

water
resources

Managing Severe Droughts with the Twin Oaks Aquifer Storage & Recovery Project

Janelle W. Okorie

Vice President



September 9, 2006



Our water. Our future.

San Antonio Water System

Twin Oaks ASR Facility



1. What is the Twin Oaks ASR Project?
2. How does it assist SAWS with managing severe drought periods?

What is the Twin Oaks ASR Project?

**Environmentally
-friendly
method of storing
potable water**

Water does not evaporate
when stored underground

Large land acquisitions for
storage are avoided

Much of land above ASR can
continue its prior use (e.g.
grass farming, livestock)

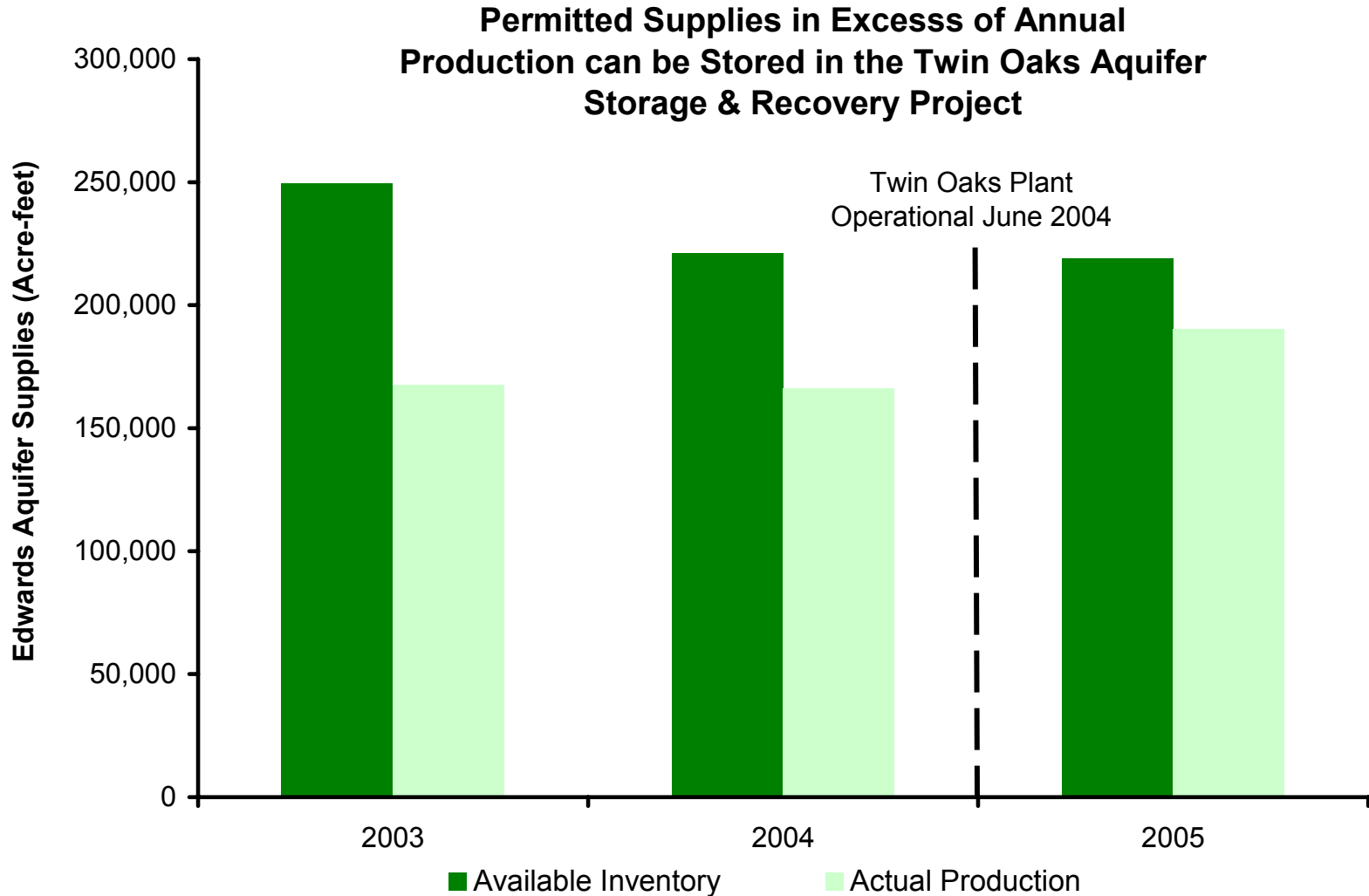
What is the Twin Oaks ASR Project?

- Edwards Aquifer water is currently transported from SAWS production facilities and stored in the Carrizo Aquifer
- Water is typically stored (or “injected”) during wet or low demand periods
- Water is typically withdrawn (or “recovered”) during severe droughts
- Responsible water management tool to help maximize existing and future allocations of supplies

Why an ASR Project?

- Provides multi-year storage
 - Edwards allocation system does not allow for inventory credits or carryover
 - Withdrawals from the Edwards Aquifer are being limited by legislation
- Allows for water banking
 - Additional groundwater supplies from SAWS regional Carrizo Aquifer project will be stored beginning 2010

Why an ASR Project?



How does it help manage droughts?

SAWS Approach to Drought Management

**Drought
Monitoring**

**Drought
Alert**

**Drought
Declaration**

**Drought
Management**

Drought prediction forecasts

Inventory scheduling

ASR injection

Conservation outreach

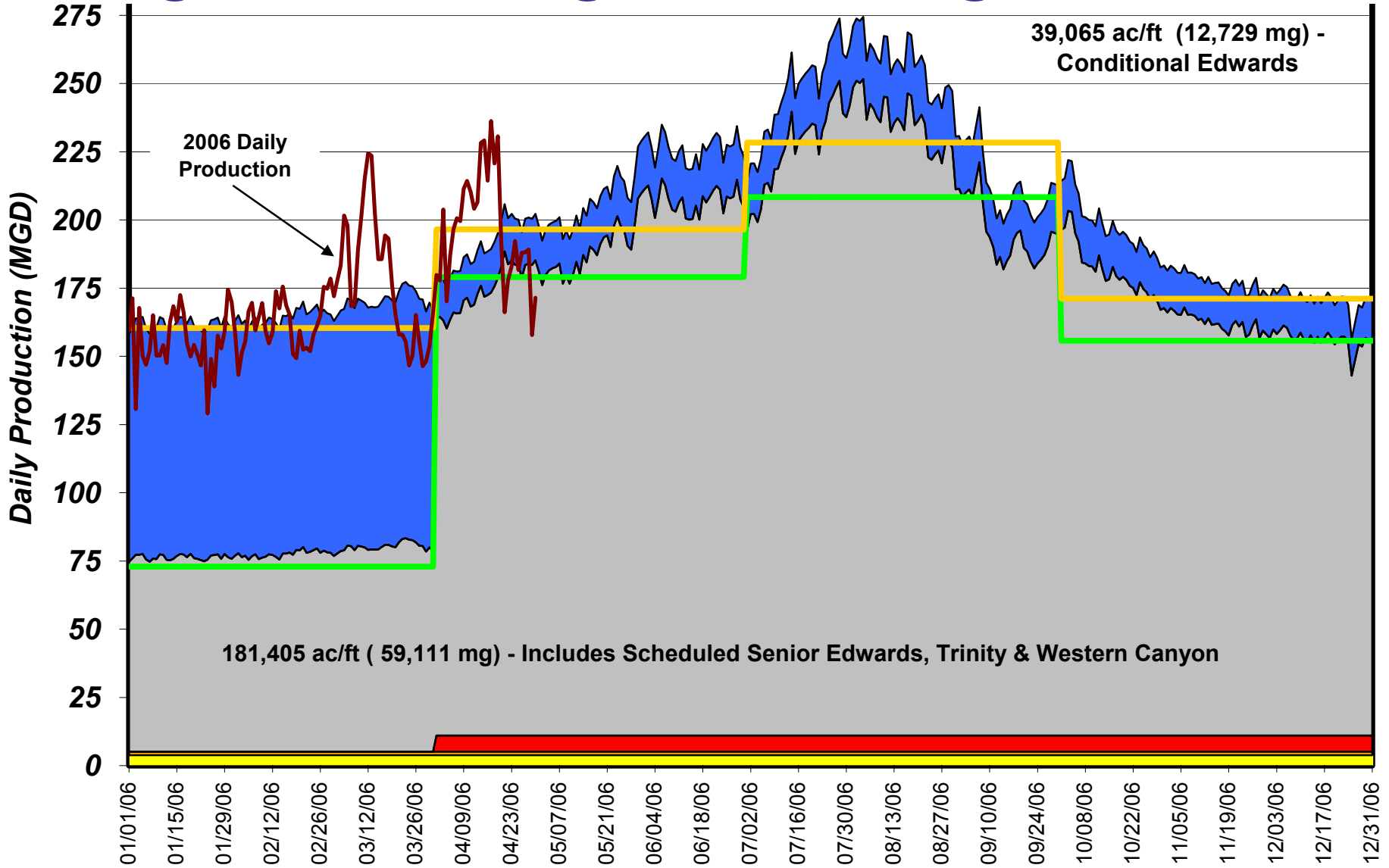
Demand management & enforcement

ASR recovery

Drought Monitoring: Forecasting

- Assess weather conditions
- Review historical J-17 index well levels during the period of record
 - Above 650.1 ft above msl 82.1% of the time
 - Above 640.1 ft above msl 9.2% of the time
- Review springflow conditions
 - San Marcos springs
 - Comal springs
- Prepare predictions for next 18 months

Drought Monitoring: Scheduling



Oliver Ranch

Western Canyon Water

EAA Cond. Water

Quarterly Budget - EAA Senior & Cond. Water

BSR

EAA Senior Water

Quarterly Budget - EAA Senior Water

Drought Monitoring: Scheduling

- Base inventory schedules include water from the Edwards and Trinity Aquifers and Canyon Lake
- Revisions completed weekly to account for changes in weather conditions
- Evaluations provide status of production in relation to total inventory and quarterly allocations imposed during EAA critical period / demand management stages

Drought Management: Conservation

- Continue Conservation Focus
 - Achieve annual savings in excess of 11,000 acre-feet through rebates and hands-on classes on outdoor conservation
 - Work with Community Conservation Committee and volunteers to educate the general public
 - Recognize leadership among commercial users
- Demand Management & Enforcement
 - Apply restrictions to discretionary water use
 - Apply enforcement to ensure compliance

Drought Management: ASR Recovery

- Our operational intent is to use the ASR project as a reserve for severe droughts
- The challenge is to ensure long-term supply availability, while complying with immediate supply reductions imposed by the EAA
- Appropriate operational balance achieved by withdrawing stored water, if necessary, toward the end of calendar quarter

Effective Drought Management

- Effective drought management dependent on our ability to effectively forecast aquifer conditions, application of stage restrictions, and customer response

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