October 15, 2014

Water Resource Planning

Conservation

Co. River System Conservation

Intake Pumping Station No. 3

Meeting Topics

- ❑ **Water Resource Planning Overview**
- ❑ **Conservation Recommendations**
- ❑ **Colorado River System Conservation Recommendations**
- ❑ **Intake Pumping Station No. 3 Recommendations**

Water Resource Planning Overview

Water Resource Planning

The Southern Nevada Water Authority was formed in part to conduct water resource planning for the region

- ✓ **Evaluate water resources and demands on a regional scale**
- ✓ **Maintain a 50-year resource planning horizon**
- ✓ **Anticipate and adapt to changing conditions**
- ✓ **Utilize a portfolio-based strategy to maximize water supply security**

Water Resource Planning

The guidance document for this effort is the SNWA's Water Resource Plan

- ✓ **Initially created in 1996**
- ✓ **Identifies existing water resource assets and options**
- ✓ **Evaluates and projects demands and supplies under different scenarios**
- ✓ **Amended as conditions dictate**
- ✓ **Most recently updated in 2009 to reflect hydrologic and economic conditions**

Water Resource Planning

Southern Nevada's water resource portfolio can be categorized into three classes:

- ✓ **Permanent Resources**
- ✓ **Temporary Resources**
- ✓ **Future Resources**

Water Resource Planning

Current Permanent Resources are focused predominantly on the Colorado River, which represents approximately 90 percent of the water presently delivered to Southern Nevadans

- ✓ **Colorado River allocation**
- ✓ **Return flow credits**
- ✓ **Las Vegas Valley groundwater rights**
- ✓ **Owned Muddy and Virgin River rights**
- ✓ **Coyote Spring imported Intentionally Created Surplus**
- ✓ **Direct water recycling**

Water Resource Planning

Current Temporary Resources take a variety of forms, but also rely extensively on the Colorado River as a delivery mechanism

- ✓ **Arizona Groundwater Bank**
- ✓ **California Water Bank**
- ✓ **Southern Nevada Groundwater Bank**
- ✓ **Intentionally Created Surplus***
  - **Short-term Virgin and Muddy River leases**
  - **Brock Reservoir credits**
  - **Yuma Desalting Plant – Pilot demonstration credits**
  - **Mexico Minute 319 agreement**

* Some temporary resources are not available during declared shortages

Water Resource Planning

The <u>Future Resources</u> listed below include potential supplies that are hydrologically independent of the river and projects producing water that can be conveyed through Lake Mead

- ✓ **In-State Groundwater Project**
- ✓ **Colorado River augmentation projects, transfers and exchanges of conserved water**
  - **Ocean desalination (via exchange agreement)**
  - **Brackish desalination (via exchange agreement)**
  - **Agricultural conservation**

Water Resource Planning

Because Southern Nevada is so reliant on Lake Mead, factors impacting its elevation are of particular concern

- ✓ **Colorado River Basin drought**
  - **Potential for declared shortages**
  - **Access to Lake Mead through existing infrastructure**
  - **Water quality impacts at low reservoir levels**

- ✓ **Climate change**
  - **Mid- to long-term reductions in natural Colorado River inflows**
  - **Projected increases in water consumption due to increased temperatures and changing precipitation patterns**

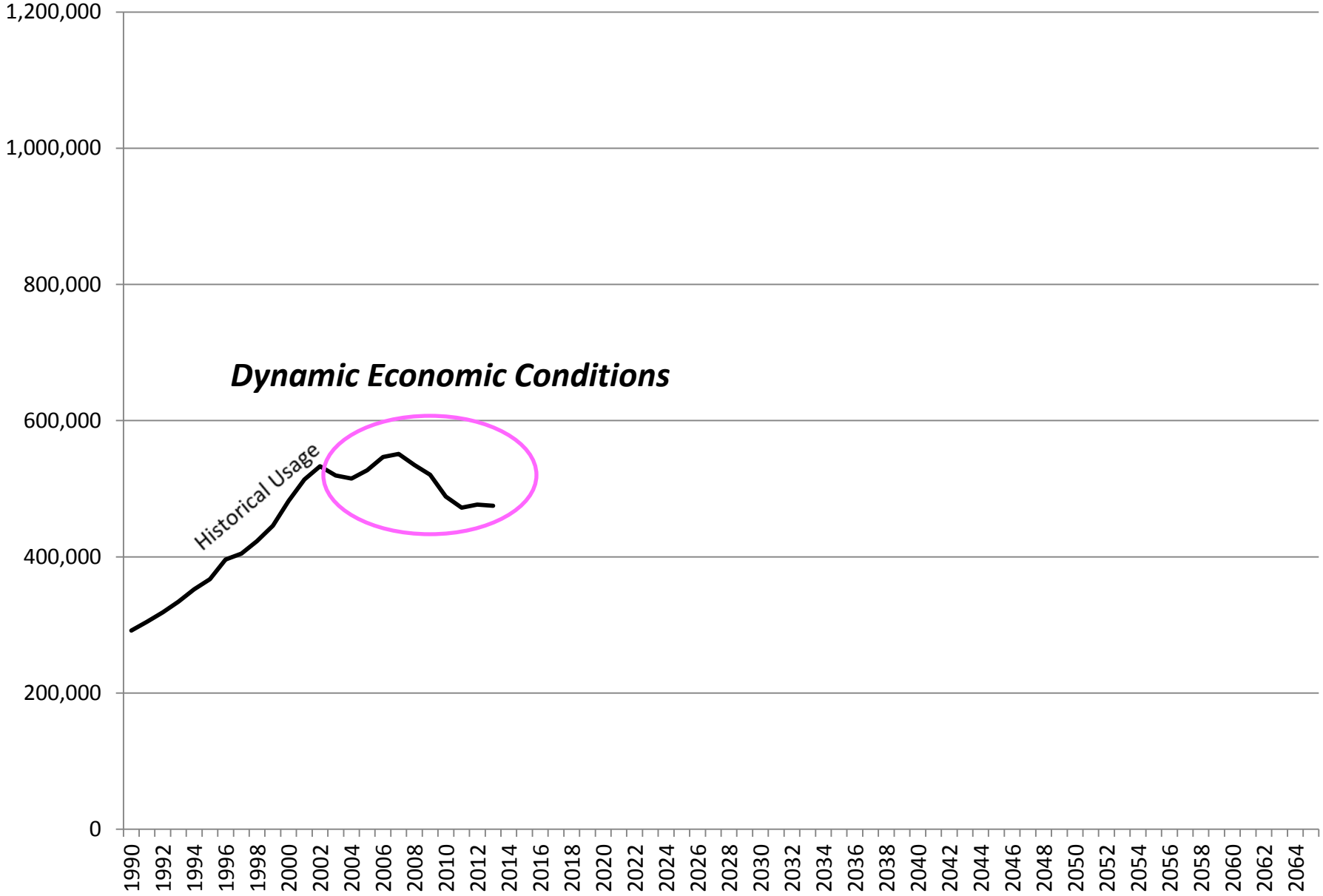
- ✓ **California (in-state) drought**
  - **Withdrawals by CA agencies from Lake Mead water banks**
  - **Reduced opportunities for "shared" augmentation projects**

Water Resource Planning

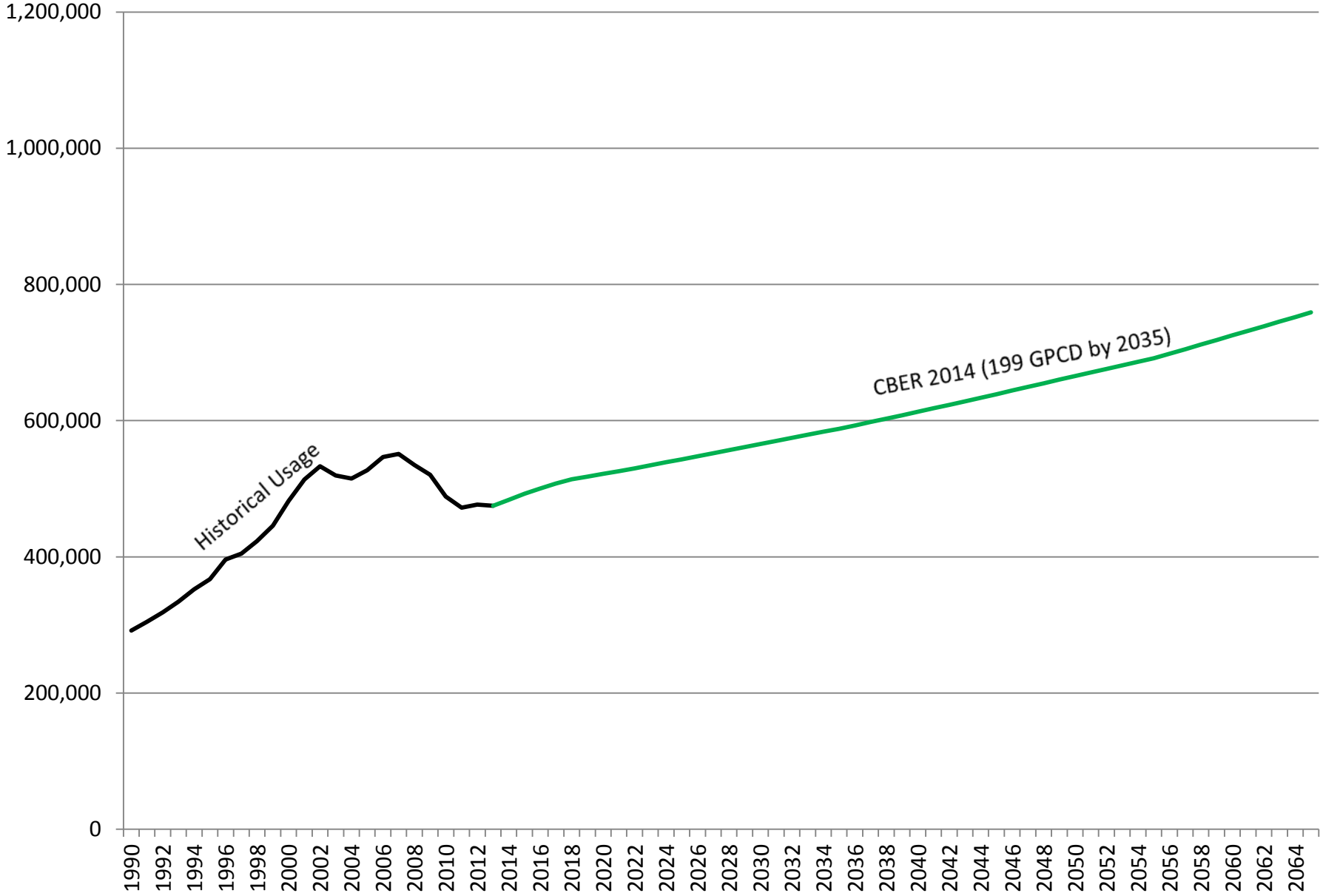
The SNWA takes a conservative approach to projecting population and hydrologic conditions due to historical variability

- ✓ **Population forecast accounting for moderate growth is provided by the UNLV Center for Business and Economic Research**
- ✓ **SNWA also models an enhanced recovery scenario to reflect uncertainty and safeguard against underestimating population and demand**
- ✓ **Planning efforts encompass variable Colorado River conditions to account for normal hydrology, expected shortage, and severe shortage scenarios**
- ✓ **Scenarios are designed to capture a range of possibilities Southern Nevada may face**

SNWA Historical Weather Normalized and Projected Demands



SNWA Historical Weather Normalized and Projected Demands



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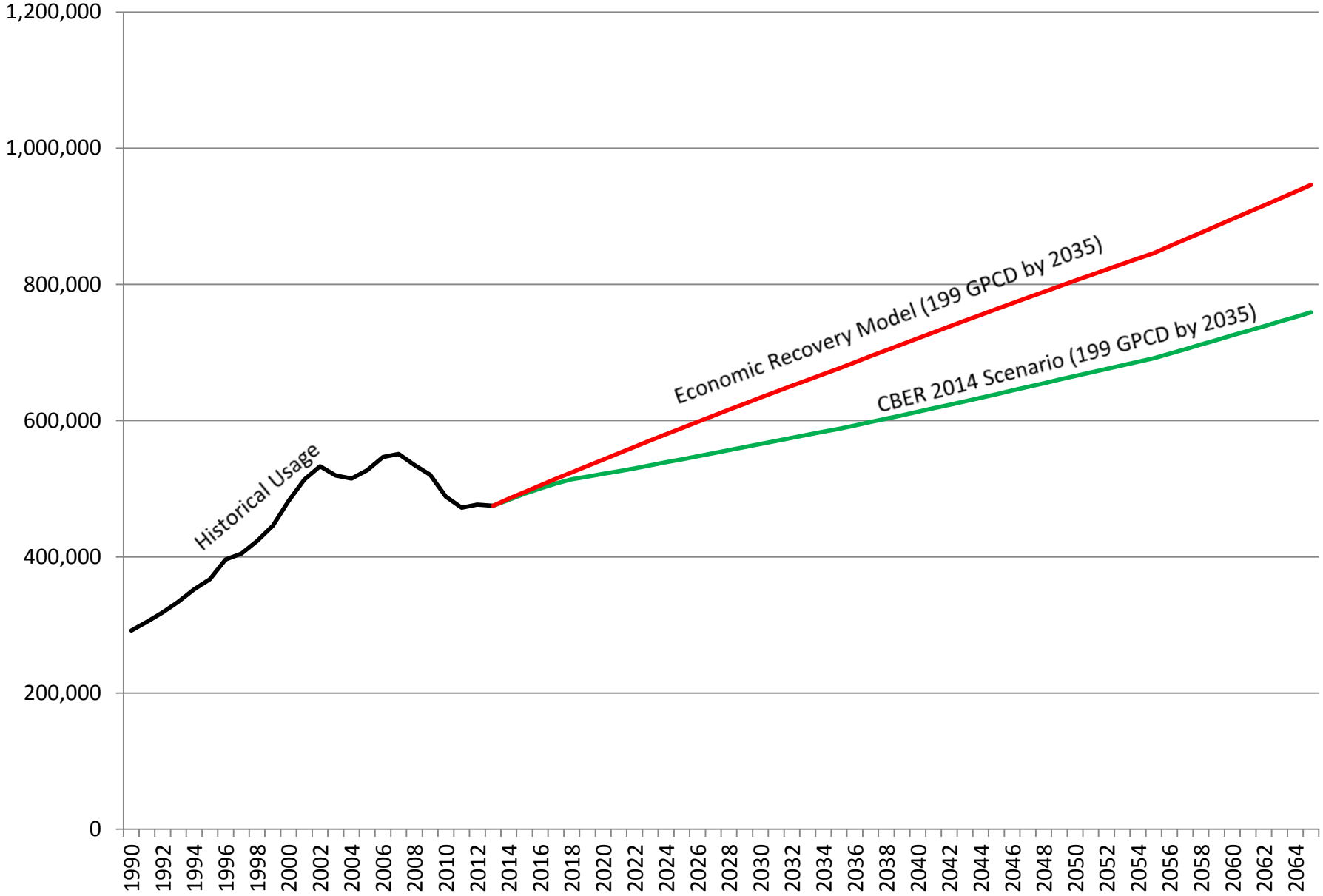

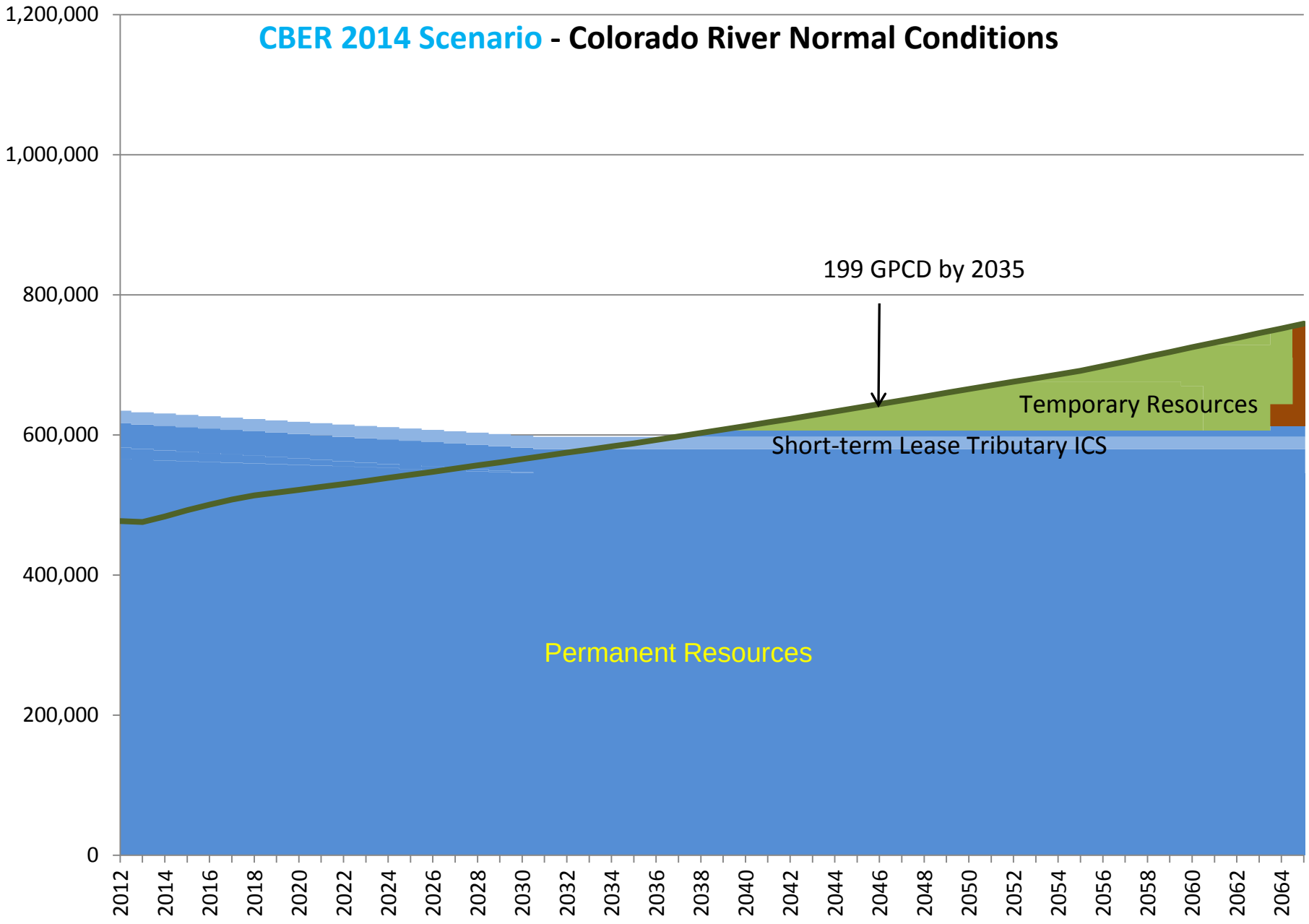
CBER 2014 Scenario - Colorado River Normal Conditions
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199 GPCD by 2035
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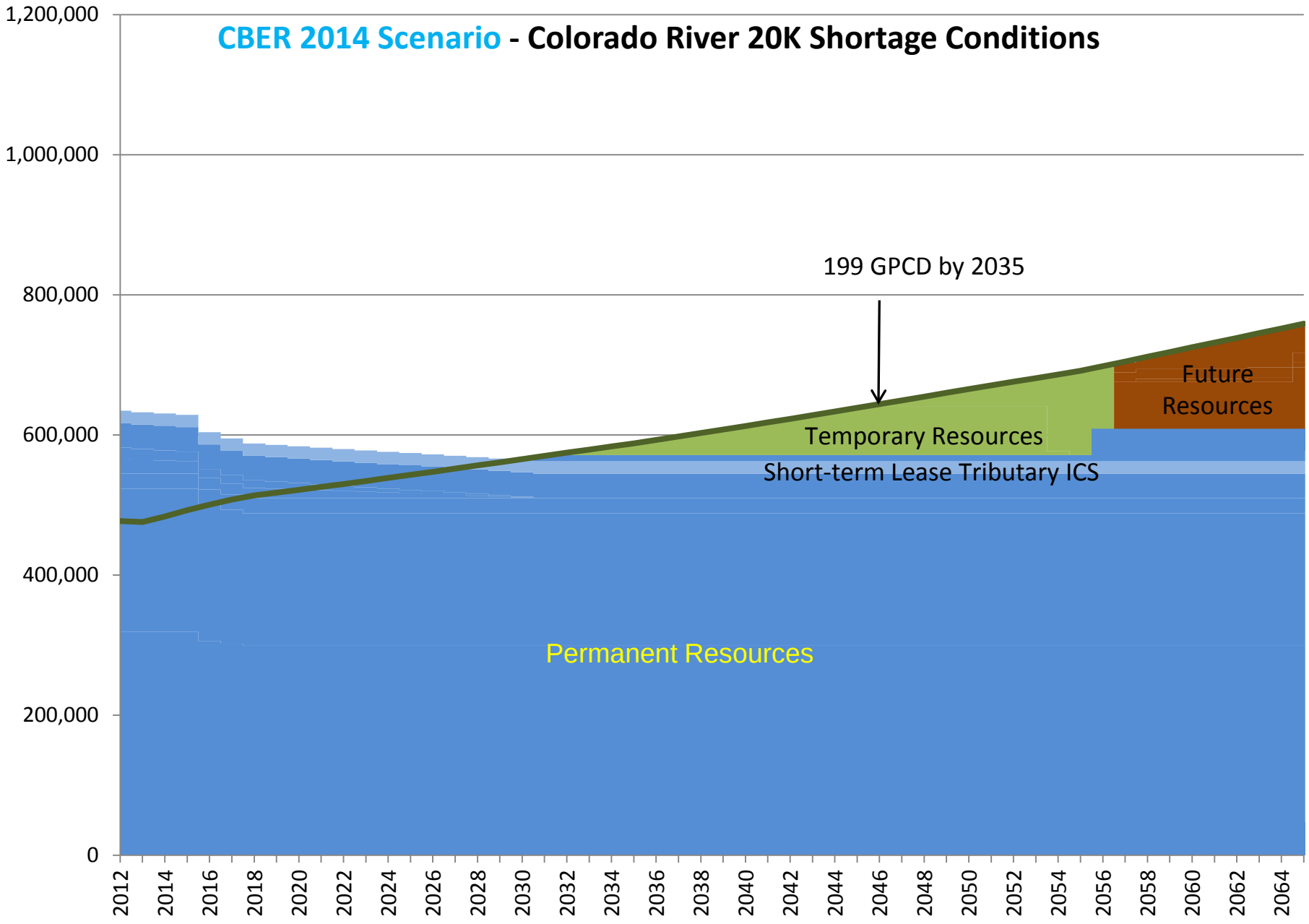
CBER 2014 Scenario - Colorado River 20K Shortage Conditions
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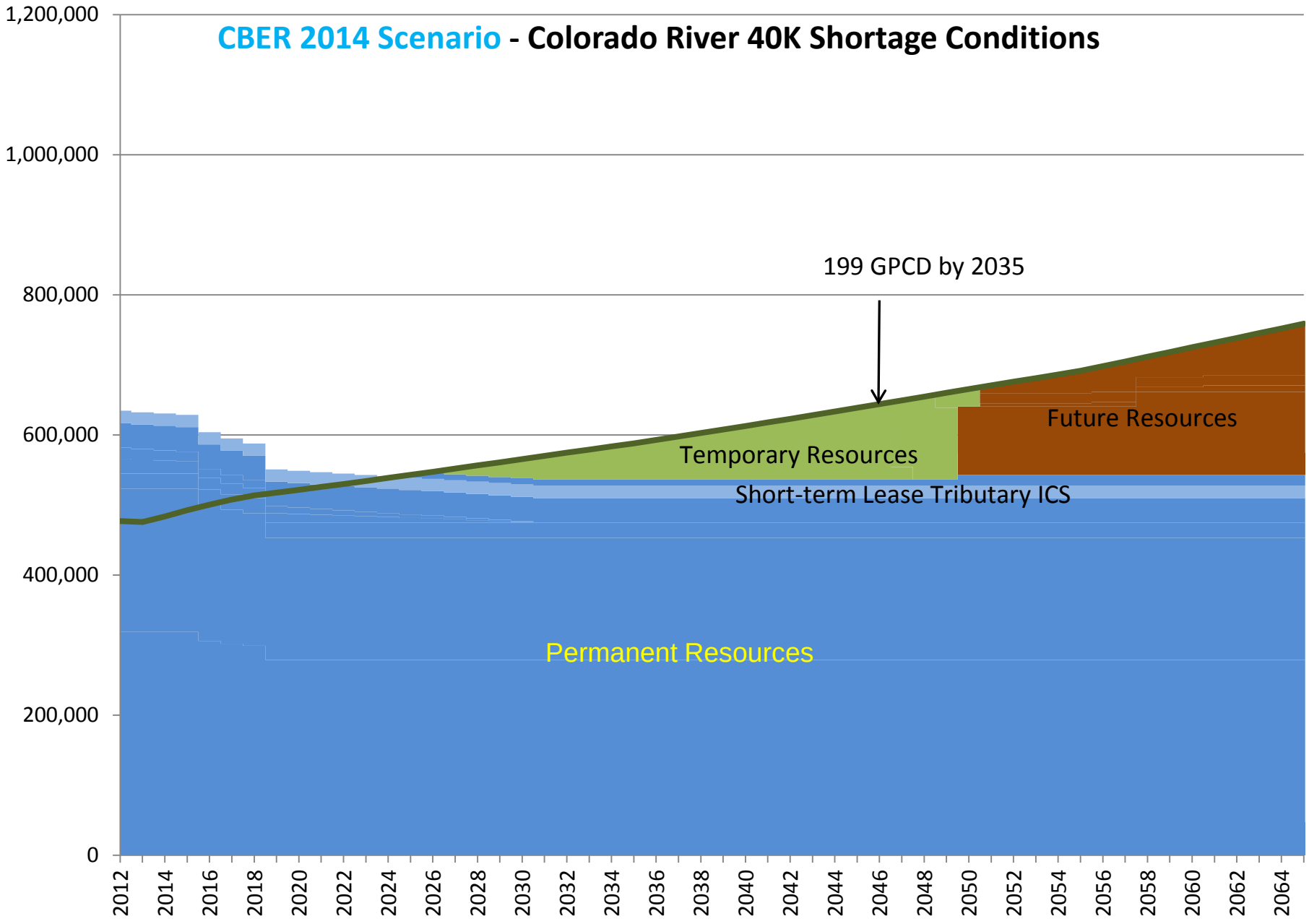
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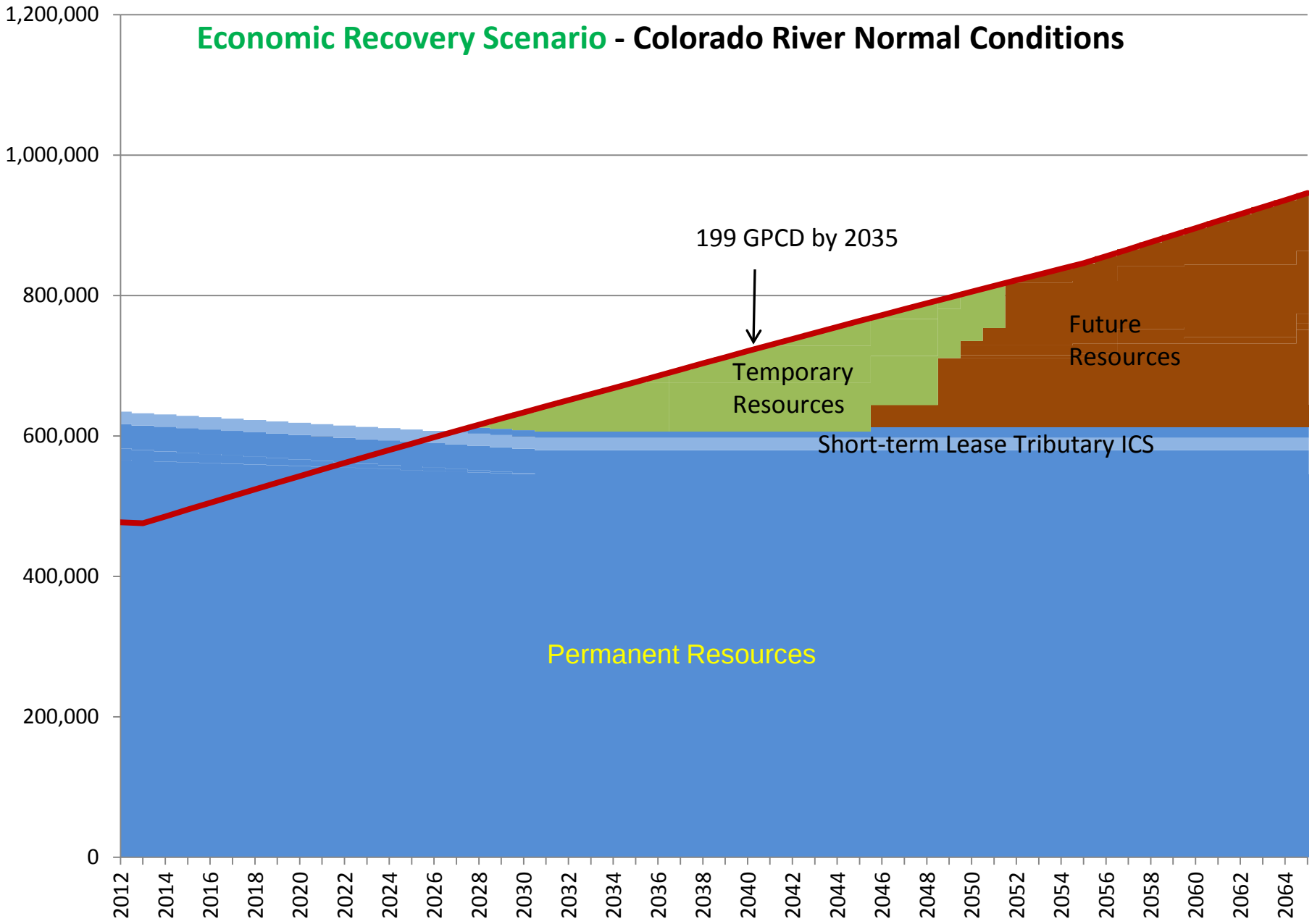
Economic Recovery Scenario - Colorado River Normal Conditions
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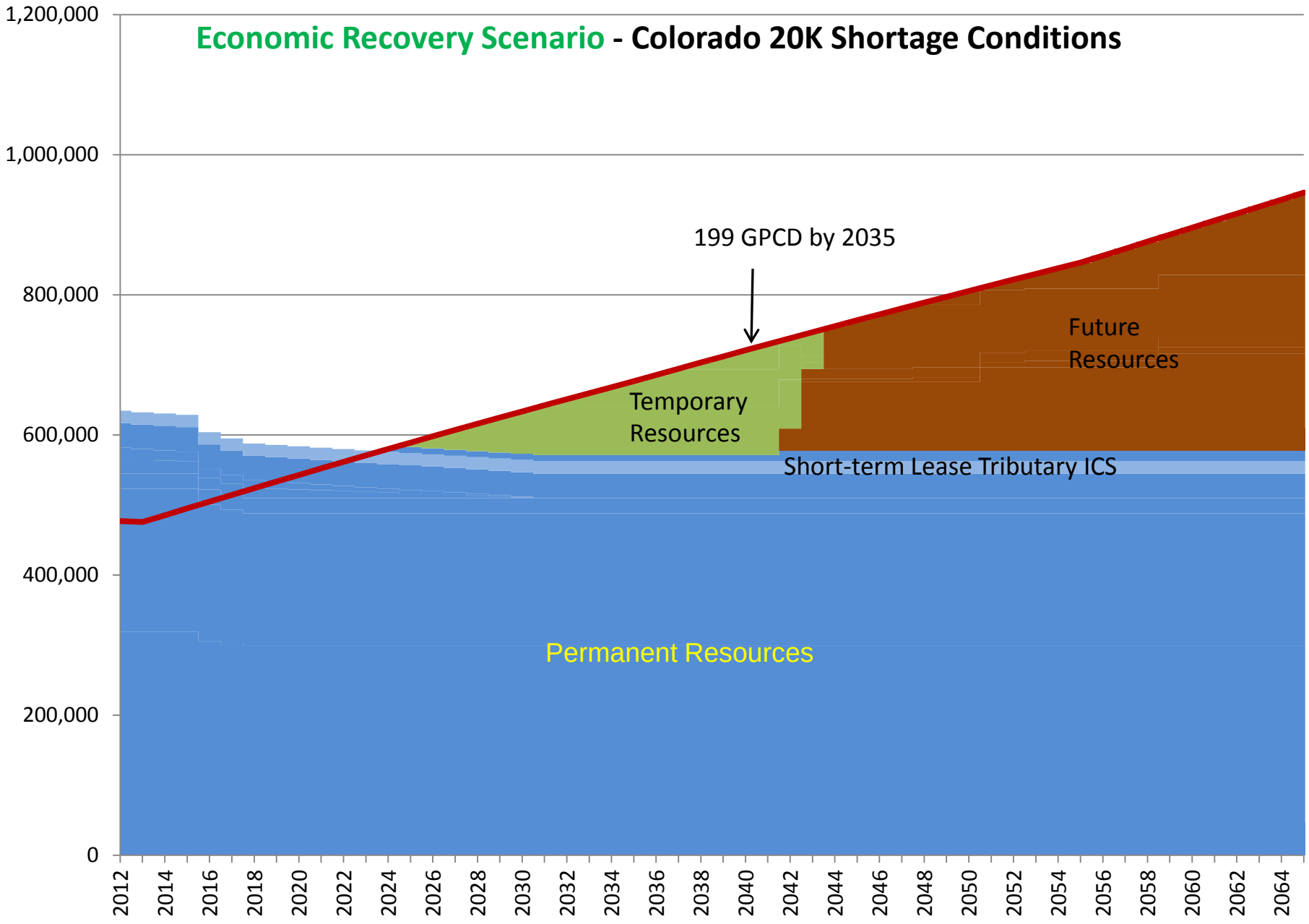
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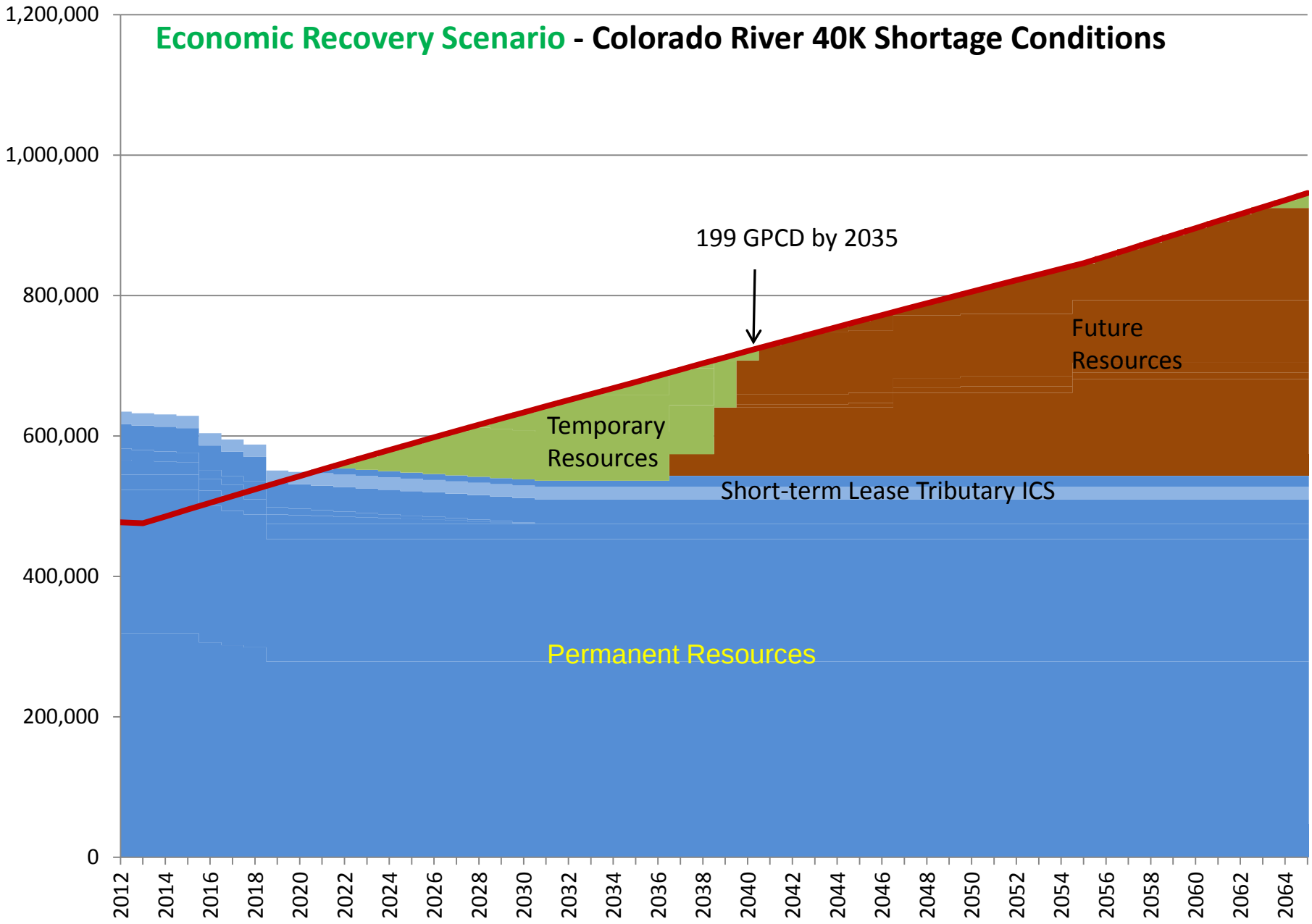
Economic Recovery Scenario - Colorado River 40K Shortage Conditions
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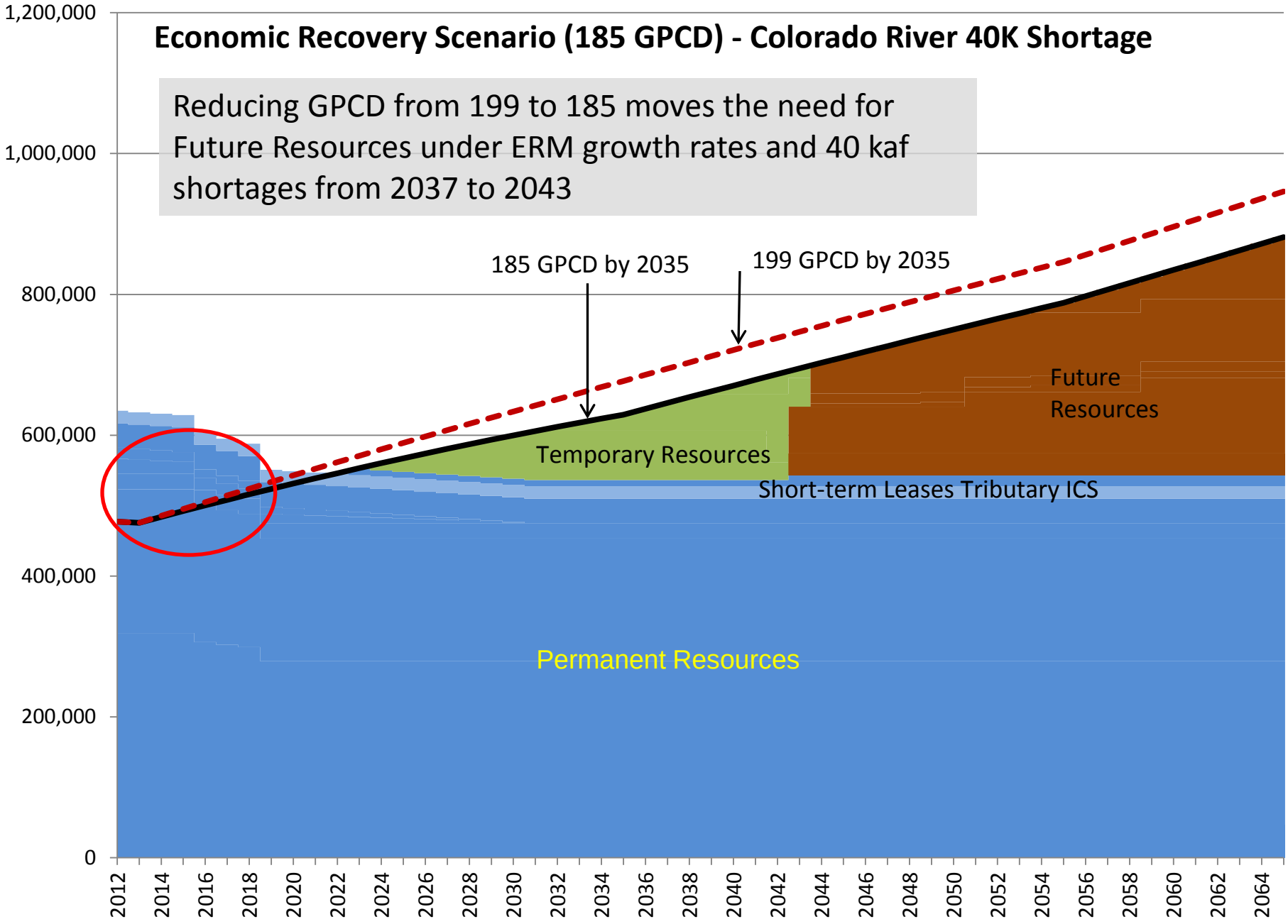
Conservation Recommendations

Conservation Recommendations

The level of conservation has implications for water resource planning efforts

- ✓ **GPCD x Population = Gross Demands**
- ✓ **Greater conservation doesn't address access issues due to Southern Nevada's de minimis influence on Lake Mead's elevation**
- ✓ **Additional conservation would have little impact on Southern Nevada's water security in the near term (<5 years)**
- ✓ **It also does not eliminate the need to develop Future Resources. However, it does shift their development to the right**


Economic Recovery Scenario (185 GPCD) - Colorado River 40K Shortage
Reducing GPCD from 199 to 185 moves the need for Future Resources under ERM growth rates and 40 kaf shortages from 2037 to 2043
185 GPCD by 2035
199 GPCD by 2035
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Conservation Recommendations

Question for IRPAC Deliberation:

- ✓ **Should the SNWA adopt a more stringent GPCD trajectory of 185 at this time, or should the current goal be maintained until it is achieved or Permanent Resource availability dictates additional reductions?**
  - **If so, what guidance would IRPAC provide related to the timing and resource expenditures associated with achieving the 185 GPCD?**
    - **Should efforts begin immediately, or be ramped up as Current Resource thresholds are approached?**

Conservation Recommendations

Key considerations:

- ✓ **Availability of Current Resources**
  - **Impacting quality of life and water bills before the resource is needed**

- ✓ **Implications for water sales and rates**
  - **Because most costs associated with providing water are fixed, rate increases will likely be needed to compensate for decreased revenue**
  - **Price elasticity also dictates that water rates will play a significant role in inducing additional conservation**

- ✓ **Expenditures associated with additional 13 GPCD reduction**
  - **Maintaining trajectory to 199 requires continued investment**
  - **Because policies (mandatory watering schedules, turf restrictions, etc.) significantly contributed to conservation, few policy tools remain**
  - **Significant "headwinds" are expected that impede further reductions**

Conservation Recommendations

As "low-hanging" incentive fruit is exhausted and there are fewer new policies to implement, conservation becomes incrementally more expensive

- ✓ **Reducing GPCD from 314 to its current 212 has required an investment of nearly $300 million**
- ✓ **Factoring in "headwinds" to reaching 199 GPCD, projected conservation investments through 2035 are projected at $115 million to $380 million***
- ✓ **Reducing the GPCD goal to 185 by 2035 is projected to require an additional investment of $60-115 million, for a total of $175 million to $495 million***

* High end of range is based upon extensive reliance upon incentives

Attribute	Measure	Score
Reliability	Reduces vulnerability to hydrologic variability of Colorado River: Score 1 if reduces vulnerability to river hydrology, 5 if no change from current condition	5
	Resilience to climate change: Score 1 if no impact from climate change, 5 if high susceptibility to climate change	3
	Reduces probability of not meeting water demands	3
	Reduces amount of water demand shortfall	3
Minimize Implementation Risk	Score 1 if not complex regulatory/technical/public process, 5 if highly complex	1
	Score 1 if multi-state and/or federal cooperation not required, 5 if extensive multi-state and/or federal cooperation required	1
	Timeline required to implement	4
Cost Effectiveness	Initial Capital Cost ($)	2
	NPV (Capital and O&M) ($)	2
Impact to Ratepayer	Competitiveness of average SFR water rate with other cities: Score 1 if no change, 5 for maximum change from current position on 62-City Municipal Water Rates Survey	2
Impacts to Quality of Life	Score 1 allows water efficient consumptive water use, 5 restricts existing consumptive water use	4
Water Use Efficiency	Score 1 for most change, 5 if no change from existing condition	2
Environmental Impact	Relative environmental impact: Score 1 if low impact, 5 if high impact	1

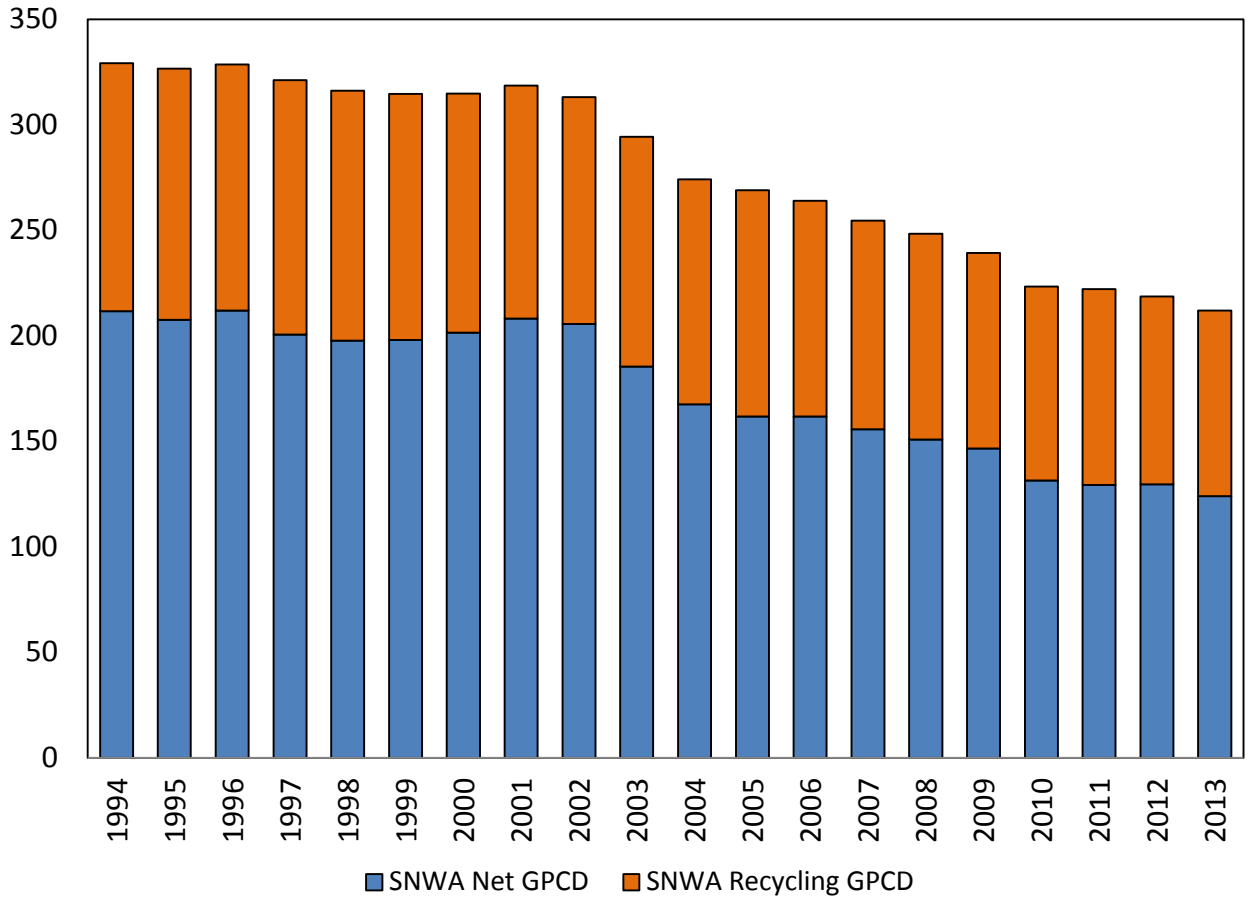
Conservation Recommendations

Question for IRPAC Deliberation:

- ✓ **Should SNWA staff present to the Board of Directors and the community water usage information in both “gross” and “net” terms for the purposes of more accurately conveying water resource implications associated with various conservation measures?**

Measuring Progress

Gross versus Net GPCD in Southern Nevada



Conservation Recommendations

Key Considerations:

- ✓ **The "Gross" versus "Net" distinction has implications for the prioritization of conservation programs and communications**
  - **Gross GPCD is valuable in evaluating facilities because it reflects deliveries**
  - **Because Net GPCD reflects water recycling, it is useful when considering the impact of conservation initiatives on the community's "water footprint"**
  - **Net GPCD is also helpful in communicating to customers the importance of outdoor conservation**

Colorado River System Conservation

Colorado River System Conservation

System conservation projects are designed to protect the "Current Resources" portion of the community's water supply

- ✓ **Positively affects the elevation of Lake Mead**
- ✓ **Reduces the risk, duration and magnitude of Colorado River shortages for Southern Nevada**
- ✓ **Does not yield additional water resources for Southern Nevada**

Colorado River System Conservation

Several system conservation-oriented projects have already been implemented on the Colorado River

- ✓ **Yuma Desalting Plant – Pilot Demonstration**
  - **($2 million/3,050 acre-feet/$645 per acre-foot)**
- ✓ **Drop 2 (Brock) Reservoir**
  - **($150 million/600,000 acre-feet/$250 per acre-foot)**
- ✓ **Minute 319 to U.S./Mexico Water Treaty**
  - **($10 million/95,000 acre-feet/$105 per acre-foot**
- ✓ **Virgin and Muddy River short-term leases**
  - **($130 to $286 per acre-foot avg.)**
- ✓ **Lower Basin fallowing programs**
  - **Several exist, ranging in cost from $120 to $175 per acre-foot**

Colorado River System Conservation

Additional projects are currently being evaluated

- ✓ **Inland (brackish) desalination**
- ✓ **Agricultural irrigation efficiency upgrades**
- ✓ **Agricultural land fallowing**
- ✓ **Urban conservation**
- ✓ **Weather modification**
- ✓ **Tamarisk removal**

Colorado River System Conservation

The efficacy of these projects is determined by five key factors

- ✓ **Implementation costs**
- ✓ **Implementation timeframe**
- ✓ **Quantity available**
- ✓ **Legal constraints**
- ✓ **Political impediments**

Colorado River System Conservation

Question for IRPAC Deliberation:

- ✓ **Should the SNWA continue to partner with other Basin States to protect critical elevations in Lake Powell and Lake Mead?**

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Water Use Efficiency	Score 1 for most change, 5 if no change from existing condition	5
Environmental Impact	Relative environmental impact: Score 1 if low impact, 5 if high impact	2

Colorado River System Conservation

Question for IRPAC Deliberation

- ✓ **Should the SNWA Board of Directors begin budgeting sufficient funds to enact system conservation projects on a significant scale?**

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Reliability	Reduces vulnerability to hydrologic variability of Colorado River: Score 1 if reduces vulnerability to river hydrology, 5 if no change from current condition	3
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Intake Pumping Station No. 3

Intake Pumping Station No. 3

To recap previous discussions:

- ✓ **IPS3 would allow the SNWA to provide water to Southern Nevada's residents even at "dead pool," when Arizona, California and Mexico can no longer access the Colorado River**
- ✓ **The proposed design would provide up to 900 million gallons a day to both existing water treatment facilities**
- ✓ **The financial impact to typical single-family customers from this project is estimated at $3-5 per month under current assumptions and market conditions**
- ✓ **Design will take approximately one year, construction another 4 years**

Intake Pumping Station No. 3

IPS3 does not address water quality issues expected to occur at extremely low lake elevations

- ✓ **As Lake Mead's elevation decreases, turbidity and organics increase**
- ✓ **However, significant water quality deterioration is unlikely to occur at Intake No. 3 until/unless the lake descends below elevation 975**
- ✓ **Even without the new low-elevation pumping station in place, Intake No. 3 greatly reduces water quality problems at the two upper intakes for as long as they remain in service**
- ✓ **Additional treatment costs are difficult to model accurately because conditions are unprecedented, but could reach hundreds of millions**

Intake Pumping Station No. 3

Question for IRPAC Deliberation

- ✓ **Does IRPAC recommend that the SNWA construct Intake Pumping Station No. 3?**
  - **If so, should the SNWA initiate design and construction activities immediately or establish a "trigger" elevation or hydrologic trend?**

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Committee "Homework"

The meeting minutes, including the draft recommendations, will be distributed to all committee members next week

- ✓ **Review recommendations for each issue**
- ✓ **Evaluate attribute scoring**
- ✓ **Check for consistency, duplication of recommendations**
- ✓ **Bring any comments to the November IRPAC meeting for discussion**

Upcoming Meetings

November 5

December 3

January (TBD)

February (If necessary)

SOUTHERN NEVADA WATER AUTHORITY®