Rio Grande Valley Spring 2023 Review

Spring 2023 Weather Story for the Rio Grande Valley:
Drought…Out! Early March Dryness Erased by Spring Rains
Severe Thunderstorms Cause Repeat Damage in April and May

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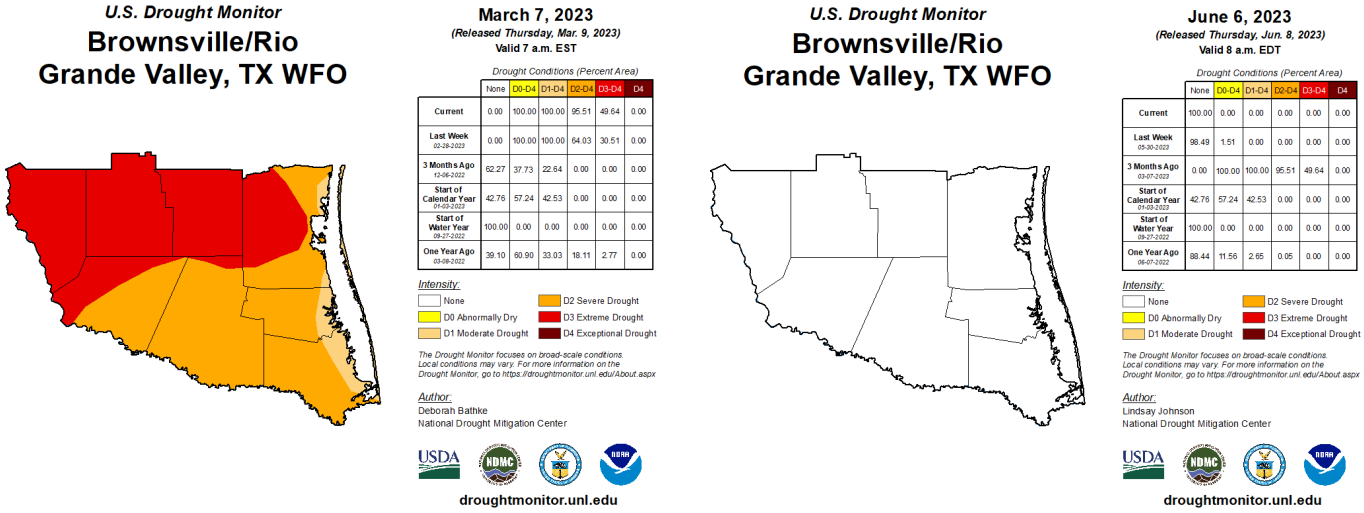

***Figure 1*:** Severe (D2) Drought covered the Lower Rio Grande Valley, with Extreme (D3) Drought covering the South Texas Brush Country/Rio Grande Plains from Zapata through Kenedy County to begin spring 2023. Frequent and locally heavy rains that began March 28th in the Lower Valley and eventually covered all of Deep South Texas through spring erased the drought and dryness by the start of June 2023.

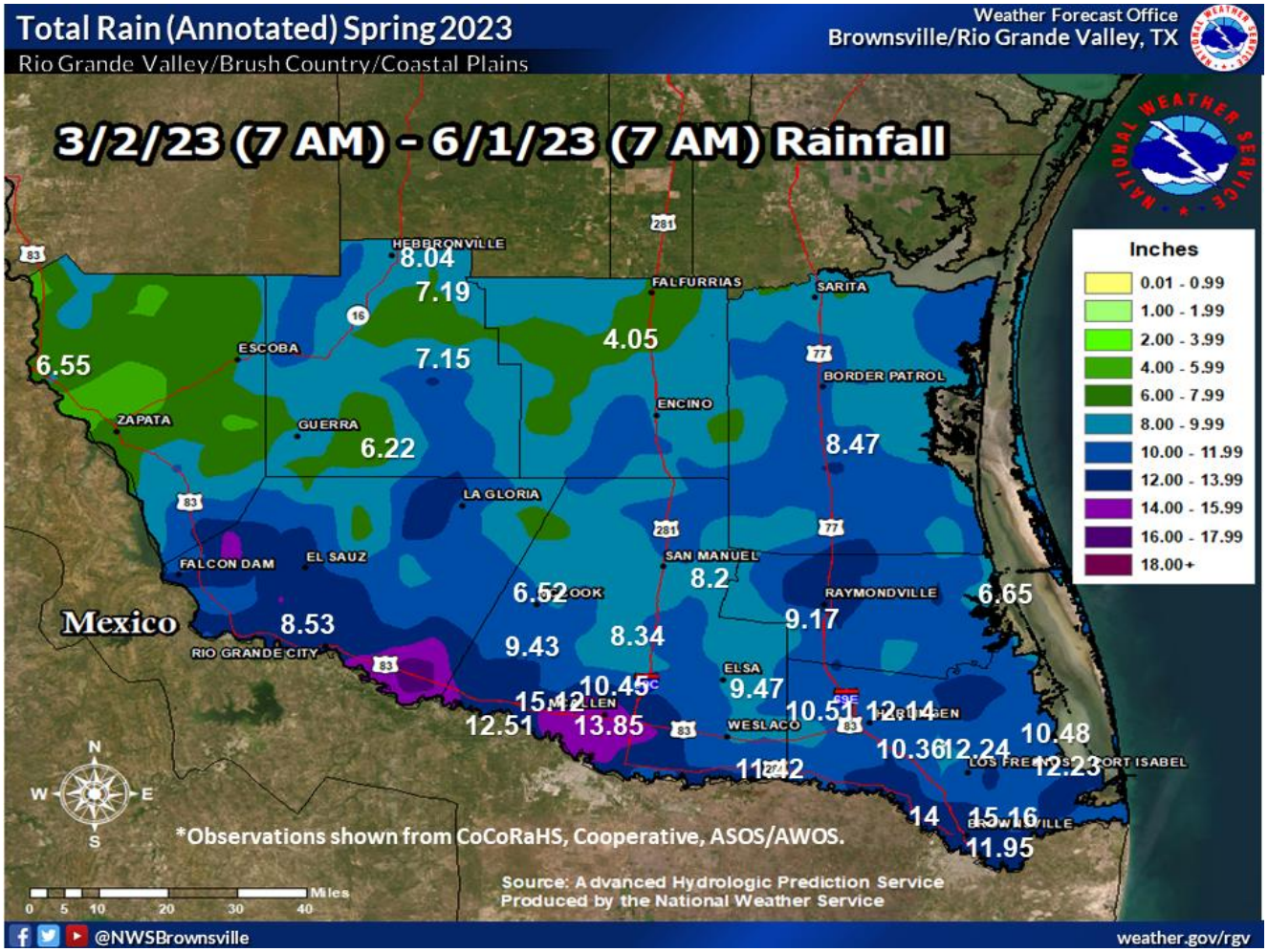

Figure 2 Annotated rainfall map for spring 2023 across the Lower Rio Grande Valley/Deep South Texas region.

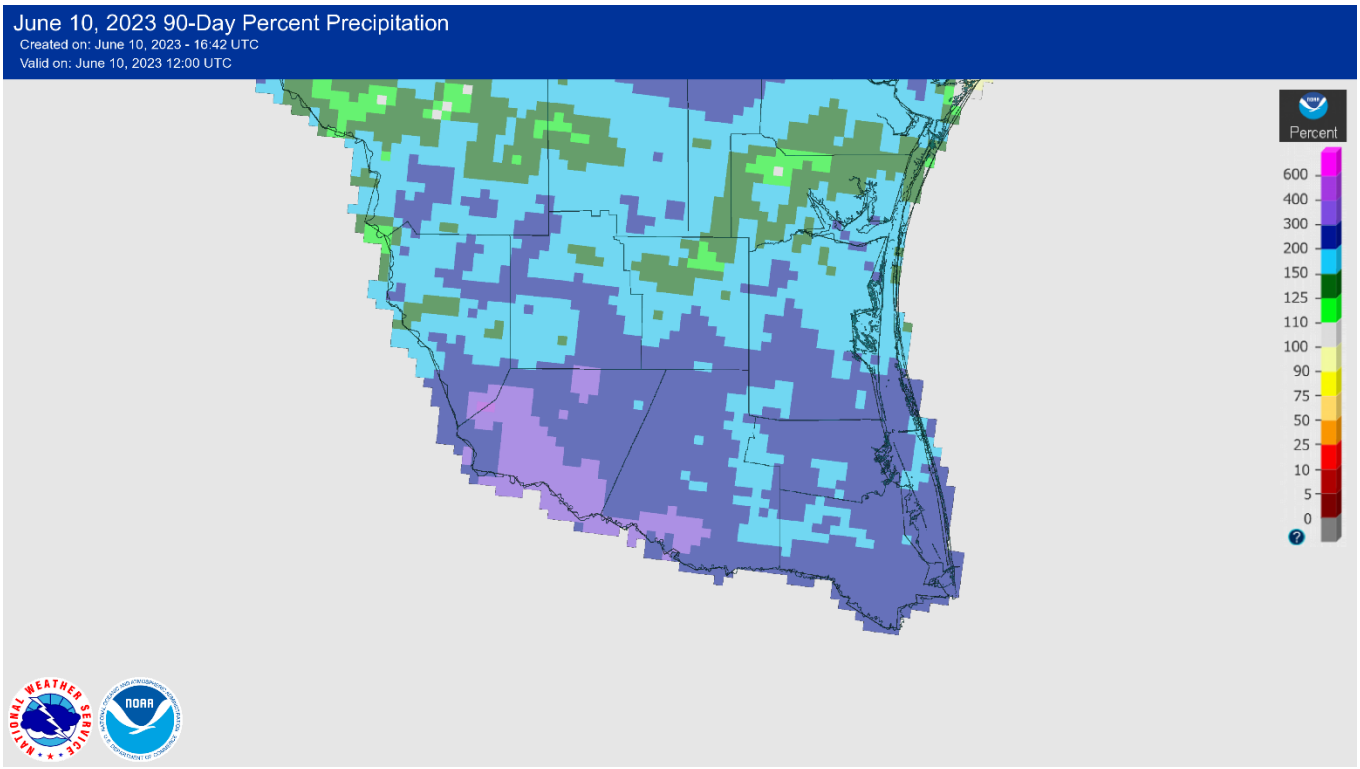

Figure 3. *Rainfall departure from average, March 13 through June 10, 2023. This includes the balance of spring rainfall, along with additional localized rains across the region from June 3 through 8, 2023.*

Month-by-Month Summary

March picked up where February left off: Warm, breezy to windy, with no rainfall of note. The spring drought peaked in March, with difficulties noted by farmers and ranchers providing water to thirsty crops and livestock as the month wore on. On March 4th, a day with low humidity and a modest afternoon sea breeze, two large wildfires were noted: one in southwest Brooks County that burned more than 900 acres, and a second of unknown size but visually reported just west of the Border Patrol Checkpoint along U.S. 77 just north of Armstrong (Kenedy County). Though largely rain-free weather persisted across the Brush Country/Kenedy Brooks County ranches for most of the month, these were the only known large wildfires – a sharp decline in acreage burned between February and April 2022, when more than 30 thousand acres burned mostly across farm/ranch country north of the populated Lower Rio Grande Valley. A strong emphasis on wildfire prevention from NWS and core partners may have been a difference maker – before the onset of late March and especially April rains put an end to the wildfire season later in April, when green-up began in earnest.

A band of torrential-rain producing thunderstorms during the afternoon of March 28th developed and moved from southeast Starr County along the IH-2 corridor and along the Rio Grande before winding down in Cameron County. Between 3 and nearly 5" fell across the McAllen metropolitan area, in some cases double the monthly average in just one day. The rain was a harbinger of weather to come during April and May, which would become the most active severe weather season in the Valley since 2012.

The warm to hot and dry first half of March, which culminated in triple-digit heat on the 12th away from the coast set the temperature tone for the month. A St. Patrick's Day Weekend cold snap briefly dented the warmth, as another triple-digit day arrived on the 24th. Overall, temperatures ranged from 2 to 4 degrees above the 1991-2020 averages, and ranked around the top ten warmest on record.

The combination of continued warm to hot, dry, and occasionally breezy conditions with increased releases from Falcon International Reservoir to aid agricultural needs in northeast Mexico as well as the Lower Valley resulted in a 20-year low of the total water storage levels at month's end. The rains which soaked the IH-2 corridor on March 28 missed the Lower Rio Grande basin's headwaters, and values plunged to as low as 11.4% of total capacity. Increased releases would soon follow from Amistad International Reservoir to help backfill some of the lost water into Falcon, but values on rose to 17% of capacity by mid-April – still very low for future water supply needs.

April opened dry and warm, before the season's final notable cool front arrived on the 6th, and was followed by deep southwesterly flow aloft which ultimately produced a widespread and drought-quenching rain event on the 6th through the 8th. Rainfall across all of the eastern half of Texas was "manna", with peak rainfall of 5 to 8 inches between Houston and Austin/San Antonio. For the southern tip of Texas, 1 to 3" of 'cool' rain was quite helpful, with Severe (D2) to Extreme (D3) Drought reduced to mostly Abnormal Dryness (D0) for the populated Lower Valley and D1 (Moderate) for most other areas by April 11.

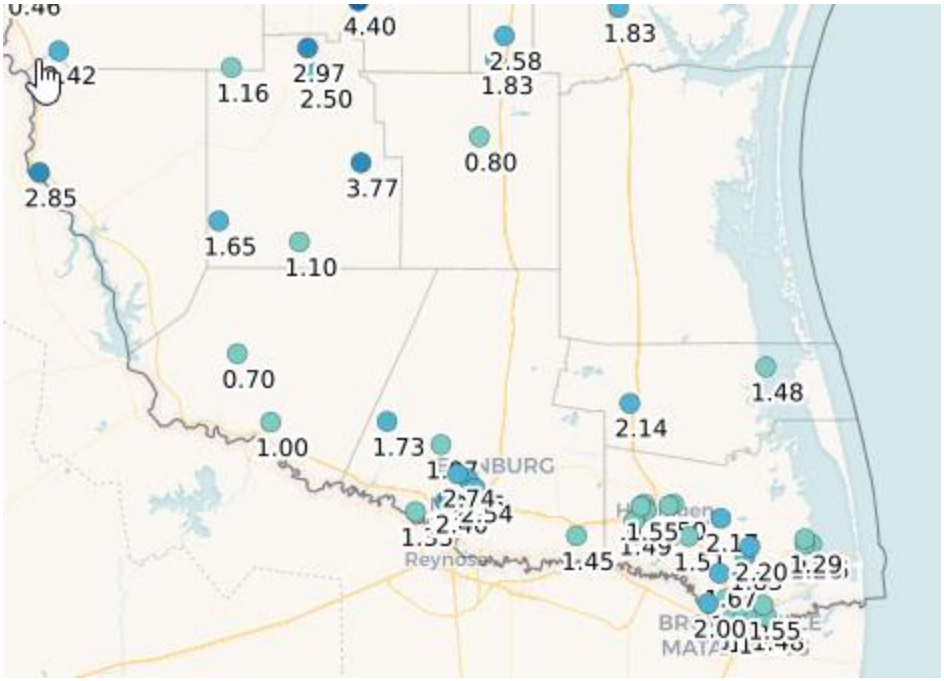

Figure 4. CoCoRaHS rainfall (50 percent completeness or greater) for the Lower Rio Grande Valley/Deep S. Texas region, April 5 to 8, 2023.

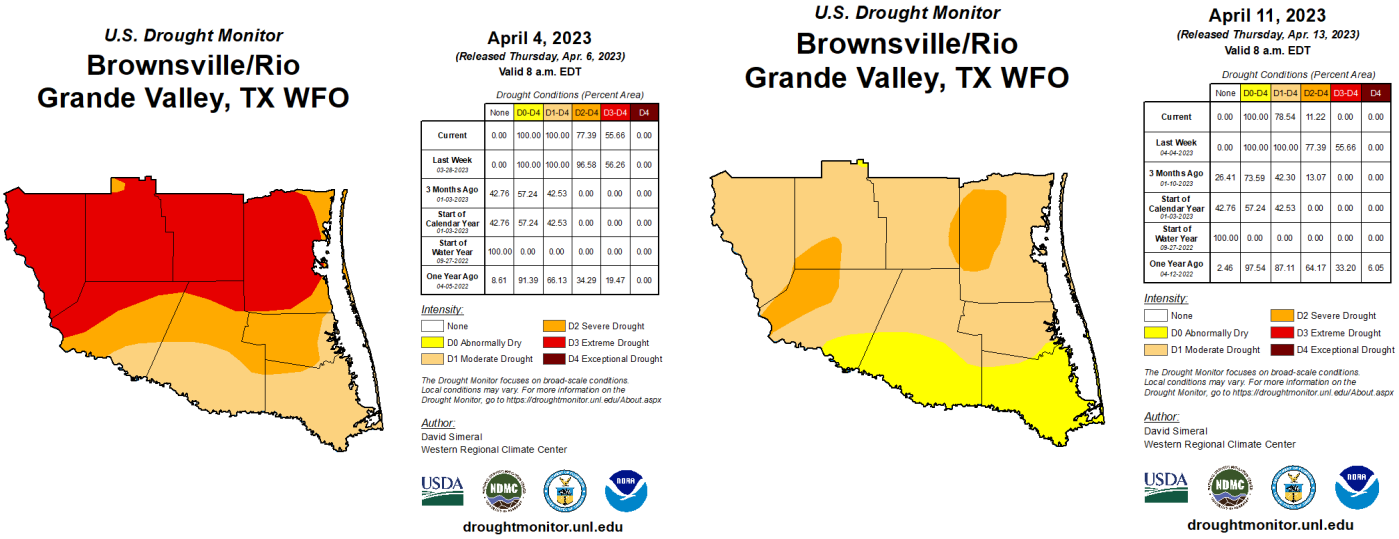

Figure 5. Drought monitor changes from prior to the April 6-8 rain event and after. Extreme (D3) Drought was eliminated across the Rio Grande Plains/Brush Country/Kenedy and Brooks ranches with a two-category improvement in many locations. For the entire area, at least a one-category improvement was realized.

Temperatures gradually recovered into mid-April, with drier fronts keeping readings from recovering much; highs in the mid to upper 90s occurred on the 15th.

Then the action began.

The persistent and speedy westerly flow aloft which had kept dry air dominant for much of winter through the end of March tilted a bit more southwesterly, coinciding with the natural increase in sun angle and mid-spring warming. At the same time, warm to very warm sea surface temperatures extending from the Gulf through the western Caribbean and coastal tropical Pacific Ocean along the southern Mexico through central American

coast helped "juice" the lower levels of the atmosphere with increasingly unstable air. On April 21st, the region saw its first severe weather coverage event – in the form of large to very large hail in several supercell/storm clusters that ripped through the region from northwest to southeast during the Friday afternoon commute. Two days later, a front cruising across south Texas acted on the reservoir of unstable air, with inflow of mid-level dry air providing momentum for wind gusts between 50 and 75 mph across much of the Lower Valley. The strongest winds were noted from Raymondville to Bayview, where some structural damage was noted to substandard/poorly anchored structures exposed to the northerly microburst, as well as hundreds of tree limbs felled.

April saved its worst for last, with another front linking up with a speedy jet streak and running into more unstable air from late evening of the 28th through the post-midnight hours of the 29th. A break-off cluster of mainly hailstorms in Starr and Zapata County during the mid-evening of the 28th organized into a small but potent squall line around midnight on the 29th. The squall line accelerated along/near the Rio Grande, across heavily populated Hidalgo County before rolling down the U.S./Mexico border region in Cameron County. Damage "worse than Hanna" struck hundreds of buildings, signs, power lines, trees and limbs on a line from near Mission/La Joya through McAllen and Pharr, continuing on the south side of Donna and Weslaco before hugging the Rio Grande along U.S. 281 in southwest Cameron County. When the damage is fully counted, it is likely that between $50 and $100 million in insured and uninsured damage from the 75 to 85-90 mph winds will be realized.

A full story on the events of late April 2023 for the Lower Valley can be found **here**.

Each event brought more welcome rainfall that joined the unwelcome severe weather. Another 1 to 3+ inches fell across the Lower Rio Grande Valley region (Starr, Hidalgo, Willacy, Cameron) between the 28th and 30th, ensuring that continued drought improvements seen through mid-month would be able to hold through May. By the start of May, Abnormal Dryness (D0) was all that was left of the former D2 and D3 drought across the Brush Country, with the populated Valley now wet and green. Total monthly rainfall, which ranged from 4 to 8 inches across the southern tip of Texas (with a few pockets of 2 to 3" in northern Hidalgo and northern Zapata), ranked among the top ten wettest all-time for April. This included Brownsville (5.04", 8th wettest) and McAllen (5.01", 4th wettest).

Left: Large hail up to baseball size blew out this vehicle's rear window near Peñitas on April 21st, 2023; large hail >2" in diameter was noted in the Mission/McAllen area as well as across the border in Reynosa, Tamaulipas, Mexico. Right: A flipped Cessna aircraft at McAllen/Miller Airport from the "midnight madness" of April 29th, 2023. Surface and top-floor wind gusts in this area were estimated at 80 to 90 mph. Left photo credit: Oscar Sobrevilla, Televisa Noreste (Mexico).

May continued the active pattern, with more upper level disturbances acting on increasingly warm/humid airmasses to create frequent squall line events through the month. While each event brought more helpful rain which would ultimately remove all dryness from the Deep S. Texas ranch country by early June, some of them came with a price that included more damaging winds and hail. The severe weather would persist into early June – rare for the Lower Rio Grande Valley.

A quiet but increasingly "soupy" start to May was rudely interrupted by a rapidly developing squall line that punched through southeast Hidalgo and Cameron County just after midnight on May 9th, with 75 to nearly 90 mph winds raking Laguna Madre Bay and South Padre Island. Poorly fastened and exposed structures including an entire roof deck at an older condominium on Laguna Blvd., a partial roof deck at the South Padre Island Convention Center, and two recreational vehicles at Isla Blanca Park were impacted. Just four days later, a squall line raced across the Lower Valley, with outflow possibly impacting a "mini" supercell ahead of it. That supercell dropped an EF1 Tornado on Laguna Heights (near Port Isabel), with heavy impact to life and property. Tragically, one person died and eleven others were injured when very substandard buildings they resided in were demolished by the 85 to 105 mph wind; a total of 60 buildings sustained varying levels of damage in the community.

Heavy rainfall joined the squall line and attendant mesoscale convective system; the rain would continue through late morning and early afternoon across much of the Lower Valley, with another 1" to 3" adding to the monthly and seasonal total.

Additional rain fell with scattered to locally numerous thunderstorms through the next week, with another round of strong to severe thunderstorms on Memorial Day Weekend that dropped more mentionable hail, and 1.5" to more than 3" in portions of Hidalgo and Starr County.

May 2023, similar to April, ranked in the higher echelons of the overall period of record; Brownsville landed at 18th wettest (5.52") and McAllen at 10th wettest (5.28"). Harlingen/Valley International Airport ended at 3rd wettest (6.42") – though historical data is spotty at that location. Harlingen/cooperative landed at 23rd wettest (4.65").

Left: Complete roof decking damage to the El Castile Condominium roof decking on South Padre Island, early on May 9th, 2023.
Right: Demolished very substandard/unanchored structures in Laguna Heights from an EF1 tornado early on May 13th, 2023.

Spring 2023 will go down as a tale of two seasons: A continuation of the warm and dry start to the year; as by mid-March temperatures ranked among the top ten warmest and rainfall among the top ten driest. Then, a rather abrupt change to much wetter conditions beginning on March 28th and continuing right into early June. The wetter conditions erased the drought/dryness across the far south Texas/Lower Rio Grande Valley region by the end of spring, but it came at a destructive and unfortunately deadly cost in one case (Laguna Heights).

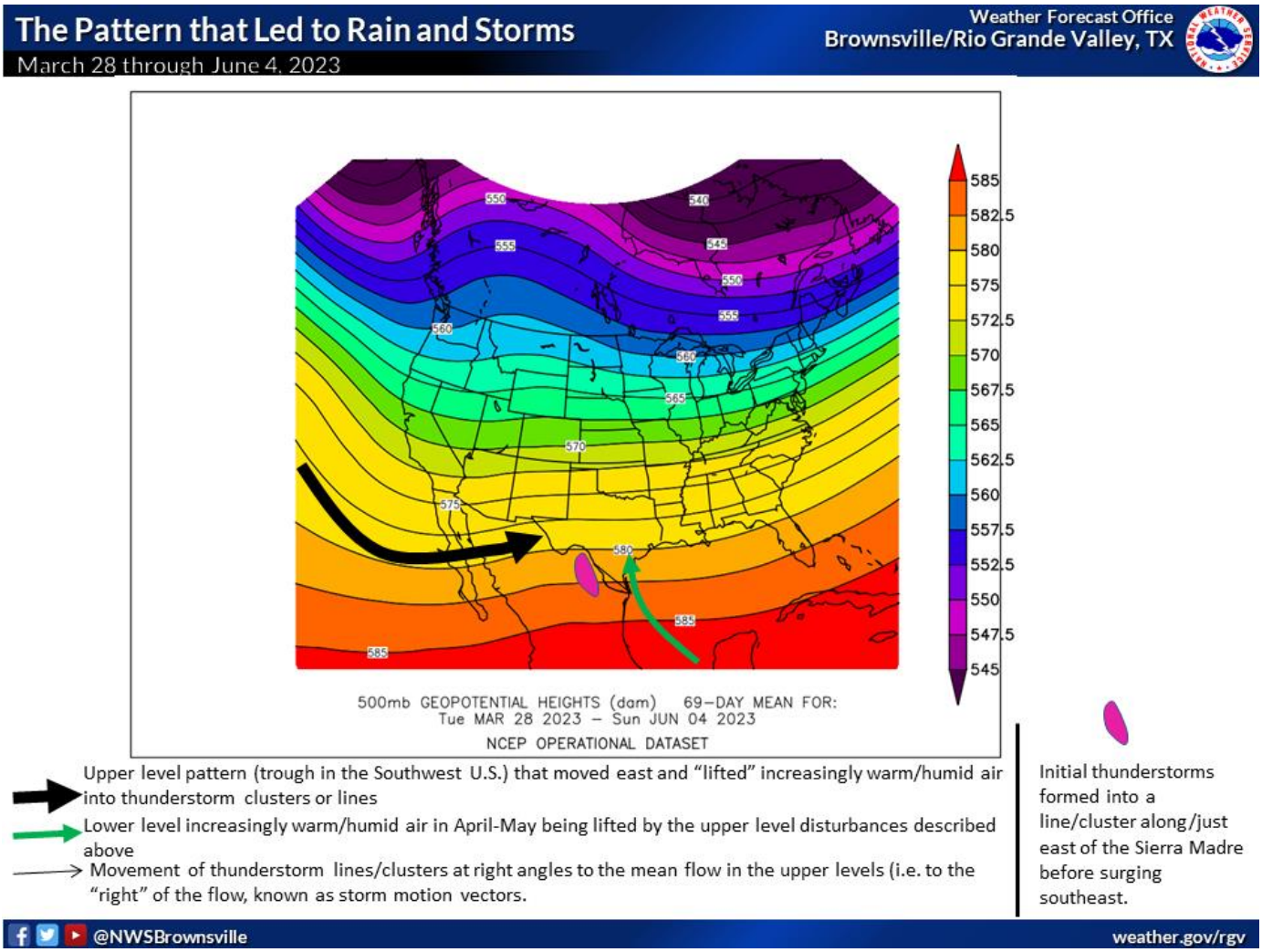

Figure 6. General 500 mb steering pattern for the period of March 28 through June 24, when the bulk of the spring rain and thunderstorm events occurred across the Lower Rio Grande Valley region.

Between April 21 and the end of May, there were six individual severe weather episodes – each causing a combination of strong/damaging wind and hail for many locations across the Lower Rio Grande Valley:

- April 21 (afternoon): Large/very large hailstorm that developed originally in Jim Hogg County and moved into two clusters across the RGV, one in the McAllen/Mission metro and the other from west Harlingen south the Santa Maria/Los Indios/La Feria/Mercedes.
- April 23 (afternoon): South-moving squall line that produced welcome rain across the upper and lower Valley, and 47 to 68 mph wind gusts by early afternoon (measured). Strongest storms ripped from near Raymondville through Arroyo City/Rio Hondo, Los Fresnos, and Bayview, where we estimated wind speeds up to 75 mph.

- April 28/29 (overnight): Hail and some strong winds in Starr County morphed into a mini squall line that ripped across southern Hidalgo and southwest Cameron. Strongest winds, 75 to 85+ mph, occurred between 1215 and 115 AM (roughly) from La Joya/Penitas through McAllen, south side of Donna/Weslaco, Progreso, and into Santa Maria-Los Indios.
- May 9 (overnight): Rapidly intensifying mini squall line produced 75 to 90 mph wind gusts mainly on South Padre Island and the lower Laguna Madre nearby.
- May 13 (overnight; pre-dawn): Squall line produced lower wind speeds overall (25 to 37 mph), though higher toward the coast (40-50). Episode known for the Laguna Heights tornado (EF1) occurred just after 4 AM.
- May 29: Memorial Day wind/hail storms (afternoon)

Total property damage from all events in the period was likely to be well over $100 million, which would be the most for a season since the legendary 2012 severe weather season, which included a six-week period of predominantly hail events, highlighted by the March 29, 2012 McAllen Hailstorm which alone resulted in several hundred million in property damage.

The good news? Farmers and ranchers had a very welcome reprieve from the water supply issue and drought impacts, and the temporary surplus gave renewed hope for a successful growing season – though an expected summer of dry and hot/very hot conditions could change the outcome from water-dependent dryland crops. The rainfall which continued through June 8th ended up high in the overall rankings (below), with Brownsville and McAllen ending up top-five wettest on record for the wet period, and Rio Grande City at 11th wettest. Shown is a slide for rainfall rankings through June 4th.

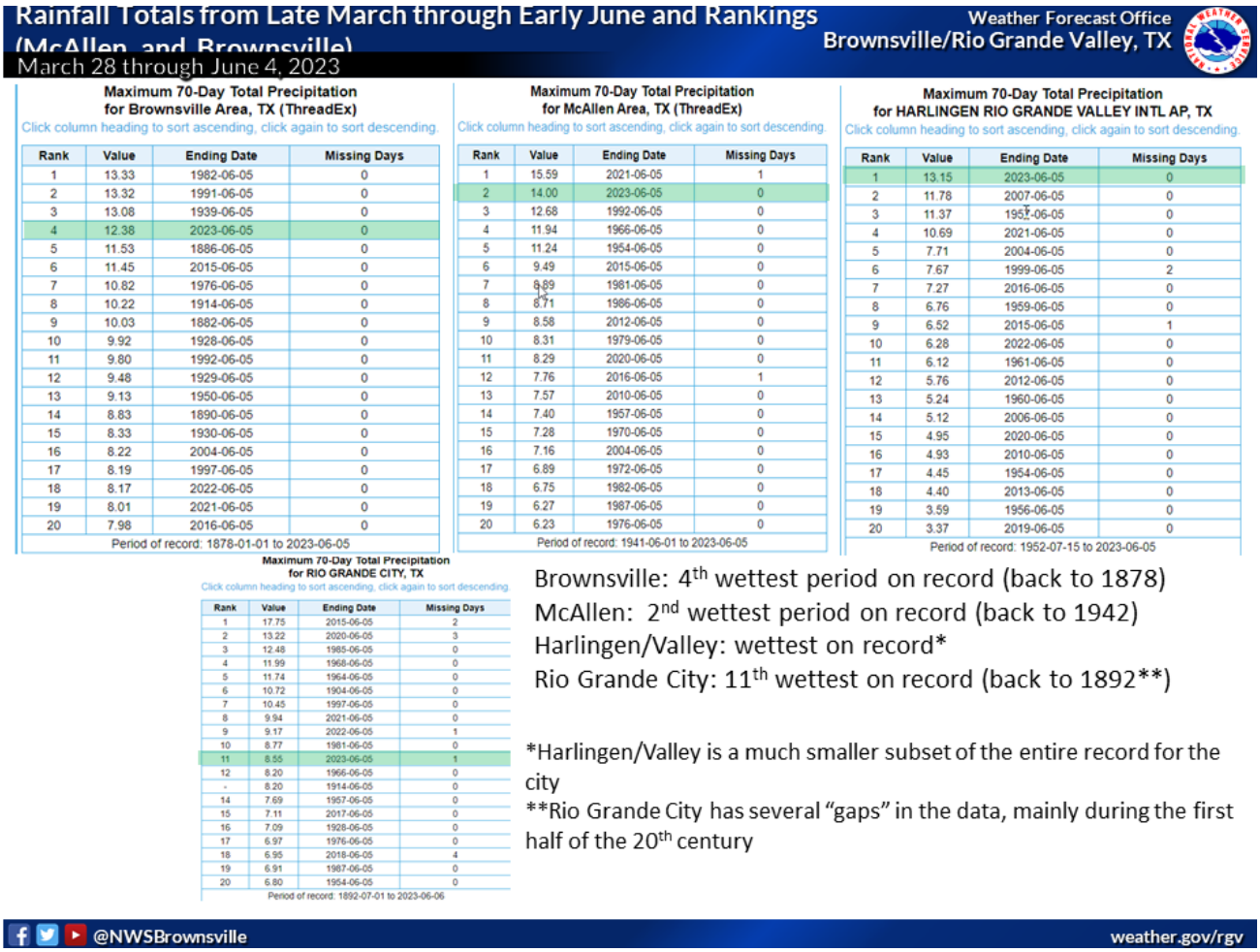

Figure 7. Measured rainfall and rankings for the spring into very early June 2023 wet period across the Lower Rio Grande Valley.

Summer 2023 may well revert the green gains to yellowing grass and brush – and a resumption of dryness and moderate (D1) drought. But the end of spring was quite a nice site of lush green landscapes, courtesy of the rainy pattern.

Green Streets: North Brownsville road bathed in green after multiple April rain events in 2023.