

Water Contingency Planning Task Force

Summary of findings and recommendations

January 14, 2010

Agenda

How we looked at options

Findings

- Contingency plan- 2012
- 2015 Contingency
- 2020 Contingency
- Areas not fully investigated

Recommendations

- What to pursue now
- What to consider, on contingency basis

Recapping our task

Determine how can we close the potential supply gap

- By when
- With what actions
- At what cost

Not sufficient just to see what is attainable by 2012...

Not sufficient just to evaluate conservation options and then hope for reauthorization...

Options were categorized by general timeframe

Type of measure

Timing of impact

Conserve

Some impact by 2012

- Many measures require adoption and behavior change; only some savings available in 2-3 years
- Outdoor watering restrictions are quickest lever
- Reuse project could yield by ~**2015**, assuming available financing

Capture

Control

No impact by 2012- most options yield by 2020

- Significant (often 2-4 years) pre-construction work (permitting, environmental impact studies) + construction time
- Small groundwater projects could yield by **2015**
- Transfers face additional approval challenges- authorizations, legislative changes required

Only conservation measures could provide meaningful yield by 2012. 2015 and 2020 other key timeframes for evaluation, based on option availability

"Supply curve" framework served as starting point for option prioritization

Unit cost of savings
(\$/million gallons (MG))

3,000

Unit cost of savings

- Ratio of cost, (in 2009 \$), versus millions of gallons (MG) yielded over life of project
- Costs include opex, capex, capital charges, transport costs to key areas

Target water savings – requirement to fill shortfall

- Need to identify ~280 million gallons per day (MGD) in water savings, additional supply to address 2012 gap
- Shortfall grows over time due to increased demand

Millions of Gallons per day, in average terms, saved or supplied

- Conserve
- Capture
- Control

Options

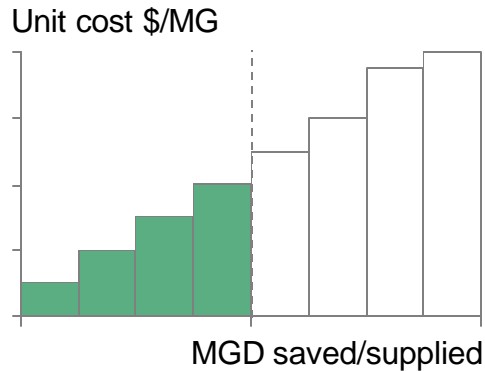
- Plot each option with its unit cost and yield
- Can categorize by type of option, speed to impact, implementation difficulty, etc



How did we arrive at recommended contingency portfolio?

Consideration of multiple criteria- beyond just cost

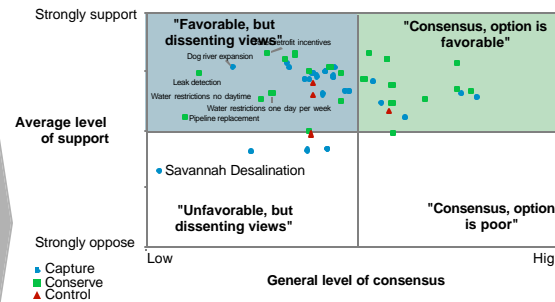
Starting point: "lowest cost" portfolio



- Long list of options generated (TF input, interviews/research)
- Cost, yield and timing estimates by technical advisors and water professionals

Applied additional considerations

- Task Force survey ratings and comments



- Implementation feasibility
 - Authorizations?
 - Legislative changes?
 - Permitting?
 - Funding flexibility?

Identified portfolios for final evaluation

- Reflect Task Force input
- Attempt to address gap while balancing costs, feasibility, impacts
- Survey task force members on refined option portfolios

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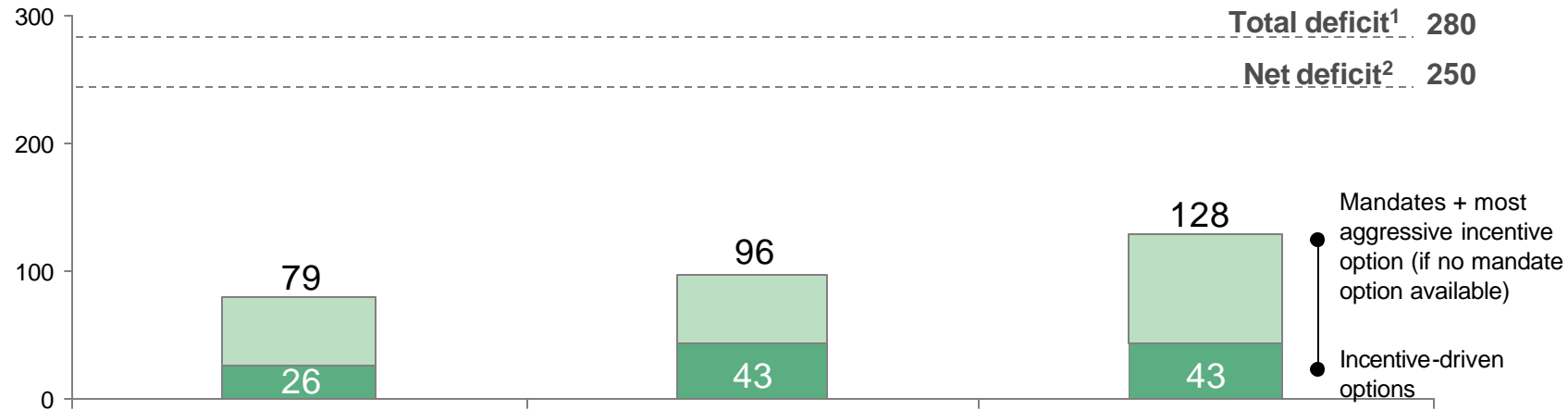
Recommendations

- What to pursue now
- What to consider, on contingency basis

Do not see ability to close supply gap in 2012

Even drought-level outdoor watering restriction not enough

Potential water savings in 2012³ (MGD)



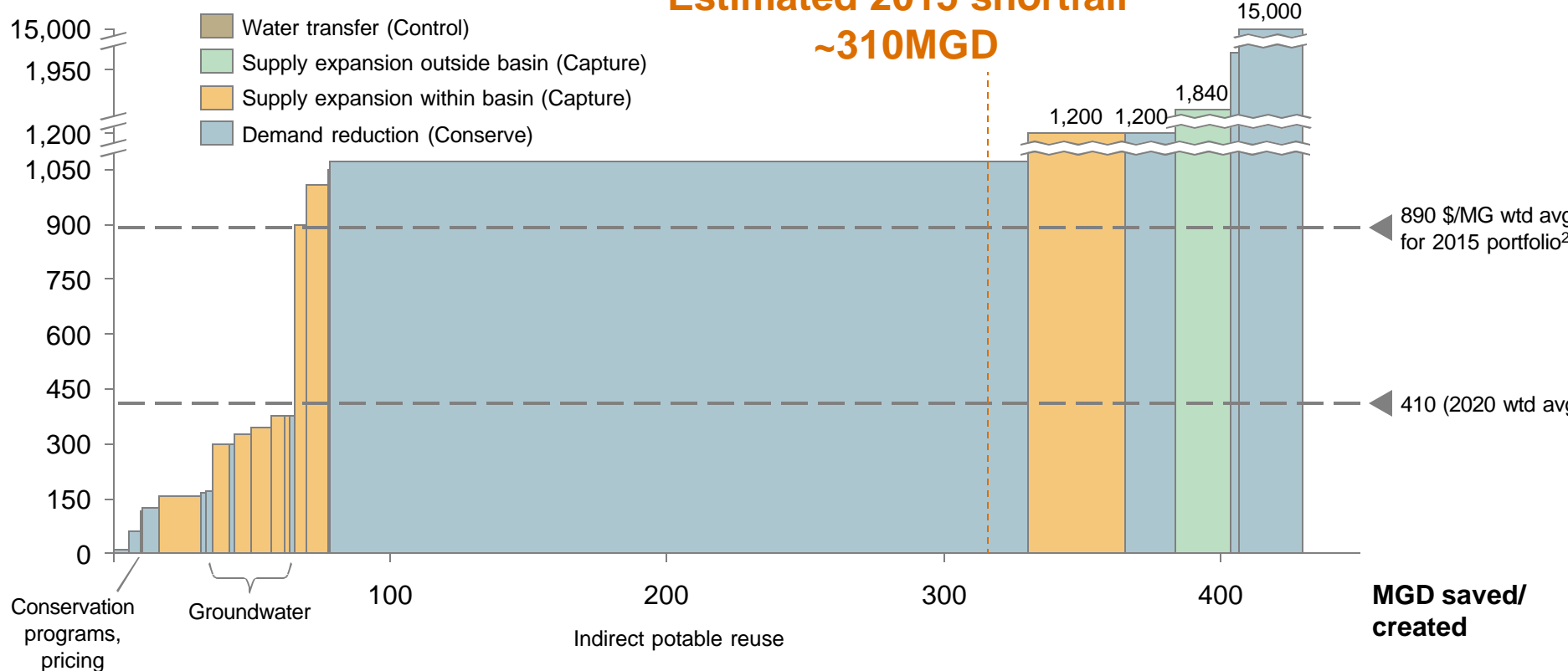
Scenario Options considered by TF incremental to district plan Further increase water rates (city of ATL levels on 14k GPM +) Enact residential watering ban

Aggressive conservation critical element of any plan – but not sufficient to close gap

1. Total deficit = total shortfall in 15 county Metro Area per EPD analysis, deficits already assume realization of 21MGD water savings per current district plan (May 09) 2. Net deficit = net shortfall for 15 county Metro Area per EPD analysis, deficits already assume realization of 21MGD water savings per current district plan (May 09) 3. Savings do not include projected savings assumed in the District Plan, solely additional savings considered by TF Source: Metro North Georgia Water Planning District- May 09 Plan, GA EPD; Technical Advisory Panel analysis

By 2015, shortfall can be addressed largely through indirect potable reuse, at ~890 \$/MG

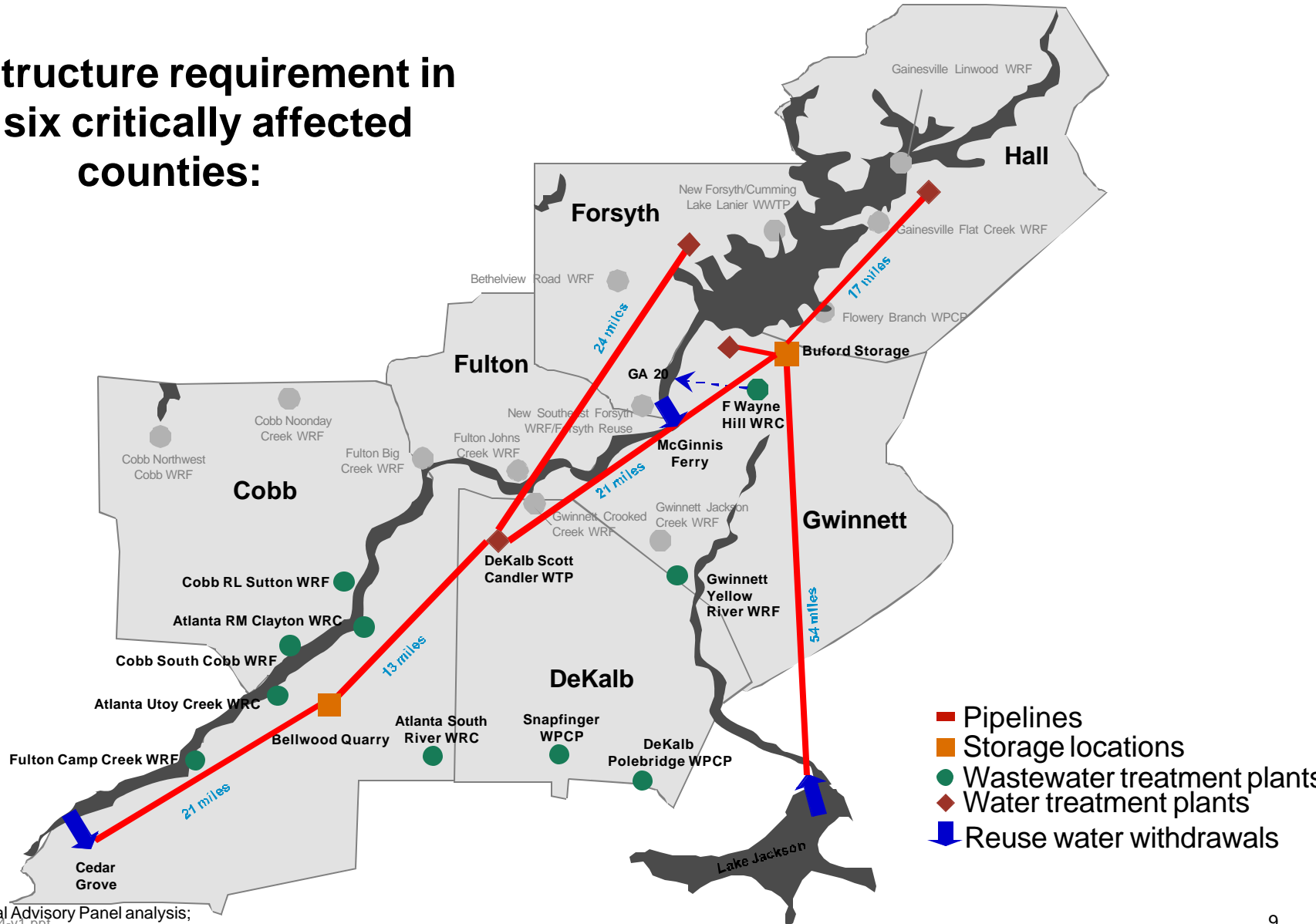
Unit cost of savings (\$/MG)



1. Shortfall = Projected 2015 demand with conserv. in Metro plan – Estimated 2015 supply (Lanier and Chatt. withdrawals per ruling, all other sources at current levels). Assumes demand continues to grow until year of shortfall. Other approaches could assume demand decreases as result of ruling, thus reducing implied gap. This analysis uses existing plan demand as baseline. Shortfall only accounts for counties with deficit under ruling. 2. Weighted average \$/MG calculated based on options that can address 2015 gap at lowest cost
 Certain option yields may not be additive due to interaction effects
 Source: Technical Advisor Panel preliminary estimates

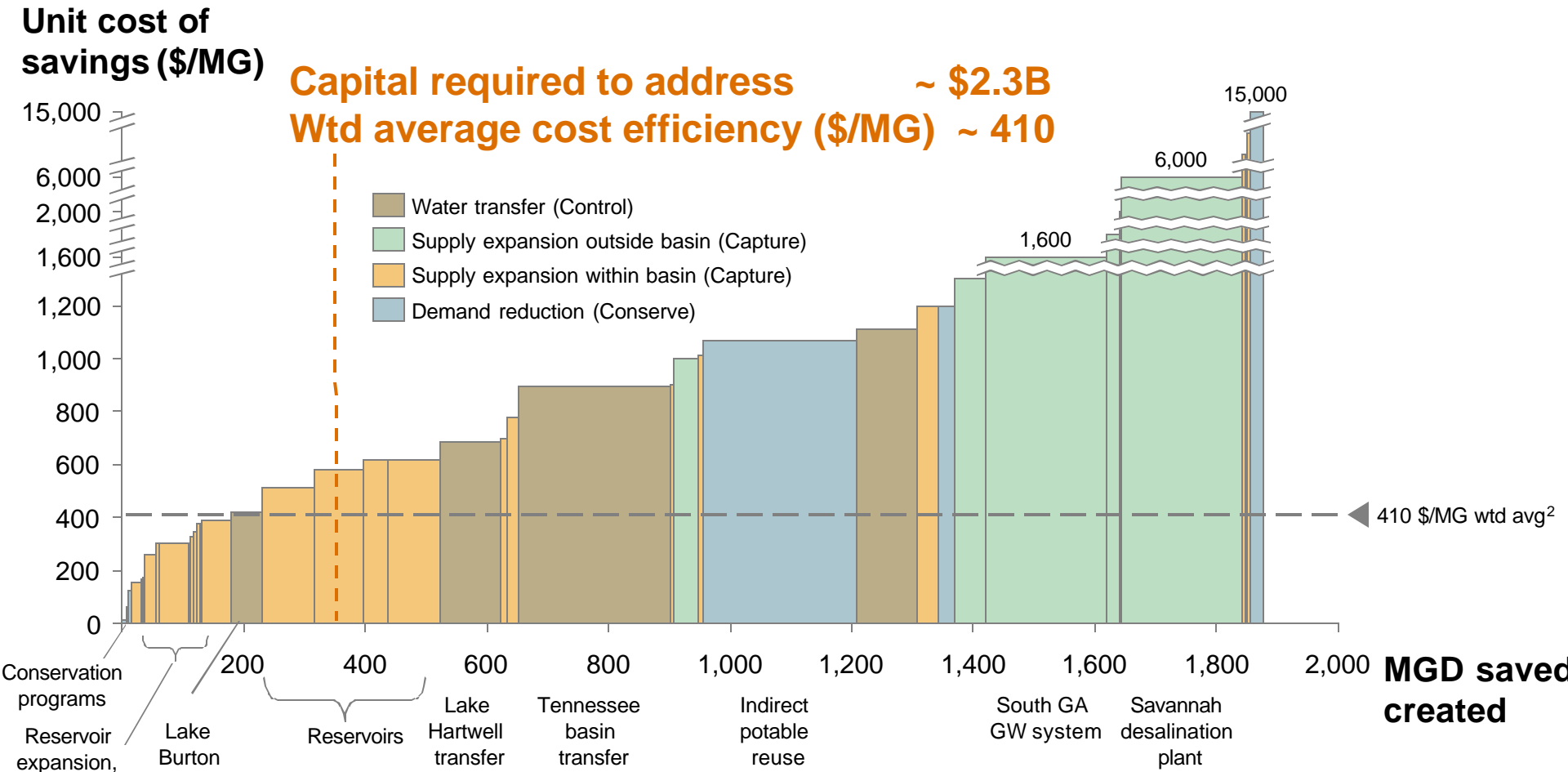
Indirect potable reuse: *infrastructure requirement*

Infrastructure requirement in the six critically affected counties:



Source: Technical Advisory Panel analysis; Water Forum - Jan 14-v1.ppt

2020 view: once supply options come online, they can offer long-term cost efficiency (for \$~2.3B capital cost)

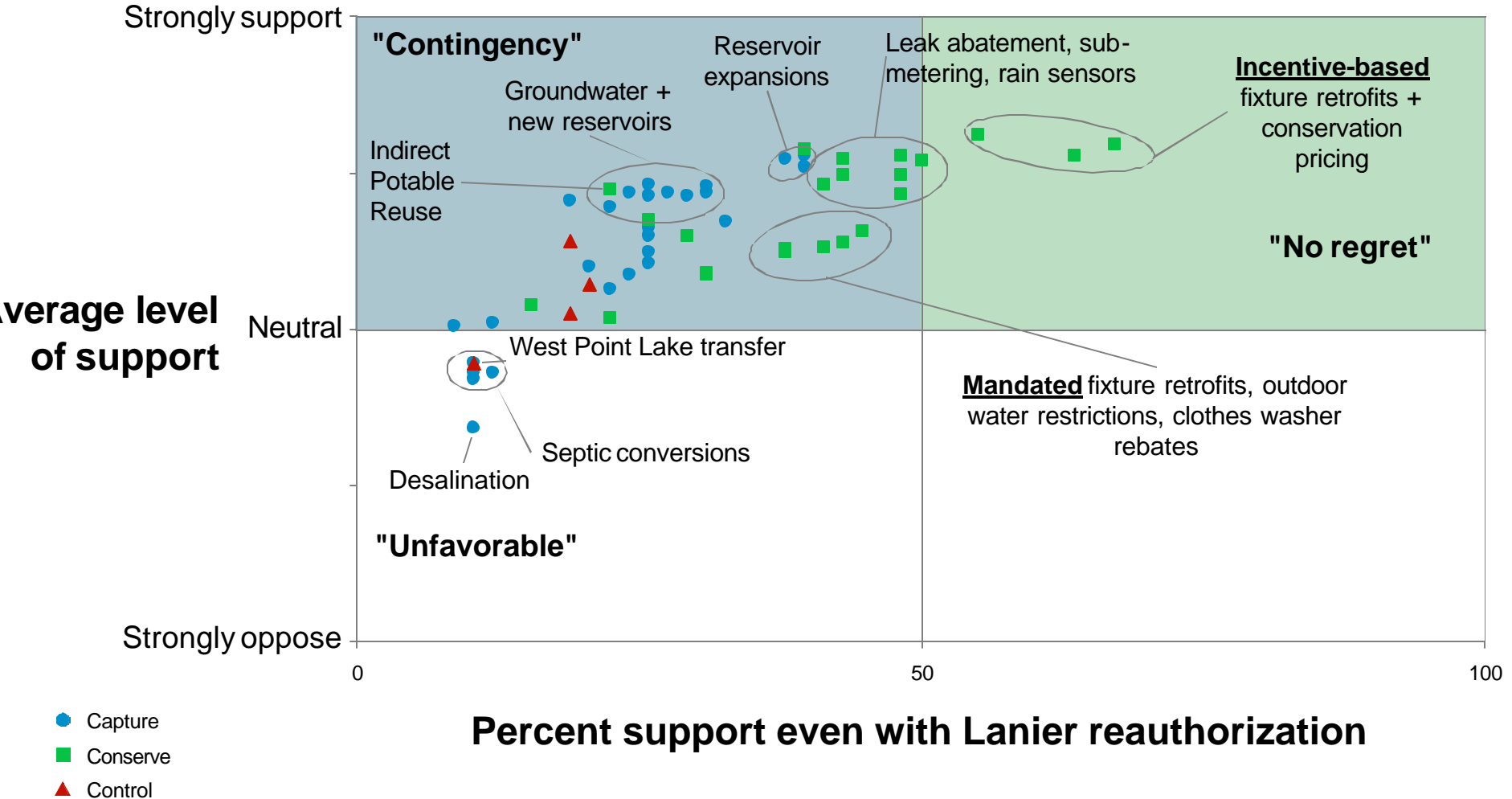


This is one view— there are more ways to prioritize than by long-term cost efficiency

Source: Technical Advisor Panel preliminary estimates

Incentive-based conservation generally viewed "no regret"

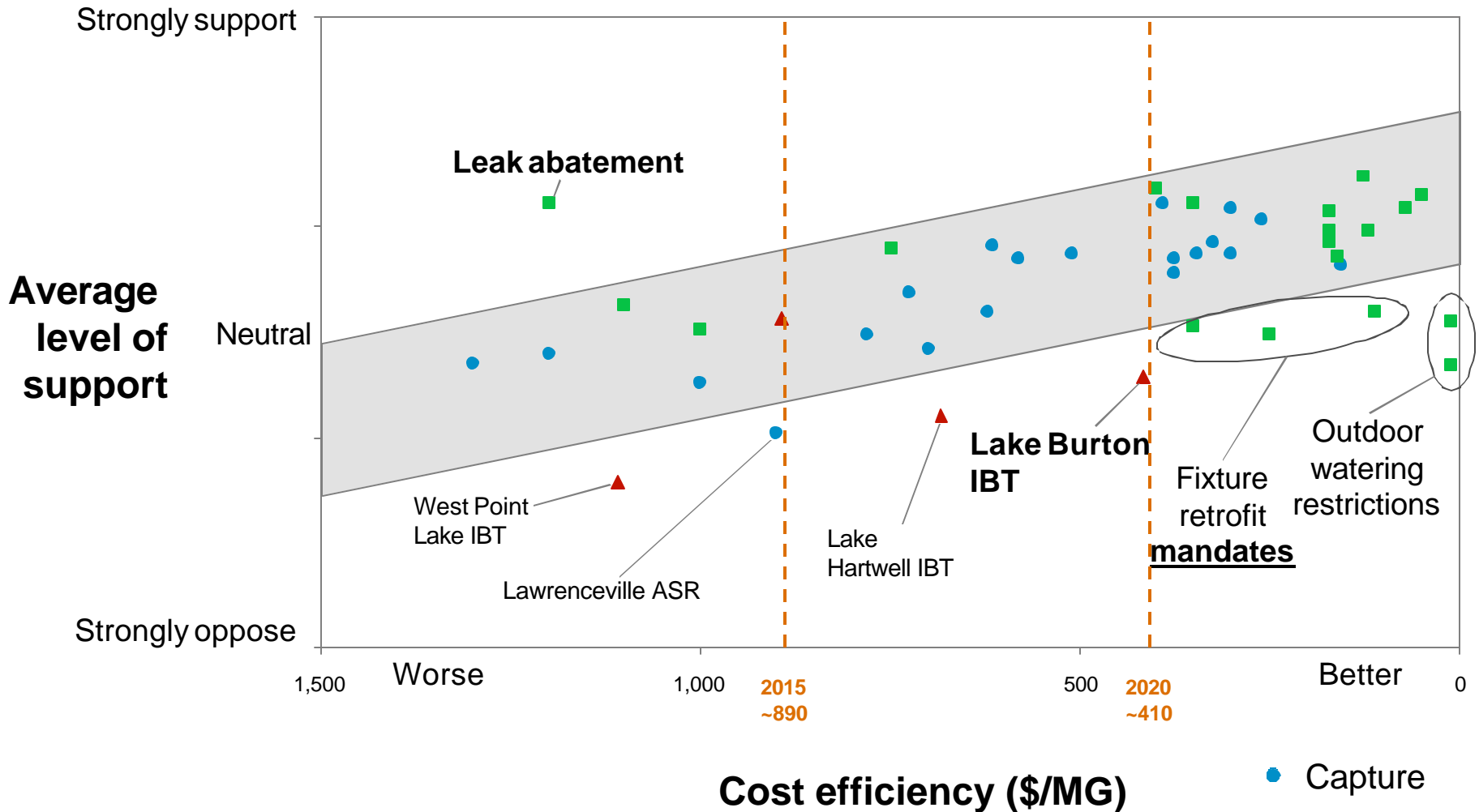
Groundwater supply and reservoirs most favorable "contingency" options



Source: Water Contingency Planning Task Force Survey results, n=64

Comparison of support vs. relative cost-efficiency

highlighted outliers, informed alternate portfolio development



Note: n=64; Only options with cost efficiency <\$1,500/MG shown
Source: Water Contingency Planning Task Force Survey results, Technical Advisory Panel analysis
Water Forum - Jan 14-v1.ppt

Task Force endorsed "Alternate" 2020 portfolio narrowly. Most members cited need for mix of mandates in a contingency scenario

Primary 2020 Portfolio				Alternate 2020 portfolio			
Option	Cost efficiency (\$/MG)	Capital cost (\$M)	Yield (MGD)	Option	Cost efficiency (\$/MG)	Capital cost (\$M)	Yield (MGD)
Water restrictions (no daytime watering)	10	0	7	Water restrictions (no daytime watering)	10	0	7
Rain sensors (retrofit 25% existing systems)	60	6	3	Rain sensors (retrofit 50% existing systems)	70	6	6
Spray rinse valves (rebate program)	115	1	0.3	Spray rinse valves (direct install program)	110	1	2
Conservation pricing	125	14	6	Conservation pricing	125	14	6
GW for non-potable use (parks, golf courses, etc)	155	8	15	GW for non-potable use (parks, golf courses, etc)	155	8	15
Multi family sub-metering (retrofit 50% existing homes)	165	6	2	Multi family sub-metering (retrofit 100% existing units)	170	6	3
Cooling towers (rebate program)	170	6	3	Cooling towers (required standards)	170	6	5
Tussehaw Creek reservoir expansion	260	64	20	Tussehaw Creek reservoir expansion	260	64	20
Lawrenceville GW system	300	5	6	Lawrenceville GW system	300	5	6
Dog river reservoir expansion	300	230	48	Dog river reservoir expansion	300	230	48
Showerheads and faucets (increased rebate program)	300	8	1	Showerheads and faucets (direct install program)	250	8	10
Spalding county GW system	325	7	6	Spalding county GW system	325	7	6
Bartow county GW system	345	11	7	Bartow county GW system	345	11	7
Suwanee GW system	375	10	5	Suwanee GW system	375	10	5
Palmetto GW system	375	3	2	Palmetto GW system	375	3	2
Toilet retrofits (increased rebate program)	375	25	1	Toilet retrofits (direct install program)	350	25	15
Big Haynes Creek reservoir expansion	390	270	47	Big Haynes Creek reservoir expansion	390	270	47
New reservoir NW of Forsyth	510	660	88	Etowah River Dam No. 1 expansion	615	350	41
Richland creek reservoir (larger)	580	620	80	Richland creek reservoir (larger)	580	620	80
Leak abatement	1,200	17	27	Leak abatement	1,200	17	27
Wtd. Avg.	~470	~1,970	~370	Wtd. Avg.	~460	~1,660	~360

Note: Changes from "primary" to alternate" portfolio include:

- 1) Most aggressive retrofit/efficiency program implementation, and**
- 2) Etowah River Dam 1 expansion instead of New Reservoir NW of Forsyth**

Some important areas for further evaluation

Some key topics not addressed by Task Force due to scope, data limitations

Key areas requiring further evaluation

Significance of topic and future considerations

Downstream impacts of pursuing contingency options

- Task Force estimates incorporate existing standards/guidelines to be conservative- but precise answer requires more technical analysis
- Quantifying net impact of pursuing multiple options requires extensive hydrology modeling (EPD)

Potential for system interconnections and transfer of surpluses

- Increased interconnection can mitigate system risks
- Purchase of surplus water could be potential option for 2012
- Areas of future surplus not clear; hinges on growth assumptions and future permitting

Cost/benefit of Morgan Falls (Bull Sluice Lake) dredging

- Potentially large impact (up to 100-130 MGD yield) depending upon Corps of Engineers (COE) operating policies
- Significant operational costs and implementation concerns; ultimate cost/benefit of option not clear without future COE operations policies

Minimum flow requirements at Peachtree Creek

- Actual min flow requirement not set rigorously; scientific study needed

Commercial sector focused conservation

- No robust commercial usage dataset right now; option evaluation difficult
- Measures which are sub-scale at residential application could be cost-effective at commercial scale (eg, forms of local reuse)

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Recommendations

- What to pursue now
- What to consider, on contingency basis

Summary: Task Force Recommendations (I of II)

1. Continue to pursue reauthorization of Lake Lanier

- Aggressively pursue other three prongs of Governor's 4 prong-plan (negotiations, appeal, Congressional action)

2. Pursue aggressive conservation program- in support of current plans and incremental Task Force options

- ***Expanded efficiency programs (fixture retrofits, sub-metering, rain sensors, cooling towers, etc):*** Georgia Assembly to pass statute that requires local government to create efficiency programs, AND to appropriate funding to help support these programs
 - enhanced incentive for fixture retrofit, rain sensor retrofit
 - expand rebate programs to all residential Water Sense appliances
 - expand rebate programs to commercial spray-rinse valves and cooling towers
- ***More aggressive conservation pricing:*** Provide guidelines for minimum rate differentials across usage tiers and usage information levels to be provided on bills
- ***More aggressive utility leak abatement programs:*** Pass statute that requires annual water loss audits, loss data reporting to EPD, and leak abatement programs, prioritize for SRF Green Funds
- ***Funding for conservation education program:*** Appropriate funding for holistic conservation education program
- Evaluate incorporation of conservation plan and efficiency criteria in permitting applications
- Evaluate conservation efficiency criteria in GEFA low-interest loan qualification

Summary: Task Force Recommendations (II of II)

- 3. Only devote resources towards the 2015 Contingency Solution if outlook on negotiations and reauthorization demands. Metro ATL should only pursue this if required**
 - If 2015 Contingency Solution is deemed necessary, the State must ensure a funding mechanism exists to address joint liability issues.
 - Indirect Potable Reuse project would be so costly and involve so many counties, resolving funding liability issues would be a key challenge
 - Smaller groundwater options included in the 2015 plan should be evaluated by local governments

- 4. If we must pursue a contingency plan, but we are able to pursue a 2020 solution, we recommend initiating feasibility studies and permitting on capture options in the recommended 2020 Portfolio**
 - Confirm yield, cost, and timing estimates. Specifically, incorporate outputs from forthcoming state water plan and EPD hydrology modeling to ensure the portfolio incorporates best available information

Important to distinguish between "do now" recommendations and "contingency" options

"Do now": for immediate consideration

Measures that Task Force supported even if Lanier reauthorization obtained-incentive based conservation measures

Generally three areas of focus

- 1. Data- mandatory collection, reporting** (eg, loss reporting)
- 2. Enhanced incentives/higher standards** (includes incentives for retrofits, conservation pricing)
- 3. Linking conservation progress to permits, low-interest loans**

"Contingency": evaluate need for these measures

Measures supported by task force in contingency context; not supported as 'do anyway' measures

Includes mandate-based conservation measures, which could supply greater yield

- Time-of-day watering restrictions
- Retrofit on resale
- Direct installation programs (eg, toilets)
- Mandated sub-metering of multifamily housing- or demonstrate full retrofitting has occurred

Includes 2015 and 2020 capture and reuse measures

Refer to final report for details

Appendix

Summary: Task Force Findings (I of II)

Do not see ability to meet gap by 2012- even with extremely aggressive conservation scenarios

Conservation playing a major role for Metro district- low impact, cost-effective

- Only conservation contributes by 2012. Conservation is a necessary, but not sufficient, part of solution
- Metro ATL per capita usage, after considering existing plans combined with TF options reach levels comparable to leading metro areas

There is a potential 2015 contingency solution- though it is very expensive and difficult to implement

- Solution largely defined by large Indirect Potable Reuse option; there is not a broad set of sizable, cost-effective alternatives potentially available by 2015
- Solution capital intensive (\$3B) and overall twice as costly (long term \$/MG) than 2020 solution
 - 2015 average cost efficiency (\$/MG) level of **\$~890/MG**, with capital expense **\$~3.0B**
 - Total 50-yr cost of portfolio is **\$~5.0B** which is significantly higher than 2020 cost optimal portfolio (**\$~480/MG** difference which equates to **\$~2.4B** over 50 yrs)
 - Funding this portfolio could increase overall retail water rates by **~\$2.70/kgall** or **~55%¹**
- Additionally, the Indirect Reuse option poses a number of feasibility questions (timing, funding, environmental impact)

1. Ga Association of Water Professions; assumes incremental portfolio costs borne by utilities (directly or indirectly). Analysis assumes ~\$5/kgall weighted average retail rate baseline.

Summary: Task Force Findings (II of II)

By 2020 a broader set of potential solutions exist, and there are more cost-effective potential solution portfolios

- The theoretical "least cost" 2020 portfolio has cost efficiency of **\$~410/MG avg**, with capital expense **\$~2.3B**; equates to **~\$2.6B** over 50 years
- Based on Task Force feedback, Primary and Alternate 2020 portfolios were defined- balancing cost efficiency with concern for environmental impacts and implementation feasibility
 - While there is not consensus, there is general agreement on core set of conservation and capture options. These alternatives differ primarily on the mode of conservation (ie, desired extent of mandates) and the mix of reservoir expansions vs. new builds
 - No Interbasin transfer options are contained in the 2020 alternate portfolios under evaluation. This is based primarily on relative cost effectiveness, as well as on Task Force input and on implementation feasibility

Task Force members endorsed the "Alternate 2020" portfolio by a narrow margin

- While almost all recognize the need for, and are willing to endorse mandates in a "dire" situation, significant proportion feels strongly that initial implementation be incentive-based
- TF primarily divided over willingness to accept conservation mandates as the "norm"
- Many members suggest a balanced mix of incentives *and* mandates as optimal approach

Recommended options for 2012 contingency plan

Option	Cost Efficiency (\$/MG)	Capital Cost (\$M)	Yield (MGD)
Water restrictions (no daytime watering)	10	0	5
Rain sensors (retrofit 25% existing systems)	60	6	5
Spray rinse valves (rebate program)	115	1	0.7
Enhanced conservation pricing	125	14	6
Multi family sub-metering (retrofit 50% existing homes)	165	6	2
Cooling towers (rebate program)	170	6	3
Showerheads and faucets (increased rebate program)	300	8	3
Toilet retrofits (increased rebate program)	375	25	2
Residential clothes washers	1,050	14	0.2
Leak abatement	1,200	17	9
	Wtd. Avg. ~410	~100	~35

Source: Technical Advisor Panel estimates

Note: Expected 2012 yield shown for conservation options

Recommended options for 2015 contingency plan

Option	Cost Efficiency (\$/MG)	Capital Cost (\$M)	Yield (MGD)
Water restrictions (no daytime watering)	10	0	6
Rain sensors (retrofit 25% existing systems)	60	6	4
Spray rinse valves (rebate program)	115	1	0.5
Enhanced Conservation pricing	125	14	6
Groundwater (GW) for non-potable use	155	8	15
Multi family sub-metering (retrofit 50% existing homes)	165	6	2
Cooling towers (rebate program)	170	6	3
Lawrenceville GW system	300	5	6
Showerheads and faucets (increased rebate program)	300	8	2
Spalding county GW system	325	7	6
Bartow county GW system	345	11	7
Suwanee GW system	375	10	5
Palmetto GW system	375	3	2
Toilet retrofits (increased rebate program)	375	25	2
Lawrenceville ASR	900	19	4
Small Quarry	1,010	95	8
Residential clothes washers	1,050	14	0.4
Indirect potable reuse (6 county)	1,070	2,800	252
	Wtd. Avg. ~890	~3,060	~340

Source: Technical Advisor Panel estimates

Note: Expected 2015 yield shown for conservation options

Detail of options for "Lowest cost" 2020 portfolio

Option	Cost Efficiency (\$/MG)	Capital Cost (\$M)	Yield (MGD)
Water restrictions (no daytime watering)	10	0	7
Rain sensors (retrofit 25% existing systems)	60	6	3
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Palmetto GW system	375	3	2
Toilet retrofits (increased rebate program)	375	25	1
Big Haynes Creek reservoir expansion	390	270	47
Lake Burton transfer	417	362	50
New reservoir NW of Forsyth	510	660	88
Richland creek reservoir (larger)	580	620	80
	Wtd. Avg. ~410	~2,300	~400

Note: Expected 2020 yield is shown for conservation options
Source: Technical Advisor Panel estimates

Costs of funding contingency portfolios were also framed in terms of possible impact on water rates

Addressing potential shortfall using the most cost-efficient option portfolio ...

... by 2015

... by 2020

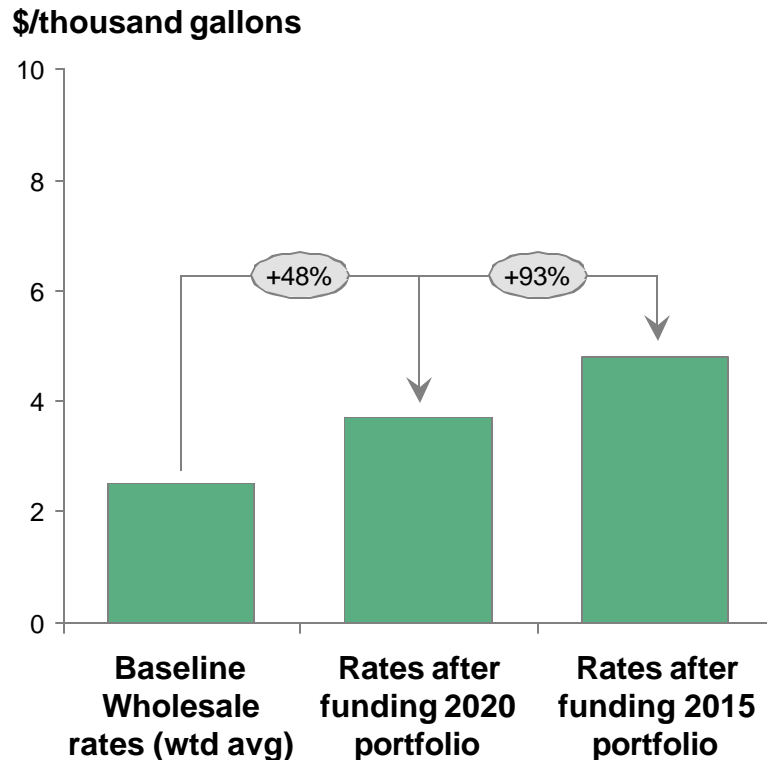
	... by 2015	← ~2x →	... by 2020
Costs to fill gap	Capital cost (\$M)	~3,000	~2,300
	Annual operating cost (\$M)	~80	~12
	Cost efficiency (\$/MG)	~890	~410
Potential impact on <u>wholesale</u> water rates	Incremental cost (\$/MG)	~2,330	~1,200
	Percentage price increase ¹	93%	48%
Potential impact on <u>retail</u> water rates	Incremental cost (\$/MG)	~2,680	~1,380
	Percentage price increase ²	54%	28%

If forced to replace Lanier as source, we fundamentally will pay more for less water

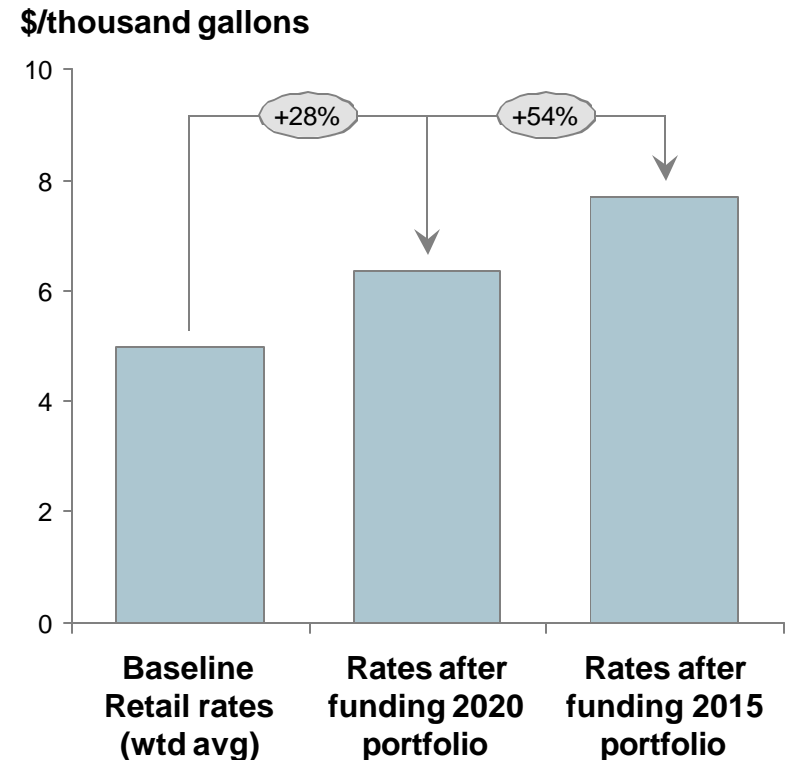
1. Assuming current avg. wholesale rate of \$2,500/MG 2. Assuming current avg. retail rate of \$5,000/MG; Potential rounding errors
 Key assumptions: Incremental cost based on annual cash needs of utilities (debt servicing + operating expense); Capital cost is entirely financed with debt - 30 year term, 4.5% average interest rate; 15% increase to incremental wholesale cost when passed on to retail, to account for non revenue water Source: Technical Advisor Panel Analysis

Addressing potential shortfall could have significant impact on water rates if utilities bore costs

**Wholesale rate potential impact:
~50 – 90% increase**



**Retail rate potential impact:
~30 – 55% increase**



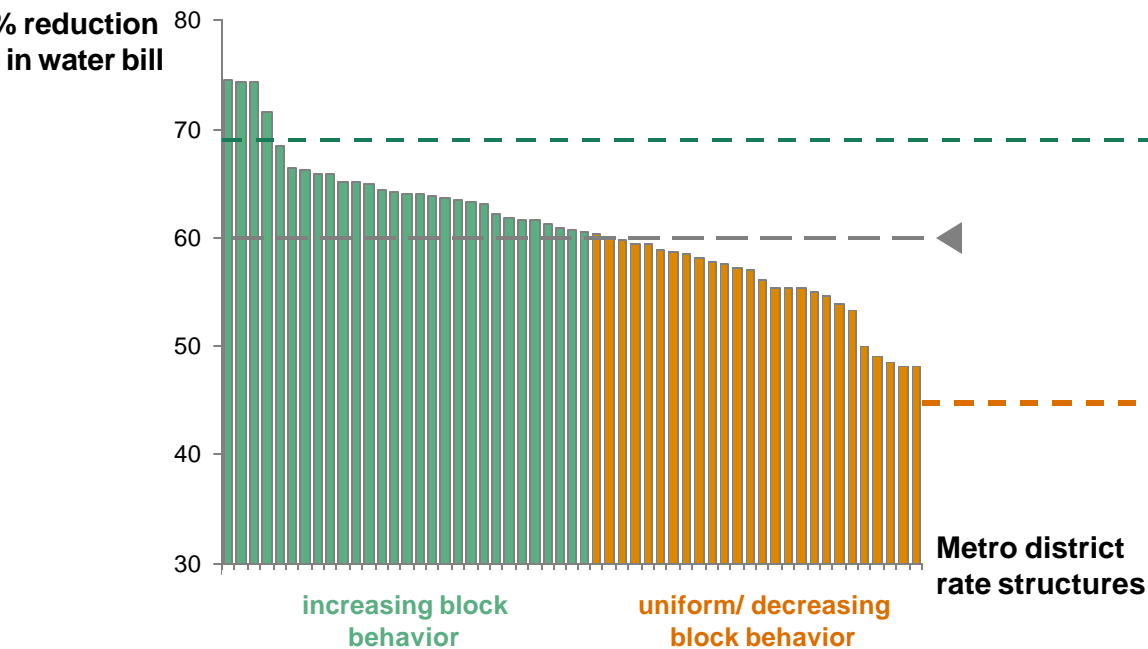
Replacing Lanier withdrawals would pose significant incremental costs to water providers, which would pass thru to consumers

Many Metro district rate structures are effectively flat for average consumers

Scenario: Heavy water user (consuming 15K GPM) drops consumption 60% to average levels (6K GPM)¹

Actual utility rate structure examples: highlight variation in rate structure design

Scenario tests steepness of the underlying rate structure
 – If bill decreases by *more than 60%*, the rate structure is increasing block

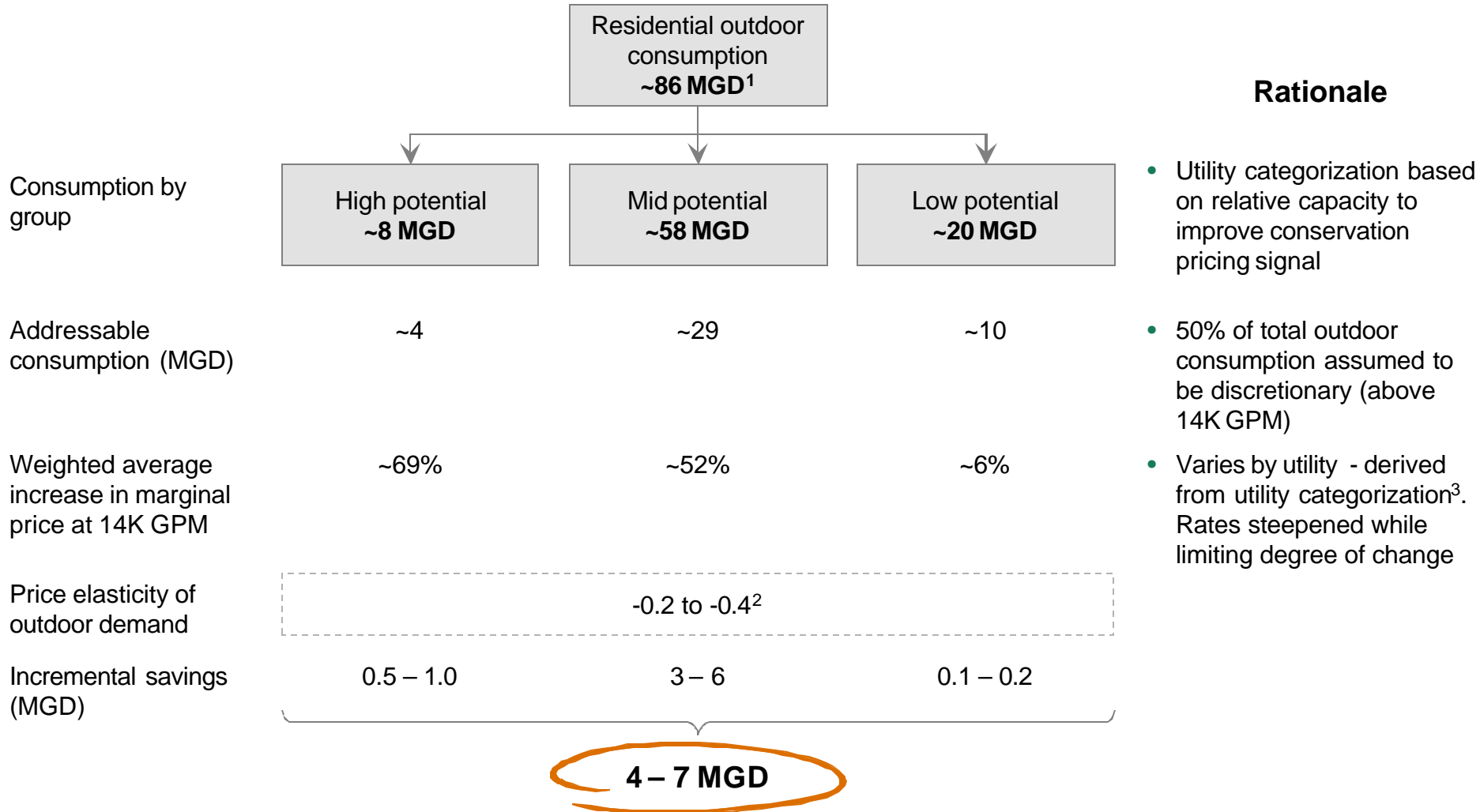


GPM tier	Rate (per 1000 gal)	
0 – 2000	\$0 (Base Charge - \$19.75)	
2001 - 4000	\$5.34	
4001 - 6000	\$6.67	125%
6001 - 10000	\$10.68	200%
>10000	\$17.09	320%

GPM tier	Rate (per 1000 gal)
0 – 2000	\$0 (Base Charge - \$17.60)
2001 - 20000	\$3.08
>20000	\$4.18

Note: 1. Average metro district residential consumption = 6000 GPM, Peak consumption (2.5x average) = 15000 GPM; GPM – Gallons Per Month
 Source: GEFA & UNC Environmental Finance Center table of Rate Structures and Bills (May 2009)

Approach to estimate residential outdoor water savings through pricing



1. Estimated using per capita outdoor water consumption from Metro water plan (May 2009), Table 3-2 and data on population served by each utility from GEFA/UNC Rate Survey (May 2009)
 2. Water and Wastewater pricing, EPA 832-F-03-027; Olmstead et al, Comparing price and non-price approaches to urban water conservation; Metro plan assumptions; TAP estimates
 3. Assumes Marg. Price (MP) of utilities at 14K GPM would reach the avg. of their peers in the next category. MP for low pot. utilities assumed to reach 75th percentile within the category
 Note: Numbers may not add up due to rounding errors; GPM – Gallons Per Month; Source: Technical Advisor Panel Analysis