Rio Grande Watermaster Program

Water Availability Division
Office of Water
Texas Commission on Environmental Quality
Presented by: Jose A. Davila

Disclaimer: This presentation and slides serve only as a summary of the operations of the RGWM. The material presented is not intended, nor should it be accepted as superseding actual references treaties, rules and regulations. Please refer back to the original documents for actual applicable regulatory text.
Overview

• General Information
• Rio Grande Watermaster Program
• Photo Journal
• Questions
General Information
Rio Grande River (Rio Bravo)

4th longest river in North America

1896 River Miles

175 in Colorado

470 in New Mexico

1251 in Texas
Rules and Regulations

TWC Chapter 11
Statutes on Water Rights

TAC Chapter 288
Agency rules on water conservation

TAC Chapter 295
Procedural agency rules to apply for water rights and amendments

TAC Chapter 297
Substantial agency rules to implement Texas Water Code

1944 Water Treaty Between Mexico and the United States
Managed by IBWC/CILA

TAC Chapter 303
Operation of the Rio Grande Watermaster Program
RIO GRANDE WATERMASTER PROGRAM
TEXAS ADMINISTRATIVE CODE
CHAPTER 303
Operation of the Rio Grande

Responsible for allocating, monitoring, and controlling surface waters in Rio Grande Basin, excluding the Pecos-Devil Rivers.

Jurisdiction covers 1,173 miles of the Rio Grande. Administers approximately 1,600 Water Right Accounts.

11 Total Staff Members
3 in Eagle Pass, TX
7 in Harlingen, TX
1 in Laredo, TX
The Valley water suit between the State of Texas vs. HCWC&ID No. 18 was finalized in 1971 resulting in the final adjudication of the Lower Rio Grande water rights and appointment of a Watermaster.

Priority was given based on Purpose of Use.

The final adjudication of the Upper Rio Grande water rights was completed in 1977.

The final adjudication of the Middle Rio Grande Water rights was completed in 1983.

User-Funded Program.
RIVER SEGMENTS

• UPPER RIO GRANDE
  Fort Quitman-Amistad Dam including URG Tributaries
  “Run of the River” water rights
  Priority Date System

• MIDDLE RIO GRANDE
  Amistad Dam to Falcon Dam
  Water Stored/Water Released
  Purpose of use Priority System

• MIDDLE RIO GRANDE TRIBUTARIES
  “Run of the River” water rights
  Priority Date System

• LOWER RIO GRANDE
  Falcon Dam to Gulf of Mexico
  Water Stored/Water Released
  Purpose of use Priority System

• NUECES-RIO GRANDE COASTAL
  “Run of the River” water rights
  Priority Date System
Texas Watermaster Areas

- **South Texas Watermaster Area**
- **Concho River Watermaster Area**
- **Brazos Watermaster Area (2015)**
  - Includes Possum Kingdom Lake
- **Rio Grande Watermaster Area**
  - Includes Southern portion of the Nueces - Rio Grande Coastal Basin

Non Watermaster Areas in the Rio Grande Basin:
- Bolson - Closed Basin
- Upper Rio Grande - North of Fort Quitman
- Pecos & Devils River Watersheds

Marked Areas:
- **Upper**
- **Middle**
- **Lower**

Location: Fort Quitman
Water Uses

- Municipal
- Industrial
- Domestic
- Irrigation
- Mining
- Recreation
- Hydroelectric
- Livestock
2017 UPPER RG WATER USE

UNITS IN ACRE-FEET
1 ACRE-FOOT=325,851 GALLONS

IND IRR MIN MUN NON REC

2,298.94 9.77 0.00 0.00 0.00 0.00
2017 MIDDLE RG WATER USE

UNITS IN ACRE-FEET
1 ACRE-FOOT=325,851 GALLONS
2017 TRIBUTARIES WATER USE

UNITS IN ACRE-FEET

1 ACRE-FOOT=325,851 GALLONS
2017 LOWER RG WATER USE

UNITS IN ACRE-FEET
1 ACRE-FOOT=325,851 GALLONS

- DOM: 6,648.60
- IND: 3502.99
- IRR: 873,805.56
- MIN: 109.78
- MUN: 203,192.41
River Operations
River Operations

Dedicated Releases based on Demand

- Water conservation oriented

- Calculations of the Water Demand

- Communication with IBWC on a daily basis on river and reservoir conditions and request water releases from Amistad, Falcon and Anzalduas dams

- Communication with Water Right holders on daily basis

- Monitor IBWC gaging stations to track flows

- Monitor Excess flows
Rio Grande Reach
Travel Time: 1 Reach = 1 Day
## River Operations

### Rio Grande Flows & Reservoirs Conditions

<table>
<thead>
<tr>
<th>Date</th>
<th>CMS</th>
<th>CFS</th>
<th>Elephant Butte</th>
<th>MCM</th>
<th>AF</th>
<th>Normal Conservation</th>
<th>Current Storage</th>
<th>Percent in Storage</th>
<th>Discharge in CMS/CFS (US)</th>
<th>Discharge in CMS/CFS (MX)</th>
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<td>2,486</td>
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<td>39.72</td>
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<td>RG at Santa Fe Dam</td>
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<td>Pecon near Langtry</td>
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<td>Devils at Paffen</td>
<td>2.44</td>
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### AMISTAD ABOVE/BELOW CONSERVATION - FT

| AMISTAD ABOVE | CONSERVATION - FT | 34.98 | FALCON ABOVE | CONSERVATION - FT | 38.55 |

### Mexican Reservoirs

<table>
<thead>
<tr>
<th>Reservoirs</th>
<th>Flood Capacity</th>
<th>Cons. Capacity</th>
<th>Current MCM</th>
<th>Current A/F</th>
<th>% Storage of Cons. Capacity</th>
<th>Discharge CFS</th>
<th>CMS</th>
<th>Current as of Aug 2018</th>
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<tr>
<td>San Benito - Rio Colorado</td>
<td>307,040</td>
<td>240,431</td>
<td>104,243</td>
<td>121,875</td>
<td>67.25%</td>
<td>0</td>
<td>54,000</td>
<td>7-Aug-18</td>
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<tr>
<td>El Chichua - Rio Colorado</td>
<td>327,863</td>
<td>269,571</td>
<td>1,669,945</td>
<td>1,584,684</td>
<td>96.43%</td>
<td>1,018</td>
<td>64,300</td>
<td>7-Aug-18</td>
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<tr>
<td>Rio de Agua - Rio Colorado</td>
<td>514,452</td>
<td>448,250</td>
<td>13,270</td>
<td>13,165</td>
<td>68.14%</td>
<td>28</td>
<td>0</td>
<td>7-Aug-18</td>
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<tr>
<td>V. Carranza - Rio Colorado</td>
<td>1,327,372</td>
<td>1,122,800</td>
<td>587,312</td>
<td>483,240</td>
<td>64.97%</td>
<td>0</td>
<td>0</td>
<td>7-Aug-18</td>
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<tr>
<td>El Gustavo - Rio Colorado</td>
<td>1,146,097</td>
<td>1,122,143</td>
<td>738,708</td>
<td>556,726</td>
<td>68.65%</td>
<td>183</td>
<td>0</td>
<td>7-Aug-18</td>
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</table>

### Totals

- National Ownership at Amistad/Falcon as of 07/28/2018: 59,240%

### Current as of 07/28/2018

<table>
<thead>
<tr>
<th>Conservation Capacity</th>
<th>MCM</th>
<th>A/F</th>
<th>Combined storage - Mexico</th>
<th>MCM</th>
<th>A/F</th>
<th>United States combined at Amistad Falcon</th>
<th>MCM</th>
<th>A/F</th>
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<tbody>
<tr>
<td>Mexico at Amistad/Falcon</td>
<td>312,126</td>
<td>599</td>
<td>485,815</td>
<td>19.19%</td>
<td>3,873,612</td>
<td>47.20%</td>
<td>4,114</td>
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## TCEQ River Operations Estimates

**Date:** 3/1/2015

**Spoke to:** Charlie

**Time:** 8:48:00 AM

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<th></th>
<th>Calculated Elevation</th>
<th>Table Elevation</th>
<th>Capacity Day Sec-M</th>
<th>Gains</th>
<th>New Balance</th>
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<td>Cila</td>
<td>104.50</td>
<td>31.852</td>
<td>31.850</td>
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<td></td>
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<td>US</td>
<td>0.6</td>
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<td>Cila Current</td>
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<td>Falcon</td>
<td>US</td>
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<td>MX</td>
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<td>Anzalduas</td>
<td>US</td>
<td>11.30</td>
<td>MX</td>
<td>7.90</td>
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</table>

### Flows

- Roma
- Rio Grande City
- Los Ebanos
- San Benito
- Brownsville
- Falcon
- Falcon Elevation
- Falcon Storage
- Salts AM 825 PM 810
- Canal X

### Requests

- **Falcon**
  - Amount: 19.0
  - Release Time: 12.00
  - Contact: Charlie
  - Time of Call: 9:04
- **Anzalduas**
  - Amount: 12.20
  - Release Time: 18.00
  - Contact: Charlie
  - Time of Call: 9:04

### Comments:

- Anthony on River.
- Telemetry down.
- CWQMS down.
## River Operations

### Table: River Operations Data

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<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Mexico</th>
<th>US</th>
<th>Mexico Dams</th>
<th>A DIV</th>
<th>River Losses</th>
<th>B DIV</th>
<th>Deduced</th>
<th>Balance Gains</th>
<th>Above Anzalduas</th>
<th>ANZ Day</th>
<th>Out of Pool</th>
<th>To Storage</th>
<th>Estimated End of Day Ownership</th>
<th>Adjusted Ownership</th>
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<tr>
<td>7/26</td>
<td>AM</td>
<td>0.6</td>
<td>0.0</td>
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<td>0.4</td>
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<td>DAY</td>
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<td>B Reach Total In CMS</td>
<td>Small Dist Total</td>
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<td>LA GRULLA</td>
<td>H #13</td>
<td>H #16 822-002</td>
<td>H #18 815-002</td>
<td>H #19 847-001</td>
<td>H #19 850-002</td>
<td>UNITED TOTAL</td>
<td>BELOW ANZ Total In CMS</td>
<td>Sugar Release</td>
<td>WATER</td>
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</tbody>
</table>

8/5/2015s
Water Accounting
Water Accounting

- Water use is administered through water accounts similar to bank accounts.
- Authorization to use water is requested and diversion certification is issued.
- Processing of the pump operation report as submitted by the water user to account for the water used.
- Processing of water adjustments between diverters and users.
Water Accounting

- Processing water contracts between water right holders
- Processing temporary water use permits
- Generation of the Monthly Report outlining the status of the water account
- Updating Watermaster records as required due to water right amendments and changes of ownerships

All water accounting is processed using TXWAS (Texas Watermaster Accounting System)
Water Accounting

Authorized Water Right = AWR

Usable Balance: No charge water YTD

Storage balance: Contract Water YTD

Storage Limit: Authorized Water Right YTD

Contract Balance: Sold Water YTD
Water Accounting

Diversion Certification: Authorization to divert water

---

**TENNESSEE COMMISSION ON ENVIRONMENTAL QUALITY DIVERSION CERTIFICATE**

<table>
<thead>
<tr>
<th>Acct No:</th>
<th>0000-000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorization Number:</td>
<td>418623</td>
</tr>
<tr>
<td>Received By:</td>
<td>A C</td>
</tr>
<tr>
<td>Date:</td>
<td>01/27/2014</td>
</tr>
<tr>
<td>Time:</td>
<td>08:33</td>
</tr>
<tr>
<td>Method:</td>
<td>PHONE</td>
</tr>
</tbody>
</table>

**Owner:** John Doe Farms

**Diverter:** 10,438 ft³

---

**Deputy:** Quintanilla  
**Reach:** 1

- John Doe  
  1804 W Jefferson Ave  
  Harlingen, Texas 78550

**Comments:**

---

**Begin Date** | **End Date** | **GPM** | **Acre Feet**
--- | --- | --- | ---
02/16/2014 08:00 | 02/16/2014 17:00 | 900 | 1.4912
02/17/2014 08:00 | 02/17/2014 17:00 | 900 | 1.4912
02/18/2014 08:00 | 02/18/2014 17:00 | 900 | 1.4912
02/19/2014 08:00 | 02/19/2014 17:00 | 900 | 1.4912
02/20/2014 08:00 | 02/20/2014 17:00 | 900 | 1.4912
02/21/2014 08:00 | 02/21/2014 17:00 | 900 | 1.4912
02/22/2014 08:00 | 02/22/2014 17:00 | 900 | 1.4912

**Watermaster:** Jose G. Luna

---

Please retain this copy for your records
Water Accounting

- Pump Operation Report
- These reports must be returned with meter readings in a timely manner

![Image of Water Pump Operation Report]

**Client Name:** John Doe Farms

**Acct No:** 0000-000

**Authorization Number:** 418623

**Date:** 01/27/2014  **Time:** 08:33

**Is authorized to divert:** 10.4384 acre-feet of regular water with pump

<table>
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<th>Meter Reading</th>
<th>Beginning</th>
<th>Ending</th>
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<tbody>
<tr>
<td></td>
<td>255694</td>
<td>258694</td>
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</table>

**Remarks:**

**Signature:** John Doe Farms

THIS COPY MUST BE RETURNED TO WATERMASTER WITHIN 5 DAYS FOLLOWING END OF CERTIFICATION PERIOD
Allocation

The equitable distribution of the United States' share of water stored in the Amistad-Falcon system to eligible accounts

Two Reservoirs, One System

- Full Allocation
- Partial Allocation
- Negative Allocation*

Water Right Accounts on the Rio Grande’s Amistad-Falcon system fall in either of 2 categories.

- Water rights with municipal priority – MDI Reserve
- Water rights with a Class A or Class B – Class Reserve

*never occurred
Partial Allocation

MDI Reserve

- The highest priority of Water rights. This reserve is maintained full to ensure the availability of municipal, domestic, and industrial water before any other use.

- The MDI accounts receive a full allotment of water which is equal to their Annual Authorized Water Right at the beginning of each year.
Water for Irrigation, Mining and Recreation use is maintained in the Class Reserve. These accounts depend on the inflows into the Amistad/Falcon system for the allotment of water thru monthly allocations whenever water is available.
# Rio Grande Watermaster Report

**05/26/18**

<table>
<thead>
<tr>
<th></th>
<th>Amistad</th>
<th></th>
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</tr>
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<tbody>
<tr>
<td>Normal Conservation Elevation</td>
<td>340,402</td>
<td>Meters</td>
<td>1,117.00 Feet</td>
<td>-29.47</td>
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<tr>
<td>Water Elevation</td>
<td>331,480</td>
<td>Meters</td>
<td>1,087.53 Feet</td>
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<td>Total Normal Conservation Capacity</td>
<td>4,040,325</td>
<td>TCM</td>
<td>3,275,532 Acre-Feet</td>
<td>52.99%</td>
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<tr>
<td>Total Combined Storage</td>
<td>2,141,000</td>
<td>TCM</td>
<td>1,735,730 Acre-Feet</td>
<td>77.72%</td>
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<tr>
<td>US Share of Current Storage</td>
<td>1,666,000</td>
<td>TCM</td>
<td>1,340,832 Acre-Feet</td>
<td>22.28%</td>
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<tr>
<td>Mexico share of Current Storage</td>
<td>470,000</td>
<td>TCM</td>
<td>365,988 Acre-Feet</td>
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<tr>
<td>TOTAL RELEASES AVG</td>
<td>26.00</td>
<td>CMS</td>
<td>918 CFS</td>
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<tr>
<td>US Release AVG</td>
<td>21.80</td>
<td>CMS</td>
<td>770 CFS</td>
<td>83.85%</td>
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<td>Mexico Release AVG</td>
<td>4.20</td>
<td>CMS</td>
<td>148 CFS</td>
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<td>TOTAL INFLOWS AVG</td>
<td>31.10</td>
<td>CMS</td>
<td>1,407 CFS</td>
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<tr>
<td>US Inflows AVG</td>
<td>22.30</td>
<td>CMS</td>
<td>929 CFS</td>
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<tr>
<td>Mexico Inflows AVG</td>
<td>7.80</td>
<td>CMS</td>
<td>275 CFS</td>
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<td>US Reservoir Loss</td>
<td>13.50</td>
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<td>480 CFS</td>
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<td>Falcon</td>
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<td>Normal Conservation Elevation</td>
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<td>Meters</td>
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<td>Meters</td>
<td>267.67 Feet</td>
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<td>Total Normal Conservation Capacity</td>
<td>3,264,813</td>
<td>TCM</td>
<td>2,646,817 Acre-Feet</td>
<td>26.10%</td>
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<td>Total Combined Storage</td>
<td>866,000</td>
<td>TCM</td>
<td>693,157 Acre-Feet</td>
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<td>US Share of Current Storage</td>
<td>663,000</td>
<td>TCM</td>
<td>537,501 Acre-Feet</td>
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<td>Mexico Share of Current Storage</td>
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<td>105,050 Acre-Feet</td>
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<td>Overall Status</td>
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<td>Normal Conservation Capacity - <strong>Amistad</strong></td>
<td>4,040,325</td>
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<td>3,275,532 Acre-Feet</td>
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<td>Current US share of Normal Conservation</td>
<td>1,666,000</td>
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<td>1,340,832 Acre-Feet</td>
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<td>Normal Conservation Capacity - <strong>Falcon</strong></td>
<td>3,264,813</td>
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<td>2,646,817 Acre-Feet</td>
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<td>Current US share of Normal Conservation</td>
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<td>537,501 Acre-Feet</td>
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<td>Normal Capacity - <strong>Amistad/Falcon System</strong></td>
<td>7,305,138</td>
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<td>5,922,348 Acre-Feet</td>
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<td>Normal Conservation Capacity - <strong>US</strong></td>
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<td>3,391,883 Acre-Feet</td>
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<td>3,121,286</td>
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<td>2,638,466 Acre-Feet</td>
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<td><strong>Current Storage US</strong></td>
<td><strong>2,329,000</strong></td>
<td><strong>TCM</strong></td>
<td><strong>1,887,333 Acre-Feet</strong></td>
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<td>Current Storage Mexico</td>
<td>608,000</td>
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<td>541,554 Acre-Feet</td>
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<td>Current Storage - Amistad - Falcon System</td>
<td>2,998,000</td>
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<td>2,428,887 Acre-Feet</td>
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<tr>
<td>Percent of Storage Capacity</td>
<td>41.01%</td>
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Partial Allocation
Determining water available for allocation

Subtract reserves from the US Share of water in the Amistad/Falcon system on the last Saturday of each month to determine the amount of Unallocated Water.

On May 26, 2018 the reserves were:
- US Share in Amistad/Falcon = 1,887,333 AF
- Dead Storage = 4,600 AF
- Municipal Reserve = 225,000 AF
- Middle Class A & B Reserve = 214,412.6564 AF
- Middle Allocation = ___________ AF
- Lower Class A & B Reserve = 1,312,878.8467 AF
- Lower Allocation = ____________ AF
- Operating Reserve = 75,000 AF
- Unallocated Water = 55,441.4969AF
Dead Storage: 4,600,000.00
MDI Reserve: 225,000.00
Lower Reserve: 1,312,878.84
Middle Reserve: 214,412.65
Operating Reserve: 75,000.00
Unallocated Water: 55,441.49

Amistad/Falcon System 05/26/2018
1,887,333.0000 AF
AUTHORIZED WATER RIGHTS

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<th>Lower</th>
<th>Middle</th>
<th>Total</th>
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<td>Class A=LA</td>
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<td>LA+MA=X</td>
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<tr>
<td>Class B=LB</td>
<td>Class B=MB</td>
<td>LB+MB=Y</td>
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</table>

\[(X \times 1.7) + Y = Z\]

Unallocated water: \(\frac{55,441.4969}{Z} = 0.019806851\) (B Rate)

\(0.019806851 \times 1.7 = 0.033671646\) (A Rate)

Authorized Water Right of each eligible Class A Account \(\times\) A Rate = AF Allocated
Authorized Water Right of each eligible Class B Account \(\times\) B Rate = AF Allocated
May 26, 2018

- US Share in Amistad/Falcon = 1,887,333 AF
- Dead Storage = 4,600 AF
- Municipal Reserve = 225,000 AF
- Middle Class A & B Reserve = 214,412.6564 AF
- Middle Allocation = 5,455.6603 AF
- Lower Class A & B Reserve = 1,312,878.8467 AF
- Lower Allocation = 48,816.1766 AF
- Operating Reserve = 75,000 AF
- Unallocated Water = 1,158.6600 AF
Amistad/Falcon System 05/26/2018  
1,887,333.0000 Acre-Feet
### Water Accounting

#### Monthly Reports

**New Balances**

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<th>Quantity</th>
<th>Active</th>
<th>Status</th>
<th>Start</th>
<th>End</th>
<th>Unit</th>
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**Transactions**

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<th>Quantity</th>
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<th>Status</th>
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<th>End</th>
<th>Unit</th>
<th>Final</th>
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<tbody>
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</tbody>
</table>

**Avocado & Bluewater Reservoir Information**

- **In Avocado & Bluewater Reservoir (95% of State):**
  - Gallons: 4,807,133,000 AF
  - Water: 5,004,000 AF
  - Residuals: 2,126,750 AF
  - Allocation: 3,126,750 AF

**Comments**

- **Allocation Rates:**
  - Class A: 0.0007 AF
  - Class B: 0.00000 AF

- **Reference:**
Field Operations

• Watermaster staff are required to conduct a combined total of 18,600 field monitoring investigations.

• Watermaster staff monitor river diversions daily to verify valid certifications and the accuracy of the meters.

• Enforcement actions are taken for unauthorized diversions.
Field Operations

- Respond to water right complaints
- Maintain records of deputy daily inspections
- Ensure water user compliance and enforce watermaster and state water rules
- Technical assistance to water users
- Visual reconnaissance of river conditions
- Other Watermaster duties assigned
Field Operations
Field Operations
Field Operations
Field Operations
Field Operations
Field Operations
Field Operations
Field Operations

[Image of field operations equipment and pipes in a grassy area near a body of water, possibly a river.]
RIO GRANDE PHOTO JOURNAL

FORT QUITMAN, TX

AMISTAD DAM

FALCON DAM

GULF OF MEXICO
UPPER RIO GRANDE
FORGOTTEN RIVER AREA
UPPER RIO GRANDE
CANDELARIA-PRESIDIO AREA
UPPER RIO GRANDE
PRESIDIO-REDFORD AREA
UPPER RIO GRANDE
LAJITAS AREA

06/07/2007
UPPER RIO GRANDE
BIG BEND RANCH STATE PARK AREA
UPPER RIO GRANDE
BIG BEND NATIONAL PARK AREA
Amistad International Dam

- Located west of Del Rio in Val Verde County
- Operated and maintained by IBWC and its Mexican counterpart, CILA
Amistad International Dam
Amistad International Dam
Tropical Storm Alex – Summer 2010
1000 CMS release (35,315 CFS)
Tropical Storm Alex – Summer 2010

1000 CMS release (35,315 CFS)
MIDDLE RIO GRANDE
EAGLE PASS AREA
MIDDLE RIO GRANDE
LAREDO AREA
MIDDLE RIO GRANDE
LAREDO AREA
MIDDLE RIO GRANDE
ZAPATA AREA
Falcon International Dam

Located at the intersection of Starr county and Zapata county
Operated and maintained by the IBWC and its Mexican counterpart, CILA

Before 2010

During T.S Alex (2010)
Falcon International Dam
Tropical Storm Alex – Summer 2010

1000 CMS release (35,315 CFS)
LOWER RIO GRANDE
FALCON HEIGHTS AREA
Anzalduas Dam

• Located in Hidalgo County
• Operated by the IBWC and its Mexican counterpart, CILA
LOWER RIO GRANDE

STARR COUNTY
LOWER RIO GRANDE
HIDALGO & WILLACY COUNTIES
LOWER RIO GRANDE
LOWER RIO GRANDE

Mouth of the Rio Grande
QUESTIONS?
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