LCRA’s Water Operations
Overview

• Highland Lakes water rights
• Water Management Plan
  – Brief explanation
  – Update
• Other LCRA water rights
• Pending Water Rights/Amendments
• Water Supply Resource Plan
LCRA’S WATER RIGHTS
WR#s 5478 & 5482 Buchanan and Travis (LCRA)
03/29/1926
Impoundment: 2,163,227 AF
(Rec & Hydro)
Buchanan - 992,475 AF
Travis - 1,170,752 AF
03/26/1938
Diversion (Firm): 535,812 AFY - Total/ 445,266 AFY - Available
Uses: municipal, industrial, irrigation, mining, domestic,
recreation, livestock, recharge, instream flows and bay and estuary
11/01/1987
Diversion (Interruptible): 1,500,000 AFY
Uses: Same as above
Special Condition:
- Develop a Water Management Plan
- Numerous other special conditions
Intermediate Lakes

- Lake Buchanan
- Inks Lake
- Lake LBJ
- Lake Travis
- Lake Marble Falls
- Lake Austin
- Wirtz Dam
- Inks Dam
- Starcke Dam
WR#s 5479, 5480 & 5481 Inks, LBJ and Marble Falls (LCRA)  
03/29/1926  
Inks impoundment: 17,545 AF (Rec & Hydro)  
LBJ impoundment: 138,500 AF (Rec & Hydro)  
Marble Falls impoundment: 8760 AF (Rec & Hydro)  
Hydro- unspecified amount for all three  
08/24/1970  
LBJ Diversion:  
Total Industrial- unspecified  
Consumptive Industrial- 15,700 AFY
LCRA’s Water Management Plan

• First of its kind in the state
• LCRA is only river authority with a comprehensive water management plan requirement
Water Management Plan – What is it?

- Amendment to the water rights for Lakes Buchanan & Travis
- **Determines day-to-day operation of Lakes Buchanan & Travis and allocation of downstream inflow**
- Allows unused portion of firm yield to be used on interruptible basis
- Developed in 1989 & amended three times
- Any changes proposed must be approved by LCRA Board and TCEQ
- Current TCEQ-approved WMP dated 2010
- **Stakeholder process**
WMP: Key Goals

- Manage Highland Lakes & Colorado River together as a single system for water supply purposes.
- Maximize the beneficial use of water derived from the inflows below the Highland Lakes.
- Stretch and conserve the waters stored in the Highland Lakes.
- Adaptive management approach
WMP: Key Elements

• Allocate Supply
  – Sets up allocation procedures and operating policies
  – Quantify annual interruptible supply availability
  – Defines trigger levels for curtailment of interruptible supply
  – Develop guidelines for meeting downstream environmental needs

• Drought Management Plan
  – Planning for management through the “Drought-of-record”
  – Establishes criteria for determining drought more severe than “Drought-of-record”
## 2010 Water Management Plan - Drought Triggers

<table>
<thead>
<tr>
<th>When water in the lakes is ...</th>
<th>On this date ...</th>
<th>Action prescribed in 2010 Water Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 94 percent full</td>
<td>Jan. 1 or July 1</td>
<td>Interruptible supplies cease for all customers except irrigation operations.</td>
</tr>
<tr>
<td>Less than 1.7 million acre-feet</td>
<td>Jan. 1</td>
<td>Environmental releases for bays and estuaries are reduced to meet 150 percent of critical (to the extent of storable inflows).</td>
</tr>
<tr>
<td>Less than 1.4 million acre-feet</td>
<td>Jan. 1</td>
<td>Begin gradual curtailment of interruptible supply to irrigation operations. Amount of curtailment increases when water storage levels are lower. Environmental releases for instream flows are reduced to meet critical needs.</td>
</tr>
<tr>
<td>Less than 1.1 million acre-feet</td>
<td>Jan. 1</td>
<td>Environmental releases for bays and estuaries are reduced to meet critical needs.</td>
</tr>
<tr>
<td>900,000 acre-feet</td>
<td>At any time</td>
<td>Request firm customers to implement mandatory conservation restrictions. Meet with customers to develop curtailment plan should drought worsen.</td>
</tr>
<tr>
<td>600,000 acre-feet</td>
<td>At any time</td>
<td>If criteria indicate that drought is worse than the Drought of Record, then begin pro rata curtailment of firm supply after ceasing interruptible supply (timing based on duration of drought).</td>
</tr>
<tr>
<td>325,000 acre-feet</td>
<td>Jan. 1</td>
<td>No interruptible supply available.</td>
</tr>
<tr>
<td>200,000 acre-feet</td>
<td>At any time</td>
<td>No interruptible supply available.</td>
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</tbody>
</table>

LCRA encourages its firm water customers to implement long-term, year-round water conservation measures to meet the goals included in their water conservation plans. LCRA has an ongoing public awareness campaign on water use and conservation.
Requirements in 2010 Order

• Stakeholder process
  – Allow meaningful participation to achieve regional consensus
  – Include summary of steps taken by LCRA to TCEQ
• Interruptible curtailment procedures to satisfy projected firm demands should recent intense drought conditions recur
• Evaluation of criteria for declaring a drought worse than drought of record
• Evaluation of minimum combined storage level necessary to protect firm customers
• Incorporation of recent settlements- STPNOC and Austin
• Revisions to provisions governing how LCRA provides water to address environmental flows
  – New studies
  – Provide water to maximum extent reasonable and practicable
• Begin by July 1, 2010 and submit to TCEQ not later than July 1, 2013.
Next Update to WMP

- Staff has already started on the process
  - Stakeholder Process
    - 16 members- identify their alternates
    - Firm Water
      - City of Austin; Kingsland WSC; City of Burnet; STPNOC; and Horseshoe Bay Resort
    - Interruptible Customers
      - Garwood; Lakeside; Gulf Coast; and Pierce Ranch
    - Environmental
      - TPWD; Sierra Club; and NWF
LCRA’S OTHER WATER RIGHTS
WR#s 5473 Lake Bastrop (LCRA) 03/04/1963

- Impoundment: 16,590 AF (Rec)
- Unspecified amount from Spicey Creek plus water diverted from Colorado River
- Diversion: Stored water from Lake Travis - amount unspecified
- Consumptive use - 10,750 AFY (Ind)
WR#s 5474 Fayette Power Project (FPP) (LCRA)  
02/03/1975

Impoundment:
- Cedar Creek Reservoir - 71,400 AF (Rec & Ind)
- Baylor Creek reservoir - 46,600 AF (Rec & Ind)

Diversion: Stored water from lakes Buchanan and Travis
- Total industrial diversions - 73,759 AFY
- Consumptive industrial use - 38,101 AFY

Term: 09/18/2015

Special conditions:
- Can not reduce flow in Colorado River below 200 cfs
- 0.5 cfs min flow below dams
- Can not impound >1400 afy from Cedar Creek & >1050 afy from Baylor Creek in reservoirs

Legend:
- Region K
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights
Irrigation Operations Served by LCRA
WR#s 5475 (as amended) Lakeside (LCRA)
01/04/1901
Impoundment: Eagle Lake: 9600 AF
Diversion: Irrigation 52,500 AF
09/01/1907
Diversion: Irrigation & Municipal* 55,000 AF
11/01/1987
Diversion: Irrigation 78,750 AF
Irrigate up to 28,300 acres in Lakeside Water Division Service Area in Colorado And Wharton Counties
Notes:
• Entire WR is subordinated to Austin's Lake Austin WRs
• Municipal use is limited to the Lakeside Service area.
WR 5434, as amended Garwood - LCRA
11/01/1900
Impoundment: 86 AF
Diversion: 133,000 AF
Irrigation of 32,000 acres in Garwood Service Area
Municipal and industrial anywhere within Travis, Bastrop, Fayette, Colorado, Wharton and Matagorda Counties.

Garwood-Corpus Christi
11/02/1900
Diversion: 35,000 AFY
Diversion point to be designated- up to two points on west bank of the river.

Legend
- Region K
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights

Major Water Rights' Diversion Locations in the Lower Colorado River Watershed
WR#s 5477 (as amended) Pierce Ranch (LCRA)  
09/01/1901
Diversion: 55,000 AFY for municipal, industrial, irrigation and recreation within the following counties in the Colorado River basin: Travis, Hays, Bastrop, Lee, Caldwell, Fayette, Colorado, Lavaca, Wharton and Matagorda; the adjacent Colorado-Lavaca Coastal Basin. Consisting of all parts of Matagorda, Jackson, and Wharton Counties; and the adjacent Brazos-Colorado Coastal Basin consisting of all parts of Colorado, Austin, Wharton, Fort Bend and Brazoria County.

Note: Entire WR is subordinated to Austin’s Lake Austin WRs.
WR#s 5476 (as amended) Gulf Coast (LCRA)
12/01/1900
Diversion: 228,570 AFY to irrigate 50,000 acres in the Gulf Coast Water Division Service Area in Matagorda and Wharton Counties.
11/08/1939
Impoundment: 78 AF - Bay City dam
10/24/1983
Impoundment: 305 AF - Lane City dam
11/01/1987
Diversion: 33,930 AFY for irrigation in Gulf Coast Water Division Service Area
09/03/1992
- Additional impoundment of 1,482 AF at a modified Bay City Dam
- Diversions of approximately 2,142,180 AFY for non-priority hydroelectric purposes

Note: Entire WR is subordinated to Austin's Lake Austin WRs

Legend
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights
WR#s 5437 LCRA & STPNOC
06/10/1974
Impoundment: 202,600 AF (Primary) & 342 AF (Secondary) reservoirs (STPNOC)
Diversion: 102,000 AFY from Colorado River for industrial; 80,125 AFY consumptive use (LCRA)
Special conditions: Diversions limited to 55% of flows in excess of 300 cfs at the authorized diversion point

03/25/1986
Impoundment: 46 AF of additional storage in secondary reservoir (STPNOC)
LCRA’S PENDING WATER RIGHTS and WATER RIGHT AMENDMENTS
New appropriation application: (A-5731)
Originally filed with TCEQ in 1998 to allow LCRA to:
• construct up to 20 off channel reservoirs and store up to 500,000 af in total combined capacity; and
• divert and capture up to approx. 854,000 afy of available flows from the Colorado River to use for municipal, industrial and agricultural purpose within LCRA’s service area.
Amend WR#5677 Leander IBT
Filed with TCEQ in Oct 2007 to allow LCRA:
• Increase interbasin transfer of water from the Colorado River Basin to the Brazos River Basin from 6400 afy to 24,000 afy;
• Use such water within Leander's service area; and
• Capture and reuse the effluent derived from this water to use either in the Leander Service Area or the Colorado River Basin.
Amend Garwood: WR 5434
Filed with TCEQ to allow LCRA to:
• Add new diversion points to allow LCRA to divert water under WR 5434, as amended, at any of LCRA authorized points of diversion and from perimeters of lakes Austin, Lady Bird and Travis.
Future Water Rights/Amendments

- Indirect Reuse application with Austin
- Future WMP amendment
LCRA’S WATER SUPPLY RESOURCE PLAN
The Water Supply Resource Plan (WSRP) is LCRA’s roadmap to:
- Meet future water needs
- Where these needs will be
- When those needs will be met
- Potential cost
WMP vs WSRP

- **WSRP**
  - Roadmap on how LCRA will develop new water supplies
    - Strategies to meet future demands
    - Not an operating plan
- **WMP**
  - Required by water rights
  - Deals with only the water supplies from lakes Buchanan and Travis
    - Dictates how LCRA will operate Buchanan and Travis
      - In essence a reservoir operations plan

October 28, 2010
Water Supply Resource Plan

- **Projected demands**
  - LCRA will need over 670,000 afy in firm water supplies in 2100

- **Existing supplies**
  - Estimated to supply about 600,000 afy in 2100
Public input
- public meetings; and
- online survey.

Public identified over 180 potential water supply options
1. Conservation
2. Desalination
3. Wastewater reuse

Public shared over 150 priorities that they had in planning for new supplies
1. Clean water, protect environment
2. Recreation, lifestyle
3. Availability
Developed Three Strategies

Strategy I - Use LCRA’s Existing Supplies

Amend LCRA’s Existing Water Rights
Cost: about $5 mil
**Enhanced M&I conservation- $225 mil**
- Conserve about 80,000 afy in municipal and industrial use

**Enhanced M&I conservation plus agricultural conservation- $450-525 mil**
- Conserve another 118,000 afy in ag use

**Enhanced M&I conservation plus direct wastewater reuse- $325 mil**
- Conserve another 70,000 afy
Strategy III: Using Existing Supplies, Conserving and Building for our Future

Water Supply Resource Plan

- Current conservation plus off-channel reservoir- $880 mil
  - Conserve about 40,000 afy in municipal and industrial use
  - Build downstream off-channel reservoir(s) to help meet downstream firm water needs

- CB-2: Current conservation plus off-channel reservoir and pipeline- $1.6 bil
  - Add a pipeline from off-channel reservoir(s) to Austin area to satisfy about 75,000 afy need
• Current conservation plus brackish desal and aquifer storage and retrieval (ASR) $721 mil
  - Add brackish desal of 33,600 afy in Matagorda Co. to supplement industrial needs
  - Add ASR facility in Bastrop Co. of 22,400 afy with pipeline to Travis County

• Current conservation plus importing groundwater- $1.4 bil
  - Import 35,000 afy of groundwater to Travis Co.
Where you can see the WSRP?

How much water is contracted for or otherwise committed?
# Current Commitments

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Total Contracts/Commitments:</strong></td>
<td>457,986</td>
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<tr>
<td>City of Austin-Estimated backup water supply to City’s water rights</td>
<td>138,560</td>
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<tr>
<td>LCRA Power Plants- Board Commitment</td>
<td>66,601</td>
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<tr>
<td>South Texas Project Nuclear Operating Co.</td>
<td>40,000</td>
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<tr>
<td>Brazos River Authority</td>
<td>25,000</td>
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<tr>
<td>Leander</td>
<td>24,000</td>
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<tr>
<td>Cedar Park</td>
<td>18,000</td>
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<tr>
<td>Pflugerville</td>
<td>12,000</td>
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<tr>
<td>LCRA Water Utilities- Board Commitment</td>
<td>12,078</td>
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<td>Other Contracts</td>
<td>88,307</td>
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<tr>
<td>Environmental Reservation- Board Commitment</td>
<td>33,440</td>
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<tr>
<td>LCRA Board Reservation in WMP for Future Use</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>Total Commitments and Reservations</strong></td>
<td>507,986</td>
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</tbody>
</table>
Where are our customers using water? How much is being used?
2006 Total LCRA Water Use
492,768 acre-feet per year

- Supply: Run-of-River Water Rights (37%)
- Supply: Highland Lakes (26%)
- Interruptible Supply for Agriculture (63%)
- Releases for Environment Supply: Highland Lakes (8%)
- Firm Supply for Communities, Cities and Industry Supply: Highland Lakes (29%)
Total Water Use from Lakes Buchanan and Travis, 1996 - 2007 *

- Interruptible Water Use: Irrigation & Environment
- Firm Water Use: Environment
- Firm Water Use: City of Austin (Supplemental Supply Provided from LCRA Sources)
- Firm Water Use: All Other Contracts
- Firm Water Use: LCRA Power Plants

* In addition to providing firm water supply from Lakes Buchanan & Travis, LCRA also provides interruptible stored water supply for irrigation and for meeting environmental flow needs.
Historic Irrigation Water Use

Diversions by the Four Downstream Irrigation Operations 1989 - 2008

- Irrigation dependent on interruptible stored water
Historic Irrigation Water Use

What is the history and projected use of agricultural demands?

- Irrigation use has declined
- Reduced acreage and improved efficiency
- Staff using Region K’s projections
LCRA’s Water Management Plan

LCRA’s Basis
for Operations
of Lakes Buchanan and Travis
The Highland Lakes and Dams

- Buchanan Dam
- Inks Dam
- Wirtz Dam
- Starcke Dam
- Mansfield Dam
- Tom Miller Dam

Lakes:
- Lake Buchanan
- Lake Inks
- Lake LBJ
- Lake Marble Falls
- Lake Travis
- Lake Austin
Highland Lakes Water Rights

- Buchanan and Travis are multipurpose
  - Water supply, hydro, flood control, recreation & other uses
- LBJ is used for industrial, hydro & recreation
- Other lakes used for hydro & recreation
- Travis only designated flood control reservoir
  - Agreement with FEMA to lower Lake Buchanan level during summer hurricane season by 2 ft
- “Constant-level” reservoirs
  - Inks, LBJ, Marble Falls, and Lake Austin pass-thru lakes
  - Levels generally maintained within “operating range”
  - LCRA only maintains and operates Tom Miller Dam (owned by City of Austin)
LCRA’s Downstream Water Rights

- **Run-of-river (RoR) water rights:**
  - Authorized
    - 636,750 ac-ft/yr total diversion
    - diversion locations in Colorado, Wharton & Matagorda Counties
    - priority dates: 1900 to 1987
  - Currently used for irrigation
  - Availability varies annually
  - Currently **NO** environmental flow requirements
Highland Lakes History

- Storage Right Priority 1926
- Diversion Right Priority 1938
- Adjudication of Water Rights - 1986
- Settlement Agreement – 1987
- Other Agreements/Settlements with both Upstream and Downstream Water Right holders at different times
Firm and Interruptible Water Supply Concept

As firm water use increases on the Highland Lakes over time, availability of interruptible water will decrease.
Highland Lakes Water Supply

How is water being used?

- Firm Supply of the Lakes = 445,300 ac-ft/yr
- LCRA’s Firm Supply
  - Contracts with entities for M&I needs
    - Sole source and back-up existing rights
  - LCRA’s own M&I needs
    - Municipal and Power Plants – Ferguson, Sim Gideon-Lost Pines & FPP
  - Environmental needs
- Interruptible Supply
  - For the four major irrigation operations– to supplement the RoR supply
    - annual contracts
    - price per acre-foot significantly lower than the Firm water price
  - For environmental needs
Environmental Flow Needs

- Instream Flow Needs for the Lower Colorado River
  - multiple locations d/s of Lake Travis
  - Critical & Target
  - Daily
- Freshwater Inflow needs for Bays and Estuaries of Matagorda Bay
  - Critical & Target
  - Monthly
- Various criteria/policies
  - for meeting environmental needs
    - apply “flows in the river” first to meet the needs
  - firm & interruptible supply used
**WR#s 5471 Lakes Austin and Lady Bird & Barton Springs Pool (Austin)**

**06/30/1913**

Lake Austin impoundment: 21,000 AF (Recreation)

- Diversion: 248,850 AFY - municipal
- 150 AFY irrigation
- Temp use: 1000 AFY of above municipal for irrigation until 12/31/2011

**06/27/1914**

- Diversion: 21,403 AFY - municipal
- 24,000 AFY - industrial (cooling)

Diversion (24k) in combination with FPP, Lady Bird Lake (consumptive only) & Sand Hill

Special conditions (Industrial @ FPP only):
- Can not reduce flow in Colorado River below 200 cfs @ FPP diversion site
- Junior to list of intervening WRs

**12/31/1928**

Impoundment: Barton Springs Pool & By-pass - 10.7 AF, Rec

**03/05/1959**

Impoundment: Lady Bird lake - 3520 AF, Rec
WR#s 5489 Austin Decker Lake (Austin)
08/20/1945
Diversion from Colorado River:
20,300 AF - municipal
16,156 AF - industrial
Diversion rate: 28 cfs
02/23/1965
Impoundment: 33,940 AF - Decker Lake
Diversion from the lake:
Total amount - unspecified
Consumptive - 16,165 AF
Diversion rate: unspecified
## Chronology

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1960</td>
<td>Gulf Coast Water Right Acquired</td>
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<tr>
<td>1976</td>
<td>STP Settlement</td>
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<td>1983</td>
<td>Lakeside Water Right Acquired</td>
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<td>1985</td>
<td>LCRA/CRMWD Stacy Reservoir Agreement</td>
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<td>1987</td>
<td>Water Rights Adjudicated</td>
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<td>1989</td>
<td>First Water Management Plan Approved</td>
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<td>1991</td>
<td>Instream Use Study</td>
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<td>1992</td>
<td>Water Management Plan First Amendment Approved</td>
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<td>1993</td>
<td>Pierce Ranch Water Right Acquired (partial)</td>
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<td>1997</td>
<td>Freshwater Inflow Needs Study (FINS)</td>
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<td>1999</td>
<td>Water Management Plan Second Amendment Approved</td>
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<td>1999</td>
<td>Garwood Water Right Acquired</td>
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<td>1999</td>
<td>Contract with the City of Austin</td>
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<td>1999</td>
<td>Flood Flow Permit Application Submitted</td>
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<td>2000</td>
<td>Remainder Pierce Water Right Acquired</td>
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<tr>
<td>2001</td>
<td>First Region K Water Plan Completed</td>
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<td>2003</td>
<td>San Antonio Water System Feasibility Study Begins</td>
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<td>2003</td>
<td>Water Management Plan Third Amendment submitted to TCEQ</td>
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<td>2006</td>
<td>Second Region K Water Plan Completed</td>
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<td>2006</td>
<td>Freshwater Inflows Needs Update Completed</td>
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<td>2006</td>
<td>STPNOC Settlement</td>
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<td>2007</td>
<td>Austin Bed &amp; Banks and Supplemental Water Supply agreements</td>
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