water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

WATER REQUIREMENT PROJECTIONS AND WATER BALANCES

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AECOM

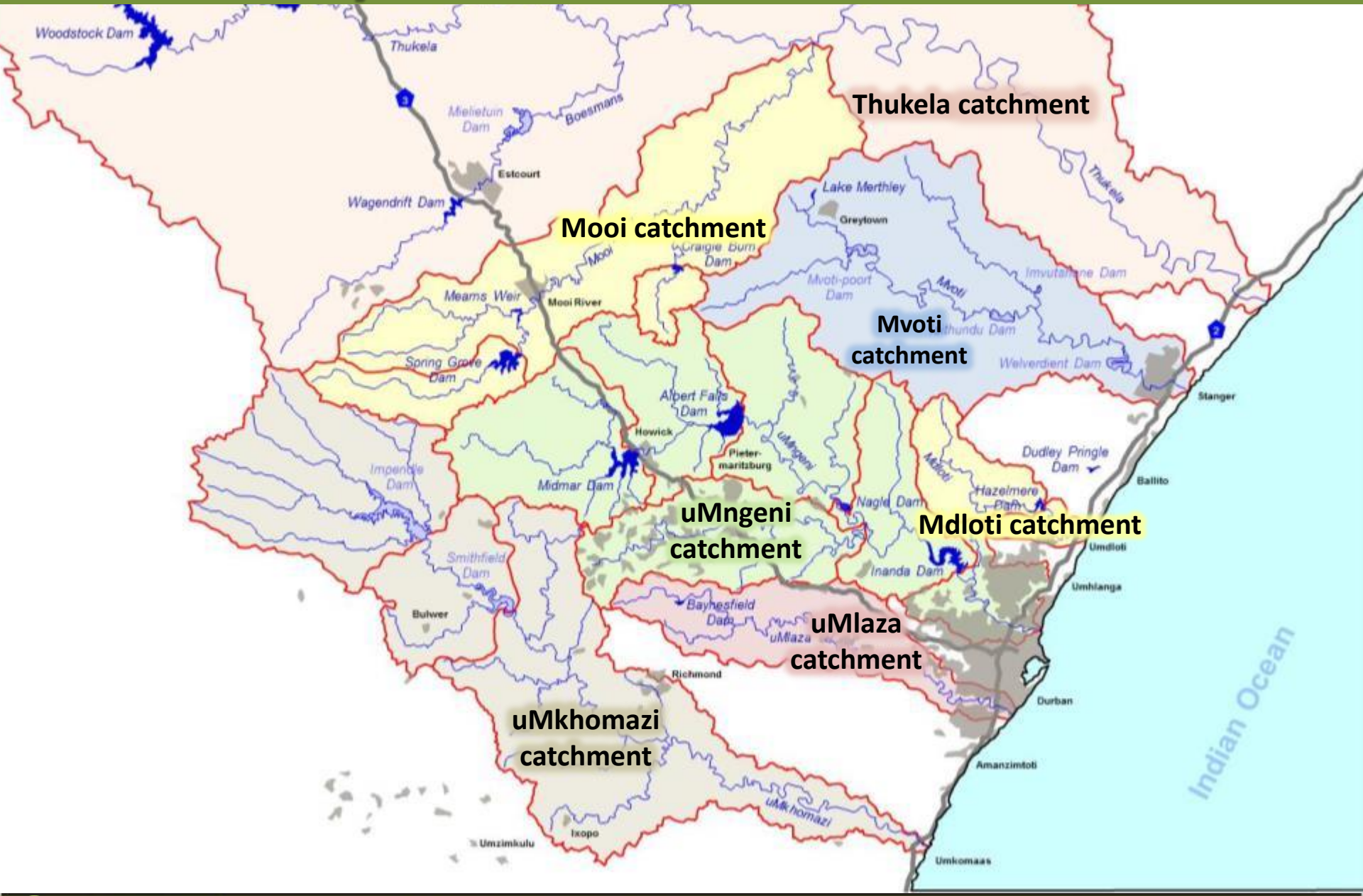
25 February 2015

SUMMARY OF PRESENTATION

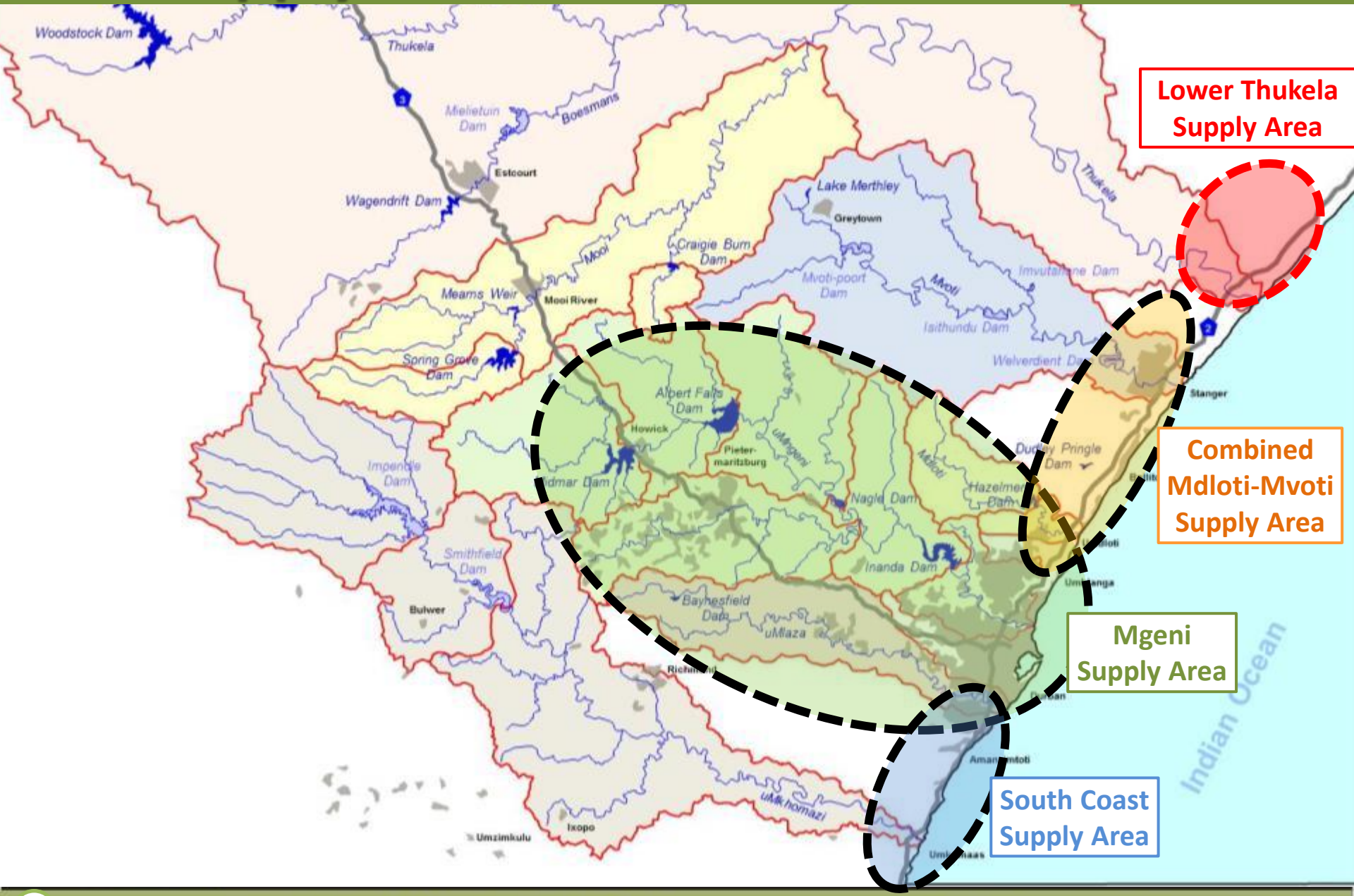
1. Supply areas covered in Reconciliation Strategy
2. Water requirement projections
3. Revised water balances (based on TSG4)
4. Risk assessment
5. Climate change impact assessment

SUPPLY AREAS

River systems in Reconciliation Area



Supply areas in Reconciliation Area



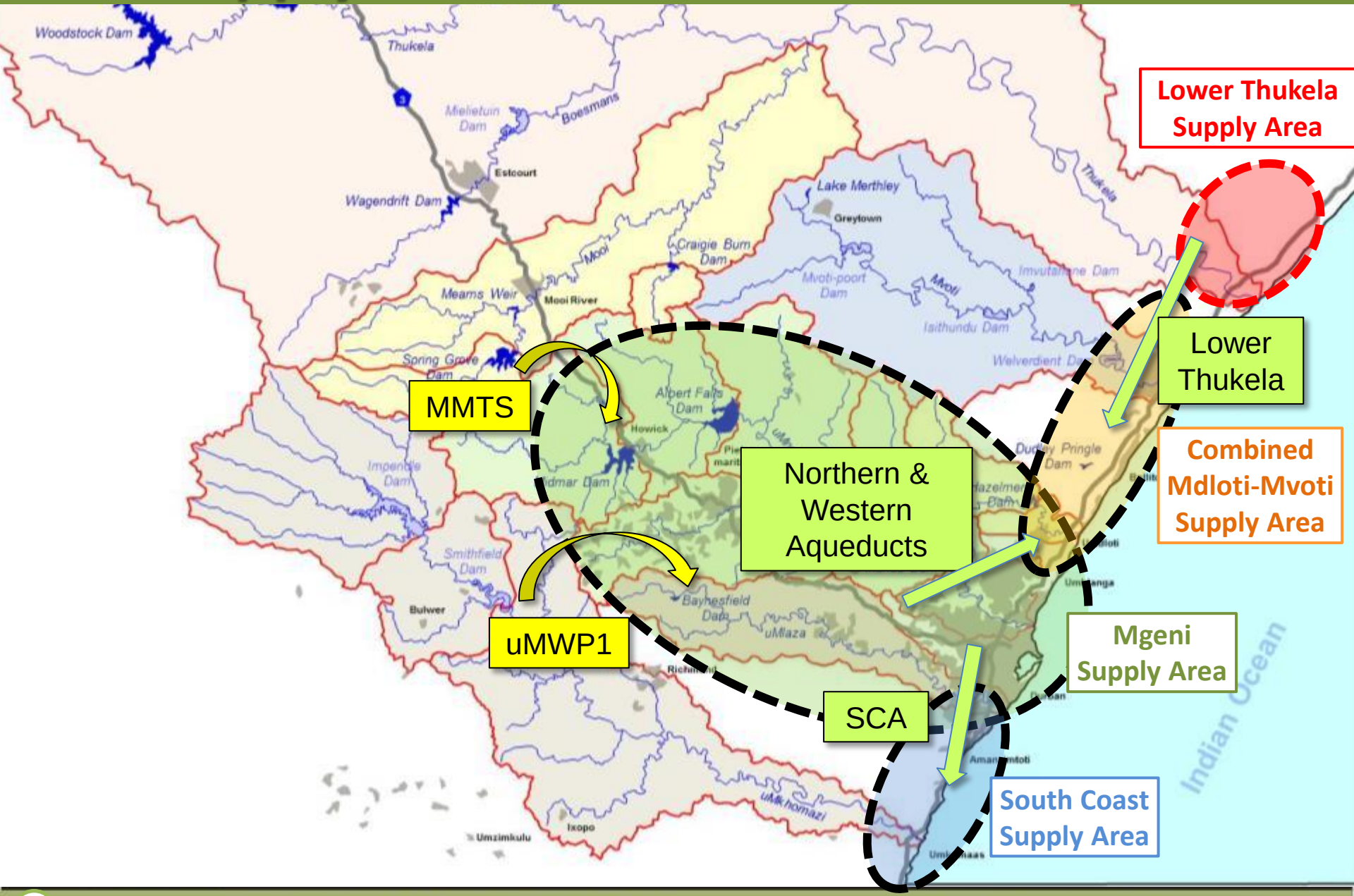
WATER REQUIREMENT PROJECTIONS

WATER REQUIREMENT PROJECTIONS

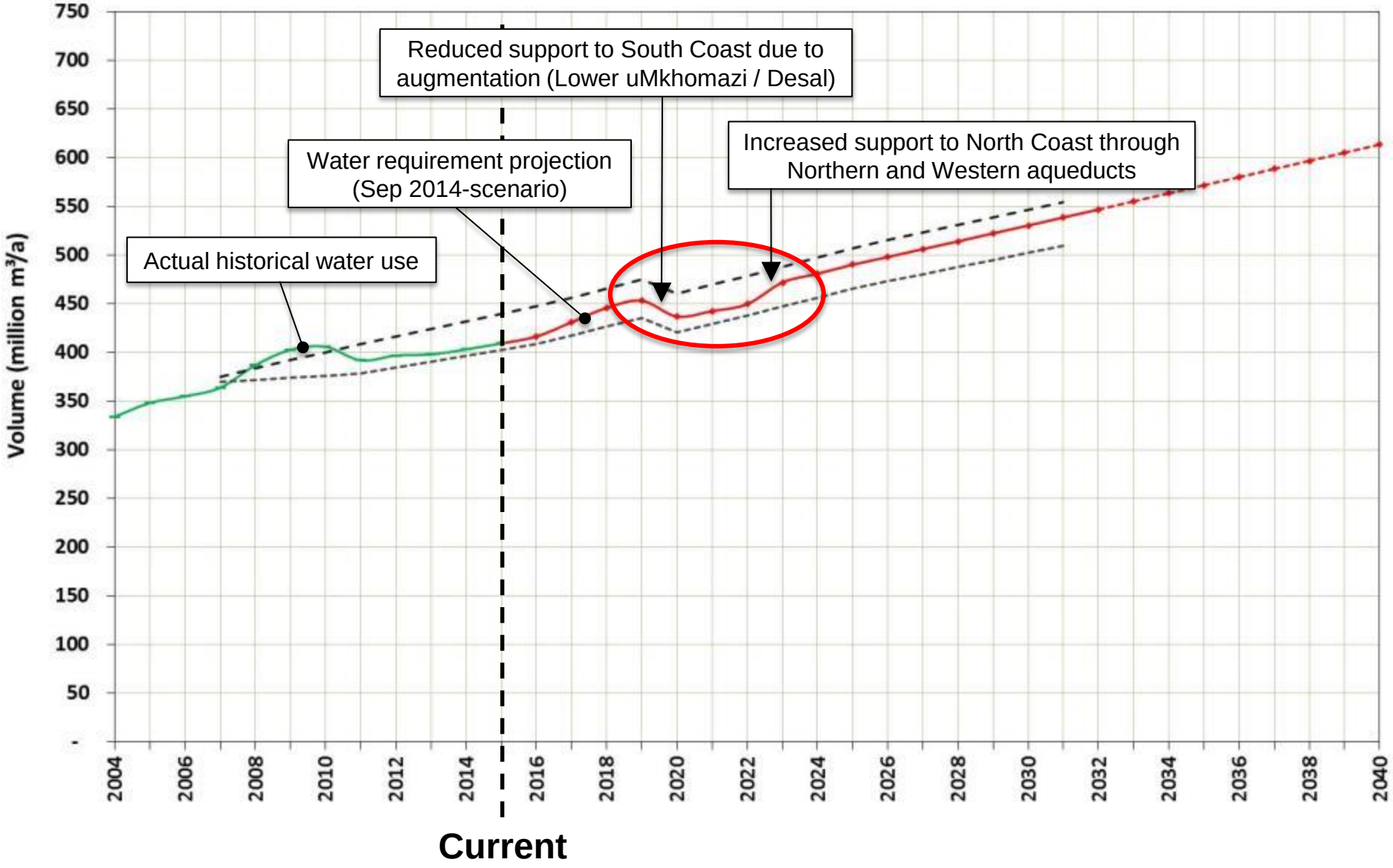
Improvements for presenting Water Balances:

1. Clearly show linkages between Mgeni WSS and the North and South Coast systems
2. Split infrastructure and water resource limitations components of availability
3. Account for suppressed supply along portions of South Coast
4. WC/WDM intervention impacts on water requirements and associated water balances
5. Possible climate change impacts

Supply areas in Reconciliation Area



MGENI WSS WATER REQUIREMENTS



INCLUSION OF WC/WDM

WC/WDM MASTER PLANS (E.G. MSUNDUZI):

Baseline Water Balance (2013/14)				Projected Water Balance (2018/19) - No Intervention				Projected Water Balance (2018/19) - With Intervention				5-year Intervention Budget Required (excluding VAT)	
SIV (kl/day)	BAC (kl/day)	NRW (kl/day)	NRW by Volume %	SIV (kl/day)	BAC (kl/day)	NRW (kl/day)	NRW by Volume %	SIV (kl/day)	BAC (kl/day)	NRW (kl/day)	NRW by Volume %	Capex (R million)	Opex (R million)
183 573	97 632	85 941	46.8%	206 395	102 789	103 606	50.2%	184 784	131 866	52 918	28.6%	R140	R27

i.e. WC/WDM saving = 206 – 185 Mℓ/d
= 21 Mℓ/d
= 7.7 million m^3/a
(±10% by volume)

INCLUSION OF WC/WDM

WC/WDM SUMMARY:

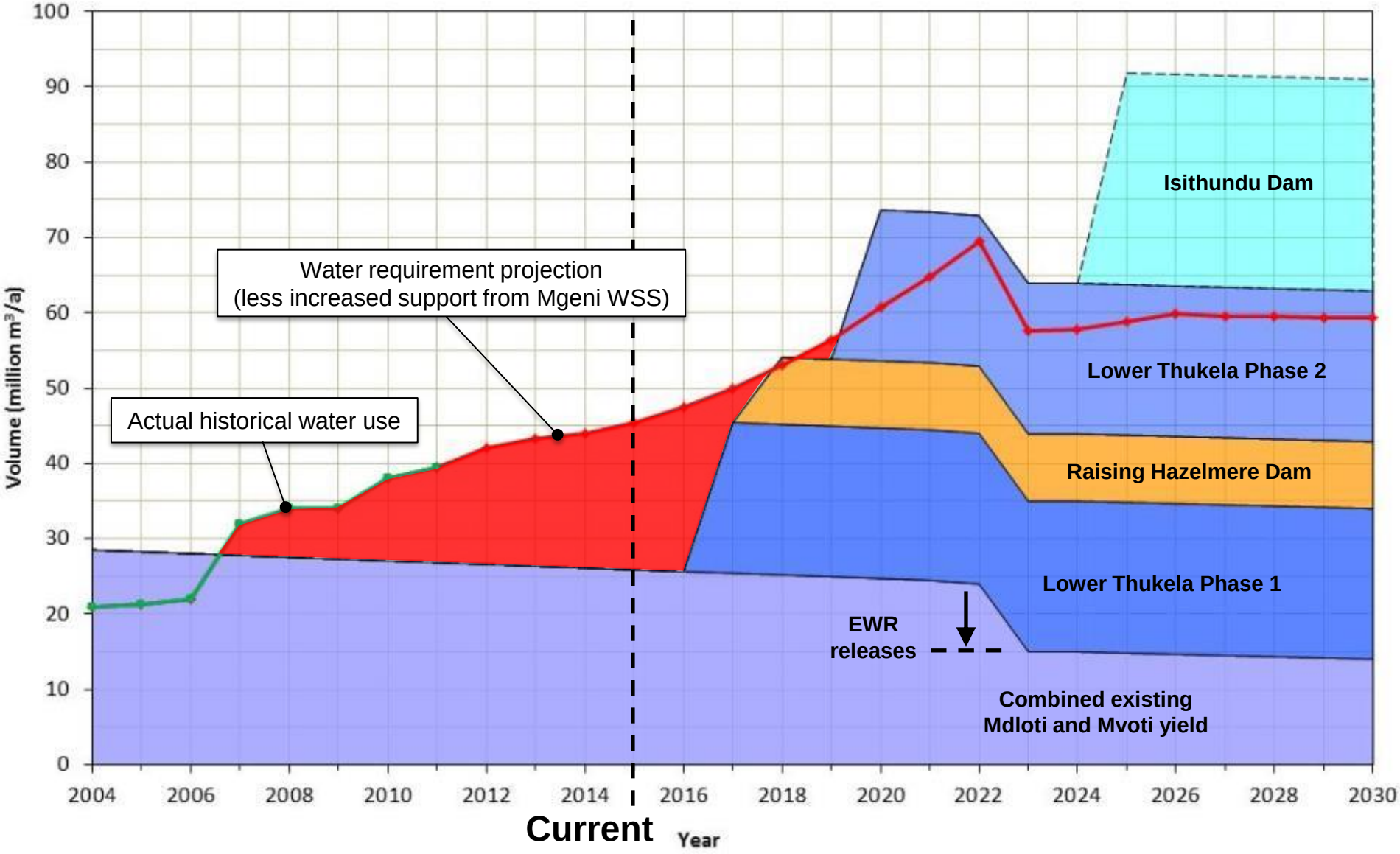
WSA	Baseline SIV (Mℓ/d)	5-year, No WC/WDM (Mℓ/d)	5-year, with WC/WDM (Mℓ/d)	Saving (Mℓ/d)	Saving (million m^3/a)
eThekwini	909	1 031	943	88	32.0
Msunduzi	183	206	185	21	7.7
Ugu					4.0
iLembe					1.8
Umgungundlovu					
Total				between **40 & 48**	

These WSA's have supply areas outside the KZN Coastal Metro's Recon Strategy Focus – Thus the volumes will only be partial

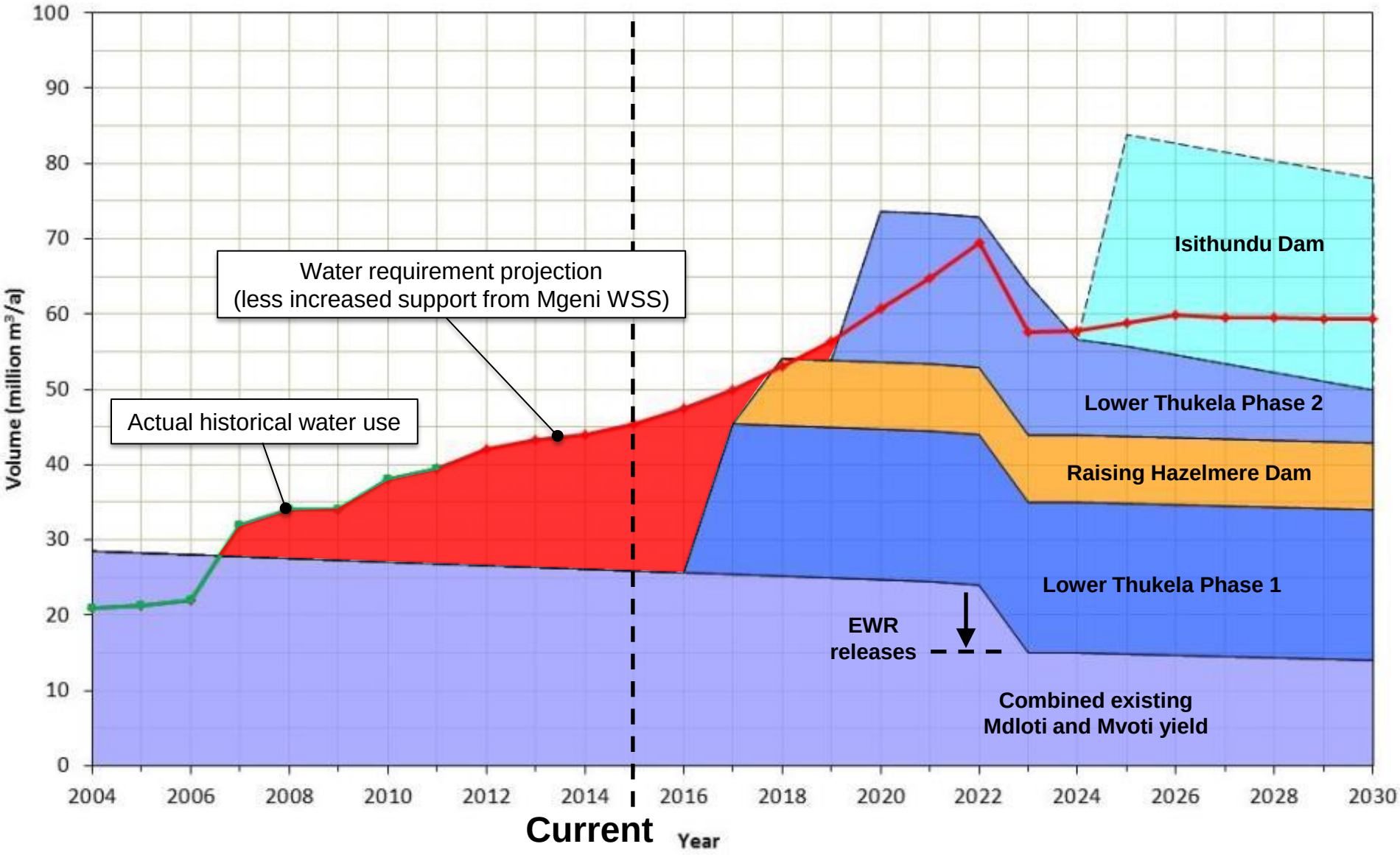
WC/WDM volumes mostly "factored" into water requirement projections

NORTH COAST WATER BALANCE (MDLOTI AND MVOTI)

BALANCE: COMBINED MDLOTI AND MVOTI

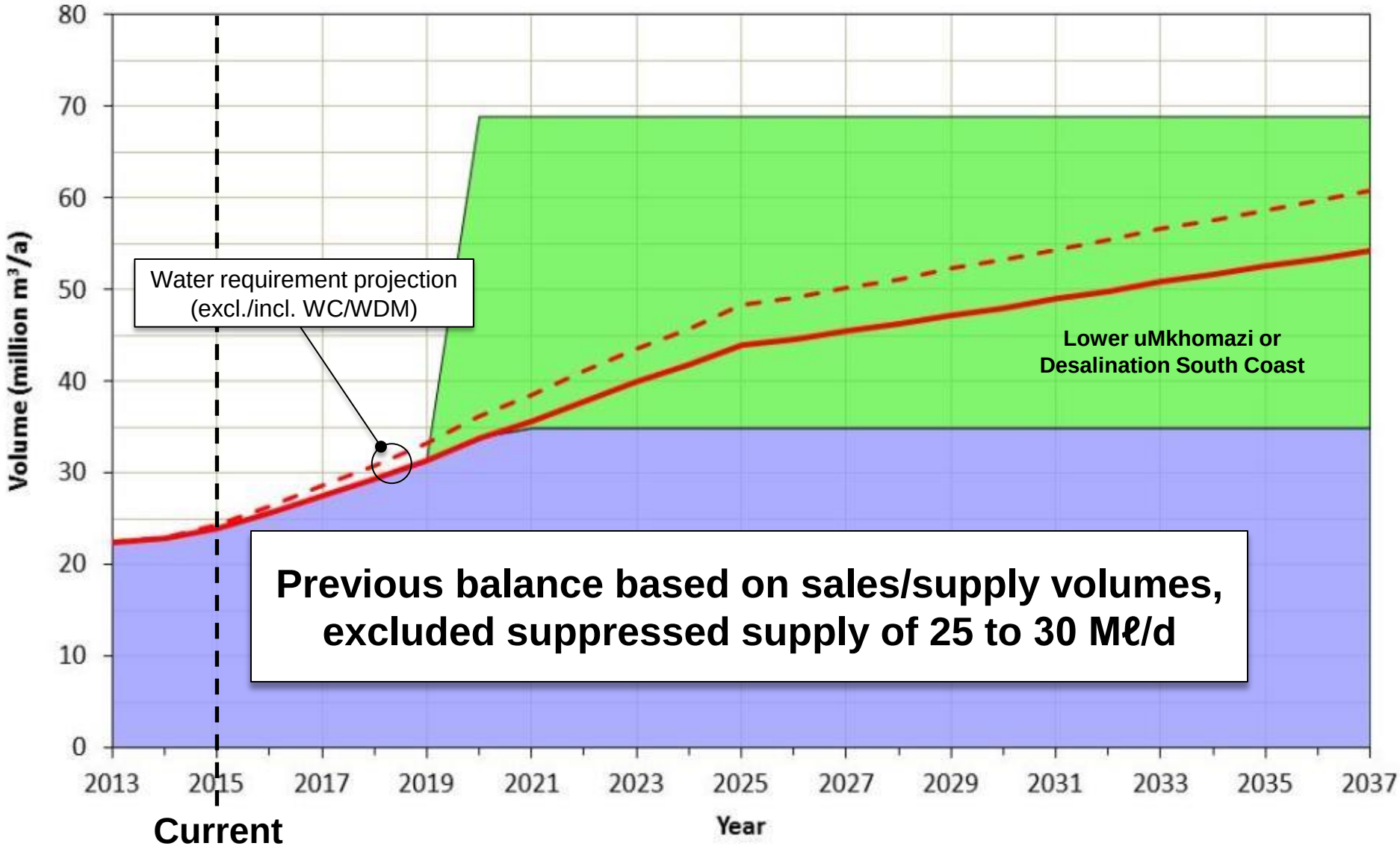


BALANCE: COMBINED MDLOTI AND MVOTI

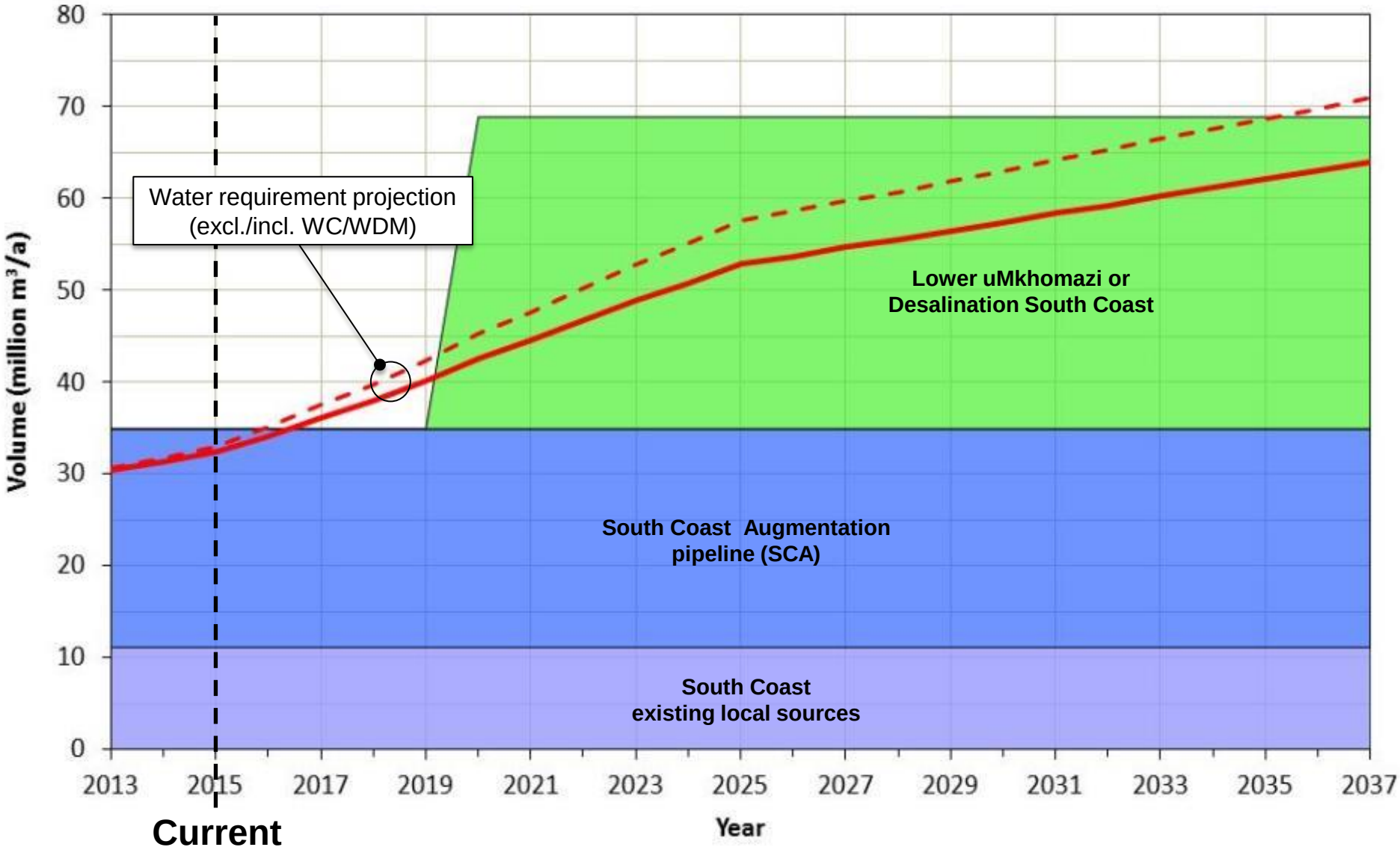


SOUTH COAST WATER BALANCE (UPPER AND MIDDLE)

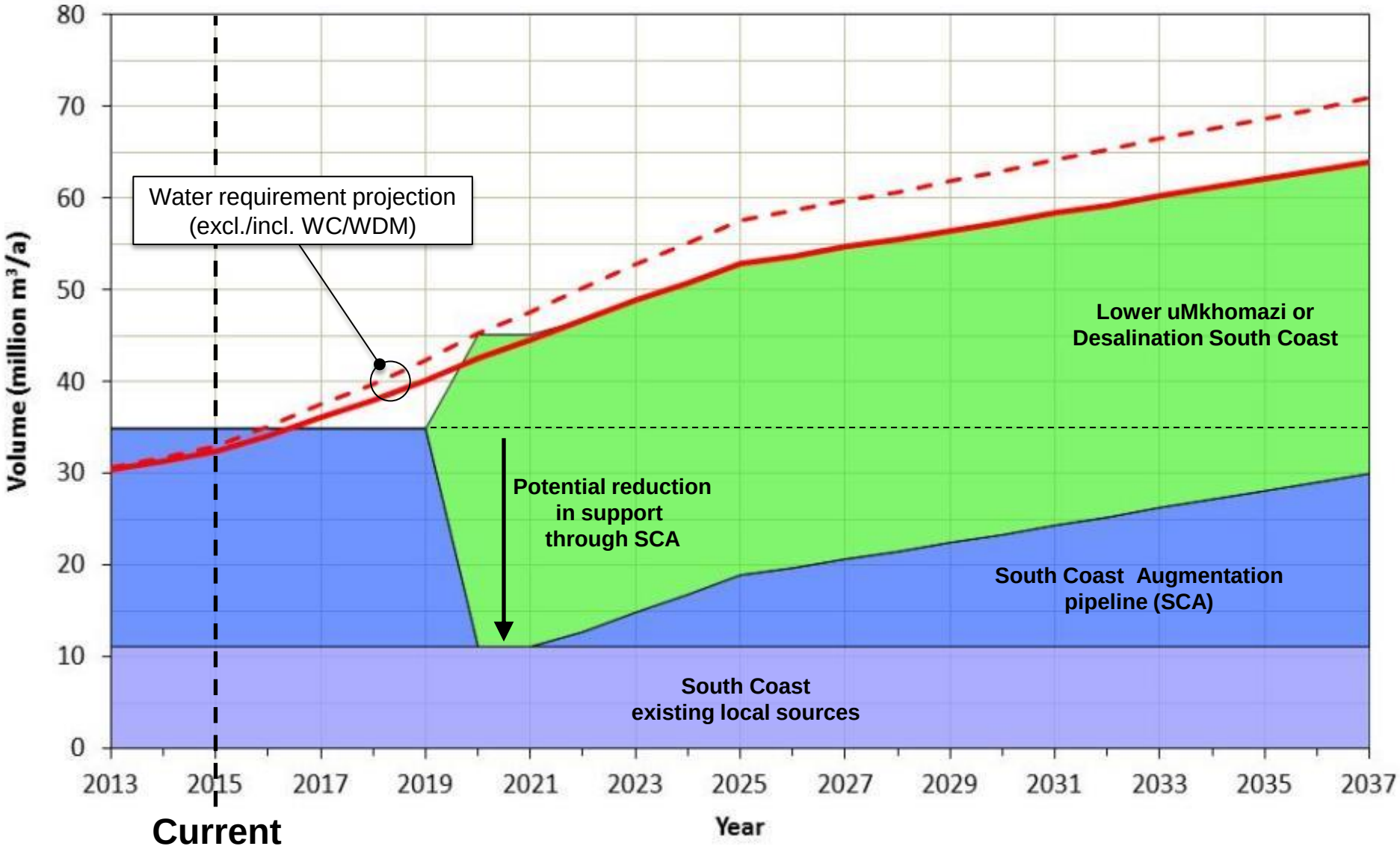
BALANCE: SOUTH COAST (1 OF 3)



BALANCE: SOUTH COAST (2 OF 3)



BALANCE: SOUTH COAST (3 OF 3)



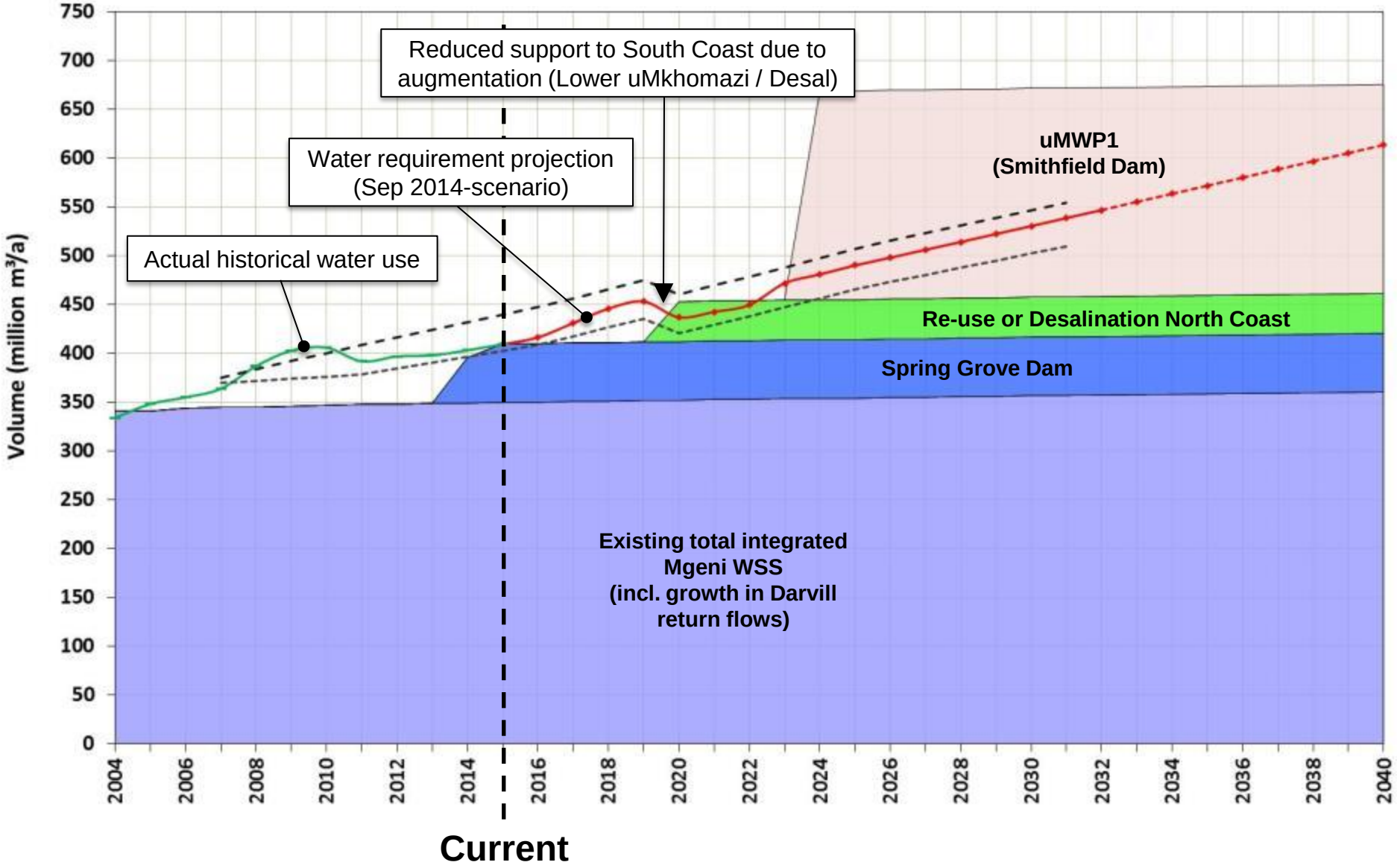
MGENI WSS
WATER BALANCE

6.2 RECONCILIATION SCENARIOS – MGENI WSS

Different combination of intervention options:

- Scenario A & B: Re-use or Desalination, then uMWP1
- Scenario C: Re-use and Desalination, then uMWP1
- Scenario D: uMWP1 Only

BALANCE: RE-USE OR DESAL, THEN UMWP1



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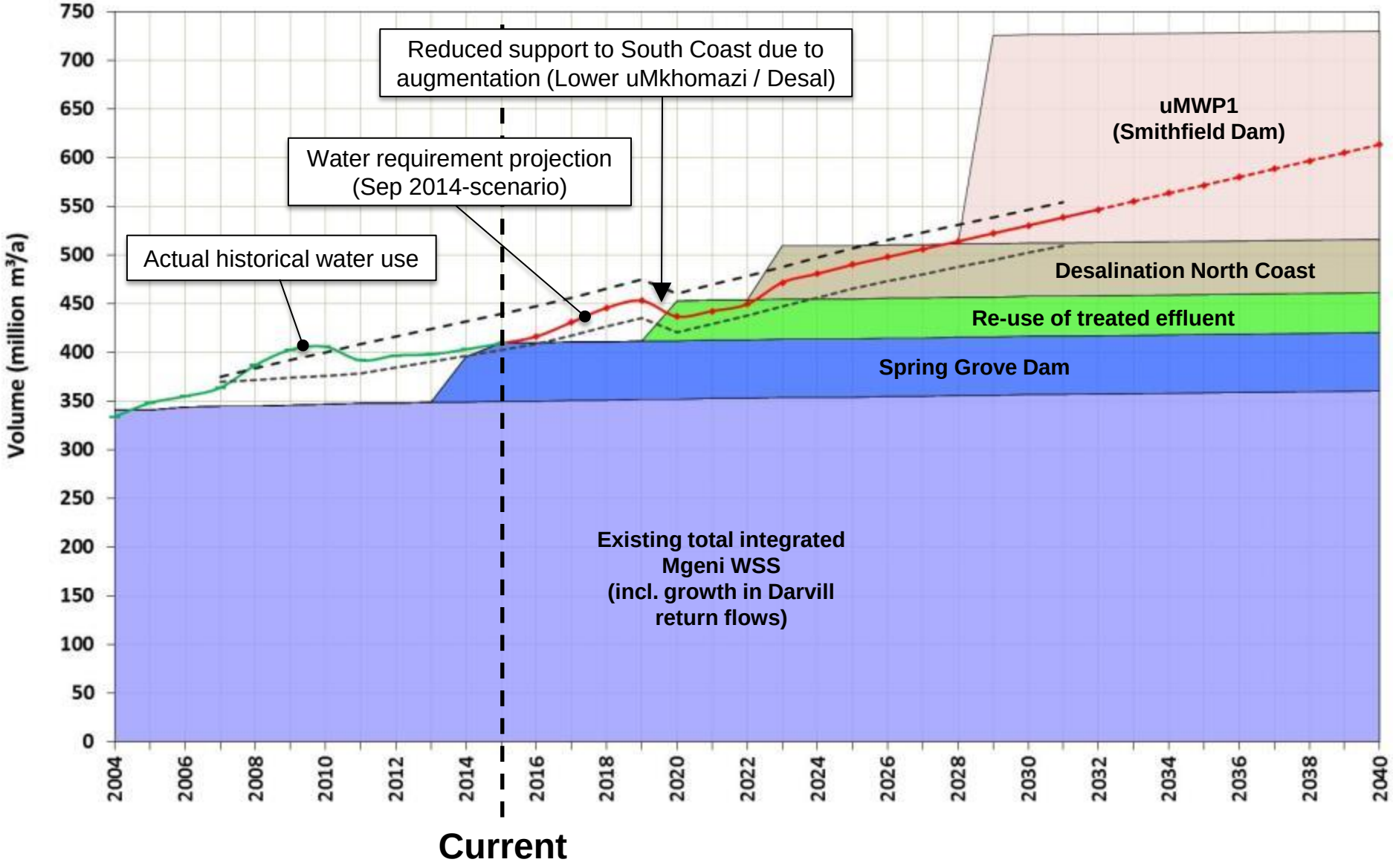
BALANCE: RE-USE AND DESAL, THEN UMWP1



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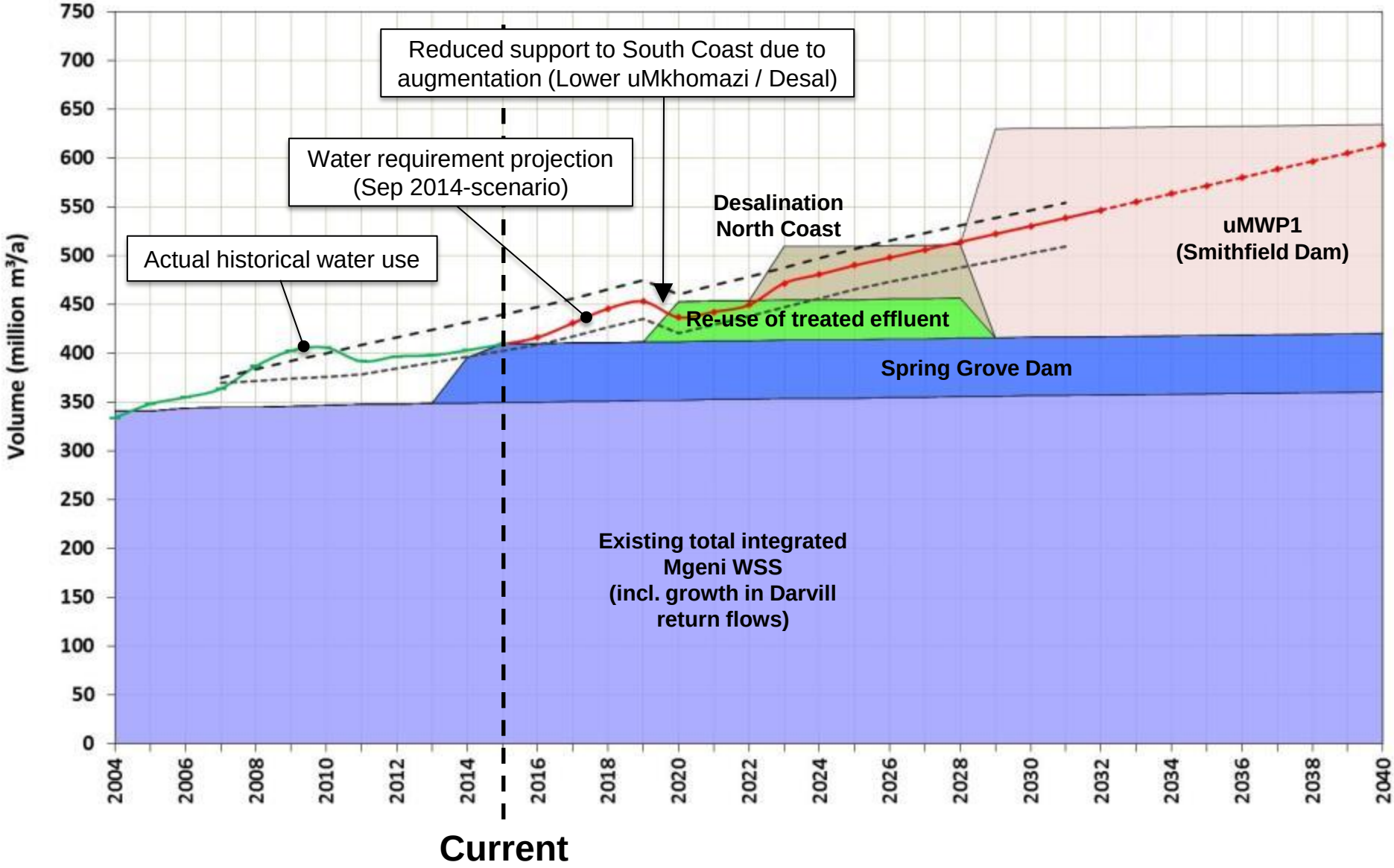
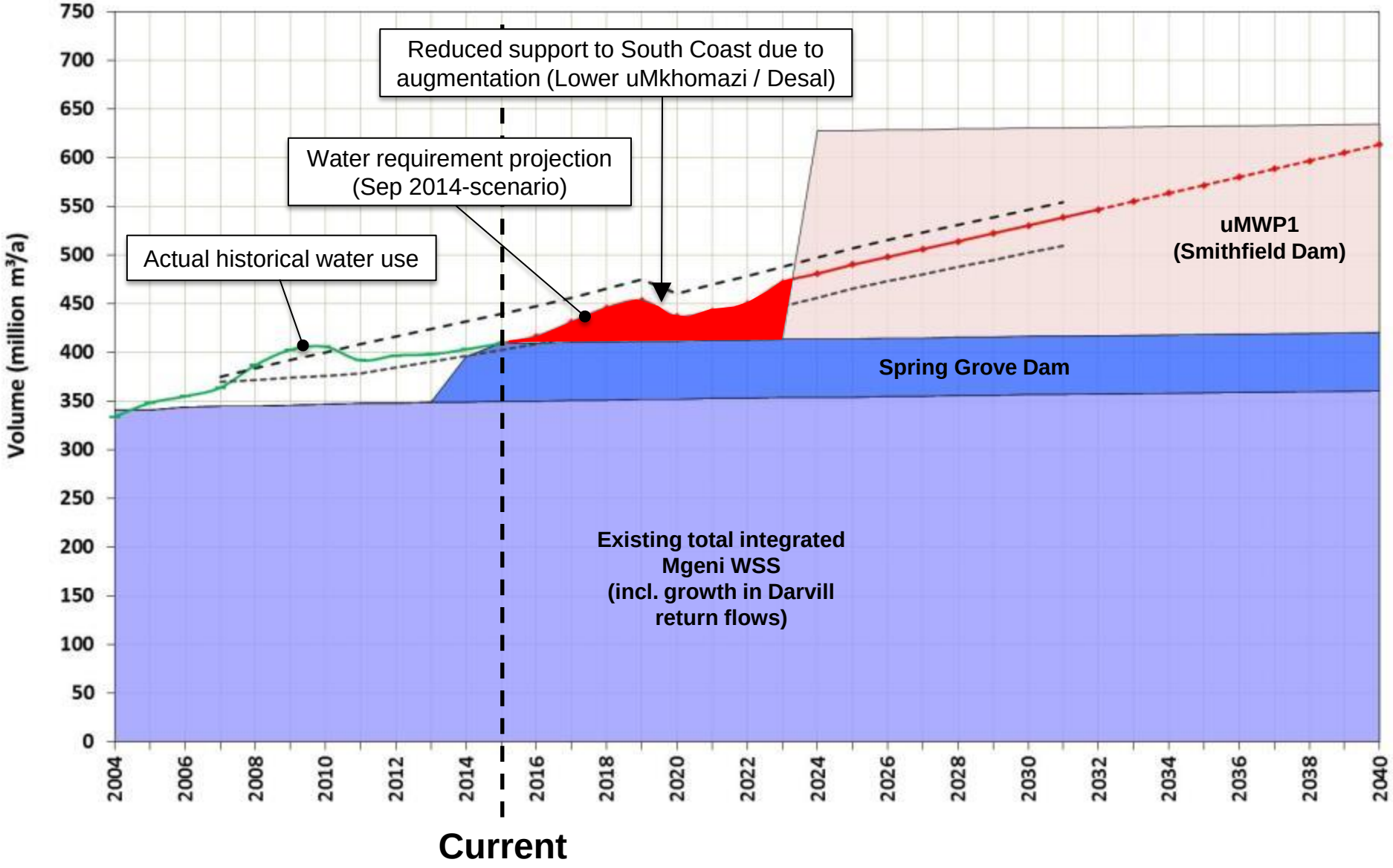
BALANCE: RE-USE AND DESAL, THEN UMWP1 (2)



BALANCE: UMWP1 ONLY



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RISK ASSESSMENT

RISK DURING DEFICIT PERIOD

Through the fortune of above average rainfall over the past decade, the recent deficit period up until MMTS2 did not manifest as a water shortage.

But the risk was there!

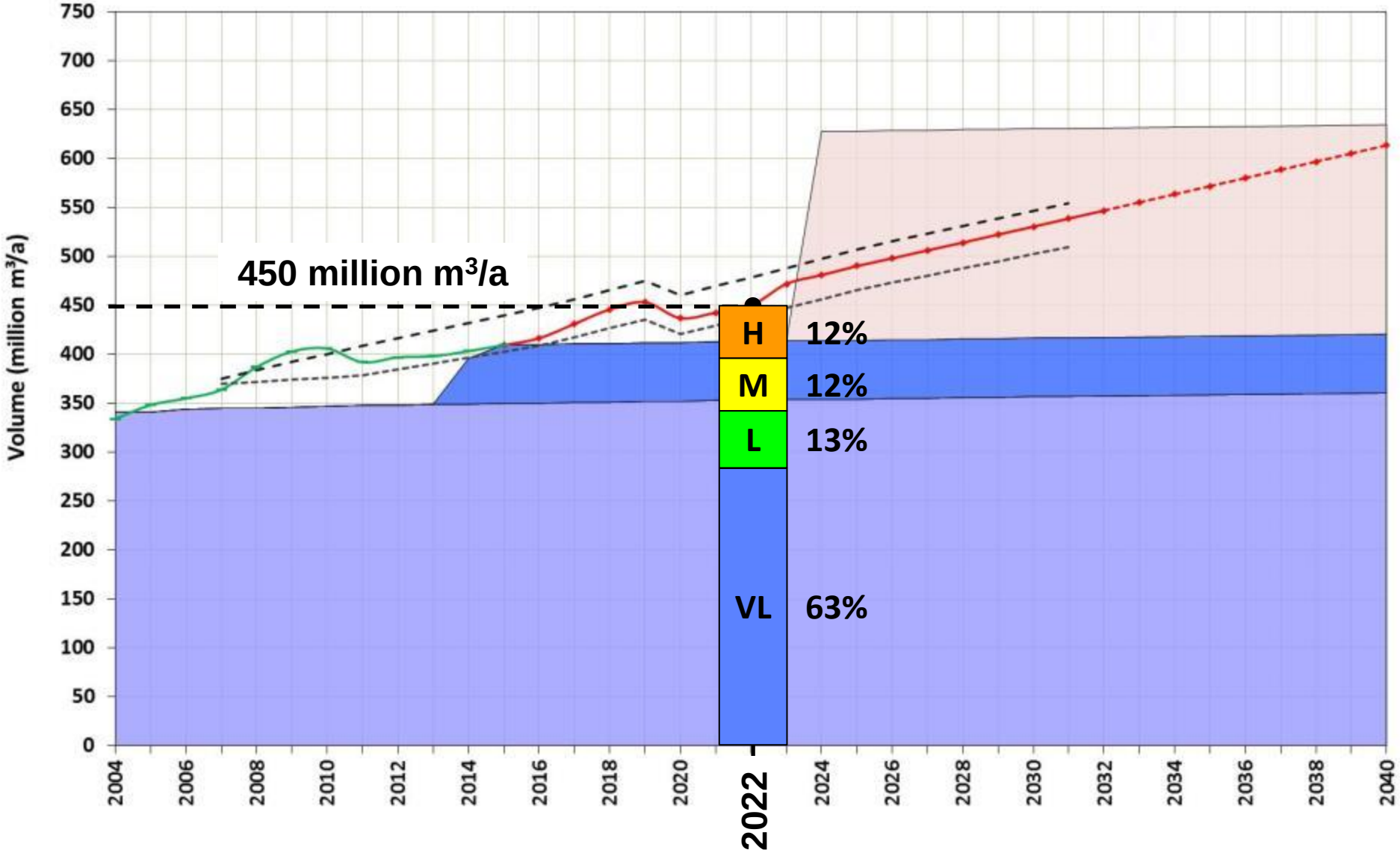
- What is risk assuming a similar deficit up to, say, 2023? (i.e. under Scenario D)
- What is risk if uMWP is delayed by, say, 5 years?

Risk assessment conducted to compare desired assurance of supply with actual achievable assurance of supply (yield)

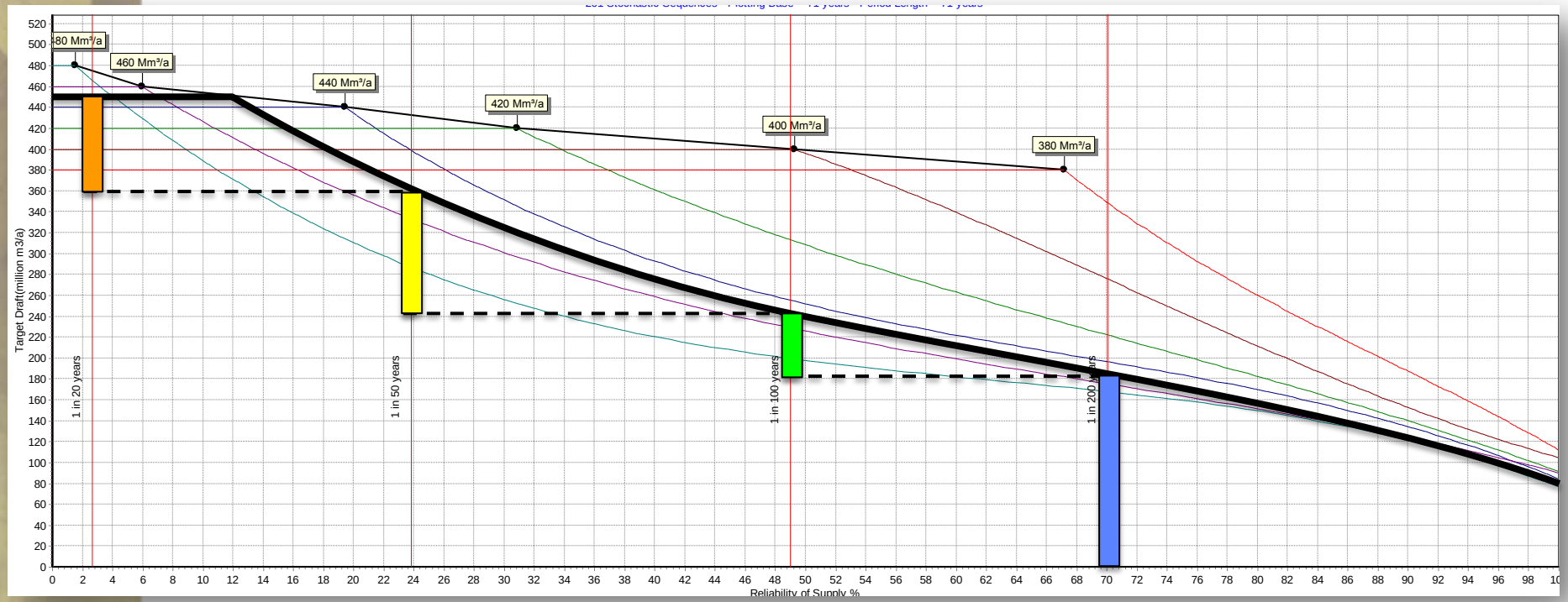
MGENI WSS RISK CRITERIA

User risk classification	Annual assurance of supply	Annual risk of failure	RI of failure (years)	% of total
High (H)	**95%**	**5%**	**1:20**	**12%**
Medium (M)	**98%**	**2%**	**1:50**	**12%**
Low (L)	**99%**	**1%**	**1:100**	**13%**
Very Low (VL)	**99.5%**	**0.5%**	**1:200**	**63%**
Total	-	-	-	100%

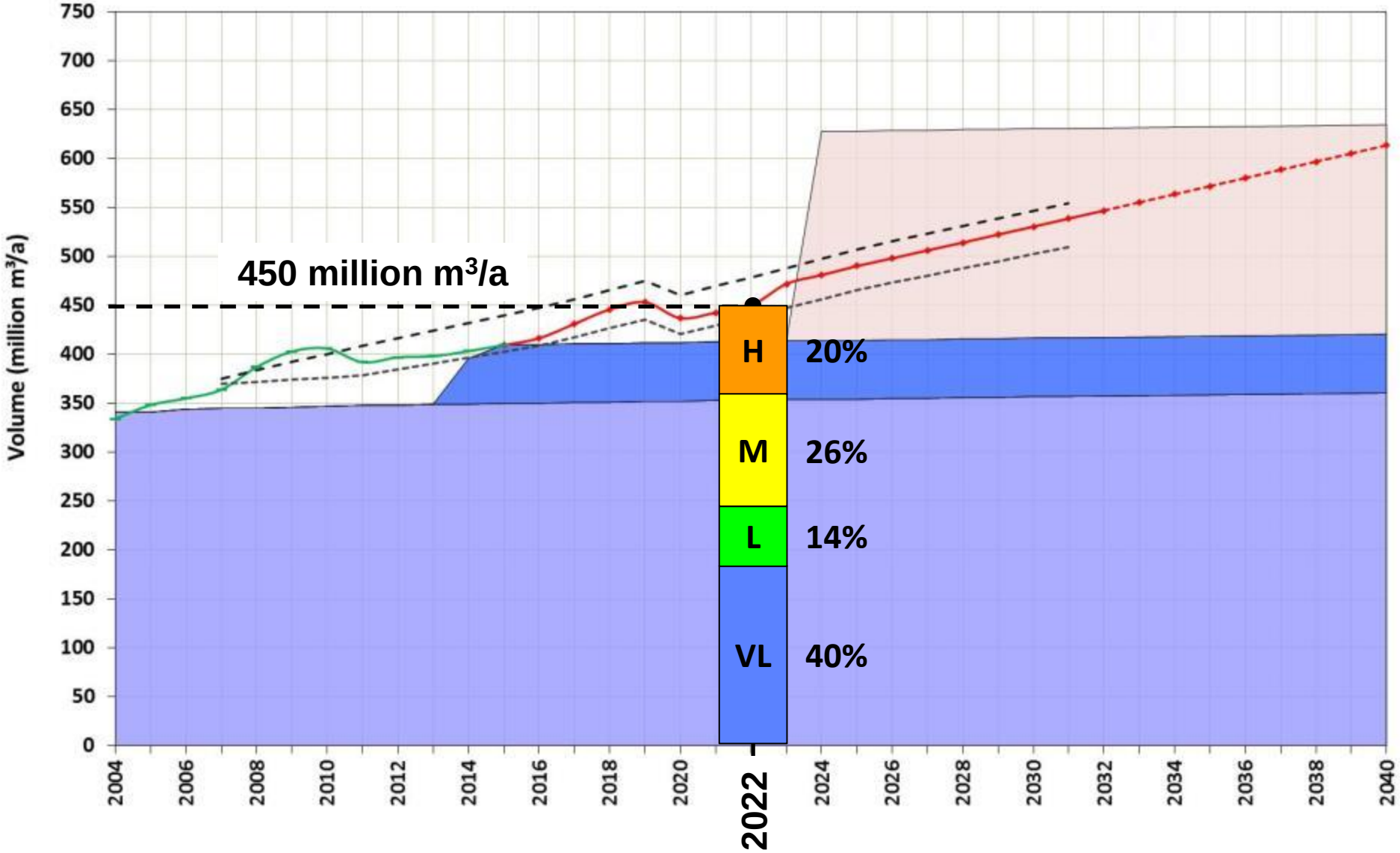
MGENI WSS WATER REQUIREMENTS, E.G. 2022



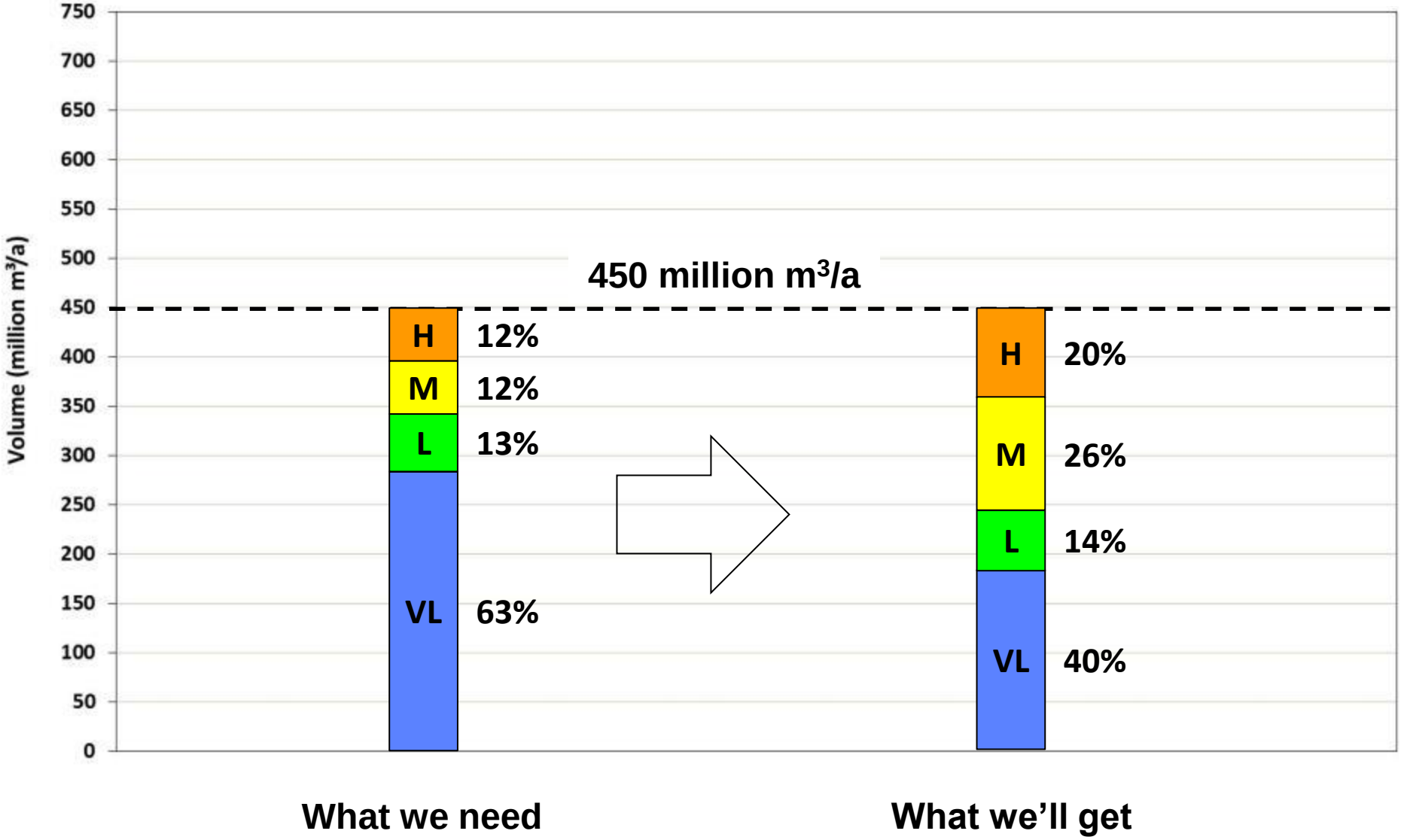
MGENI WSS WATER SUPPLY, E.G. 2022



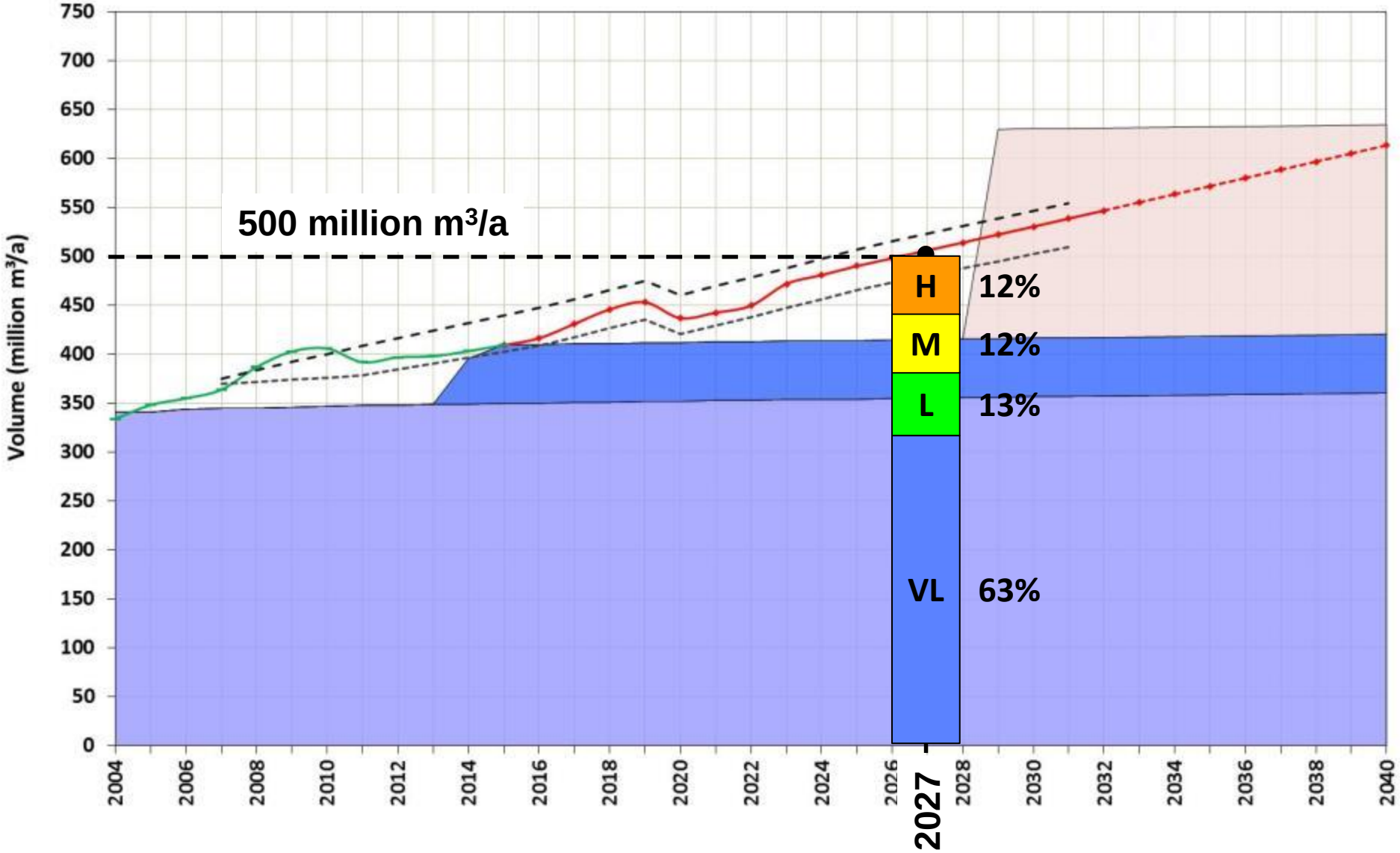
MGENI WSS WATER SUPPLY, E.G. 2022



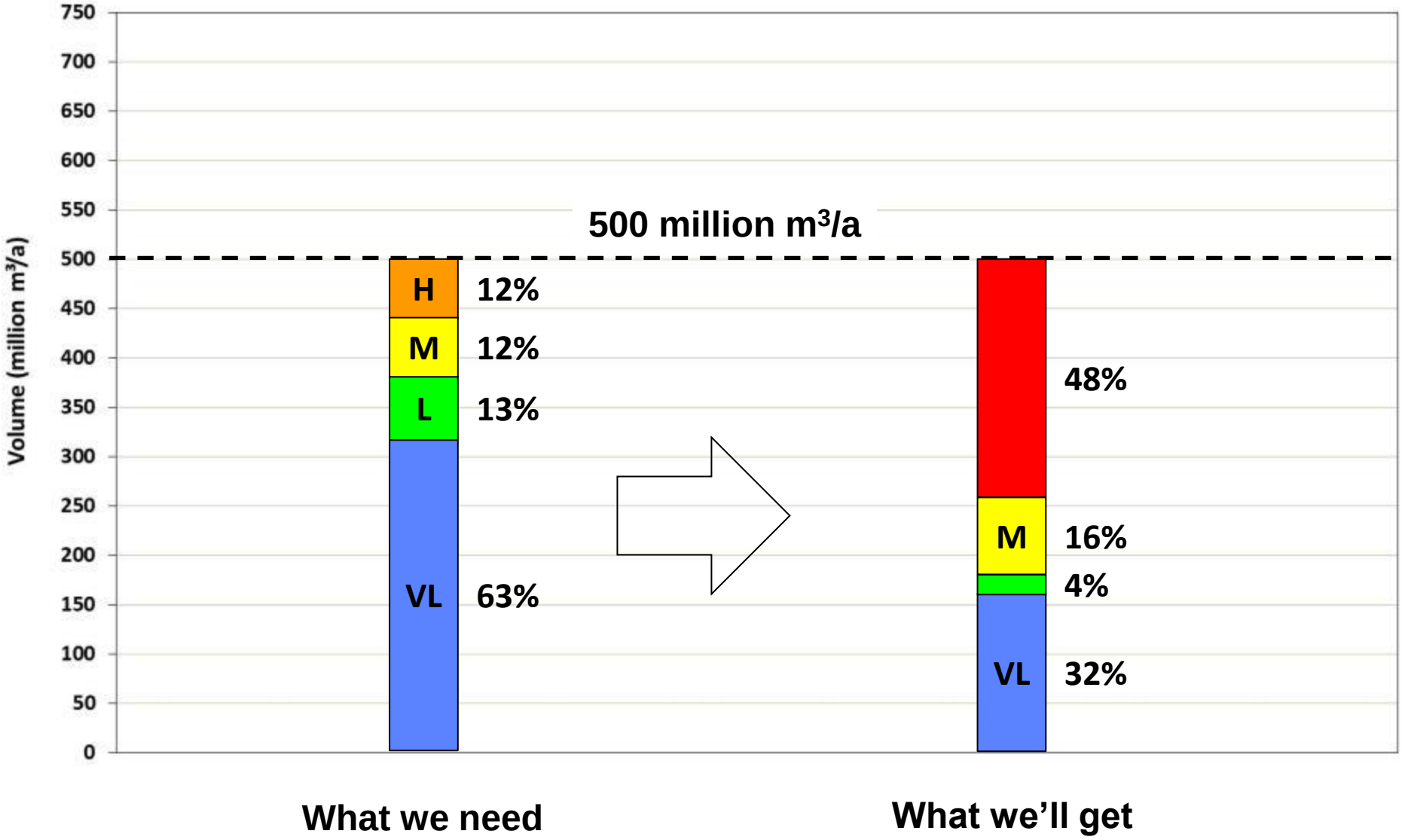
MGENI WSS REQUIREMENTS VS. SUPPLY, E.G. 2022



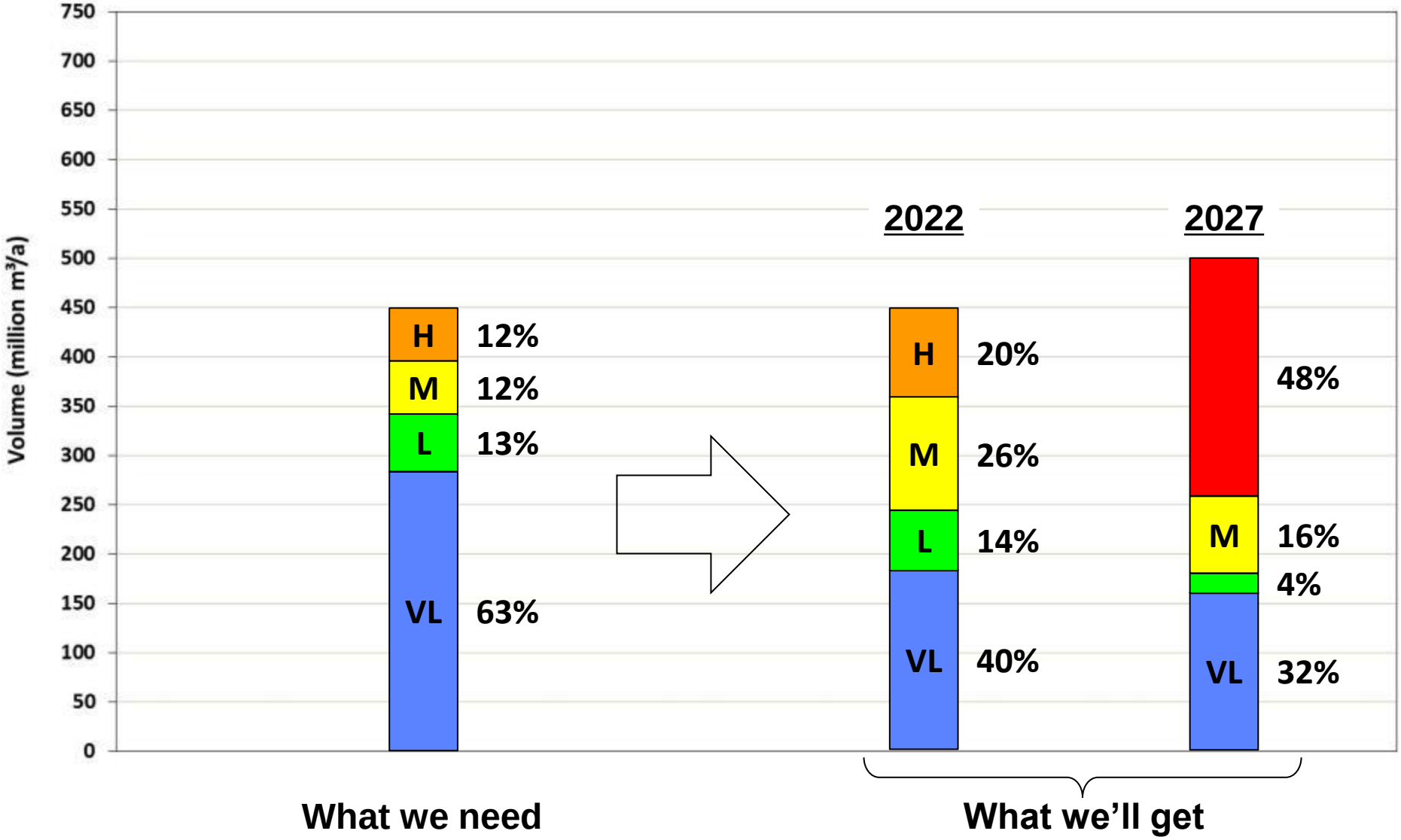
MGENI WSS WATER REQUIREMENTS, E.G. 2027



MGENI WSS REQUIREMENTS VS. SUPPLY, E.G. 2027



WHAT DOES THIS MEAN?



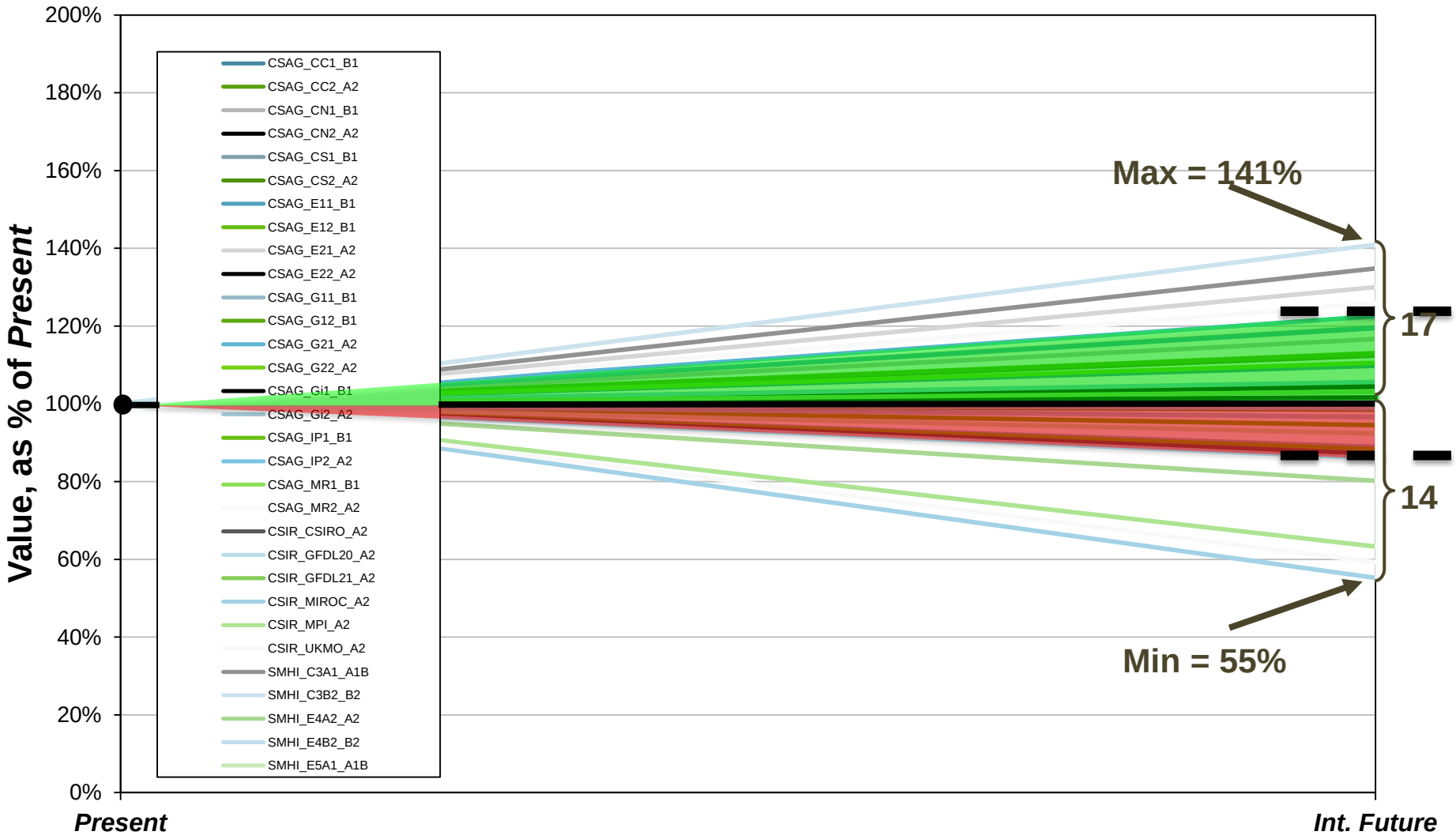
WHAT DOES THIS MEAN?

- **What's the perception of water restrictions by:**
  - System operators and managers?

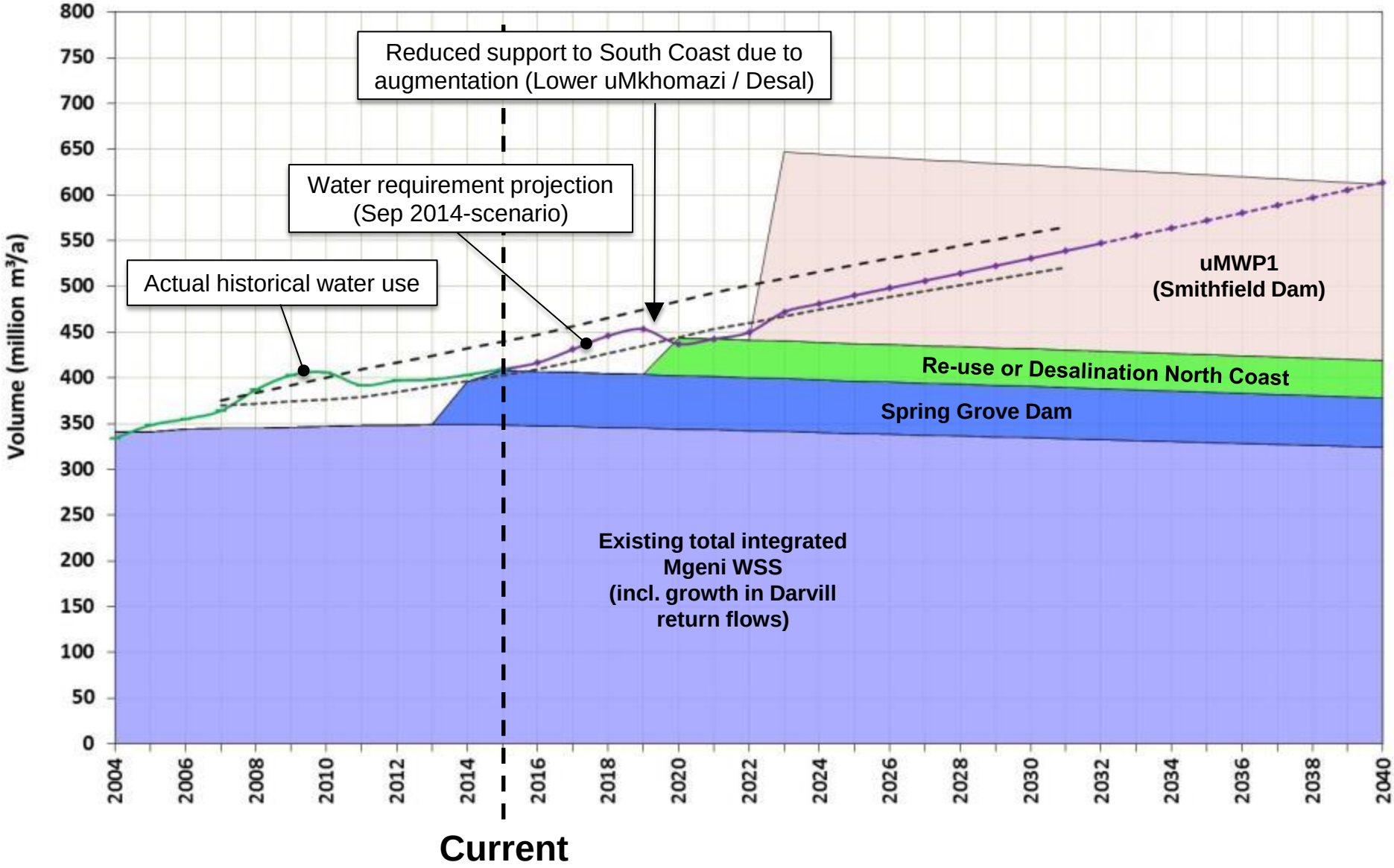
    (e.g. eThekwini and Umgeni Water)
  - Water users?
- **Increased risk vs. cost of interim solutions?**

CLIMATE CHANGE IMPACTS ON WATER AVAILABILITY AND WATER BALANCES

CLIMATE CHANGE – FUTURE VARIANCE



BALANCE: CLIMATE CHANGE (1)



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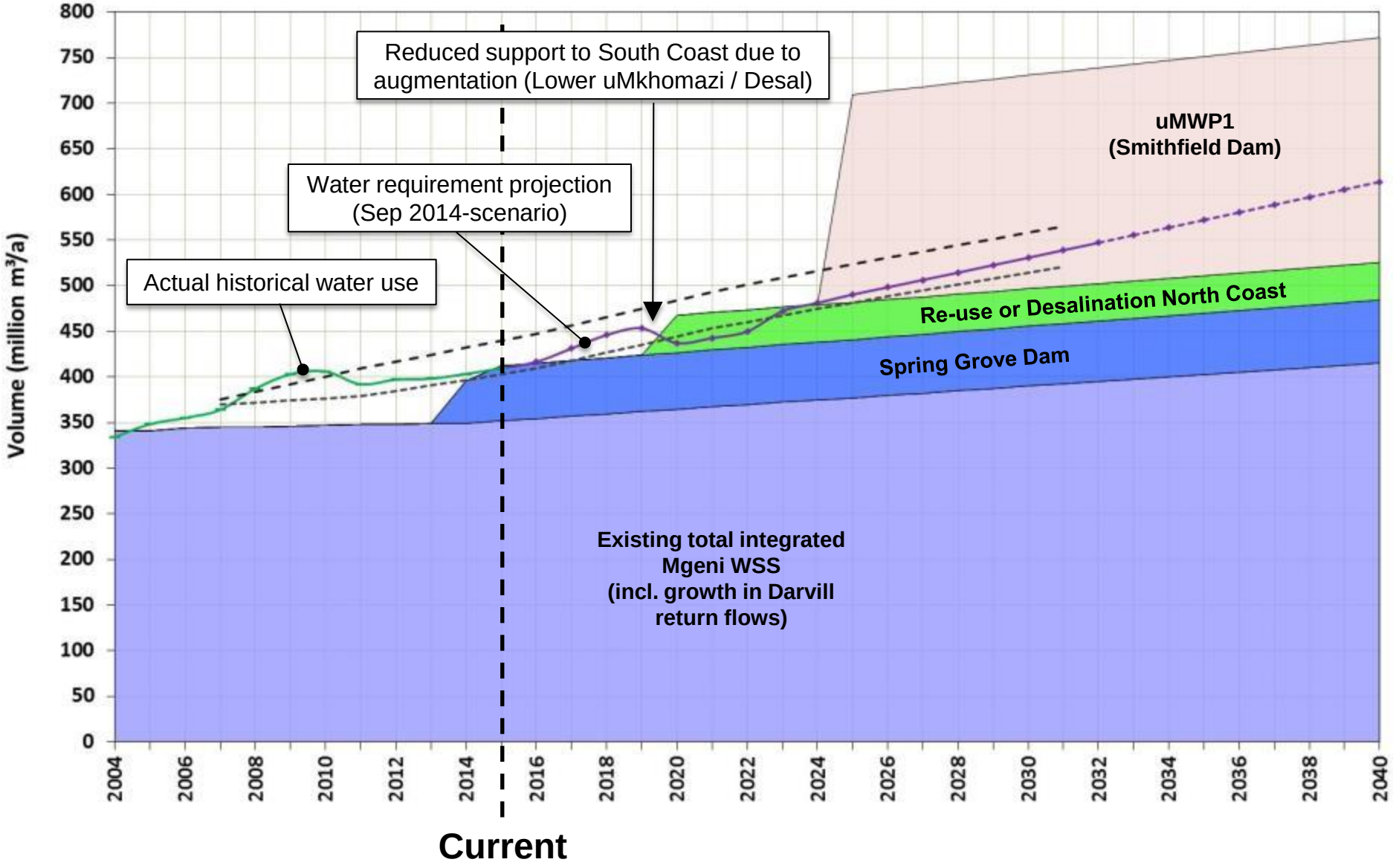
BALANCE: CLIMATE CHANGE (2)



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CLIMATE CHANGE IMPACTS – SUMMARY

Range of climate change futures has more pronounced effect over longer term:

- Limited impact over short-term
- Result in possibly all of uMWP1 being utilised by 2040 or only 30%, i.e. current planning still applicable

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Thank you