Region 15
Flood Planning
Group

TECHNICAL MEMORANDUM

TO: Mr. Jeff Walker, Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

THROUGH: Jaime J. Salazar
Operations Manager
Hidalgo County Drainage District No. 1
902 N. Doolittle
Edinburg, TX 78542

FROM: Halff Associates, Inc
50000 West Military Hwy, Ste. 100
McAllen, TX 78503

SUBJECT: Region 15 Lower Rio Grande Regional Flood Plan, Technical Memorandum

DATE: March 7, 2022

In accordance with Texas Administrative Code §361.13 regarding the Regional Flood Planning Group Deliverables, contained in this draft technical memorandum are the remaining interim datasets required for review for the Lower Rio Grande Regional Flood Planning Group (RFPG), Region 15. Due to a delay in the FATHOM data, items related to mapping of known flood risk (deliverables defined in §361.13(e)(3) to (5)), had their due dates pushed back to March 7, 2022. The remaining geodatabases and associated maps required as part of this Technical Memorandum are briefly explained in the next sections and contained in the Appendix as Attachments. **Table 1** on the next page indicates which subtasks and information is contained in each Attachment.

Table 1: Technical Memorandum Attachments

Attachment	TWDB Task	Description
L-1	4C.1.c	A geodatabase for: region-wide 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined. (§361.13(e)(3))
	4C.1.d	A geodatabase that identifies additional flood-prone areas not included in the floodplain quilt based on hydrologic features, historic flooding, and or local knowledge. (§361.13(e)(4))
	4C.1.e	A geodatabase in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available (§361.13(e)(5))
L-2	4C.1.c	Map 4: Existing Condition Flood Hazard (Exhibit C 2.2.A.1). (§361.13(e)(3))
L-3	4C.1.c	Map 5: Existing Condition Flood Hazard – Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.A.1). (§361.13(e)(3))
L-4	4C.1.c	Map 6: Existing Condition Flood Exposure (Exhibit C 2.2.A.2). (§361.13(e)(3))
L-5	4C.1.c	Map 7: Existing Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.A.3). (§361.13(e)(3))
L-6	4C.1.c	Map 8: Future Condition Flood Hazard (Exhibit C 2.2.B.1). (§361.13(e)(3))
L-7	4C.1.c	Map 9: Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.B.1). (§361.13(e)(3))
L-8	4C.1.c	Map 10: Extent of Increase of Flood Hazard Compared to Existing Condition (Exhibit C2.2.B.1). (§361.13(e)(3))
L-9	4C.1.c	Map 11: Future Condition Flood Exposure (Exhibit C 2.2.B.2). (§361.13(e)(3))
L-10	4C.1.c	Map 12: Future Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.B.3). (§361.13(e)(3))
N	4C.1.e	Associated maps in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available (§361.13(e)(5))

Table 1 Technical Memorandum Attachments (continued):

Attachment	TWDB Task	Description
O	4C.1.c	Memorandum describing approach for developing future conditions flood risk
P	2.2.A.2 and 2.2.A.3	Table 3 – Existing conditions flood risk summary table (by county) of Exhibit C-Technical Guidelines for Regional Flood Planning
Q	2.2.B.2 and 2.2.B.3	Table 5 – Future conditions flood risk summary table (by county) of Exhibit C-Technical Guidelines for Regional Flood Planning

The following sections introduce the technical memorandum deliverables included in this submittal.

4C.1.C – EXISTING AND POTENTIAL FUTURE CONDITIONS FLOOD RISK

TWDB provided regional planning groups with an official version of the existing conditions floodplain quilt. The quilt was provided to establish a starting point in identifying flood risk within the region. The floodplain quilt compiled flood risk boundaries from several sources.

- National Flood Hazard Layer (NFHL) Pending Data
- National Flood Hazard Layer (NFHL) Preliminary Data
- National Flood Hazard Layer Effective Data (Detailed Study Areas only)
- Estimated Base Flood Elevation Data
- National Flood Hazard Layer (NFHL) Effective Data (Approximate Study Areas only)
- First American Flood Data Services (FAFDS)

Because these region-wide, flood risk inundation maps are to be developed using the best available data, and not actual modeling, the draft existing conditions and future conditions flood risk inundation maps for the 1.0% annual chance flood event and 0.2% annual chance flood event were developed using the TWDB "floodplain quilt" as a base and stitching in various sources of data that were evaluated to contain the best available data. Figure 1 below shows the Floodplain Quilt Data Sources that were included (stitched) into the floodplain quilt provided by TWDB.

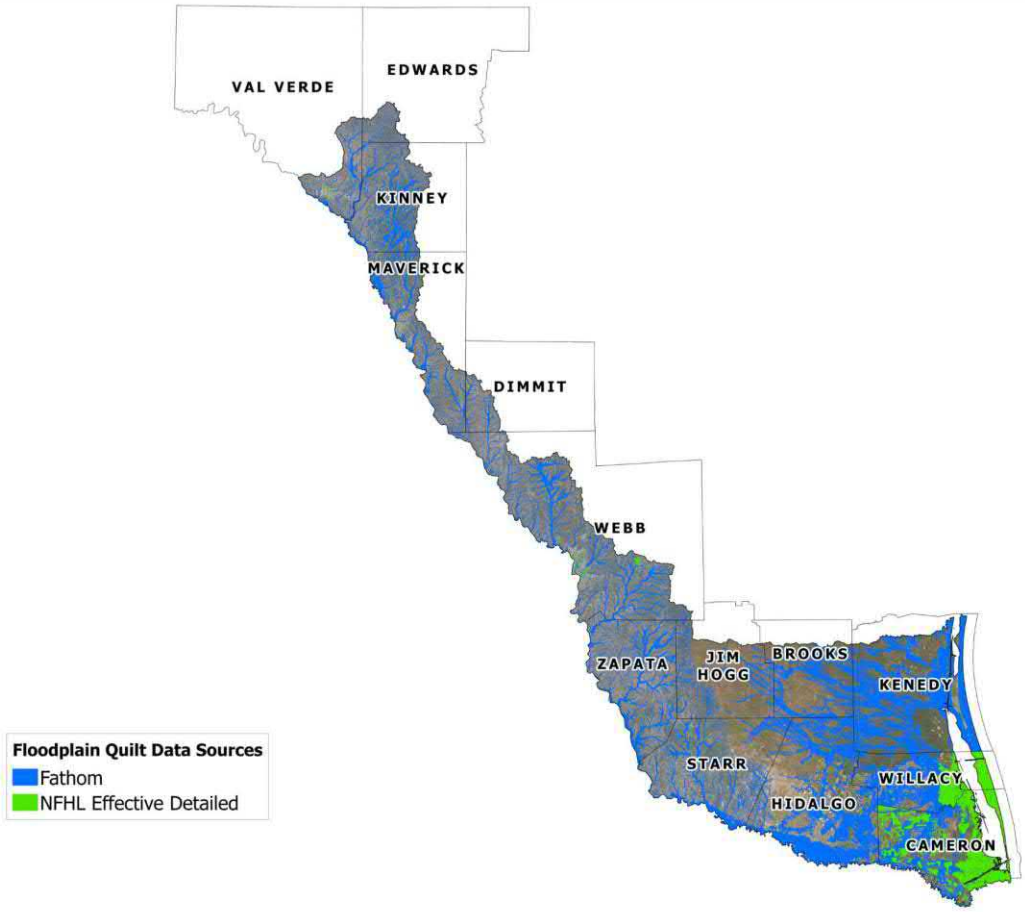


Figure 1: Data Sources that were included (stitched) into the floodplain quilt provided by TWDB.

On October 29, 2021, TWDB provided the planning group with Fathom floodplain data to estimate flood risk in locations where floodplain information was unavailable. The draft existing conditions and future conditions flood risk inundation maps for the 1.0% annual chance flood event and 0.2% annual chance flood event were developed with the inclusion of the Fathom data and floodplain data collected from local and regional flood studies. The following tables shows the approach for including information into the floodplain quilt. This approach was discussed and agreed upon during the January 19, 2022, Regional Flood Planning Group meeting.

Table 2 Floodplain Mapping Data Sources Hierarchy

	Best Available →		→		→		→		**Most Approximate**	
	Local Floodplain (if determined current)		NFHL Zone AE (Detailed Studies)		BLE (not available yet)		FATHOM / FAFDS (replaces all Zone A)		NFHL Zone A & FAFDS	
	100-YR	500-YR	100-YR	500-YR	100-YR	500-YR	100-YR	500-YR	100-YR	500-YR
Existing (Task 2A)	Local Study (if provided)	Local Study (if provided)	Floodplain quilt 100-YR	Floodplain quilt 500YR	BLE 100YR	BLE 500YR	Fathom 100-YR, (Not pluvial in coastal HUCs)	Fathom 500-YR, (Not pluvial in coastal HUCs)	Zone A	Fathom 500YR
Future (Task 2B)	Local Study (if provided)	Local Study (if provided)	Existing 500-YR	Buffer at same ratio as exist 100-YR vs. 500-YR	BLE Existing 500-YR	Buffer at same ratio as exist 100-YR vs. 500-YR	Fathom Existing 500-YR	Buffer at same ratio as exist 100-YR vs. 500-YR	Fathom 500-YR or Delta* Mapping	Areas w/o 500-YR included as floodplain gaps

Methodologies to determine potential future flood risk were discussed and agreed upon during the January 19, 2022, Regional Flood Planning Group meeting. The future conditions flood risk memorandum describing the approach is in Attachment O.

On December 1, 2021, TWDB supplied the planning groups with the final buildings dataset to be used for the existing and future conditions flood exposure analysis. The interim exposure analysis was performed to determine the number of at-risk structures (buildings, roadways, critical facilities, etc.), population estimates, the length of impacted roadways and area of agricultural land contained within the previously developed existing and potential future flood hazard boundary. Table 3 and Table 4 below summarizes Region 15's flood exposure results. The geodatabase and associated maps required for the Technical Memorandum submission are included in Attachments L-1 through L-10 (StaticMaps and GeodatabaseSubmittal) and are broken down by county.

Table 3: Lower Rio Grande Region 15 Existing and Potential Future Flood Exposure Analysis Results for 1% Annual Chance Event

Potential Flood Risk Event	Number of At-Risk Structures	Estimated At-Risk Daytime Population	Number of At-Risk Roadway Crossings*	Impacted Agricultural Area (sq. mi.)	Number of At-Risk Critical Facilities
Existing 1% Annual Chance (100-year)	199,114	476,876	121	418.76	270
Future 1% Annual Chance (100-year)	375,879	826,959	126	778.84	472

**includes low water crossings only*

Table 4: Lower Rio Grande Region 15 Existing and Potential Future Flood Exposure Analysis Results for 0.2% Annual Chance Event

Potential Flood Risk Event	Number of At-Risk Structures	Estimated At-Risk Daytime Population	Number of At-Risk Roadway Crossings*	Impacted Agricultural Area (sq. mi.)	Number of At-Risk Critical Facilities
Existing 0.2% Annual Chance (100-year)	375,479	826,959	126	777.84	472
Future 0.2% Annual Chance (100-year)	532,962	1,083,538	129	868.23	615

**includes low water crossings only*

Following the exposure analysis, a vulnerability analysis was performed for both existing and potential future conditions using the Social Vulnerability Index (SVI) dataset. The SVI uses 15 different census variables to help identify communities that may need support before, during, and after a disaster. In this first planning cycle, the SVI is used to represent resilience abilities across the region. The vulnerability analysis was performed to assess a community's resilience, with values closer to 1 denoting greater vulnerability. The SVI of each county within Region 15 can be found in draft versions of Table 3 and Table 5 of Exhibit C- Technical Guidelines for Regional Flood Planning, included as Attachments P and Q (Tables), respectively.

Table 5: Lower Rio Grande Region 15 Average Social Vulnerability Index (SVI) of features in floodplain or flood prone areas

Potential Flood Risk Event	Average Social Vulnerability Index (SVI) of features in floodplain or flood prone areas of Region 15
Existing Conditions	0.833
Future Conditions	0.828

4C.1.D – FLOOD HAZARD DATA GAPS AND ADDITIONAL PRONE AREAS

Following the compilation of the draft floodplain quilt, a flood hazard gap analysis was performed to identify known or "apparent" flood-prone areas that lack models and maps, or have existing models and maps that are outdated or otherwise not considered reliable. The existing condition gap analysis identifies the following:

- Absence of hydrologic and hydraulic models where the Fathom mapping is utilized
- Outdated National Flood Hazard Layer data greater than 10 years old
- Absence of 0.2% annual chance (500-year) flood risk data
- More than 50% absence of 0.2% annual chance (500-year) flood risk data
- Absence of modeling and mapping utilizing NOAA Atlas 14 rainfall data

Due to the absence of future condition analysis, the entire region is considered a gap lacking future condition modeling and mapping.

Maps displaying draft results of existing condition and potential future condition flood gaps are provided in Attachment L-3 (Map 5: Existing Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify Known Flood-Prone Areas) (StaticMaps) and L-7 (Map 9: Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify Known Flood-Prone Areas)(StaticMaps). Associated geospatial files are provided in Attachment L-1 (GeodatabaseSubmittal). The geodatabase feature classes titled 'Fld_Map_Gaps' provides a spatial representation of mapping gaps in the Lower Rio Grande region.

4C.1.E – AVAILABLE HYDROLOGIC AND HYDRAULIC MODELS NEEDED TO EVALUATE FMS'S AND FMP'S

A list of previous studies containing modeling data was submitted as part of the January 7, 2022, Technical Memorandum. These studies were added to the geodatabase to provide a geospatial representation of model-backed study areas for use when conducting FMS and FMP evaluations. Also provided in the database are areas where Base Level Engineering and FEMA National Flood Hazard Layer modeling are available. It should be noted that for use in developing an FMS or FMP, these models will likely require some level of enhancement. As the planning process

continues, the list of available studies and associated models will be enhanced to document sources of information relevant to plan development within Region 15. It is expected that modeling and mapping needs will be the subject of numerous potential Flood Management Evaluations. A map displaying model availability is provided in Attachment N (Map: Locations where Hydrologic and Hydraulic Models are Available)(StaticMaps).

An associated geospatial file is provided in Attachment L-1(GeodatabaseSubmittal). The geodatabase feature classes titled 'AvaliableModels' provides a spatial representation of available models in the Lower Rio Grande region.

4C.1.C, D, E – TECHNICAL MEMORANDUM ADDEDNDUM GEODATABASE AND TABLES

As outlined in the TWDB Extension of Time to Complete Technical Memorandum dated August 17, 2021 and associated Technical Memorandum Data Deliverable Clarification dated October 29, 2021, documentation in Attachment 4 outlines geodatabase deliverables included in this Technical Memorandum as well as spatial files and tables. Specific data deliverables align with the TWDB's Exhibit D: Data Submittal Guidelines for Regional Flood Planning. Please keep in mind that these files will continue to be updated and enhanced throughout the development of the Regional Flood Plan and reflect a snapshot in time of the project as it stands today.

ATTACHMENTS

L-1	A geodatabase for: region-wide 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined. (§361.13(e)(3)) A geodatabase that identifies additional flood-prone areas not included in the floodplain quilt based on hydrologic features, historic flooding, and or local knowledge. (§361.13(e)(4)) A geodatabase in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available (§361.13(e)(5))
L-2	Map 4: Existing Condition Flood Hazard (Exhibit C 2.2.A.1). (§361.13(e)(3))
L-3	Map 5: Existing Condition Flood Hazard – Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.A.1). (§361.13(e)(3))
L-4	Map 6: Existing Condition Flood Exposure (Exhibit C 2.2.A.2). (§361.13(e)(3))
L-5	Map 7: Existing Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.A.3). (§361.13(e)(3))
L-6	Map 8: Future Condition Flood Hazard (Exhibit C 2.2.B.1). (§361.13(e)(3))
L-7	Map 9: Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.B.1). (§361.13(e)(3))
L-8	Map 10: Extent of Increase of Flood Hazard Compared to Existing Condition (Exhibit C2.2.B.1). (§361.13(e)(3))
L-9	Map 11: Future Condition Flood Exposure (Exhibit C 2.2.B.2). (§361.13(e)(3))
L-10	Map 12: Future Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.B.3). (§361.13(e)(3))
N	Associated maps in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available (§361.13(e)(5))
O	Memorandum describing approach for developing future conditions flood risk
P	Table 3 – Existing conditions flood risk summary table (by county) of Exhibit C-Technical Guidelines for Regional Flood Planning
Q	Table 5 – Future conditions flood risk summary table (by county) of Exhibit C-Technical Guidelines for Regional Flood Planning Task 2A

ATTACHMENT L-1

A geodatabase for: region-wide 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined.

(§361.13(e)(3))

A geodatabase that identifies additional flood-prone areas not included in the floodplain quilt based on hydrologic features, historic flooding, and or local knowledge.

(§361.13(e)(4))

A geodatabase in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available

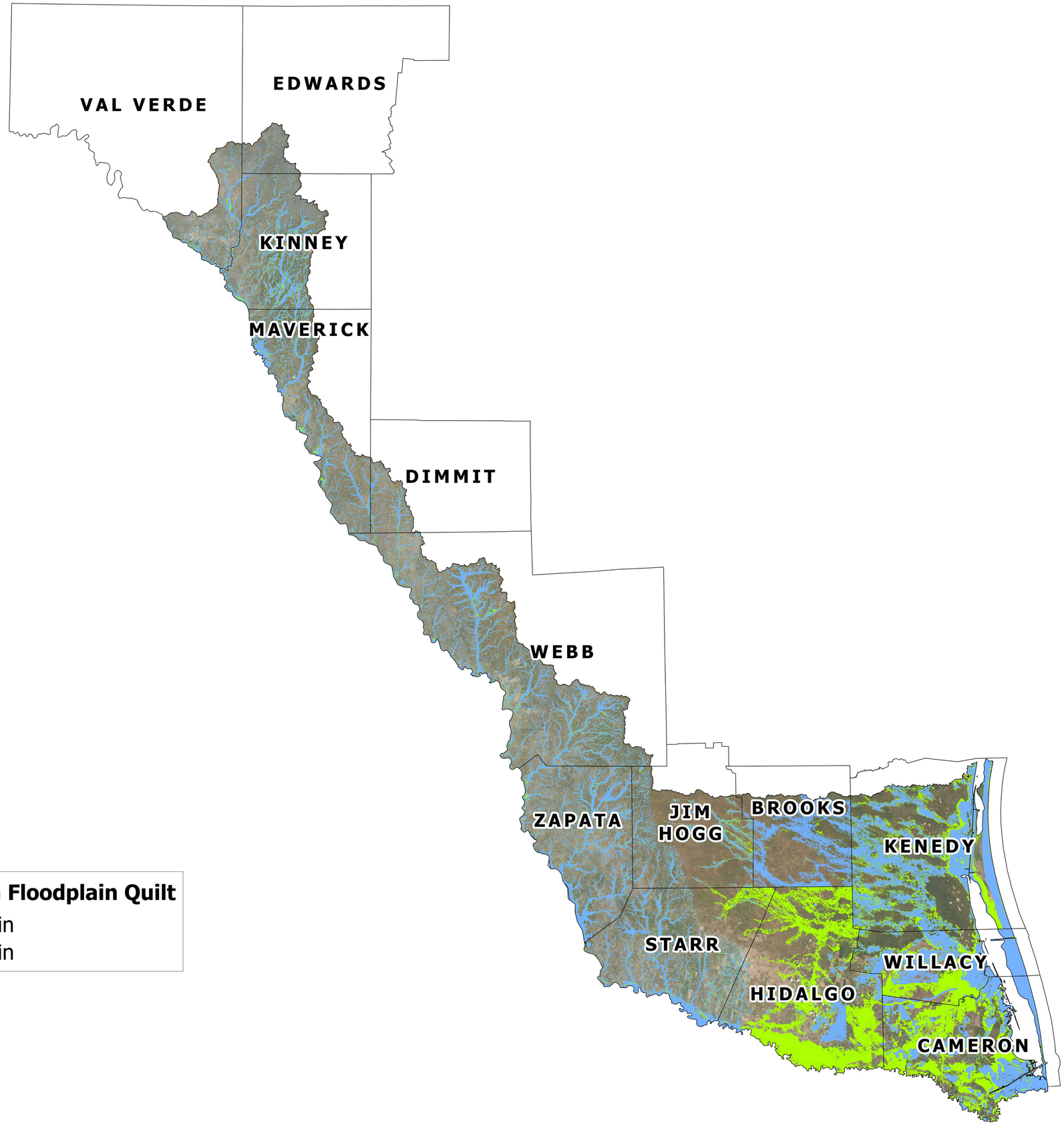
(§361.13(e)(5))

The geodatabase can be found by licking this link:
GeodatabaseSubmittal

ATTACHMENT L-2

Map 4: Existing Condition Flood Hazard (Exhibit C 2.2.A.1).

(§361.13(e)(3))



Existing Condition Floodplain Quilt

- 100-Year Floodplain
- 500-Year Floodplain

Region 15 Lower Rio Grande Regional Flood Planning Group

MAP 4: EXISTING CONDITION FLOOD HAZARD

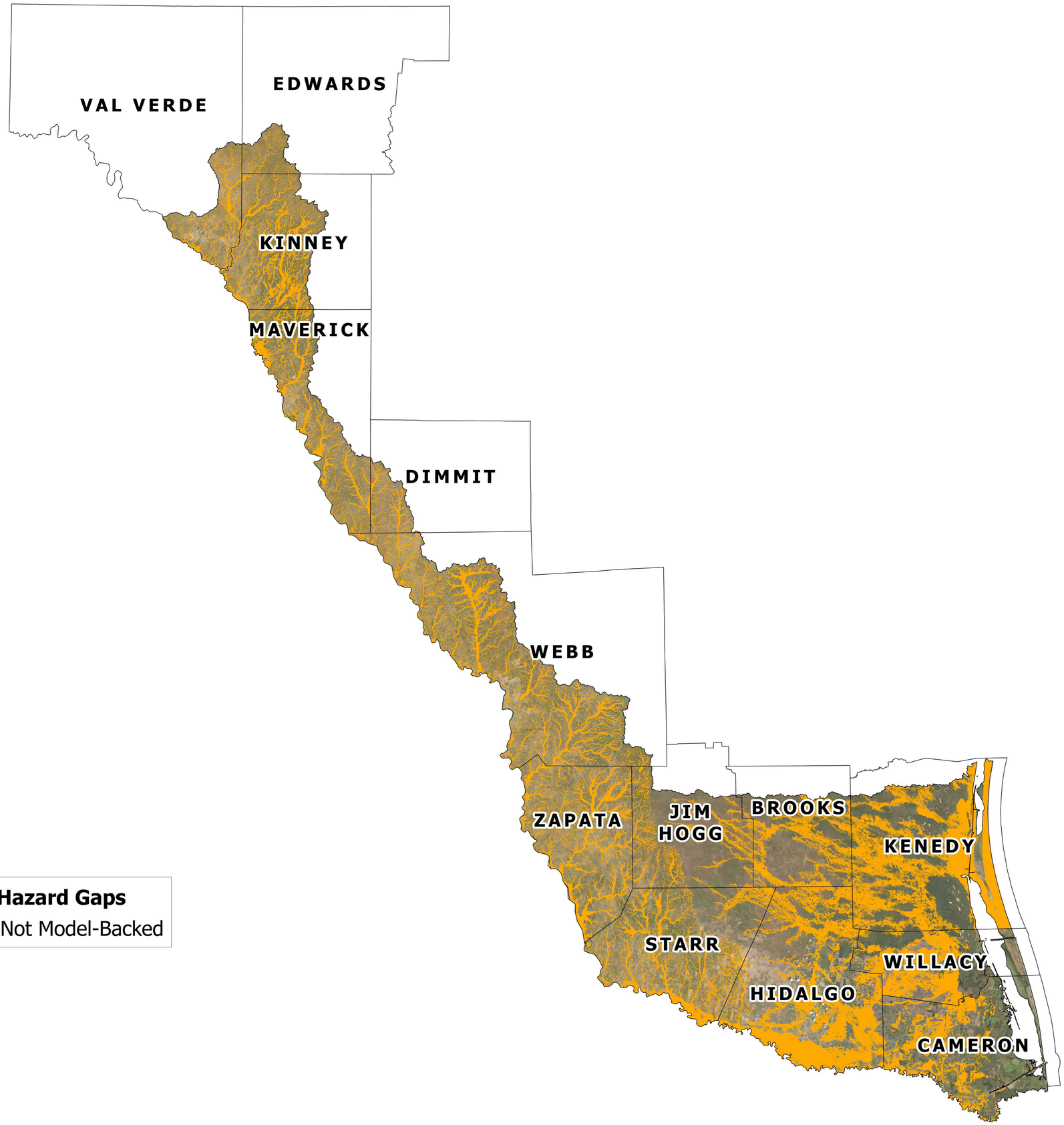
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-3

Map 5: Existing Condition Flood Hazard – Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.A.1).

(§361.13(e)(3))



Existing Flood Hazard Gaps

Fathom - Mapping Not Model-Backed

REGION 15 Lower Rio Grande Regional Flood Planning Group

MAP 5: EXISTING CONDITION FLOOD HAZARD - GAPS IN INUNDATION BOUNDARY MAPPING AND IDENTIFY KNOWN FLOOD PRONE AREAS

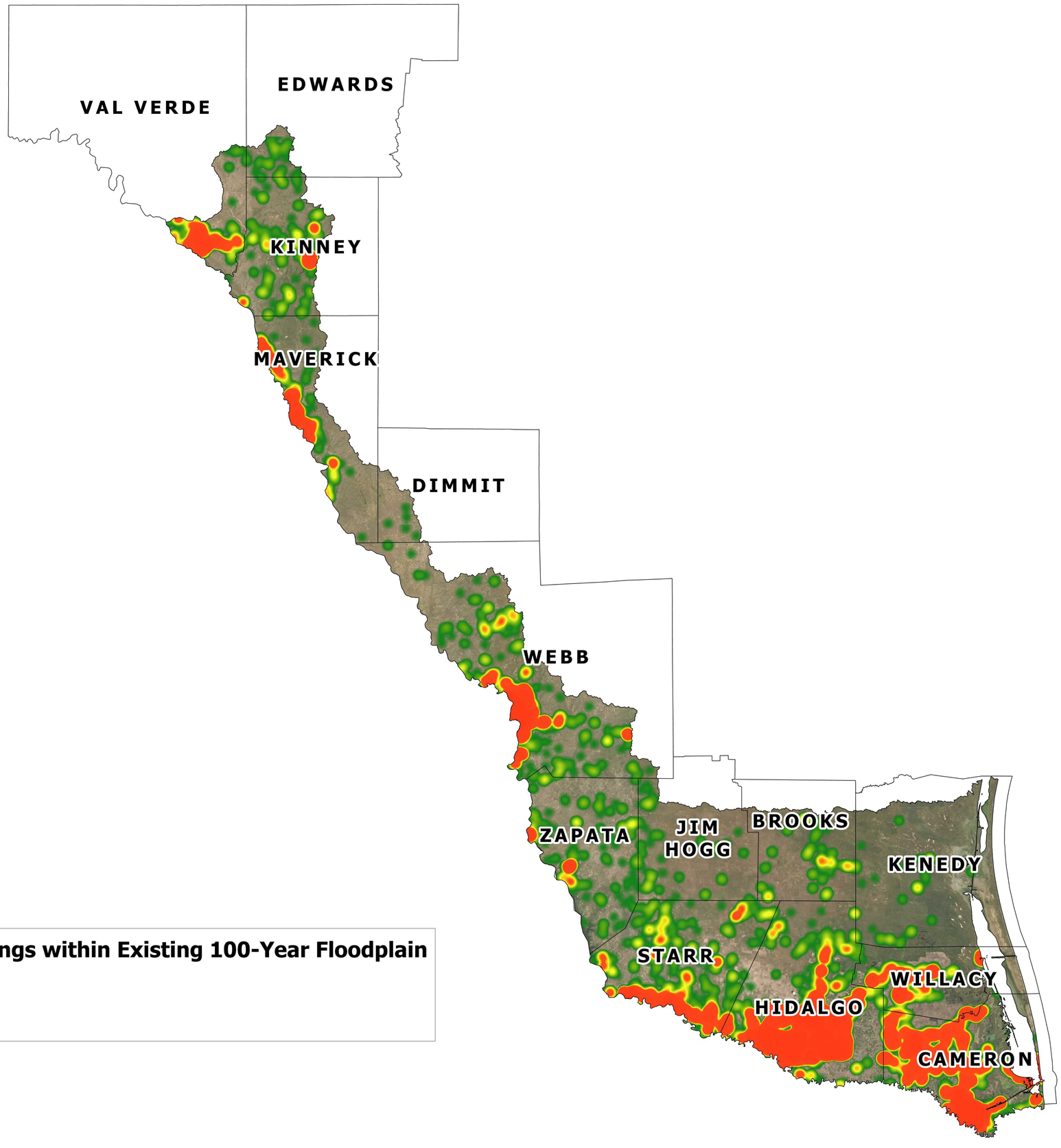
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-4

Map 6: Existing Condition Flood Exposure (Exhibit C 2.2.A.2).

(§361.13(e)(3))



Heat Map of Buildings within Existing 100-Year Floodplain

Dense

Sparse

Lower Rio Grande Regional Flood Planning Group

REGION 15

MAP 6: EXISTING CONDITION FLOOD EXPOSURE

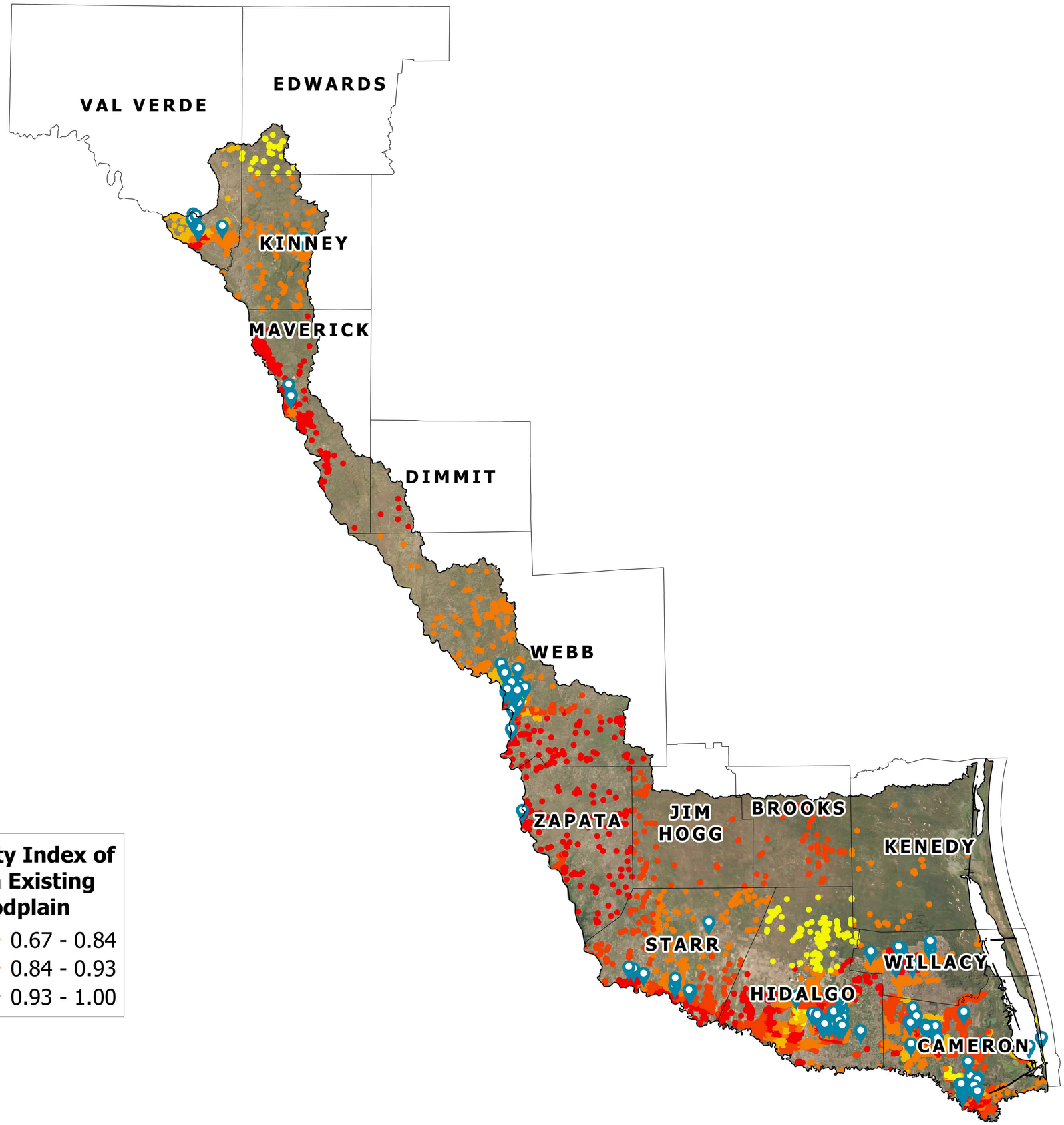
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-5

Map 7: Existing Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.A.3).

(§361.13(e)(3))



Social Vulnerability Index of Buildings within Existing 100-Year Floodplain

- Critical Facilities
- 0.29 - 0.47
- 0.47 - 0.67
- 0.67 - 0.84
- 0.84 - 0.93
- 0.93 - 1.00

Region 15 Lower Rio Grande Regional Flood Planning Group

MAP 7: EXISTING CONDITION VULNERABILITY AND CRITICAL INFRASTRUCTURE

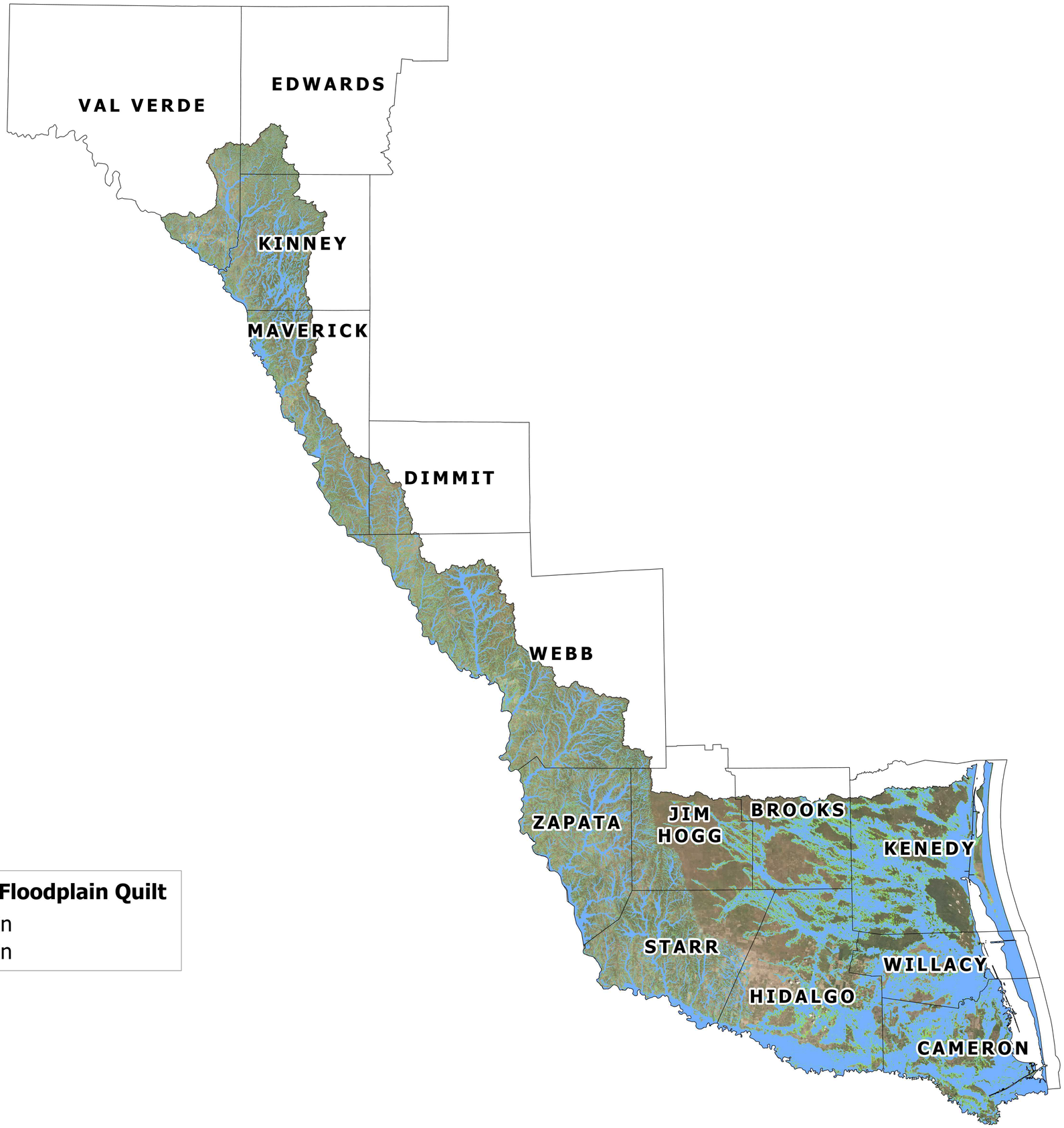
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-6

Map 8: Future Condition Flood Hazard (Exhibit C 2.2.B.1).

(§361.13(e)(3))



Future Condition Floodplain Quilt

- 100-Year Floodplain
- 500-Year Floodplain

Region 15 Lower Rio Grande Regional Flood Planning Group

MAP 8: FUTURE CONDITION FLOOD HAZARD

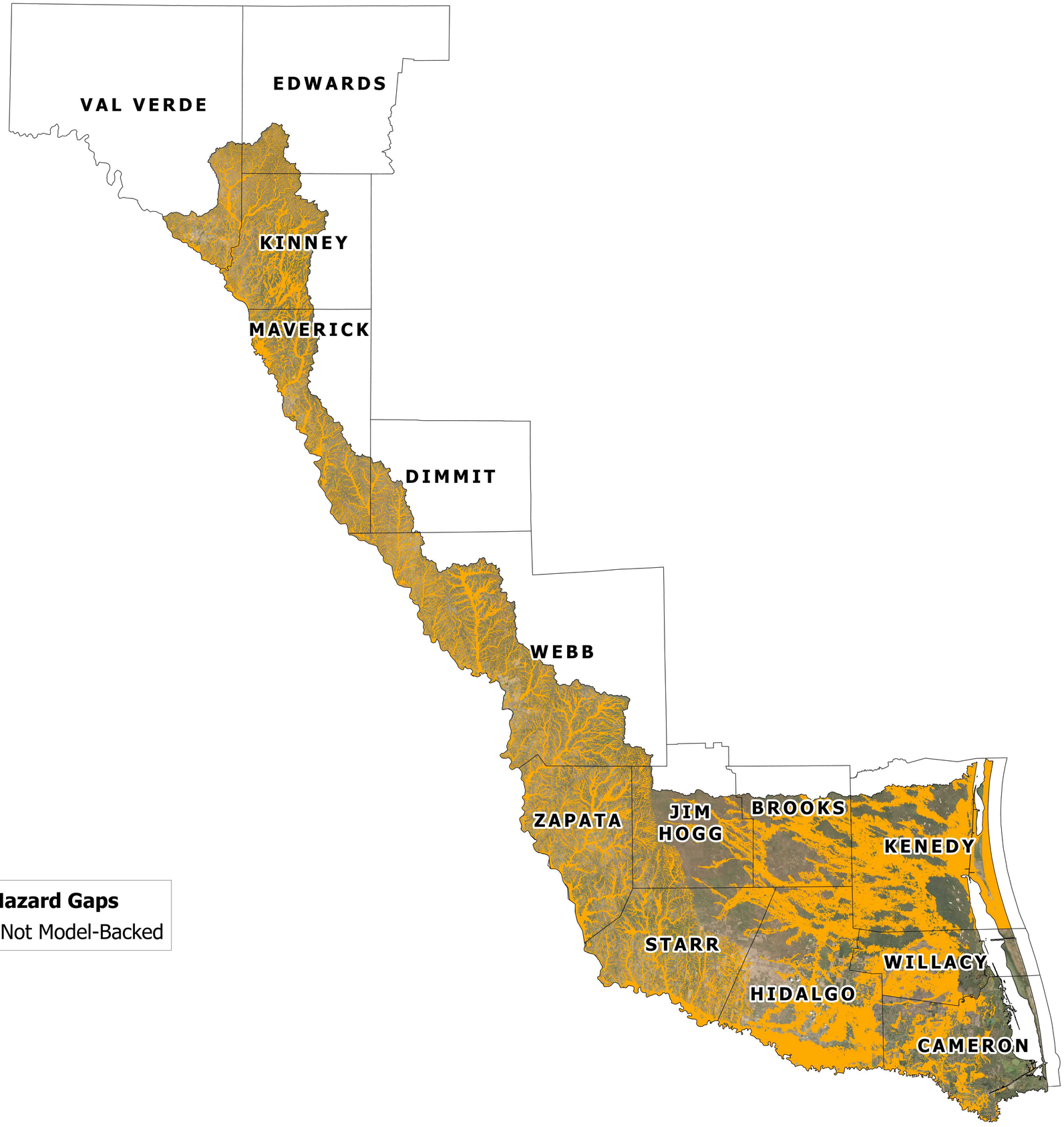
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-7

Map 9: Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.B.1).

(§361.13(e)(3))



Future Flood Hazard Gaps

Fathom - Mapping Not Model-Backed

REGION 15 Lower Rio Grande Regional Flood Planning Group

MAP 9: FUTURE CONDITION FLOOD HAZARD - GAPS IN INUNDATION BOUNDARY MAPPING AND IDENTIFY KNOWN FLOOD PRONE AREAS

0 25 50 75 100 Miles

N W E S

ATTACHMENT L-8

Map 10: Extent of Increase of Flood Hazard Compared to Existing Condition (Exhibit C2.2.B.1).

(§361.13(e)(3))

VAL VERDE

EDWARDS

KINNEY

MAVERICK

DIMMIT

WEBB

ZAPATA

JIM HOGG

BROOKS

KENEDY

STARR

WILLACY

HIDALGO

CAMERON

Extent of Increase of Flood Hazard

- No Change
- 100-Year Increase
- 500-Year Increase

REGION 15 Lower Rio Grande Regional Flood Planning Group

MAP 10: EXTENT OF INCREASE OF FLOOD HAZARD COMPARED TO EXISTING CONDITION

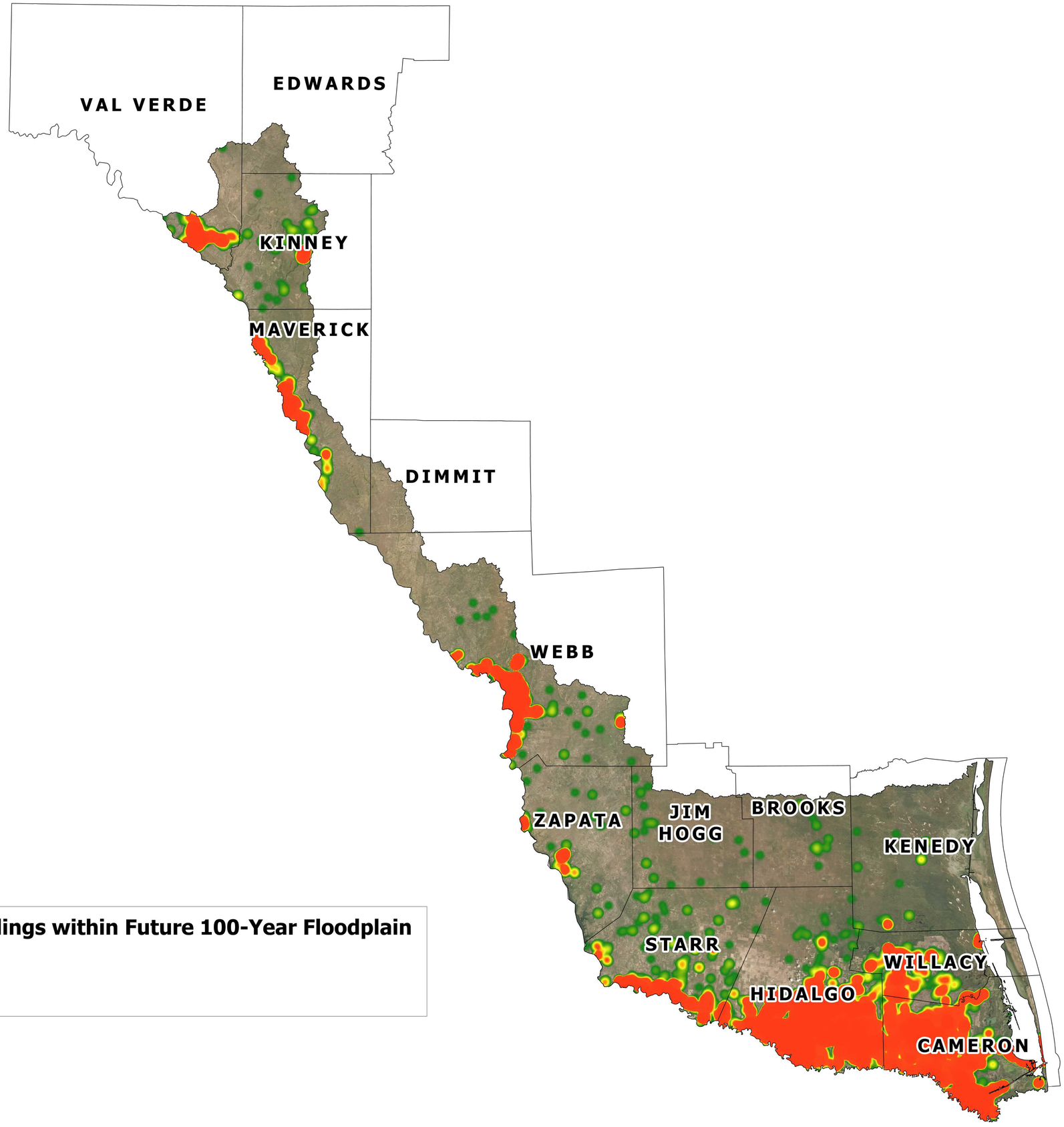
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-9

Map 11: Future Condition Flood Exposure (Exhibit C 2.2.B.2).

(§361.13(e)(3))



Heat Map of Buildings within Future 100-Year Floodplain

Dense

Sparse

Region 15 Lower Rio Grande Regional Flood Planning Group

MAP 11: FUTURE CONDITION FLOOD EXPOSURE

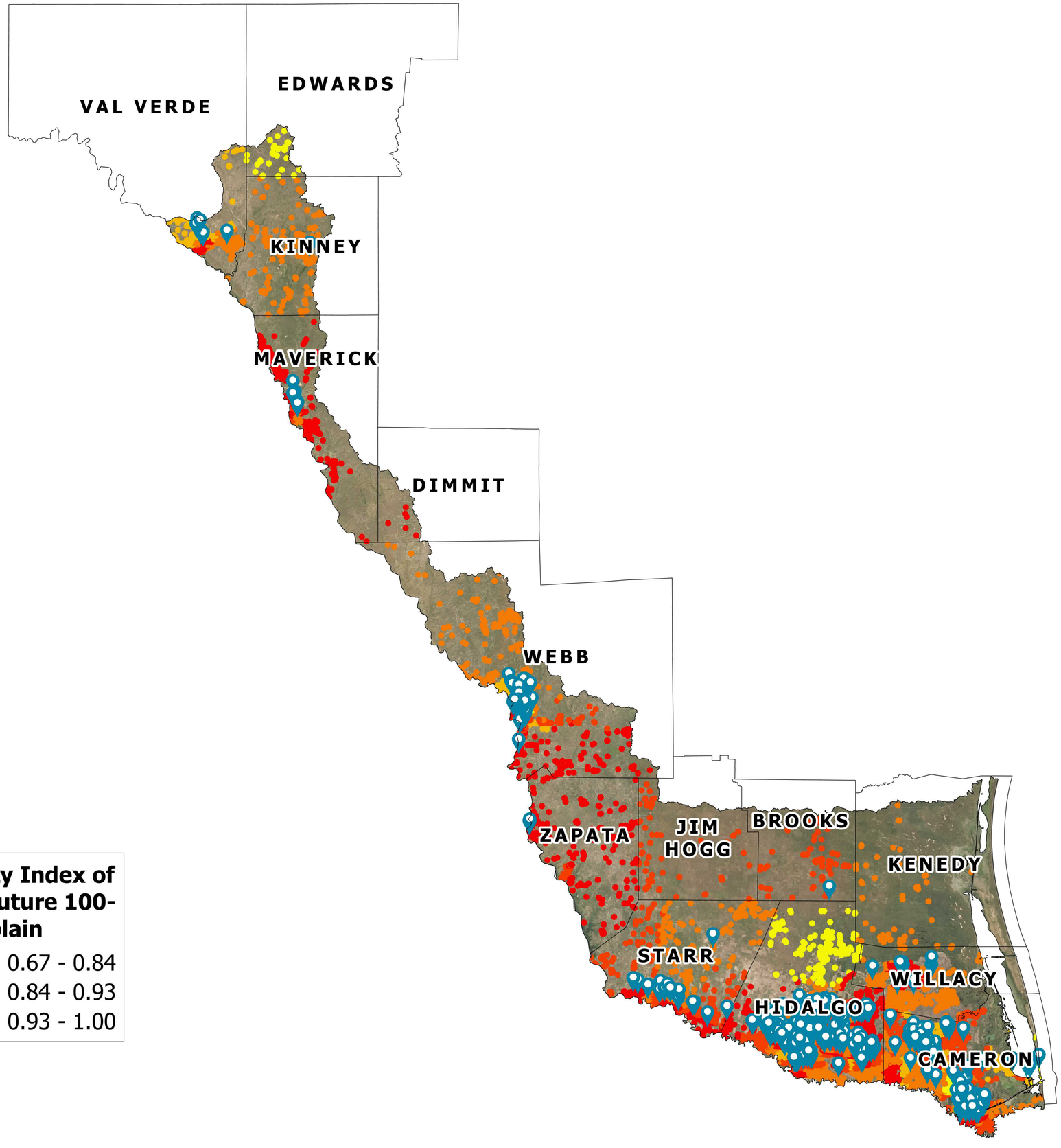
0 25 50 75 100 Miles

N W E S

ATTACHMENT L-10

Map 12: Future Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.B.3).

(§361.13(e)(3))



Social Vulnerability Index of Buildings within Future 100-Year Floodplain

- Critical Facilities
- 0.29 - 0.47
- 0.47 - 0.67
- 0.67 - 0.84
- 0.84 - 0.93
- 0.93 - 1.00

Region 15 Lower Rio Grande Regional Flood Planning Group

MAP 12: FUTURE CONDITION VULNERABILITY AND CRITICAL INFRASTRUCTURE

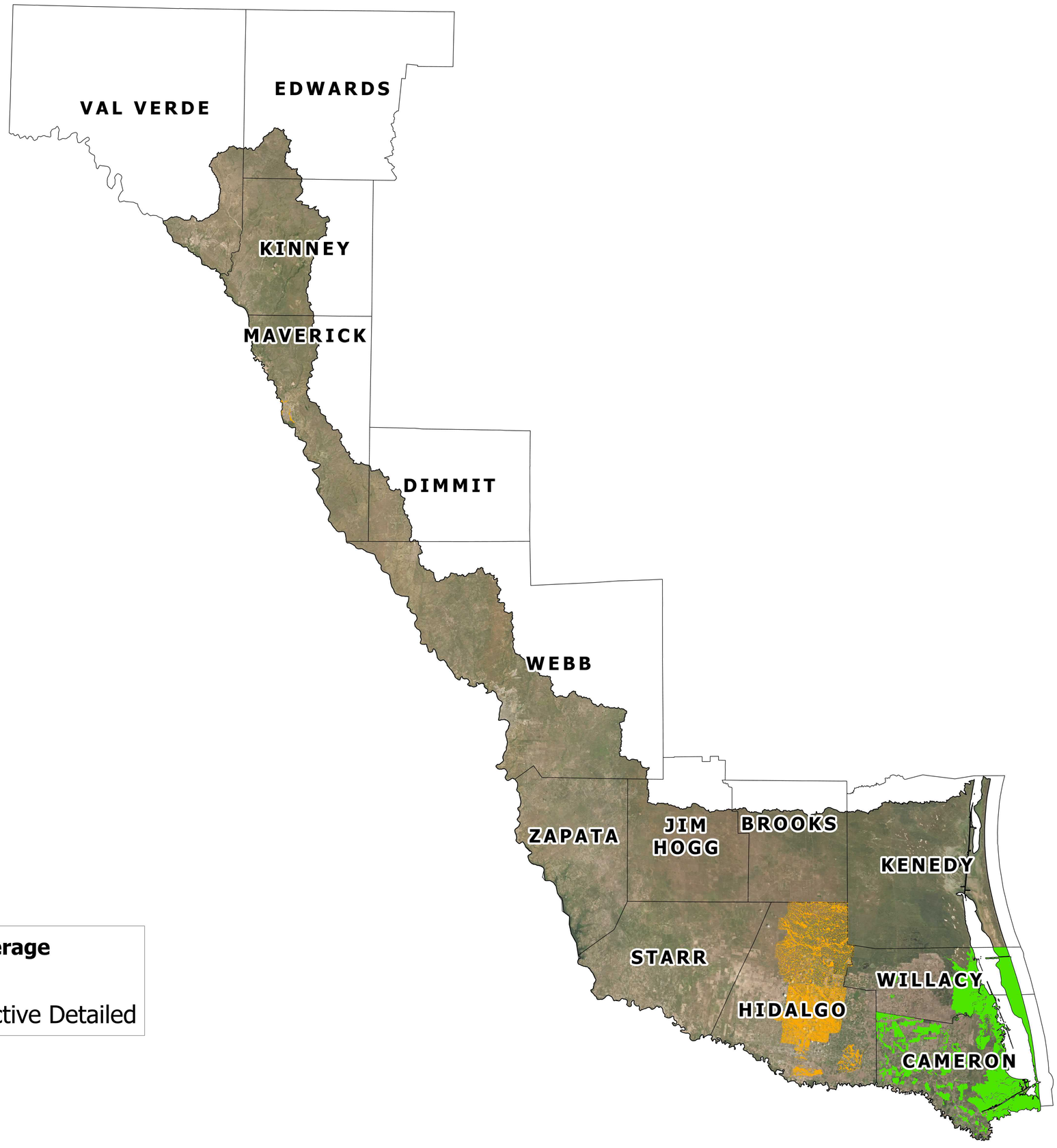
0 25 50 75 100 Miles

N W E S

ATTACHMENT N

Associated maps in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available

(§361.13(e)(5))



Model Coverage

- H & H Models
- Quilt NFHL Effective Detailed

REGION 15 Lower Rio Grande Regional Flood Planning Group

MODEL COVERAGE

0 25 50 75 100 Miles

N W E S

ATTACHMENT O

Memorandum describing approach for developing future conditions flood risk

Region 15
Flood Planning
Group

TECHNICAL MEMORANDUM

TO: Megan Ingram, Planner, Regional Flood Planning
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

THROUGH: Jaime J. Salazar
Operations Manager
Hidalgo County Drainage District No. 1
902 N. Doolittle
Edinburg, TX 78542

FROM: Halff Associates, Inc
50000 West Military Hwy, Ste. 100
McAllen, TX 78503

SUBJECT: Region 15 Lower Rio Grande Regional Flood Plan,
Proposed Approach for Developing the Future Conditions 500-Year Flood Hazard Maps

DATE: March 7, 2022

Region 15 is proposing to use the following methodology to develop the Future Conditions 500-Year Flood Hazard Maps. The potential future conditions 500-year flood hazard approach methodology was discussed during the January 19, 2022, Region 15 Regional Flood Planning Group (RFPG) meeting.

Under Method 2 in the TWDB Technical Guidelines, an excerpt regarding the determination of the future 500-year flood hazard states: "RFPGs will have to utilize an alternate approach to develop a proxy for the 0.2 percent annual chance future condition floodplain, such as adding freeboard (vertical) or buffer (horizontal) estimates. The decision on what specific approach or values to use, which may vary within the region (e.g., for urban vs rural areas), for these estimates will be up to the RFPGs, but technical justification should be provided to explain how the estimates were developed. This method cannot be applied to flood risk areas that do not already have a delineated existing condition 0.2 percent annual chance floodplain, (i.e., flood-prone areas)." Based on this statement, reasonable buffer limits were researched based on the

difference in existing top widths between the 100-year and 500-year floodplain quilt within various locations and terrains in Region 15. Based on our evaluations, it is reasonable to assume that the difference between top widths for the existing conditions, will be similar for potential future conditions in regionals with similar climates and terrains because they exhibit similar types of flooding.

The Lower Rio Grande Region was split into two sections: a western inland section and a southeastern coastal section because they exhibit different types of flooding. The more inland flood quilt was created using pluvial and fluvial Fathom data where FEMA effective detailed studies were not available while the coastal flood quilt used fluvial and coastal Fathom data where FEMA effective studies were not available. These sections are demonstrated in Figure 1 below.

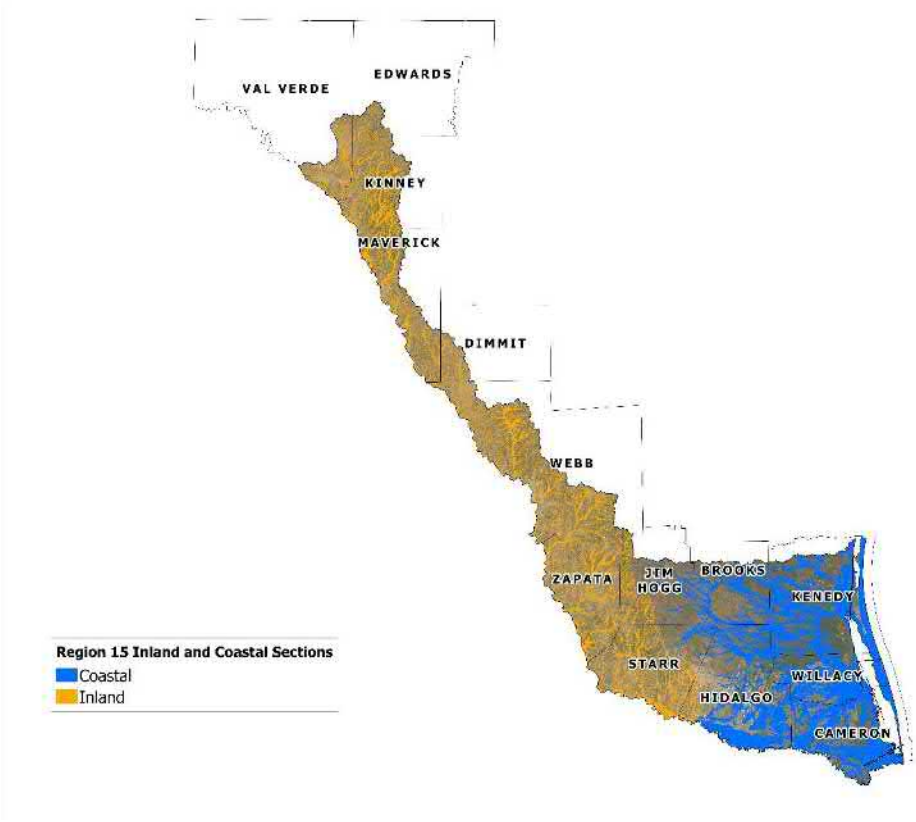


Figure 1. Delineation of areas defined as "Inland" and "Coastal" for purposes of application of approach methodology for developing future conditions 500-year flood hazard risk maps.

Cross section lines were used to determine the average top width between the existing 100-year and 500-year floodplains for both the coastal and inland sections of Region 15. An average top width of 56 ft. was calculated for the inland section while an average top width of 157 ft. was calculated for the coastal section. Buffers were created using these average top widths and then added to the future 100-year floodplain.

In accordance with Texas Administrative Code §361.13 regarding the Regional Flood Planning Group Deliverables, contained in this draft technical memorandum are the remaining interim datasets required for review for the Lower Rio Grande Regional Flood Planning Group (RFPG), Region 15. Due to a delay in the FATHOM data, items related to mapping of known flood risk (deliverables defined in §361.13(e)(3) to (5)), had their due dates pushed back to March 7, 2022. The remaining geodatabases and associated maps required as part of this Technical Memorandum are briefly explained in the next sections and contained in the Appendix as Attachments. **Table 1** on the next page indicates which subtasks and information is contained in each Attachment.

ATTACHMENT P

Table 3 – Existing conditions flood risk summary table (by county)
of Exhibit C- Technical Guidelines for Regional Flood Planning

Table 3: Existing. Condition Flood Risk Summary (Exhibit C- Technical Guidelines for Regional Flood Planning)

					1% Annual Chance Flood Risk										0.2% Annual Chance Flood Risk										Possible Flood Prone Areas							
	RFPG No.	RFPG Name	County	Area in Flood Planning Region (sqmi)	Area in Floodplain (sqmi)	Number of Structures in Floodplain	Residential Structures in Floodplain	Population (daytime)	Population (nightime)	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultural Areas (sqmi)	Critical Facilities (#)	Area in Floodplain (sqmi)	Number of Structures in Floodplain	Residential Structures in Floodplain	Population (daytime)	Population (nightime)	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultural Areas (sqmi)	Critical Facilities (#)	Area (sqmi)	Number of Structures in Flood Prone Area	Residential Structures in in Flood Prone Area	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultural Areas (sqmi)	Critical Facilities (#)
1	15	Lower Rio Grande	Brooks	685.63	230.08	1,541	11	10	32		0	20.72	1.11	0	237.64	2,820	17	18	52		-	31.54	1.54	0								
2	15	Lower Rio Grande	Cameron	1,019.95	348.39	43,804	29,679	129,198	114,036		2	768.48	109.84	75	811.01	93,880	62,853	254,993	232,523		2	1,650.46	244.29	140								
3	15	Lower Rio Grande	Dimmit	172.17	41.91	807	-	-	4		0	0.79	0.11	0	46.19	1,382	-	-	6		-	1.12	0.14	0								
4	15	Lower Rio Grande	Edwards	137.90	30.26	150	4	-	11		6	17.91	0.03	0	32.90	262	4	-	11		6	19.16	0.03	0								
5	15	Lower Rio Grande	Hidalgo	1,586.47	141.73	88,471	62,227	230,709	253,109		14	1,354.55	134.23	127	720.80	155,860	106,696	413,033	444,581		16	2,363.69	252.91	240								
6	15	Lower Rio Grande	Jim Hogg	870.79	138.62	1,625	4	20	39		1	16.21	0.30	0	172.25	3,032	4	31	62		1	20.94	0.39	0								
7	15	Lower Rio Grande	Kenedy	1,477.58	641.46	2,014	4	35	33		0	63.30	4.18	0	896.46	3,770	10	59	55		-	81.97	5.62	0								
8	15	Lower Rio Grande	Kinney	751.91	232.58	1,896	222	588	572		44	57.33	4.89	4	266.02	3,205	63	692	708		44	68.55	6.05	4								
9	15	Lower Rio Grande	Maverick	768.53	223.76	6,239	1,931	7,270	8,323		4	89.72	11.66	4	252.14	10,004	2,554	10,390	10,886		6	121.22	13.01	6								
10	15	Lower Rio Grande	Starr	1,231.48	288.82	13,957	3,657	16,205	20,139		0	214.11	48.75	10	365.18	22,013	4,421	19,805	24,505		-	265.53	55.95	19								
11	15	Lower Rio Grande	Val Verde	349.80	91.86	3,565	1,650	8,486	5,371		24	68.69	0.69	8	103.03	5,210	2,104	10,730	6,767		25	86.34	0.82	8								
12	15	Lower Rio Grande	Webb	1,654.44	460.07	24,486	12,643	74,452	65,920		26	363.02	1.09	27	512.35	37,981	17,481	101,245	87,464		26	465.88	1.23	36								
13	15	Lower Rio Grande	Willacy	665.06	334.14	6,055	3,264	9,192	11,162		0	244.18	99.83	14	502.01	28,334	4,967	15,140	15,988		26	463.40	194.03	16								
14	15	Lower Rio Grande	Zapata	1,057.05	316.04	4,504	303	711	1,063		0	36.15	2.04	1	348.31	8,126	364	823	1,273		-	46.11	2.84	3								
	Total			12,428.77	3,519.72	199,114	115,599	476,876	479,814	0	121	3,315.16	418.76	270	5,266.28	375,879	201,538	826,959	824,881		152	5,685.90	778.84	472	0	0		0	0	0	0	0

Table 3: Existing. Condition Flood Risk Sumn

	RFPG No.	RFPG Name	County	Average SVI of features in floodplain or flood prone areas
1	15	Lower Rio Grande	Brooks	0.903
2	15	Lower Rio Grande	Cameron	0.808
3	15	Lower Rio Grande	Dimmit	0.982
4	15	Lower Rio Grande	Edwards	0.488
5	15	Lower Rio Grande	Hidalgo	0.836
6	15	Lower Rio Grande	Jim Hogg	0.899
7	15	Lower Rio Grande	Kenedy	0.753
8	15	Lower Rio Grande	Kinney	0.748
9	15	Lower Rio Grande	Maverick	0.935
10	15	Lower Rio Grande	Starr	0.888
11	15	Lower Rio Grande	Val Verde	0.766
12	15	Lower Rio Grande	Webb	0.817
13	15	Lower Rio Grande	Willacy	0.869
14	15	Lower Rio Grande	Zapata	0.975
	Total			0.833

ATTACHMENT Q

Table 5 – Future conditions flood risk summary table (by county)
of Exhibit C- Technical Guidelines for Regional Flood Planning

Table 5: Future Condition Flood Risk Summary (Exhibit C- Technical Guidelines for Regional Flood Planning)

					1% Annual Chance Flood Risk										0.2% Annual Chance Flood Risk										Possible Flood Prone Areas							
	RFPG No.	RFPG Name	County	Area in Flood Planning Region (sqmi)	Area in Floodplain (sqmi)	Number of Structures in Floodplain	Residential Structures in Floodplain	Population (daytime)	Population (nightime)	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultural Areas (sqmi)	Critical Facilities (#)	Area in Floodplain (sqmi)	Number of Structures in Floodplain	Residential Structures in Floodplain	Population (daytime)	Population (nightime)	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultural Areas (sqmi)	Critical Facilities (#)	Area (sqmi)	Number of Structures in Flood Prone Area	Residential Structures in in Flood Prone Area	Population	Roadway Stream Crossings (#)	Roadways Segments (miles)	Agricultura l Areas (sqmi)	Critical Facilities (#)
1	15	Lower Rio Grande	Brooks	685.63	237.64	2,820	17	18	52		0	31.54	1.53	0	314.72	7,979	34	72	103		0	63.10	2.01	0								
2	15	Lower Rio Grande	Cameron	1,019.95	810.00	93,880	62,853	254,993	232,523		2	1,648.83	243.92	140	895.35	125,537	78,799	328,144	299,133		2	2,135.36	273.20	179								
3	15	Lower Rio Grande	Dimmit	172.17	46.19	1,382	-	-	6		0	1.12	0.14	0	59.63	3,086	-	-	29		0	3.79	0.19	0								
4	15	Lower Rio Grande	Edwards	137.90	32.90	262	4	-	11		6	19.16	0.03	0	50.51	555	6	-	16		6	22.96	0.04	0								
5	15	Lower Rio Grande	Hidalgo	1,586.47	720.80	155,860	106,696	413,033	444,581		16	2,363.69	252.73	240	129.23	200,157	125,958	534,066	525,987		17	2,932.93	280.94	317								
6	15	Lower Rio Grande	Jim Hogg	870.79	172.25	3,032	4	31	62		1	20.94	0.38	0	235.96	7,827	4	51	107		1	44.78	0.55	0								
7	15	Lower Rio Grande	Kenedy	1,477.58	859.49	3,770	10	59	55		0	81.97	5.57	0	1,001.81	11,764	13	79	97		0	120.14	6.64	0								
8	15	Lower Rio Grande	Kinney	751.91	266.02	3,205	285	692	708		44	68.55	6.03	4	327.01	7,318	404	1,447	946		46	116.33	6.68	4								
9	15	Lower Rio Grande	Maverick	768.53	252.14	10,004	2,554	10,390	10,886		6	121.22	12.98	6	318.34	18,900	3,779	17,353	15,782		6	195.57	14.19	8								
10	15	Lower Rio Grande	Starr	1,231.48	365.18	22,013	4,421	19,805	24,505		0	265.53	55.83	19	457.86	42,943	5,675	25,449	30,924		0	383.31	64.40	23								
11	15	Lower Rio Grande	Val Verde	349.80	103.03	5,210	2,104	10,730	6,767		25	86.34	0.82	8	136.45	9,205	3,318	16,231	10,560		25	145.88	0.96	10								
12	15	Lower Rio Grande	Webb	1,654.44	512.35	37,981	17,481	101,245	87,464		26	465.88	1.23	36	670.34	35,802	28,628	141,874	133,766		26	670.31	1.48	53								
13	15	Lower Rio Grande	Willacy	665.06	501.47	9,903	4,967	15,140	15,988		0	463.37	193.93	16	542.01	43,449	5,390	16,385	17,665		0	607.14	213.61	18								
14	15	Lower Rio Grande	Zapata	1,057.05	348.31	8,126	364	823	1,273		0	46.11	2.83	3	444.24	18,440	641	2,387	2,366		0	92.60	3.33	3								
	Total			12,428.77	5,227.76	357,448	201,760	826,959	824,881		126	5,684.23	777.95	472	5,583.45	532,962	252,649	1,083,538	1,037,481		129	7,534.20	868.23	615	0	0		0	0	0	0	0

Table 5: Future Condition Flood Risk Summa

	RFPG No.	RFPG Name	County	Average SVI of features in floodplain or flood prone areas
1	15	Lower Rio Grande	Brooks	0.9056
2	15	Lower Rio Grande	Cameron	0.8099
3	15	Lower Rio Grande	Dimmit	0.9824
4	15	Lower Rio Grande	Edwards	0.4704
5	15	Lower Rio Grande	Hidalgo	0.8265
6	15	Lower Rio Grande	Jim Hogg	0.8985
7	15	Lower Rio Grande	Kenedy	0.7528
8	15	Lower Rio Grande	Kinney	0.7483
9	15	Lower Rio Grande	Maverick	0.9388
10	15	Lower Rio Grande	Starr	0.8717
11	15	Lower Rio Grande	Val Verde	0.7509
12	15	Lower Rio Grande	Webb	0.8032
13	15	Lower Rio Grande	Willacy	0.8559
14	15	Lower Rio Grande	Zapata	0.9755
	Total			0.8279