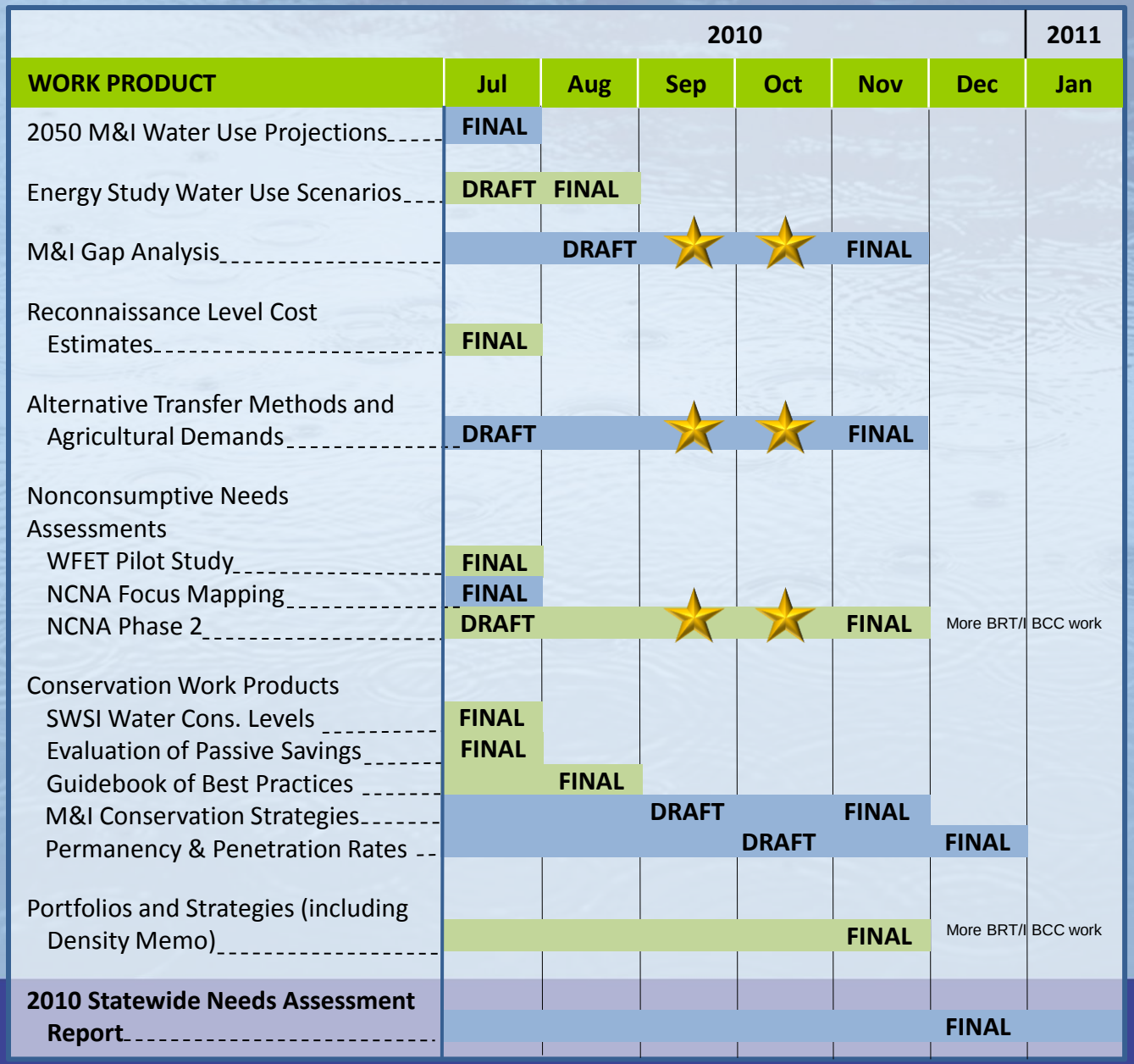
Reports in M&I Context

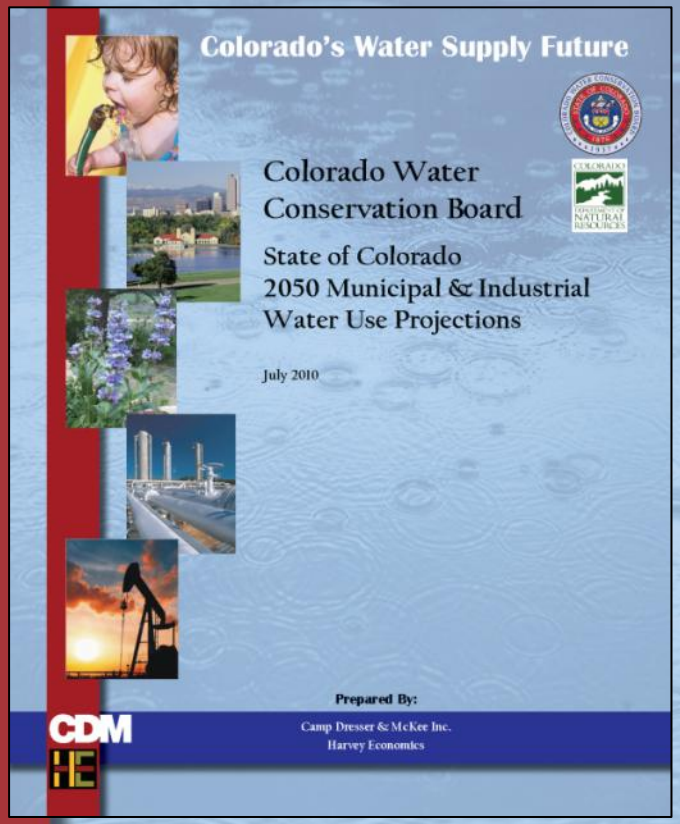


List of Reports

- **2050 M&I Water Use Projections**– final complete
- **Energy Study Phase 2 Revised Water Use Scenarios Memo** –
  draft roundtable product complete; finalize in August
- **M&I Gap Analysis** – draft scheduled for August
- **Reconnaissance Level cost Estimates for Ag & New Supply Strategy Concepts**– final complete
- **Ag Demands/ Alternative Transfer Methods** –
  draft complete; finalize in 2010 Statewide Water Needs Assessment (SNA)
- **Nonconsumptive**:
  - **Watershed Flow Evaluation Tool Pilot Study**– final complete
  - **NCNA Focus Mapping (Phase 1)**– final complete
  - **NCNA Phase 2** – draft complete; finalize in 2010 State Needs Assessment
- **Conservation Products:**
  - **SWSI Conservation Levels Analysis** – final complete
  - **Evaluation of Passive Savings**– final complete
  - **Guidebook of Best Management Practices for Municipal Water Conservation in Colorado**–
    final scheduled for August
  - **M&I Conservation Strategies** – draft scheduled for September; finalize in 2010 SNA
  - **Feasibility Study to Assess the Permanency & Penetration Rates of M&I Water Conservation** –
    draft scheduled for October; finalize in Dec. 2010
- **Portfolios and Strategies** – draft scheduled for September
  - **Density Memo** – draft completed and will be appendix for portfolios memo
- **Final 2010 State Needs Assessment Report** – due January 2011 timeframe

2010 Schedule





State Of Colorado 2050 Municipal & Industrial water use Projections

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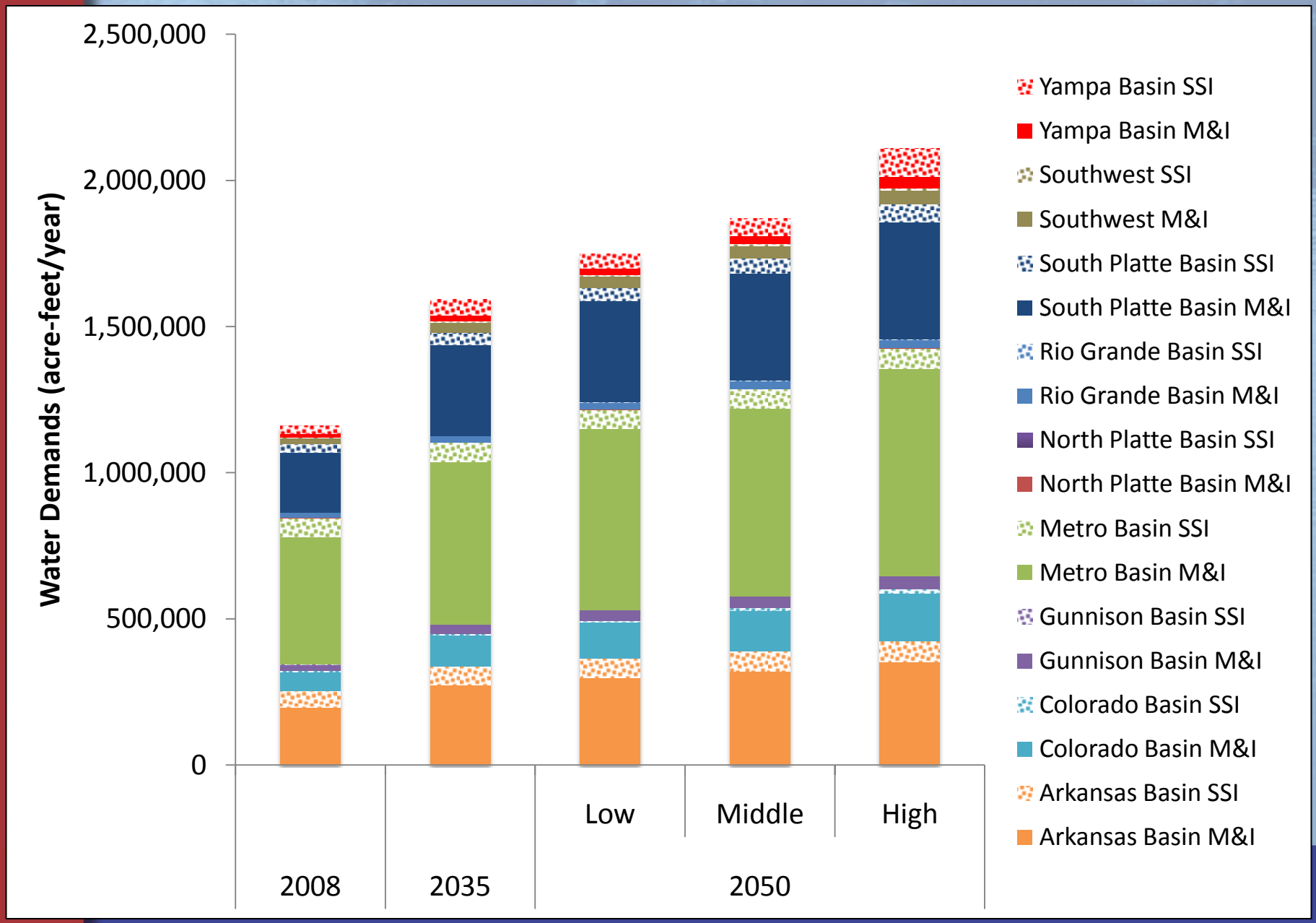
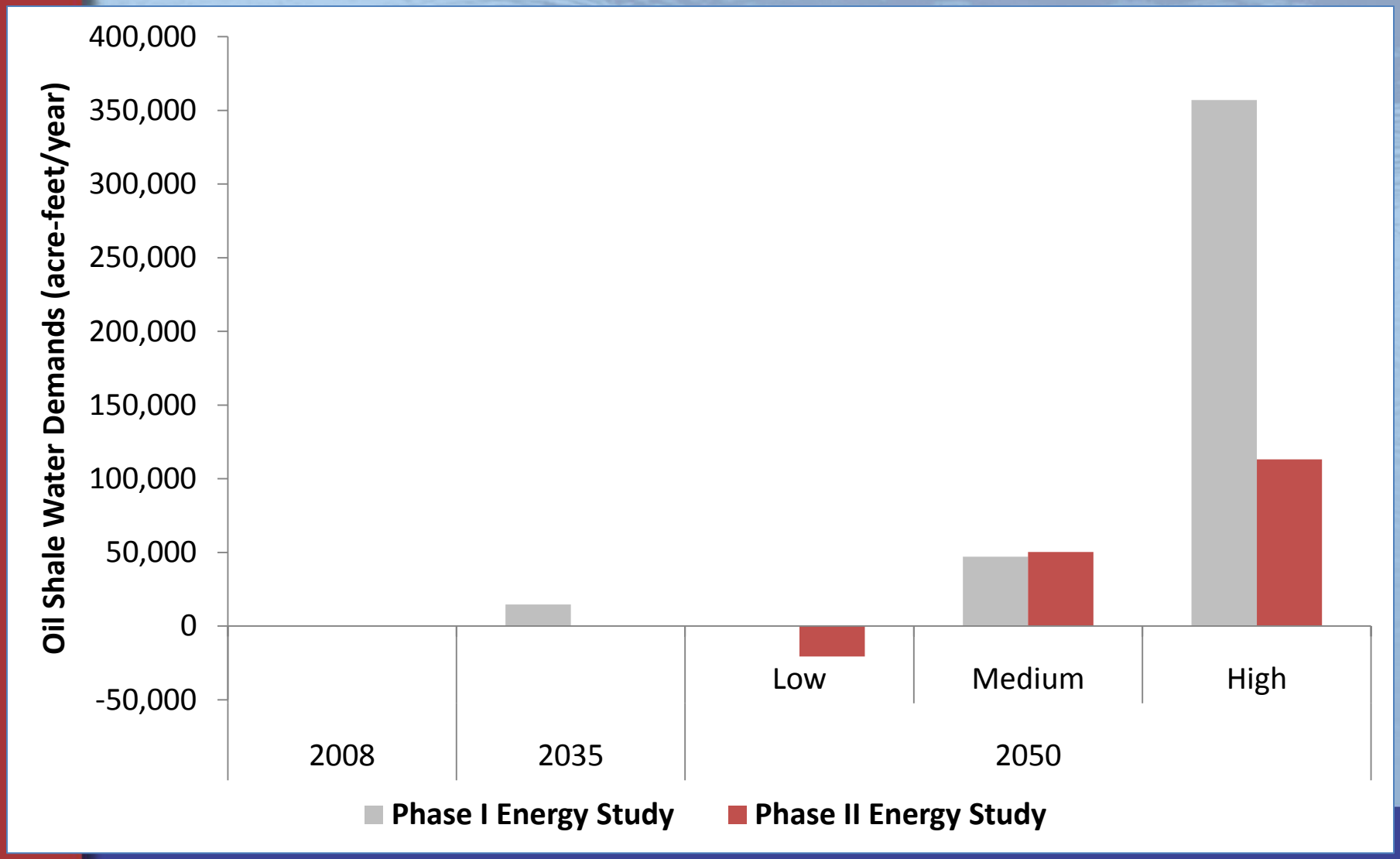
Statewide 2050 M&I and SSI Demand

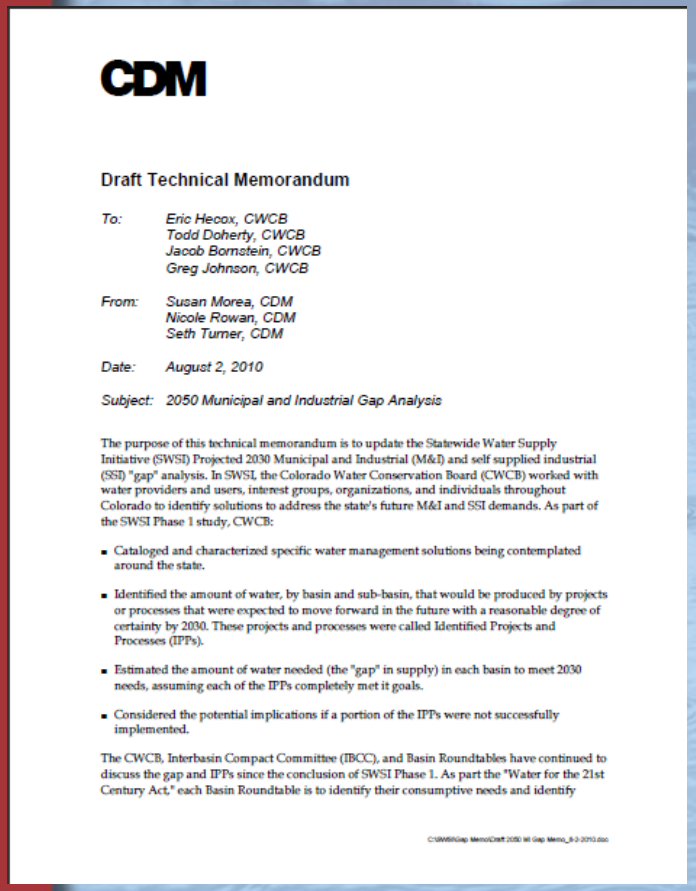


Rio Grande M&I/SSI Gap Analysis – New Demands

- 2008-2050 M&I Demand Increase
  - Low = 6,600 AF
  - Medium = 8,400 AF
  - High = 10,800 AF
- 2008-2050 SSI Demand Increase (Alamosa County only)
  - Low = 1,200 AF
  - Medium = 1,500 AF
  - High = 2,000 AF

Energy Study Phase II
Oil Shale Water Demands





CDM

Draft Technical Memorandum

To: Eric Hecox, CWCB
Todd Doherty, CWCB
Jacob Bornstein, CWCB
Greg Johnson, CWCB

From: Susan Morea, CDM
Nicole Rowan, CDM
Seth Turner, CDM

Date: August 2, 2010

Subject: 2050 Municipal and Industrial Gap Analysis

The purpose of this technical memorandum is to update the Statewide Water Supply Initiative (SWSI) Projected 2030 Municipal and Industrial (M&I) and self supplied industrial (SSI) "gap" analysis. In SWSI, the Colorado Water Conservation Board (CWCB) worked with water providers and users, interest groups, organizations, and individuals throughout Colorado to identify solutions to address the state's future M&I and SSI demands. As part of the SWSI Phase 1 study, CWCB:

- Cataloged and characterized specific water management solutions being contemplated around the state.
- Identified the amount of water, by basin and sub-basin, that would be produced by projects or processes that were expected to move forward in the future with a reasonable degree of certainty by 2030. These projects and processes were called Identified Projects and Processes (IPPs).
- Estimated the amount of water needed (the "gap" in supply) in each basin to meet 2030 needs, assuming each of the IPPs completely met it goals.
- Considered the potential implications if a portion of the IPPs were not successfully implemented.

The CWCB, Interbasin Compact Committee (IBCC), and Basin Roundtables have continued to discuss the gap and IPPs since the conclusion of SWSI Phase 1. As part the "Water for the 21st Century Act," each Basin Roundtable is to identify their consumptive needs and identify

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M&I and SSI Gap Analysis

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Components of M&I/SSI Gap Analysis

- 2050 M&I/SSI Demands
  - Assume high passive conservation
  - Calculate demand increase above current conditions (2008)
- Estimate yield of IPPs
  - Water provider interviews
  - SWSI Phase 1
  - NEPA project documentation
  - Other sources
- M&I/SSI Gap = Demand Increase - IPPs

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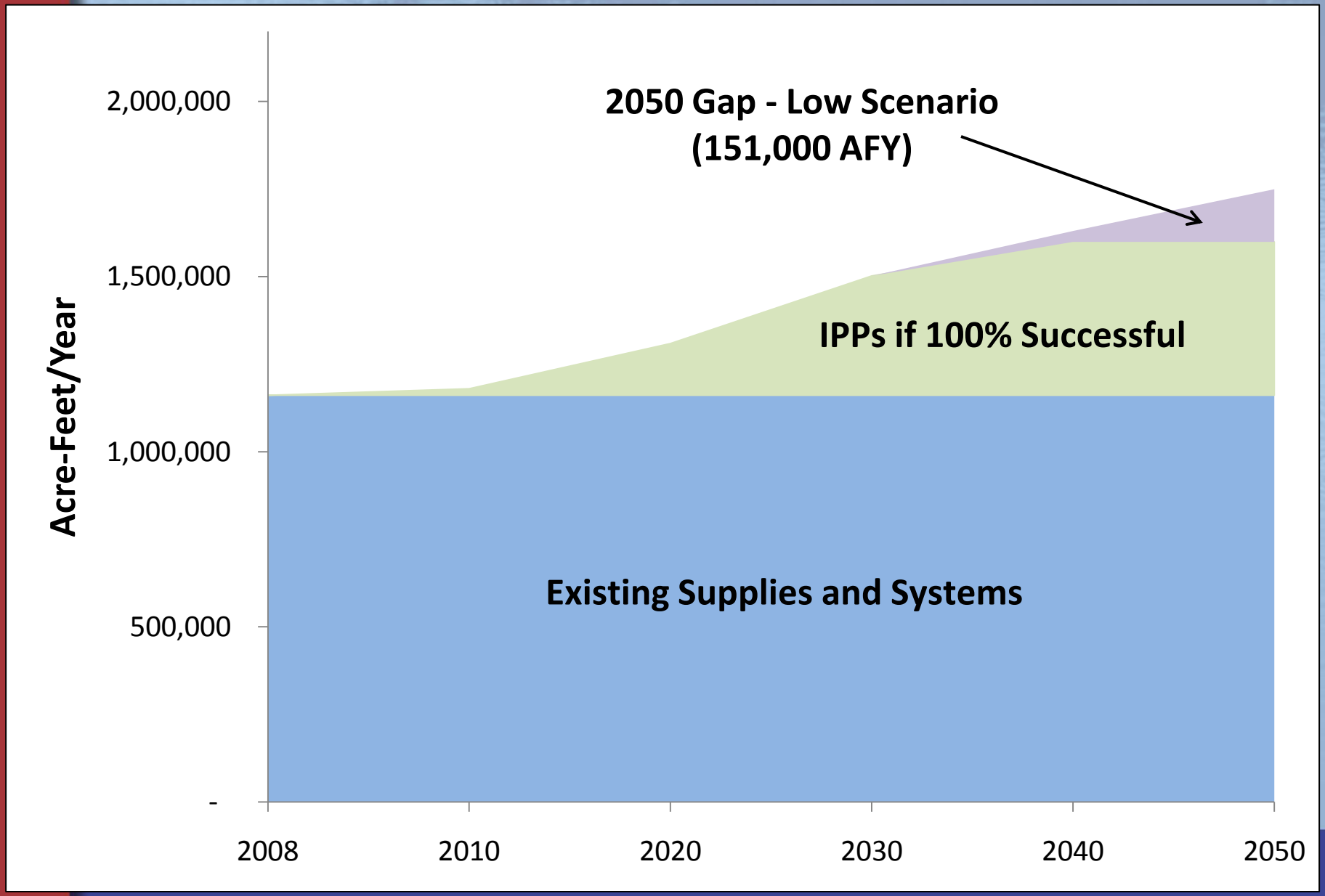
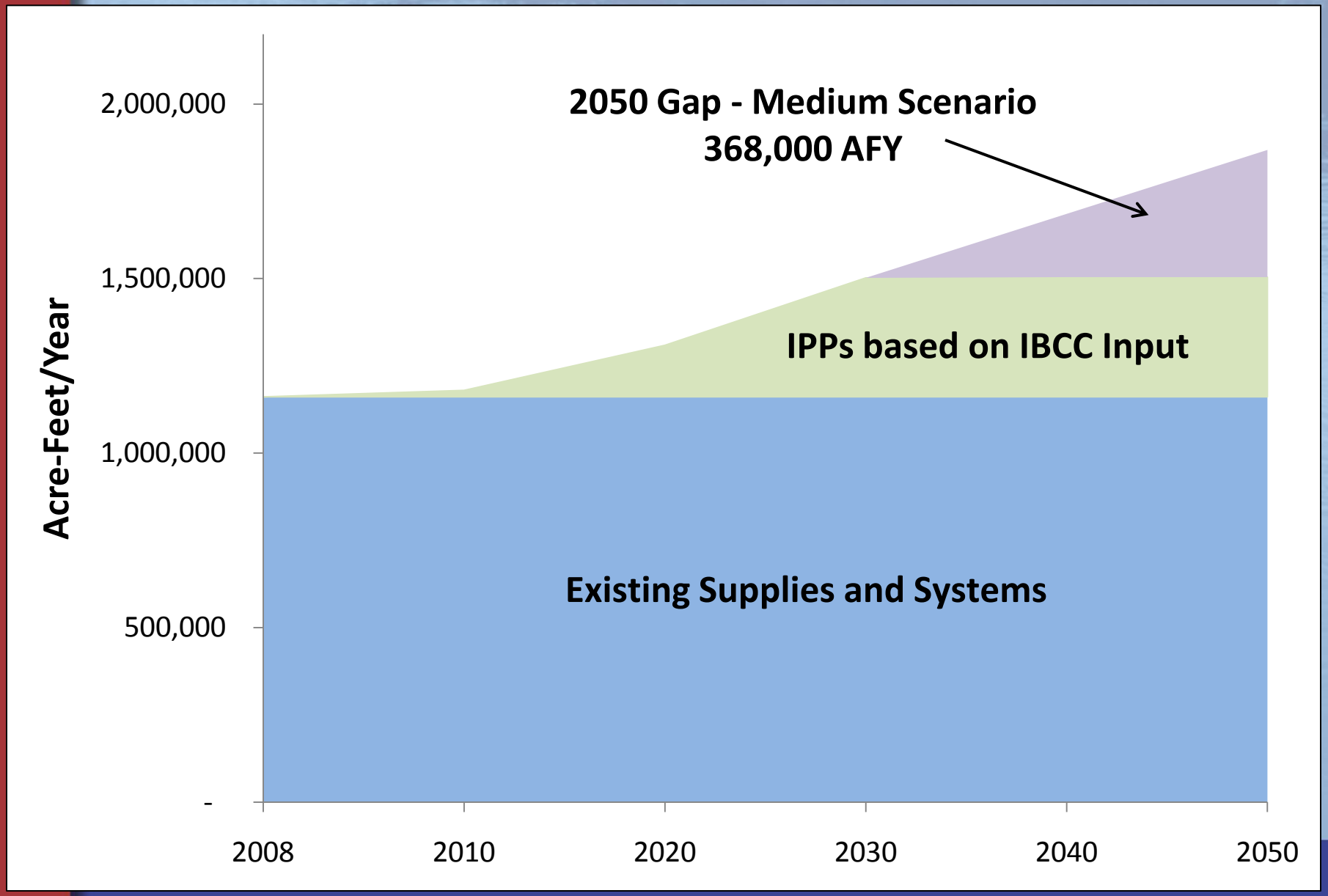
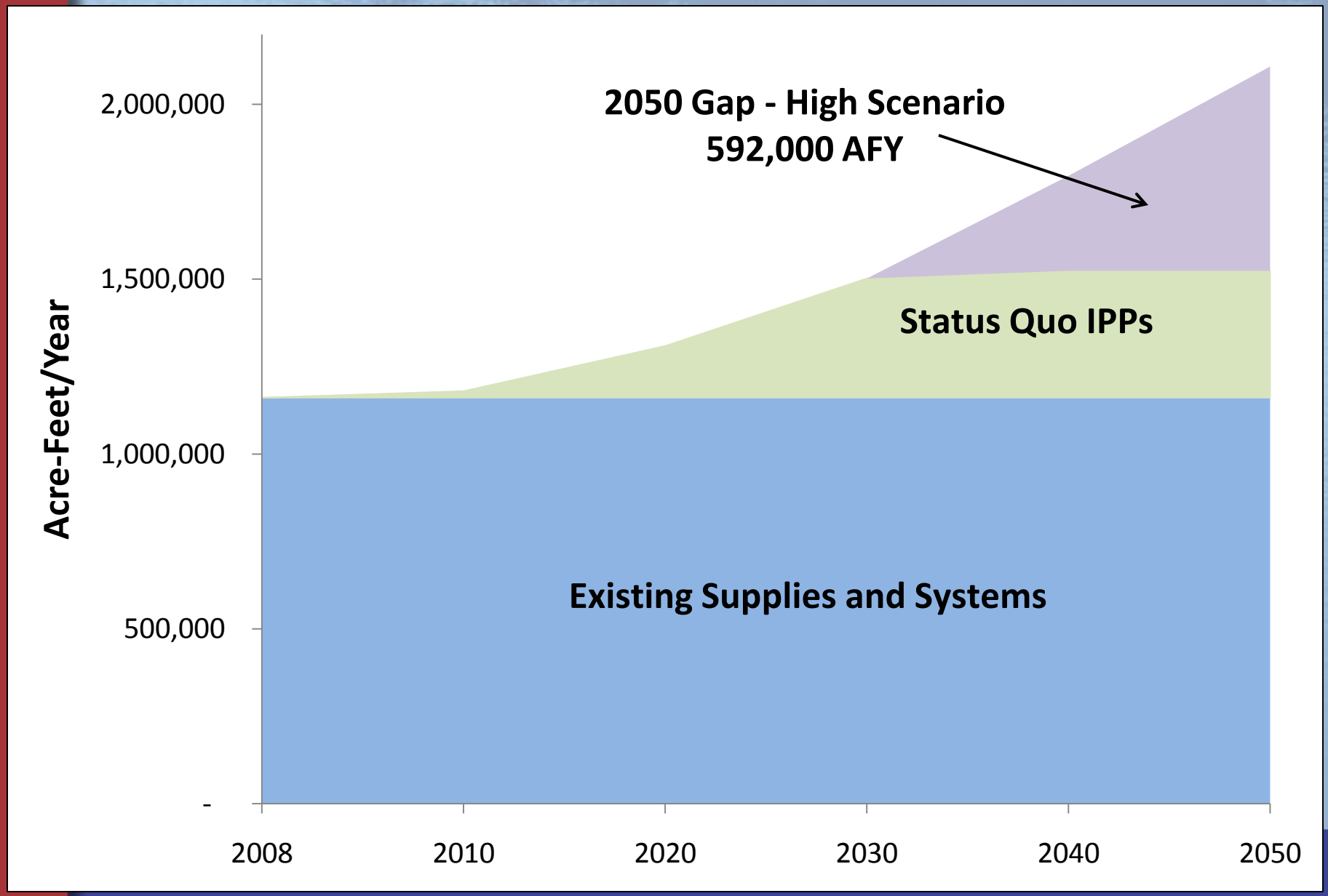
Statewide M&I/SSI Gap – Low Scenario



Statewide M&I/SSI Gap – Medium Scenario



Statewide M&I/SSI Gap – High Scenario



Rio Grande M&I/SSI Gap Analysis – Identified Projects and Processes

- No specific IPPs identified in water provider interviews
  - Cities of Alamosa and Monte Vista appear to have enough supply for 2050 M&I needs
- SWSI Phase I
  - Existing water rights, groundwater, and augmentation plans
  - Conejos and Mineral Counties have supplies beyond 2030

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Rio Grande M&I/SSI Gap Analysis – Identified Projects and Processes Summary

Region or County	Agricultural Transfer (AFY)	Reuse (AFY)	Growth into Existing Supplies (AFY)	Regional In-Basin Project (AFY)	New Transbasin Project (AFY)	Firming In-Basin Water Rights (AFY)	Firming Transbasin Rights (AFY)	Notes on what the IPPs are
Alamosa County	0	0	1,000 – 2,000	0	0	1,000 – 2,000	0	• Existing water rights • Augmentation plans • Groundwater
Conejos County	0	0	1,000	0	0	1,000	0	• Existing water rights • Augmentation plans • Groundwater
Costilla County	0	0	0	0	0	0	0	• Existing water rights • Augmentation plans • Groundwater
Mineral County	0	0	50 – 100	0	0	50 – 100	0	• Existing water rights • Augmentation plans • Groundwater
Rio Grande County	0	0	500	0	0	500	0	• Existing water rights • Augmentation plans • Groundwater
Saguache County	0	0	400	0	0	400	0	• Existing water rights • Augmentation plans • Groundwater
Total	**0**	**0**	**2,950 – 4,000**	**0**	**0**	**2,950 – 4,000**	**0**	

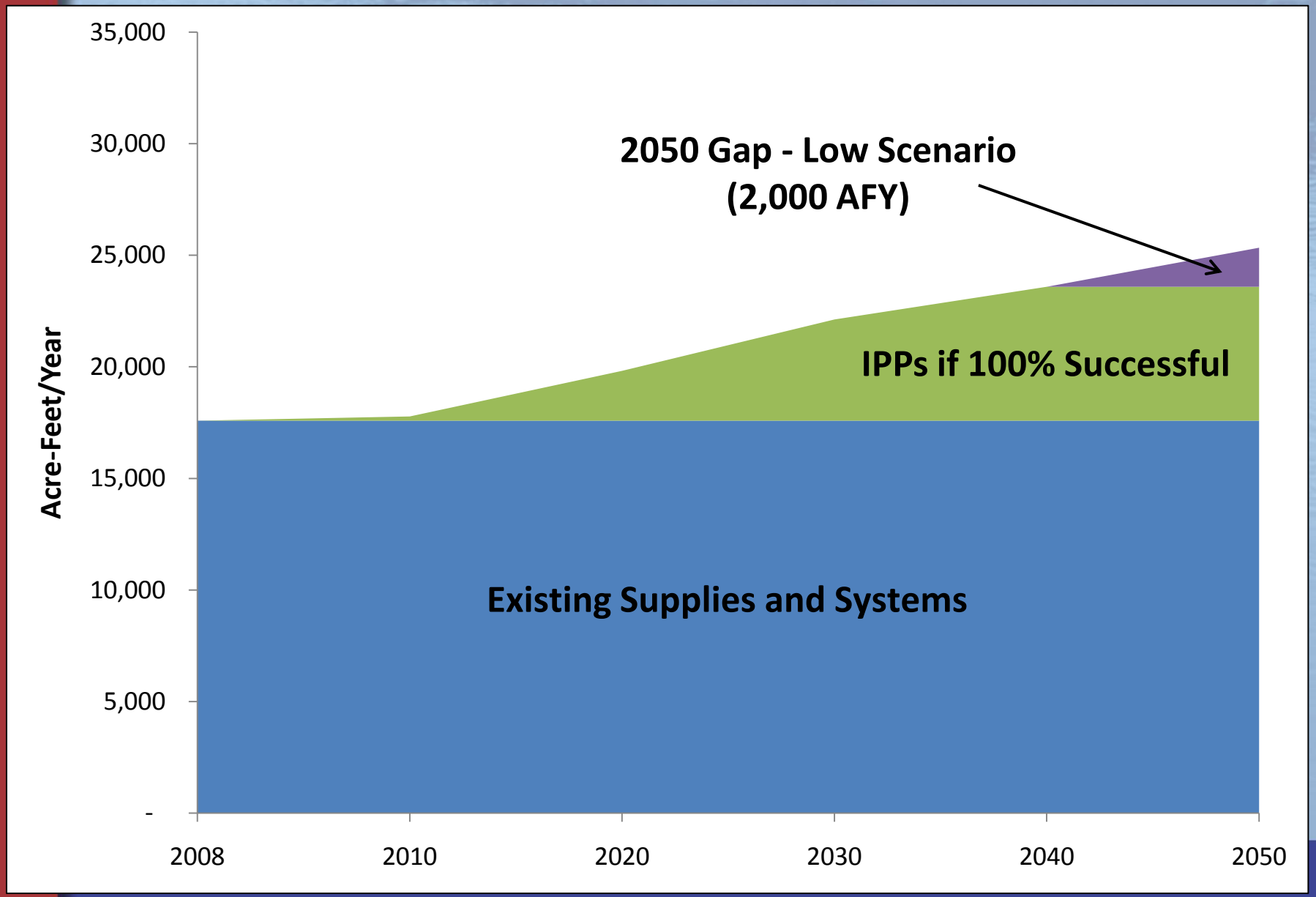
Rio Grande Basin M&I/SSI Gap Analysis - Results

Region or County	Increase in M&I and SSI Demand (AFY)	Estimated Yield of Identified Projects and Processes (AFY)	Estimated Remaining M&I/SSI Gap after Identified Projects and Processes (AFY)
Alamosa County	4,000 – 7,000	3,000 – 5,000	1,000 – 2,000
Conejos County	1,000 – 2,000	1,000 – 2,000	0
Costilla County	100 – 200	0	100 – 200
Mineral County	90 – 300	90 – 300	0
Rio Grande County	1,000 – 2,000	1,000	300 – 1,000
Saguache County	1,000	1,000	200 – 500
Total	**8,000 – 13,000**	**6,000 – 9,000**	**2,000 – 4,000**

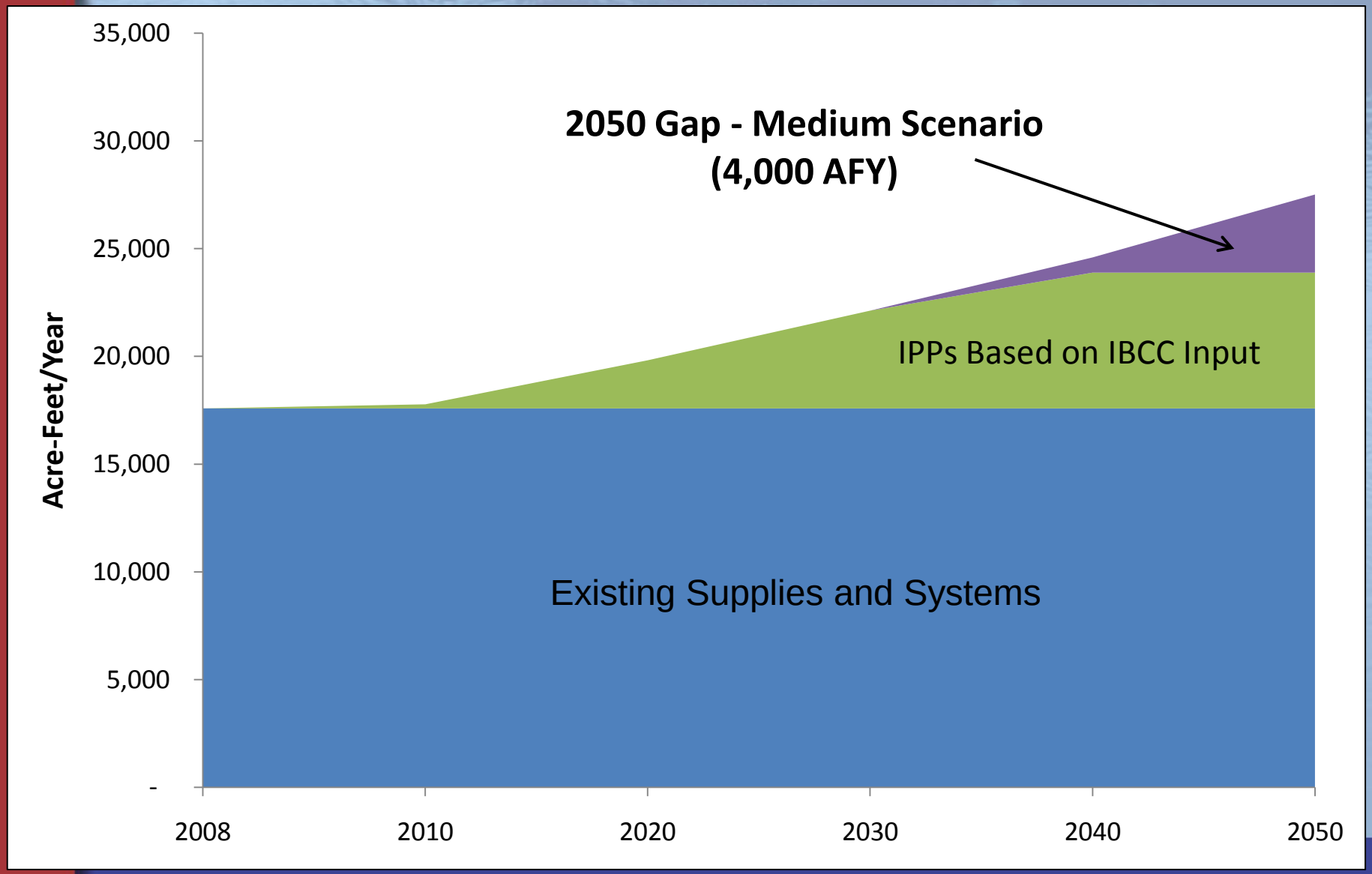
Rio Grande M&I/SSI Gap Analysis – Gap Scenarios

- Low Gap Scenario
  - Assume 100% yield success rate for IPPs
- Medium Gap Scenario (IBCC)
  - Assume 90% yield success rate for IPPs.
- High Gap Scenario (Status Quo)
  - Assume 90% yield success rate for IPPs.

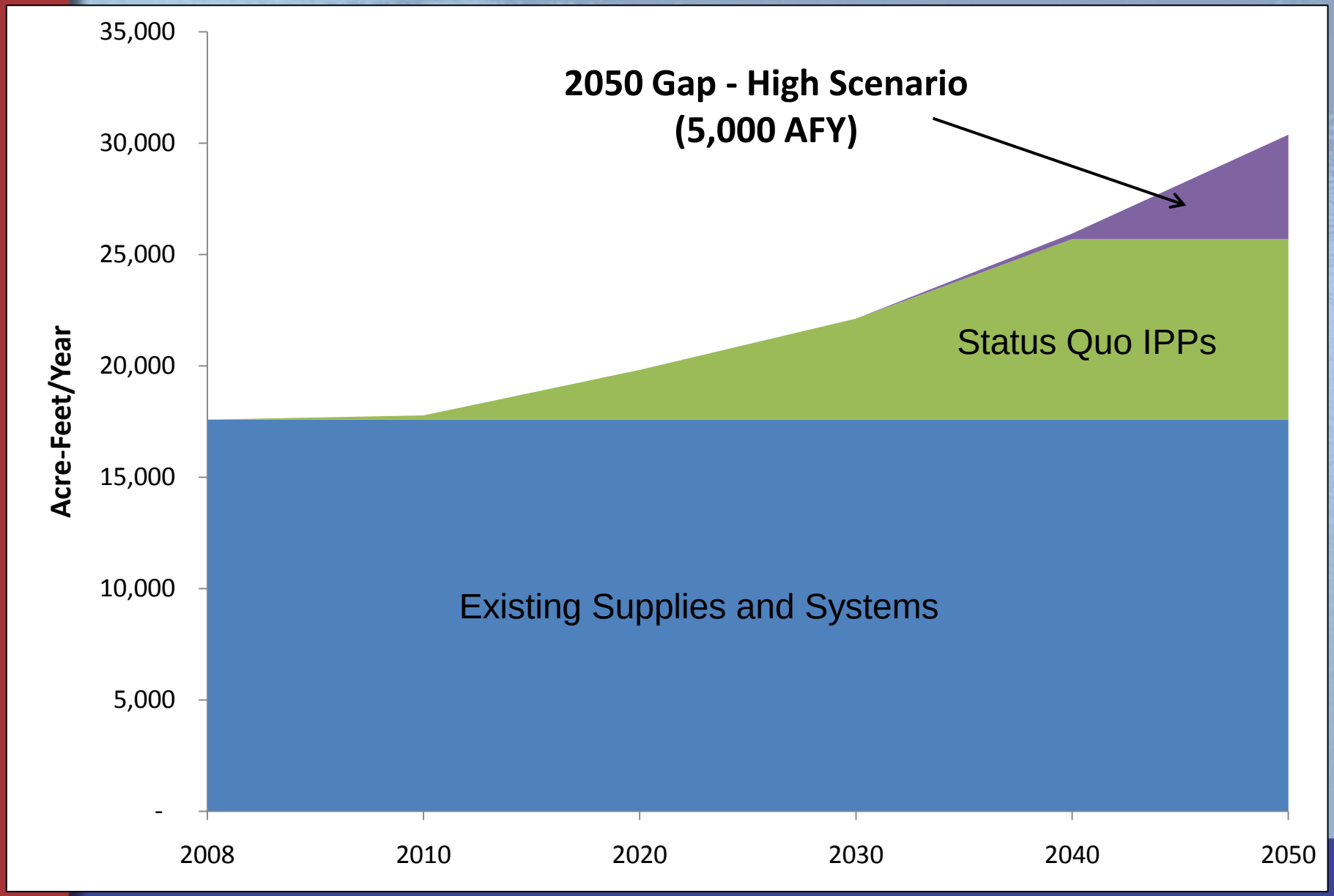
Rio Grande M&I/SSI Gap – Low Scenario

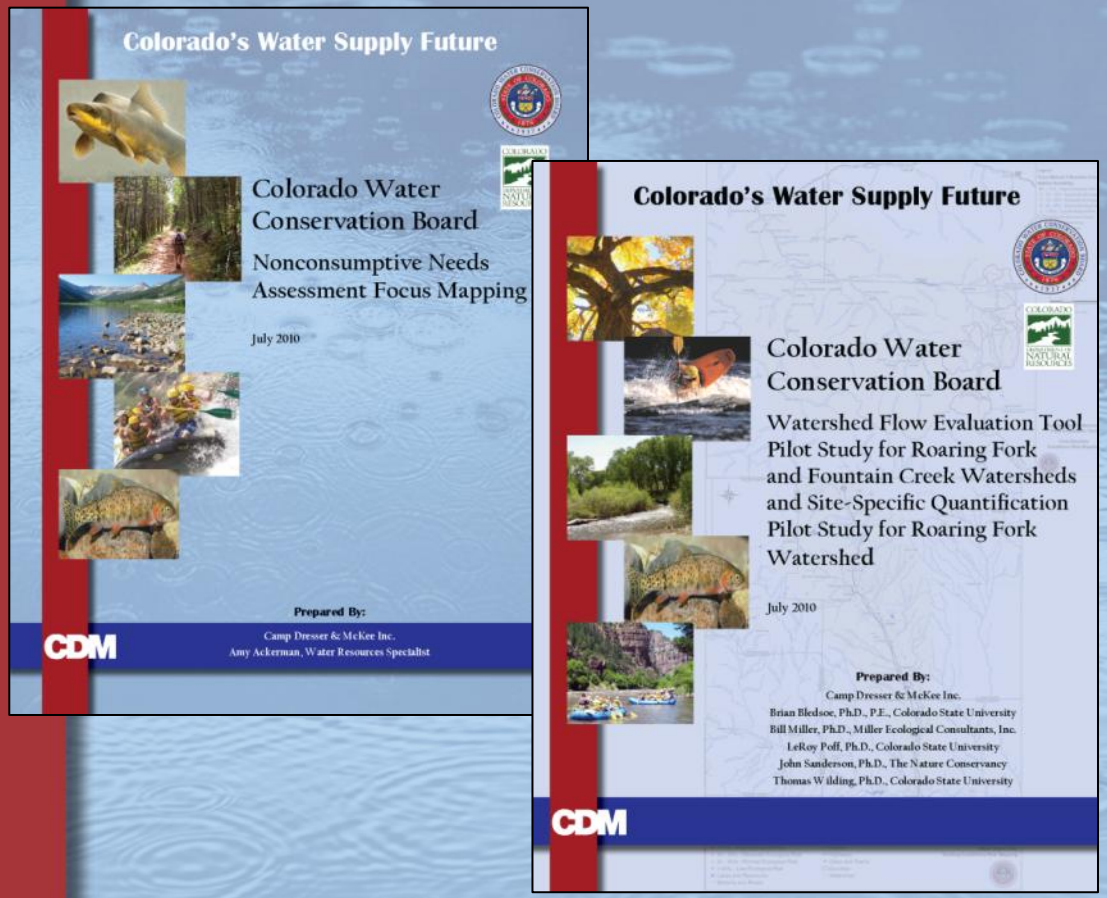


Rio Grande M&I/SSI Gap – Medium Scenario



Rio Grande M&I/SSI Gap – High Scenario





NONCONSUMPTIVE NEEDS ASSESSMENTS PHASE II

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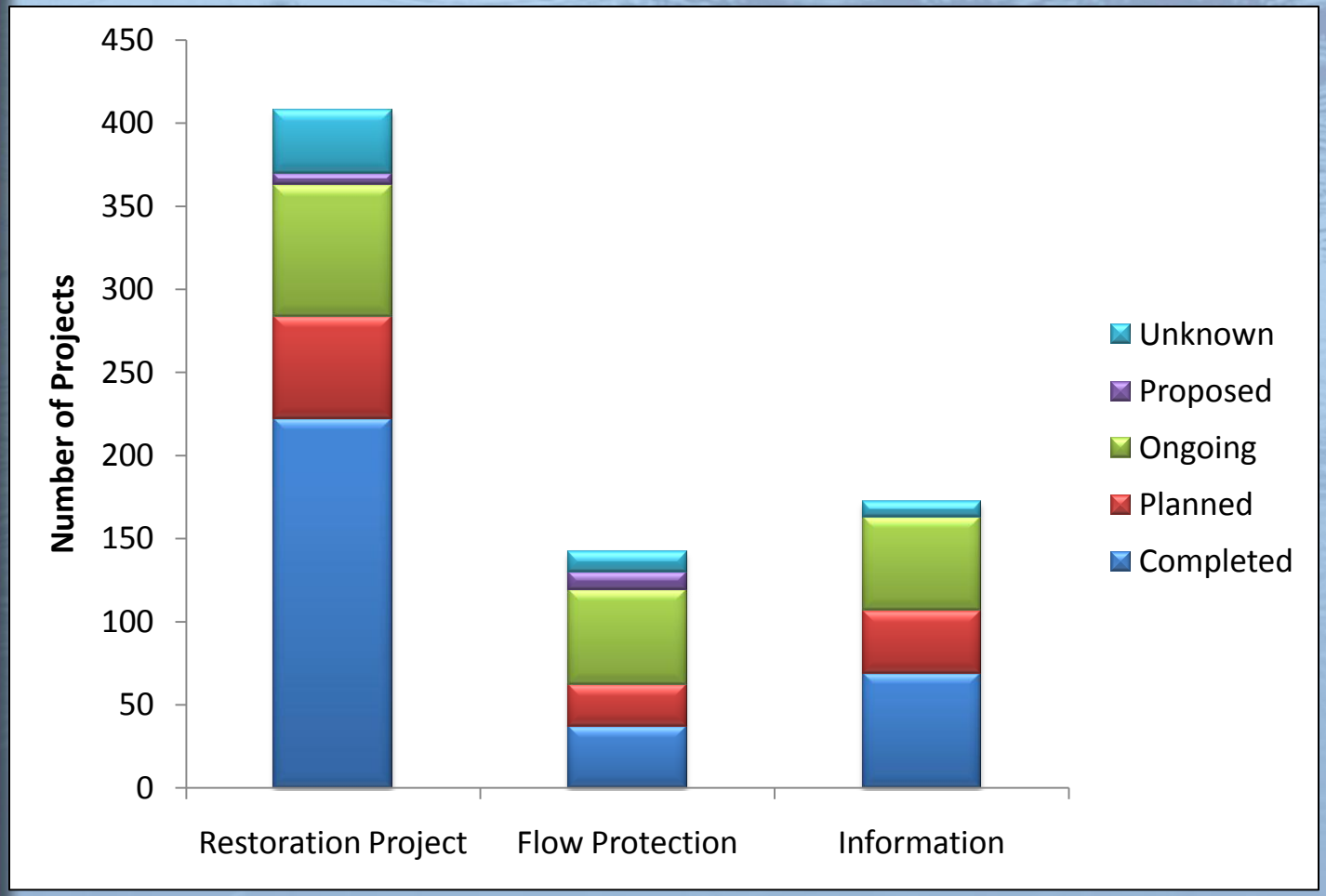
Statewide Summary of Nonconsumptive Projects & Methods Status

Project and Methods Status	# of Projects and Methods
Completed	343
On-going	195
Planned	127
Proposed/Recommended	18
Unknown	17
TOTAL	**700**

Project and Methods Status	# of Projects and Methods
Restoration Project	392
Flow Protection	142
Information	172
Unknown	5
TOTAL	**727**

* Some overlap occurs between project and methods types

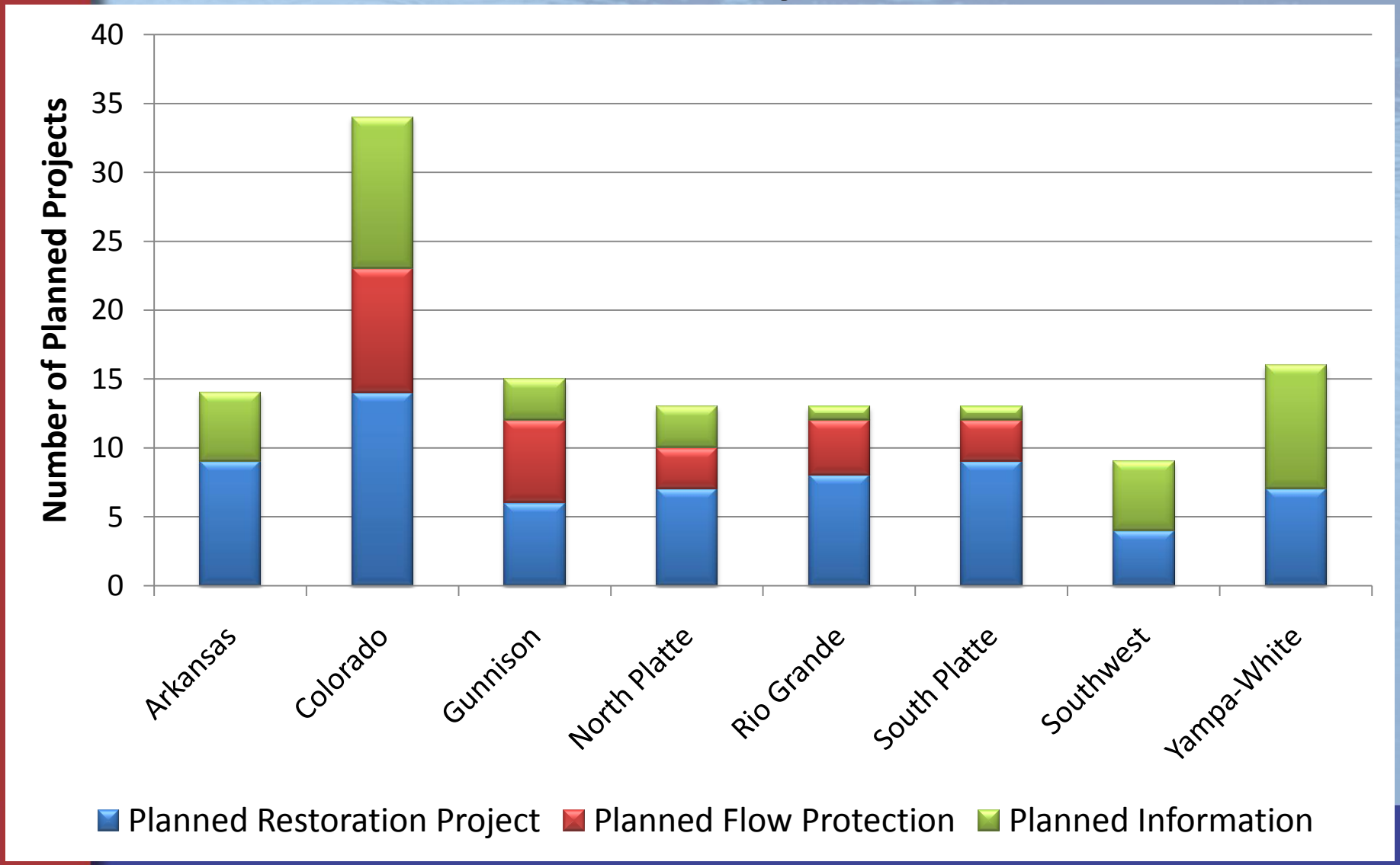
Statewide Summary of Nonconsumptive Projects & Methods Status



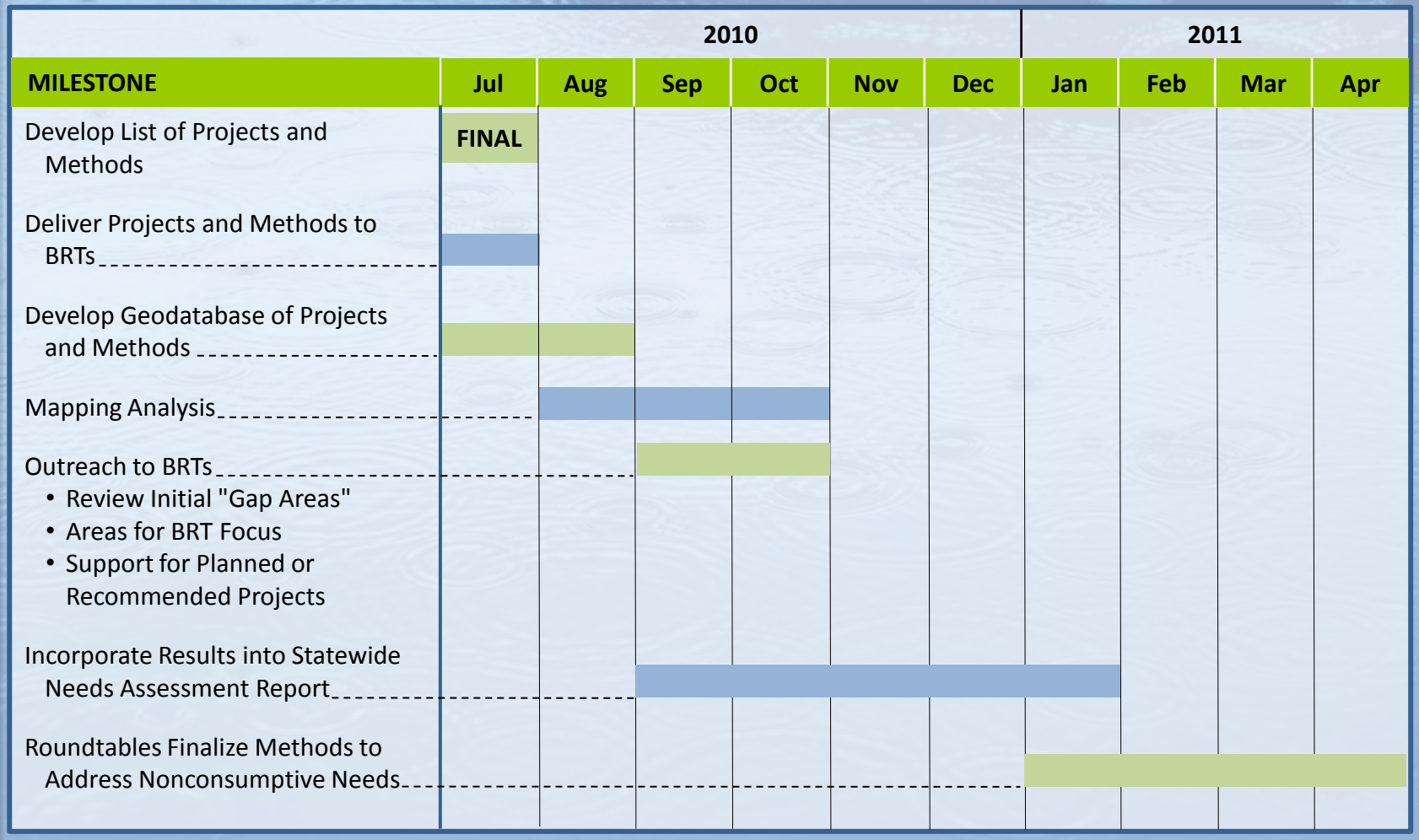
Rio Grande Summary of Nonconsumptive Projects & Methods Status

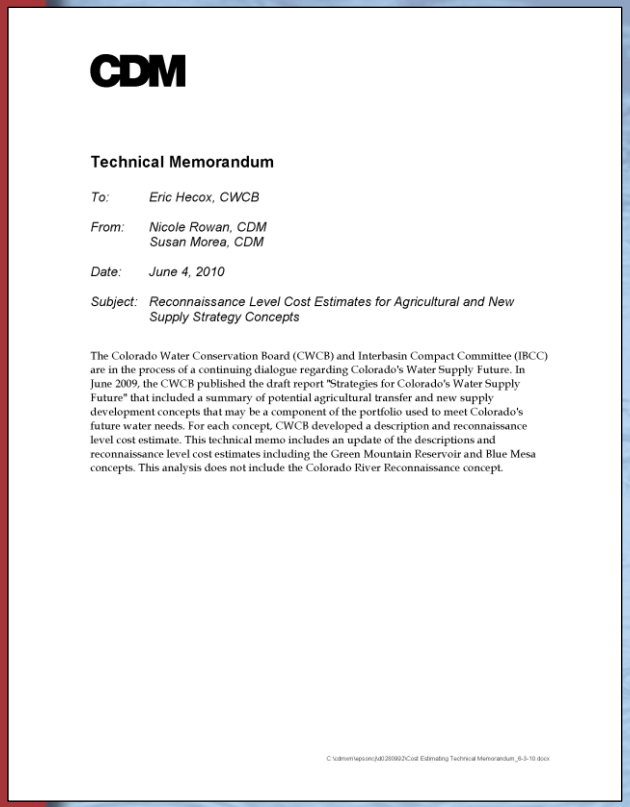
- Total Projects and Methods = 58
  - Completed = 37
  - Ongoing = 5
  - Planned = 13
  - Proposed = 3
- Planned Projects
  - Planned Restoration Project = 8
  - Planned Flow Protection = 3
  - Planned Information = 1

Planned Projects and Methods by Basin



NCNA Phase II Schedule





CDM

Technical Memorandum

To: *Eric Hecox, CWCB*

From: *Nicole Rowan, CDM*
Susan Morea, CDM

Date: *June 4, 2010*

Subject: *Reconnaissance Level Cost Estimates for Agricultural and New Supply Strategy Concepts*

The Colorado Water Conservation Board (CWCB) and Interbasin Compact Committee (IBCC) are in the process of a continuing dialogue regarding Colorado's Water Supply Future. In June 2009, the CWCB published the draft report "Strategies for Colorado's Water Supply Future" that included a summary of potential agricultural transfer and new supply development concepts that may be a component of the portfolio used to meet Colorado's future water needs. For each concept, CWCB developed a description and reconnaissance level cost estimate. This technical memo includes an update of the descriptions and reconnaissance level cost estimates including the Green Mountain Reservoir and Blue Mesa concepts. This analysis does not include the Colorado River Reconnaissance concept.

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AGRICULTURAL TRANSFER AND NEW SUPPLY DEVELOPMENT STRATEGIES

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Addressing the Statewide M&I Gap

Portfolio

Strategies	Projects and Methods
Agricultural Transfer	• Agricultural Transfers (Traditional and Alternative) – South Platte Basin – Arkansas Basin
Colorado River System	• Green Mountain • Yampa • Flaming Gorge • Blue Mesa
Conservation	• Percent Savings Off of 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
Mid Demand/ Mid Supply Working Portfolio Goals	• 60 to 70 Percent Statewide Success Rate Desired on IPPs • 15 to 20 Percent off of 2008 Demand • Agricultural Transfers Between 60,000 to 200,000 out of ag AF • 350,000 AF from New Supply Development for East Slope and West Slope

COLORADO WATER CONSERVATION BOARD STATE OF COLORADO 1876 1937

COLORADO DEPARTMENT OF NATURAL RESOURCES

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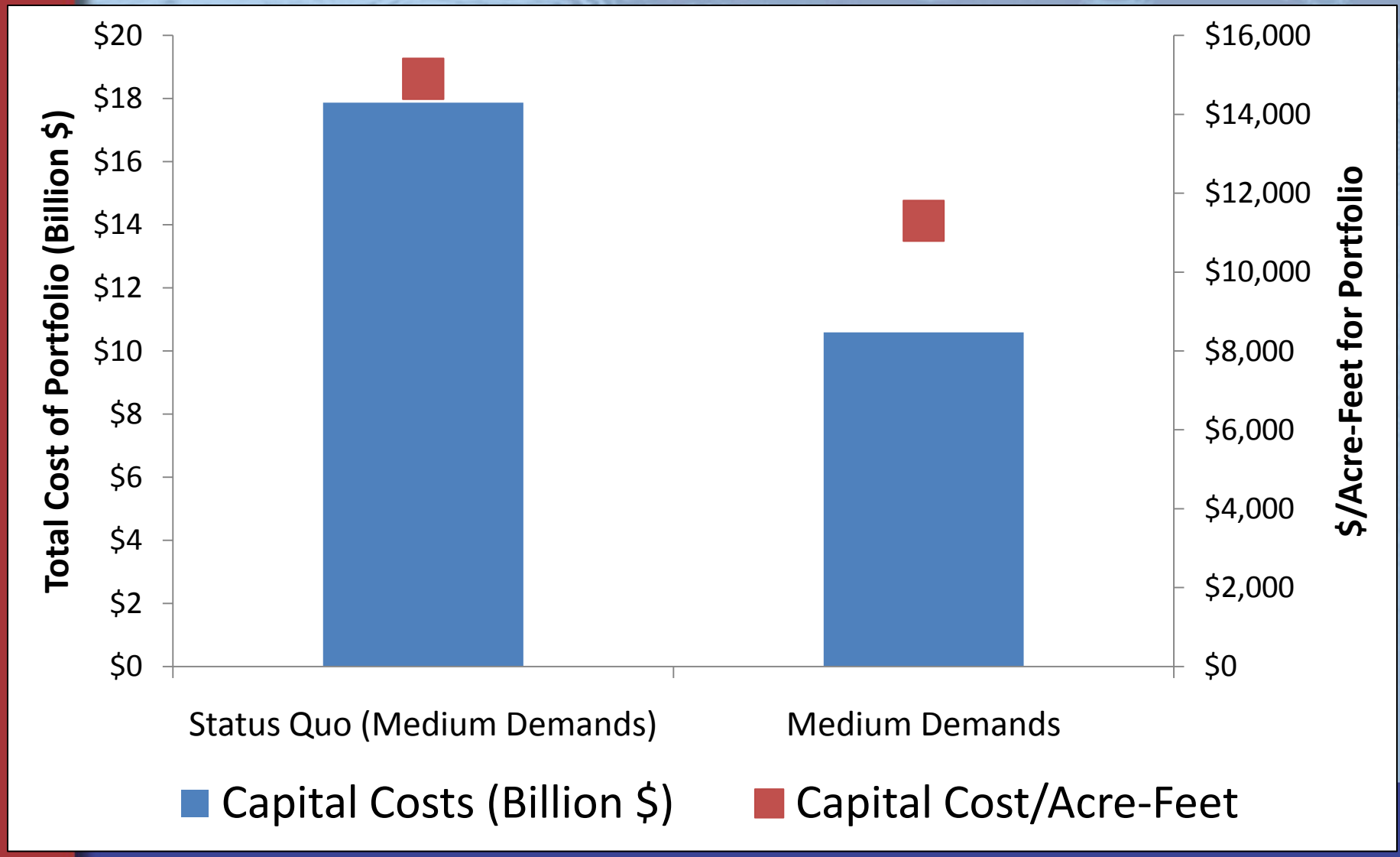
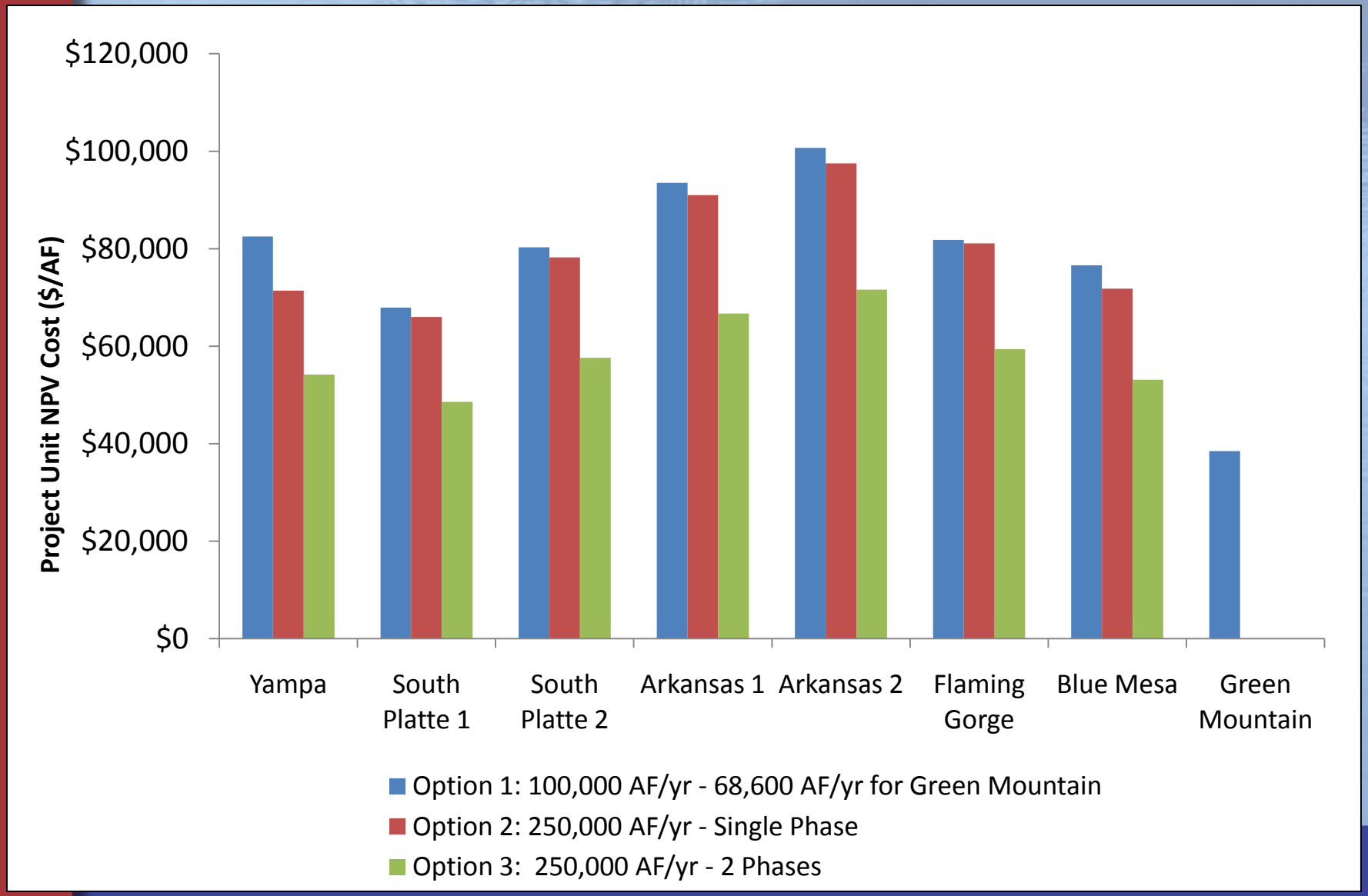
Example Capital Costs for Portfolio to Address Statewide M&I Gap



New Supply Develop and Agricultural Transfer Reconnaissance Level Life-Cycle Costs



CDM

Draft Technical Memorandum

To: *Eric Hecox, CWCB*
Todd Doherty, CWCB

From: *Nicole Rowan, CDM*
Meg Frantz, AECOM
Hal Simpson, CDM
Ed Harvey, Harvey Economics

Date: *July 16, 2010*

Subject: *State of Colorado Current and 2050 Agricultural Demand*

The purpose of this technical memorandum is to update the Statewide Water S
Initiative (SWSI) Projected 2030 Agricultural Demands. In SWSI, the Colorado
Conservation Board (CWCB) estimated agricultural demands for the years 200
SWSI also summarized agricultural shortages at the Water District level. It sho
that the CWCB did not consider the agricultural shortages identified in SWSI a
needs to be met in the future across the state.

This technical memorandum provides information about the methodologies ut
develop a current tally of irrigated acres throughout Colorado and details how
acres were estimated. In addition, the memorandum provides an overview of e
2050 agricultural demands.

Draft Technical Memorandum

To: *Eric Hecox, CWCB*
Todd Doherty, CWCB

From: *Susan Morea, CDM*
Nicole Rowan, CDM
Hal Simpson, CDM
Seth Turner, CDM

Date: *July 16, 2010*

Subject: *Alternative Agricultural Transfer Methods Grant Program*
Summary of Key Issues Evaluation

Introduction

In a recent Colorado Water Conservation Board (CWCB) report, Colorado's population is projected to nearly double from 5.1 million to upward of 9.1 million people in 2050. The majority of these new people will reside on the Front Range. By 2050, the South Platte basin alone is forecasted to grow from 3.5 million to 5.8 to 7.1 million people. By 2050, Colorado will need between 590,000 and 950 million acre-feet of additional water for municipal and industrial (M&I) needs (CWCB 2010). Most of this demand will be met through three main water supply strategies: conservation, agricultural transfers, and new water supply development.

As part of the Statewide Water Supply Initiative, CWCB identified water provider's specific projects and processes that they plan to implement to meet their future water demands. CWCB found that if 100 percent successful, these projects could yield approximately 511,000 acre-feet. Even if completely successful, there still remains a water supply gap. Over the past several years, many of these water projects have been proceeding through the federal permitting process with no guarantee of their success. If these projects and others—that are premised on the development of new water supplies—are not built, future water demand will have to be met mostly through a combination of agricultural transfers and conservation. While conservation will occur, a large portion would likely be through agricultural transfers.

Traditional agricultural water transfers have been and will continue to be an important part of water providers' plans for meeting their future water demand and there are farmers and ranchers willing to sell their water rights. Realizing this, there is a concern that some water

2050 Agricultural demands and Alternative Transfer methods

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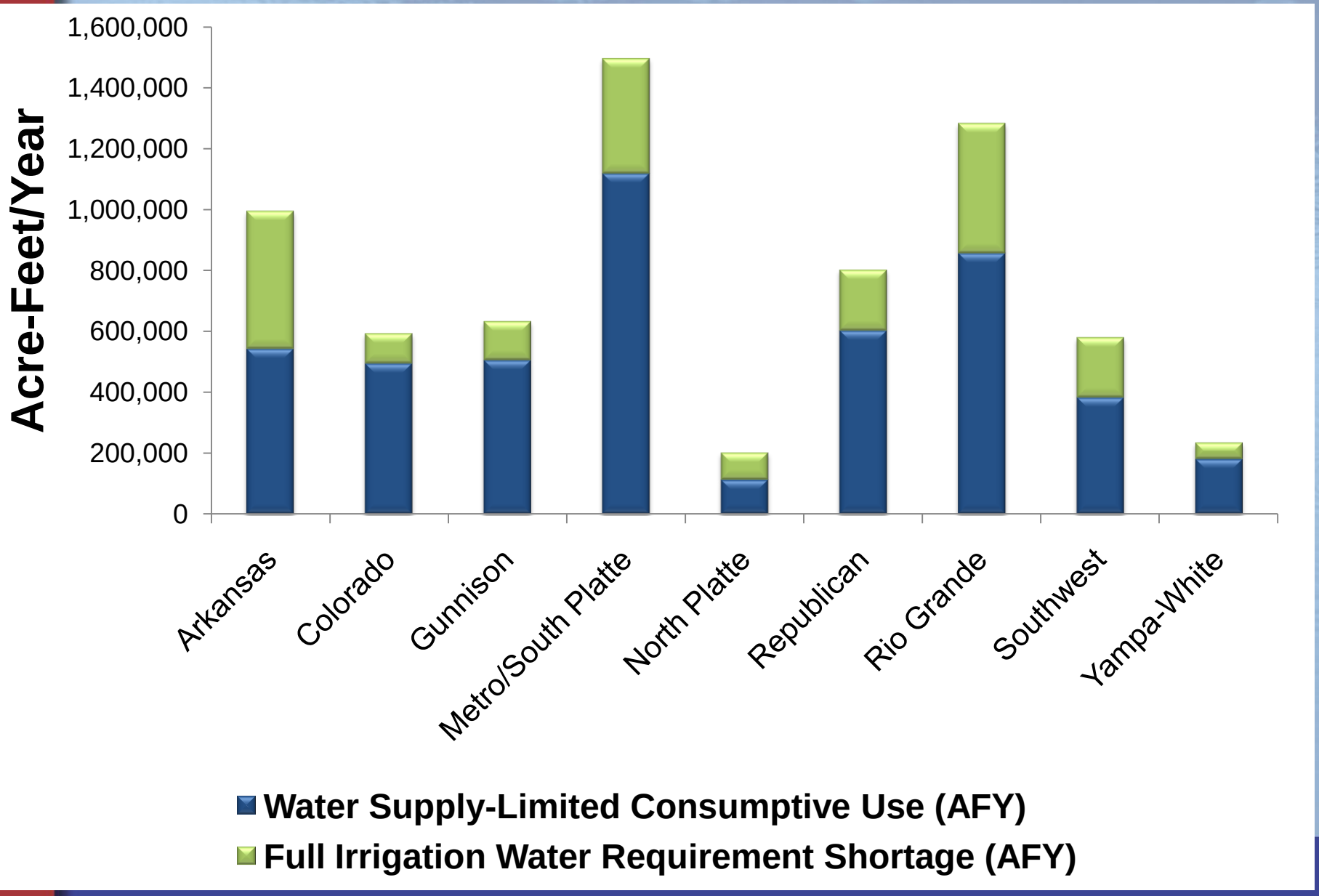
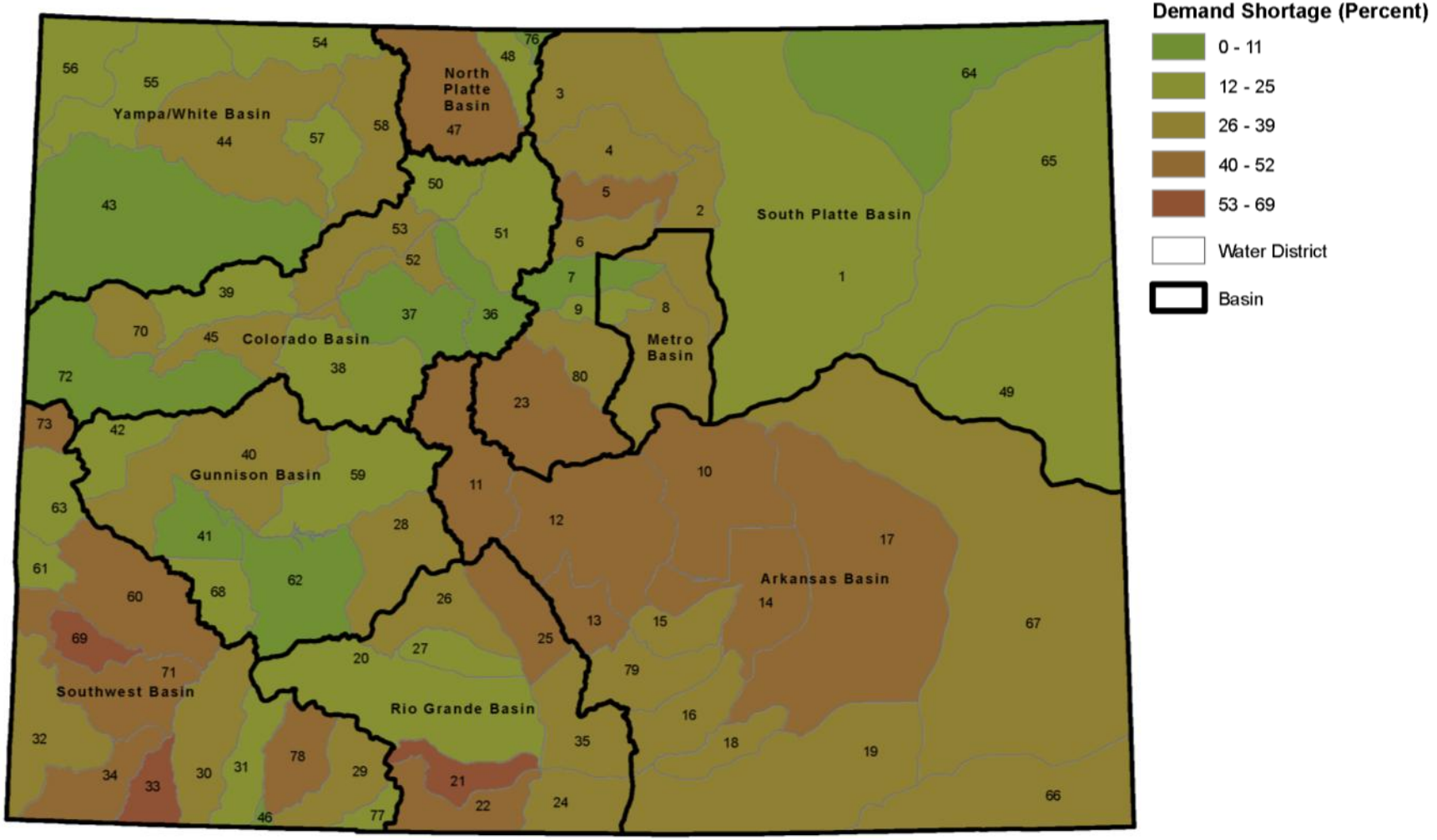
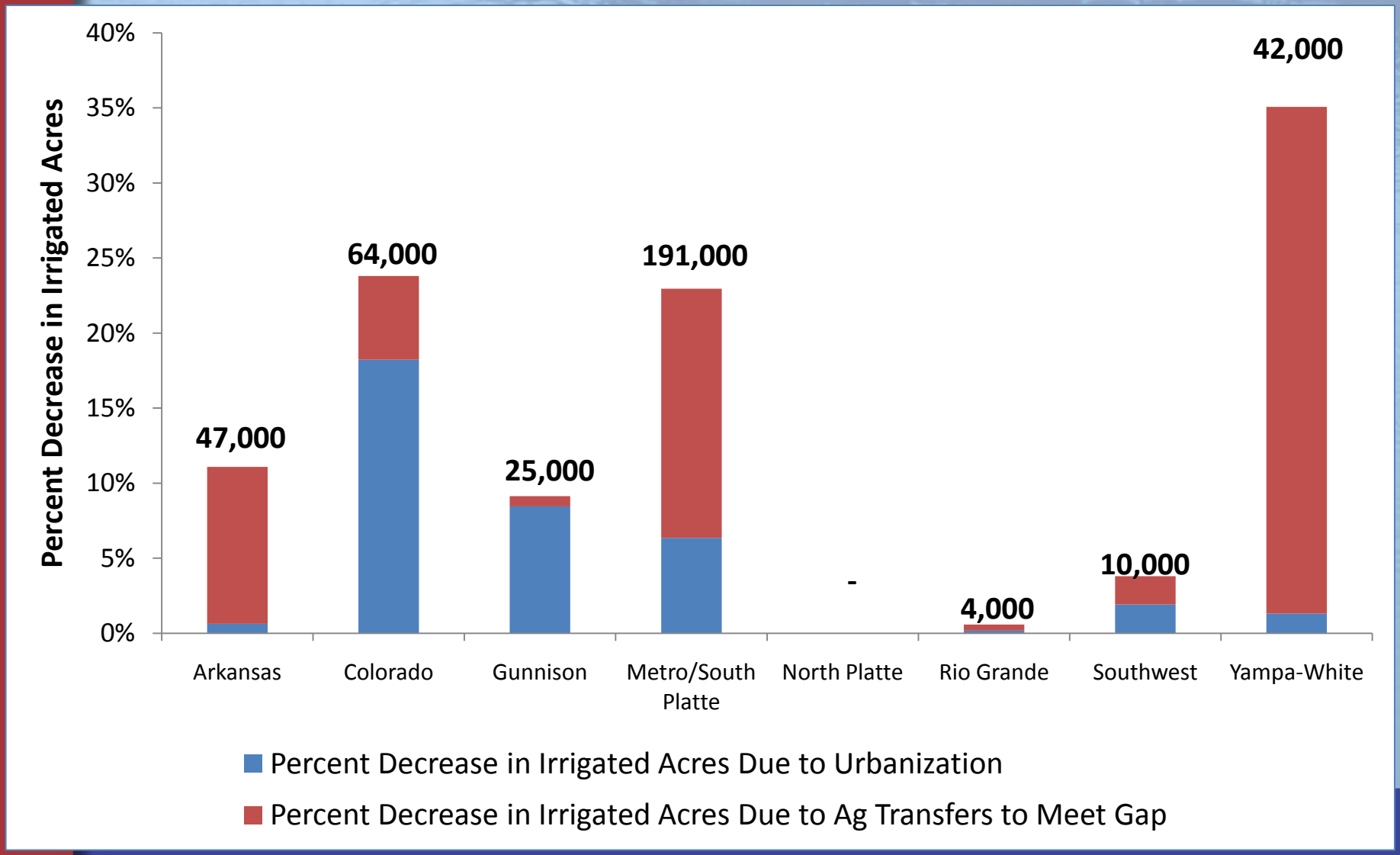
Current Agricultural Demands



Current Agricultural Shortages



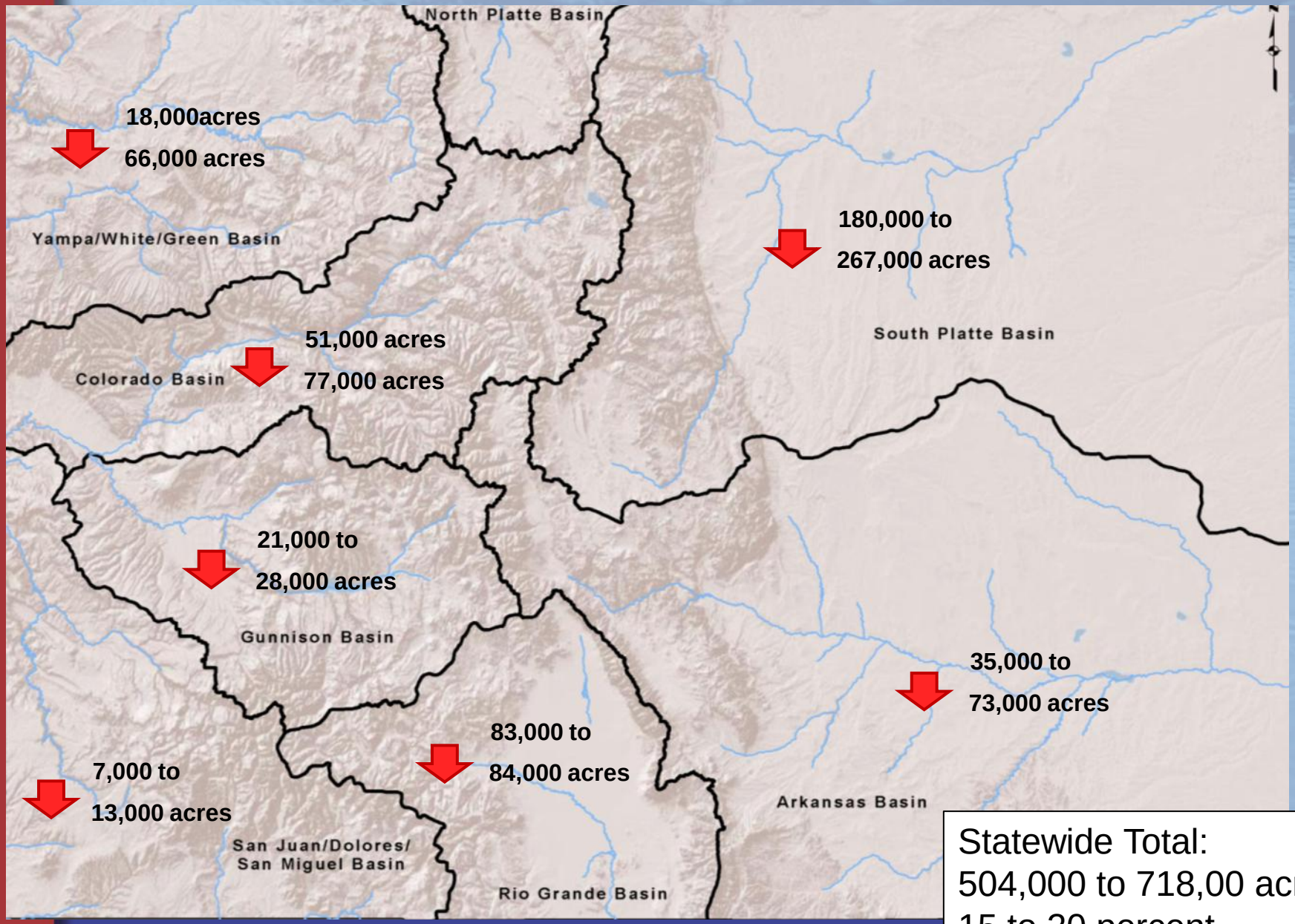
Percent Decrease in Irrigated Acres due to Urbanization



Rio Grande Irrigated Acres

- Current irrigated acres = 622,000
  - 18% of statewide total
- 2050 decrease due to urbanization and agricultural transfers to meet gap = 4,000
  - Less than 1% of basin total

2050 Changes in Irrigated Acres



Statewide Total:
504,000 to 718,00 acres
15 to 20 percent

Rio Grande Irrigated Acres Reduction

- Additional loss of irrigated lands = 80,000 acres
  - More than 12% of basin total
- Required for:
  - Protection of the water table
  - Protection of senior water rights in the Rio Grande Valley
- Groundwater Management Subdistricts
  - Needed for reduction of groundwater use
  - Must have Water Court approved management plans

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Alternative Agricultural Water Transfers Issues

Technical Issues

- Suitable irrigated lands (i.e., having adequate water yield, water quality/soil suitability)
- Infrastructure requirements compared to traditional agricultural transfers
- Impact of geography on alternative transfer viability (e.g., stateline vs. upstream water right)
- Water quality impacts (e.g., effects of reduced river flows due to agricultural transfers on TMDLs, salinity, etc.)

Alternative Agricultural Water Transfers Issues (cont.)

Legal and Institutional Issues

- Administrative/Verification
- Legislative or regulatory changes necessary to facilitate implementation of alternative agricultural transfer program
- Water court process related to program approach and implementation (i.e., water court test case)

Alternative Agricultural Water Transfers Issues (cont.)

Legal and Institutional Issues (cont.)

- Program administration (i.e., by end user, governmental agency, agricultural water rights owners, or ditch and reservoir companies)
- Likelihood of success if agricultural user is not required to bind the land and water to irrigation (short term protection of agriculture)
- Program conditions necessary to ensure that private property rights are not impaired (how will a leasing program affect value of other water rights)

Alternative Agricultural Water Transfers Issues (cont.)

Financial Issues/Economic Considerations

- Estimate costs to organize and administer a program
- Identify parties that could contribute to costs (governmental entity)
- Estimate portion of the total land and water rights value that will need to be paid to an agricultural user as compensation for enrollment in a program

Alternative Agricultural Water Transfers Issues (cont.)

Financial Issues/Economic Considerations (cont.)

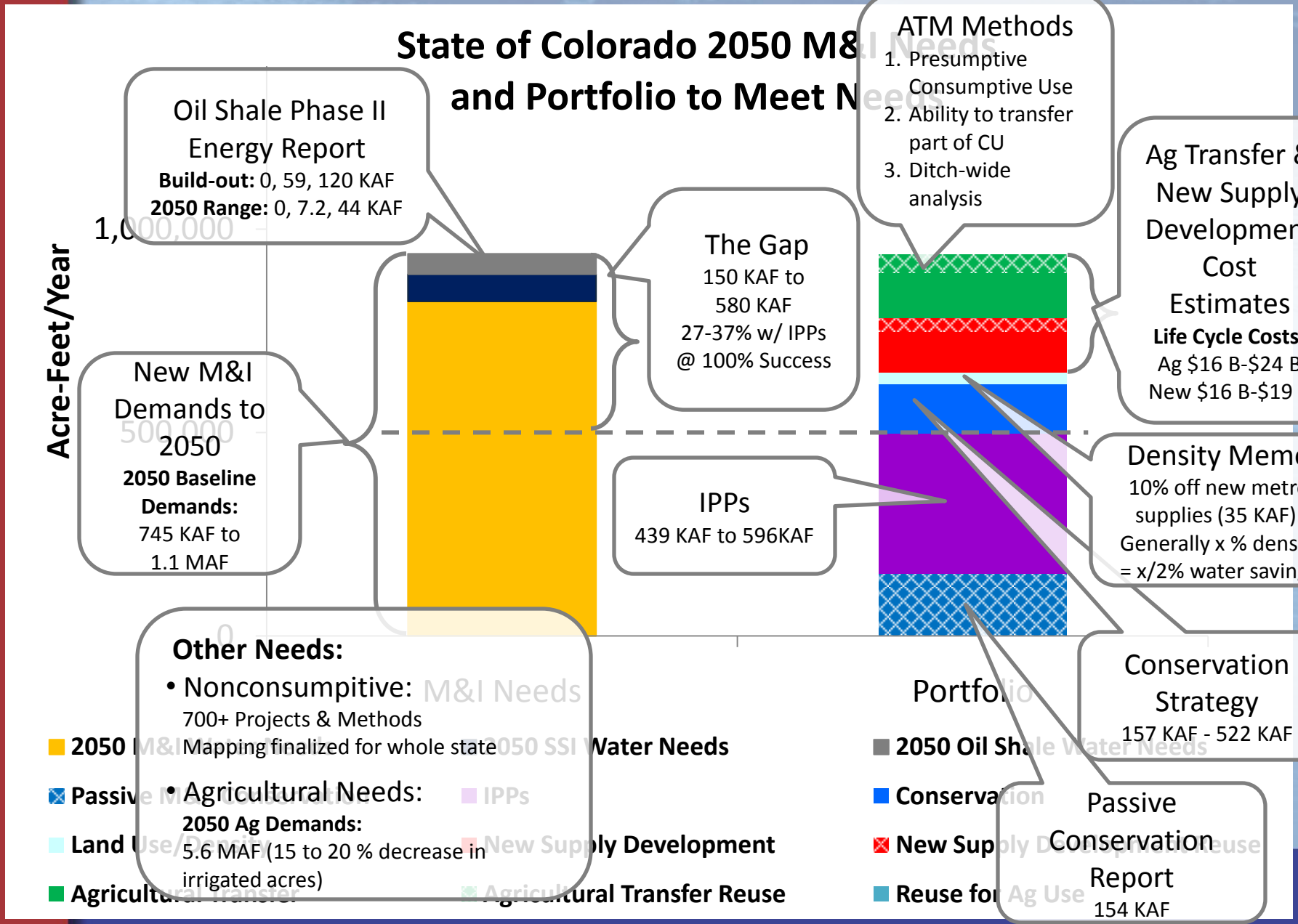
- Streamline/equalize water court transaction costs
- Cost vs. supply certainty for municipalities purchasing water via alternative agricultural transfers
- Compare annual local impacts of a rotational fallowing program with a permanent dry-up that includes voluntary payment in lieu of taxes
- Tipping points/thresholds to maintain viable agricultural economics/communities

Alternative Transfer Methods Next Steps

- Presumptive historical crop consumptive use procedures
- Canal or ditch systemwide historical consumptive use analysis
- Transfer of a portion of consumptive use

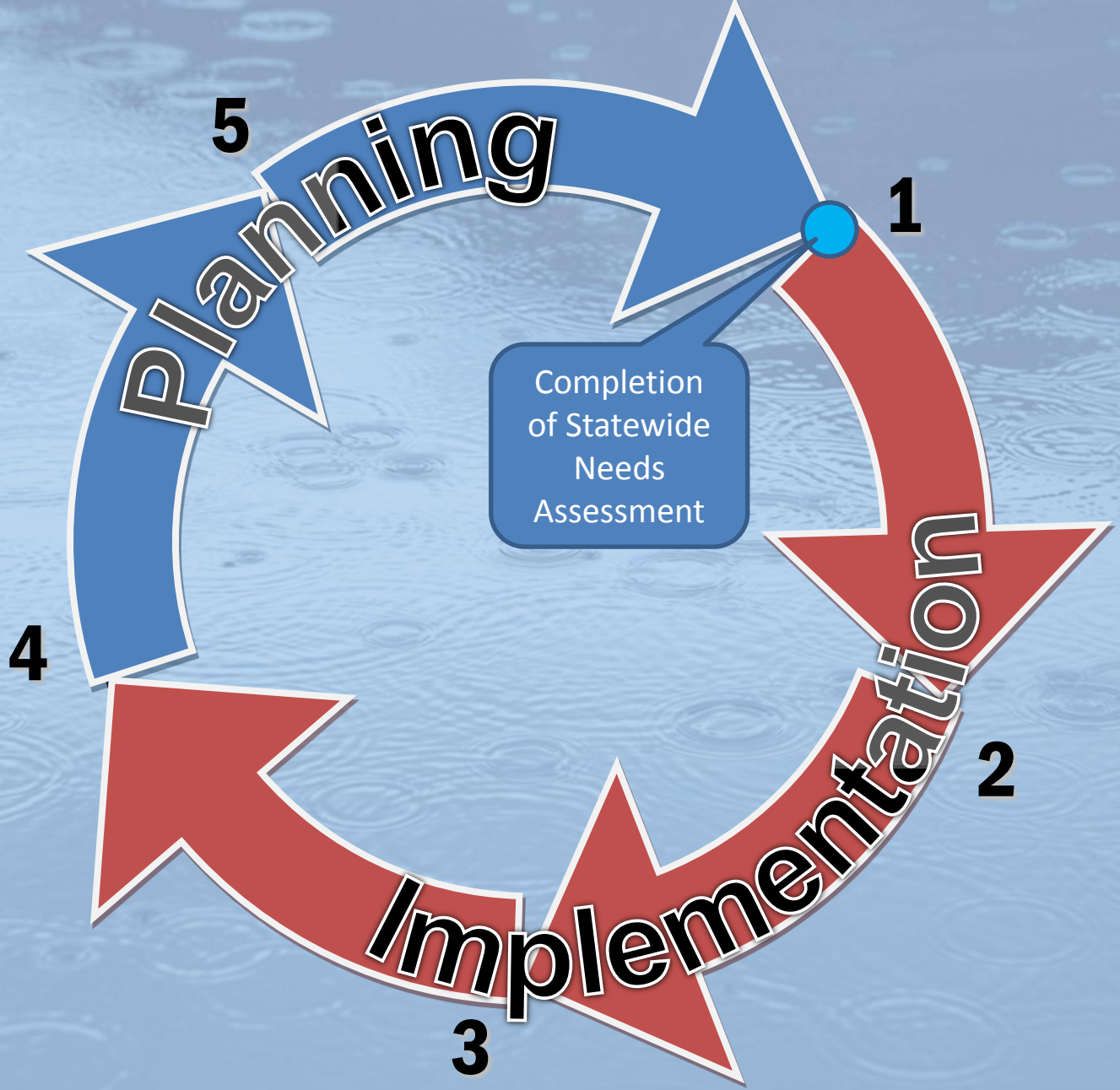
Summary and discussion

Reports in the M&I Context



SWSI Recommendations

1. Ongoing Dialogue Among all Water Interests
2. Track and Support the Identified Projects and Processes
3. Develop a Program to Evaluate, Quantify and Prioritize Environmental and Recreational Water Enhancement Goals
4. Work Towards Consensus Recommendations on Funding Mechanisms for Environmental and Recreational Enhancements
5. Create a Common Understanding of Future Water Supplies
6. Develop Implementation Plans Towards Meeting Future Needs
7. Assess Potential New State Roles in Implementing Solutions
8. Develop Requirements for Standardized Annual M&I Water Use Data Reporting



Five Year Planning Cycle