



Vegetation Changes in the Middle Rio Grande Riparian Ecosystem

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Overview of the Rio Grande

- Third Largest River System in the United States.
- Extends over 1,885 miles from Southern Colorado to the Gulf of Mexico.
- Flows through the Rio Grande Rift Valley, which was formed over 25 million years ago.



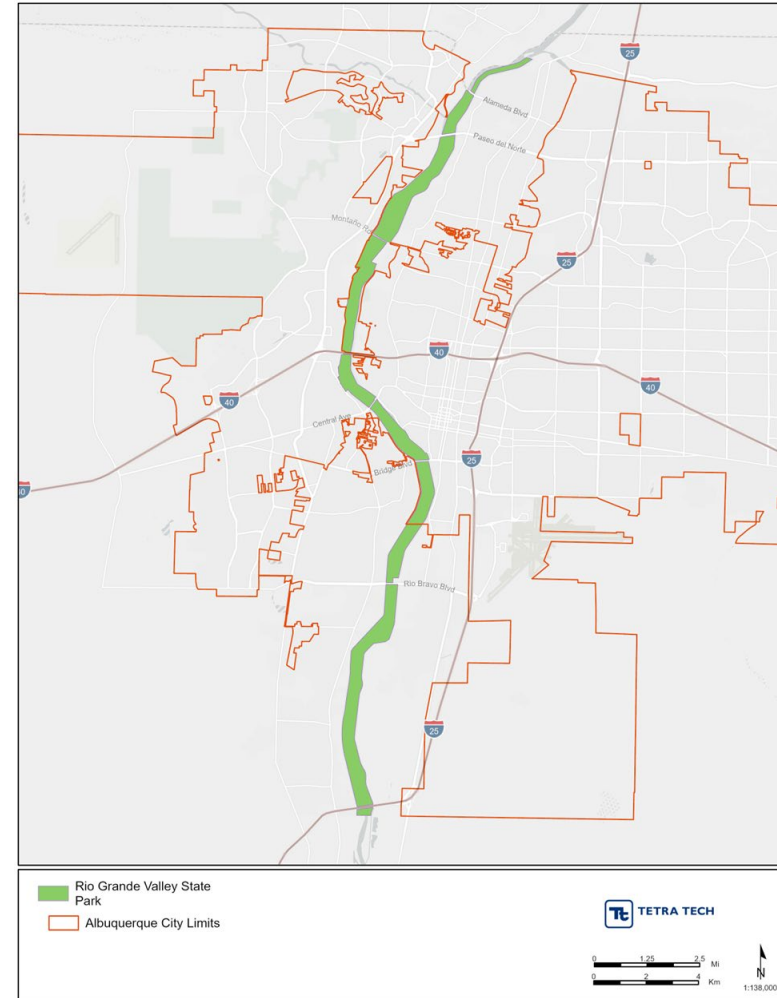
The Middle Rio Grande



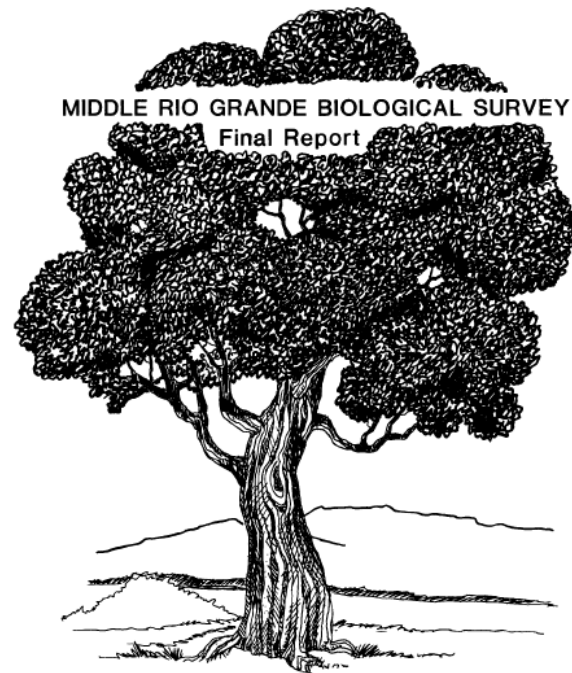
- Extends from Cochiti Dam to Elephant Butte Reservoir.
- Historically a free-flowing river with a braided channel.
- Since 1900, has experience extensive man-made changes.
- Channelized in the 1950's through the creation of dams, levees and use of jetty jacks.

Tetra Tech Study

- Assessment of the Rio Grande Valley State Park (RGVSP) “Bosque”
- Major green belt ecosystem that runs through the heart of Albuquerque, NM.
- Utilized Hink and Ohmart methodology to map vegetation communities present within the Bosque.



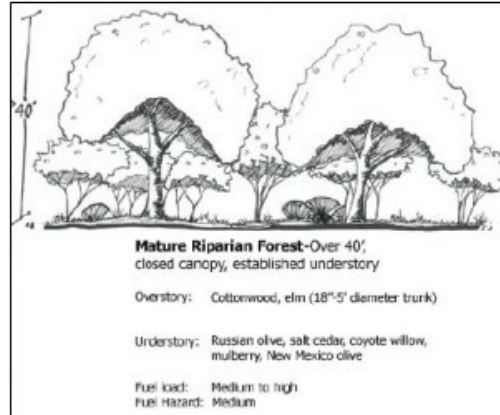
Hink and Ohmart Methodology



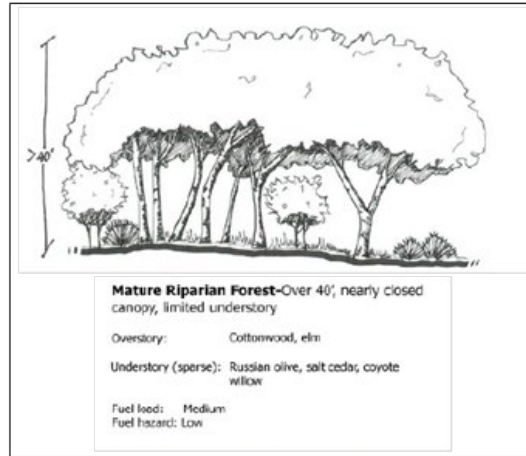
Submitted by
Robert D. Ohmart
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February 1984
In fulfillment of
US Army Corps
of Engineers
Contract No. DACW47-81-C-0015

- Developed by Robert Ohmart and Valerie Hink in 1984 to for a USACE survey of the Rio Grande.
- Classifies vegetation communities by dominant species and categorizes them into six community structure types.

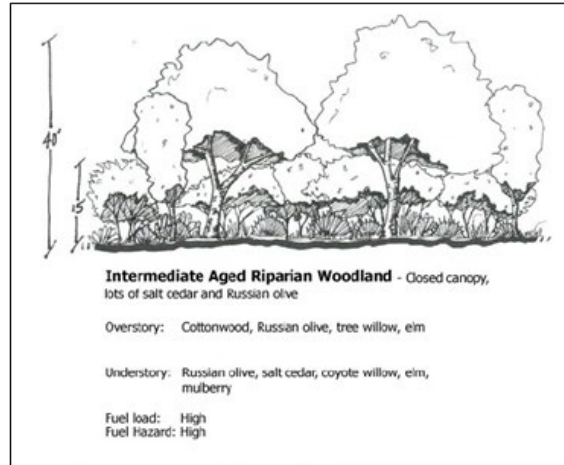
Vegetation Structure Type 1




Vegetation Structure Type 2



Vegetation Structure Type 3



Vegetation Structure Type 4



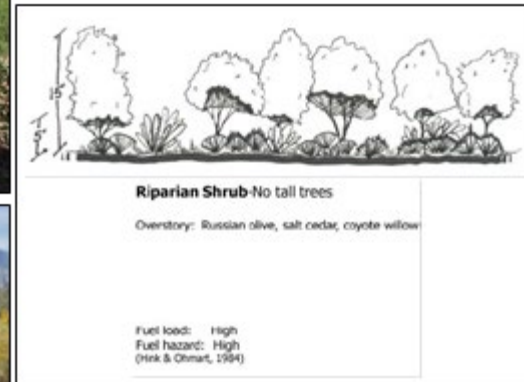
Intermediate Aged Riparian Woodland/Savannah-Broken canopy, mostly grass understory

Overstory: Cottonwood, Russian olive, tree willow, salt cedar

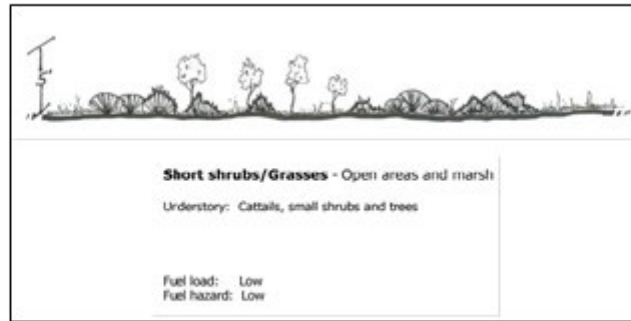
Understory (sparse): Coyote willow, Russian olive, salt cedar

Fuel load: Low
Fuel hazard: Low

Vegetation Structure Type 5

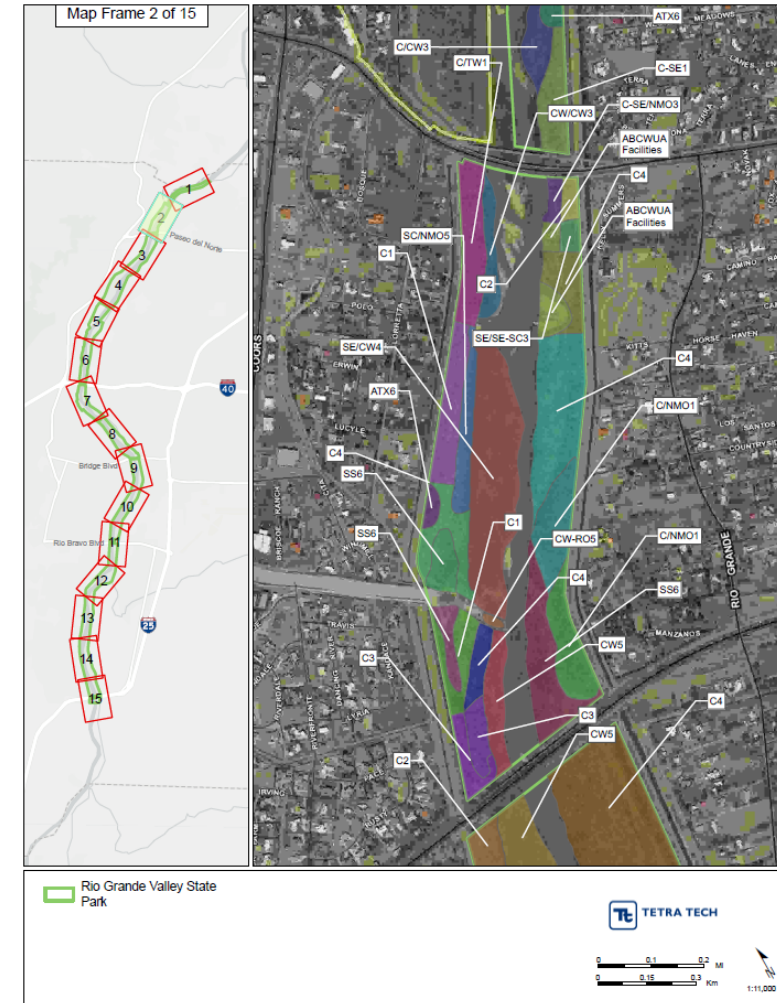


Vegetation Structure Type 6



Survey Results

- 301 vegetation communities mapped over the 4300-acre extent of the Bosque
- 9 dominant species were documented, including five native species and four non-native species.



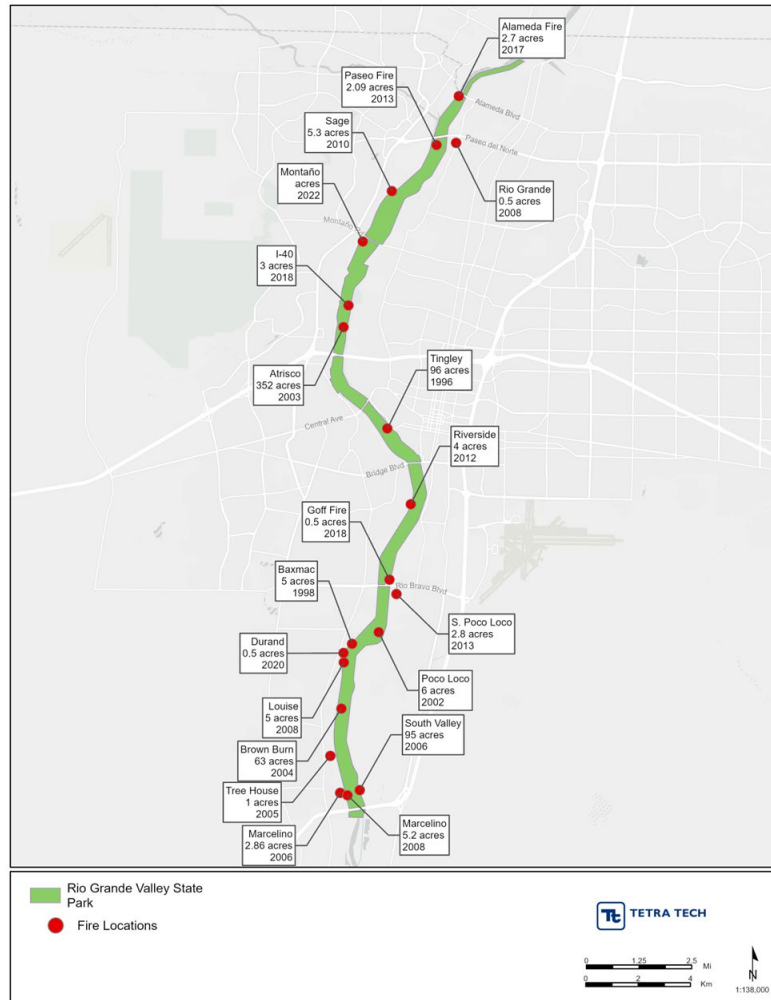
Survey Results

Dominant Species	2005 Acres	2021 Acres	Change (acres)	Change (%)
Coyote Willow	251.2	486	+234.8	+93.5
Rio Grande Cottonwood	2048.7	2123.8	+75.2	+3.7
Tree Willow	212.5	30.9	-181.6	-85.5
Four-winged Saltbush	3.2	76.5	+73.3	+2260.8
Sand Sagebrush	6.5	17.8	+11.3	+173.2
Salt Cedar	409.7	348.9	-60.8	-14.9
Russian Olive	435.2	396.9	-38.3	-8.8
Siberian Elm	254.7	522.9	+268.3	+105.3
Tree of Heaven	40.2	34.6	-5.6	-13.9
Wet Meadow	37.4	39.1	+1.7	+4.6
Open Area	180.7	84.6	-96.1	-53.2

Survey Results

Structure Type	2005 Acres	2021 Acres	Change (acres)	Change (%)
1	323.3	594.3	271.1	+83.8
2	1172.5	828.1	-344.5	-29.4
3	162.2	391.2	228.0	+141.2
4	273.2	409.9	136.7	+50.1
5	443.7	458.1	14.4	+3.2
6	104.8	124.3	19.5	+18.6

Fire in the Bosque



Fire Name	Year of Occurrence	Acres Burned
Tingley	1996	98
Baxmac	1998	5
Poco Loco	2002	6
Montaño	2003	113
Atrisco	2003	352
Lavega	2003	0.1
Brown Burn	2004	63
Tree House	2005	1
Squirrel	2005	0.1
Barcelona	2006	0.2
South Valley	2006	95
Marcelino	2006	2.9
Rio Grande	2008	0.5
Louise	2008	5
Marcelino	2008	5.2
Sage	2010	5.3
Riverside	2012	4
Poco Loco	2013	2.9
Paseo Fire	2013	2.09
mm 4.5 Fire	2016	0.25
Alameda Fire	2017	2.7
Goff Fire	2018	0.5
I-40	2018	3
Durand	2020	0.5
Shelly	2020	0.1
Rio Bosque	2021	0.25
Stadium	2021	0
Valley High	2021	0.1
Montaño	2022	30
Total		798.69

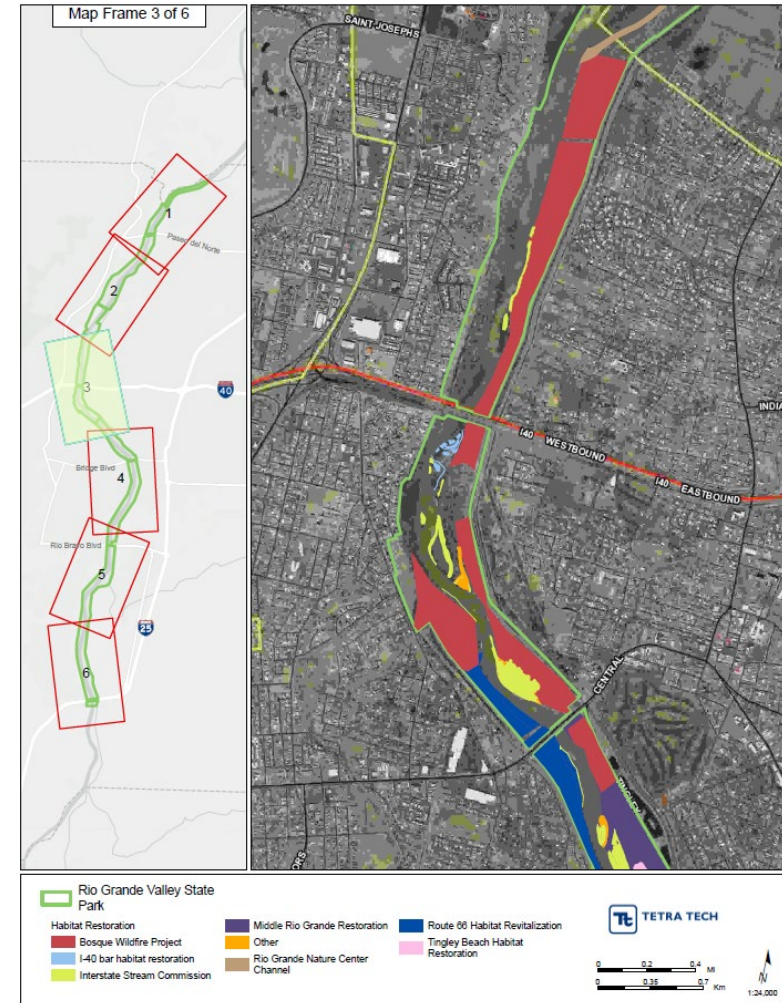
Fire in the Bosque

- Historically, large floods carried large fuel loads downstream and assisted with cottonwood and willow regeneration.
- Construction of Cochiti Dam regulated the river and drastically reduced peak flows.

Water Year	Date	Gage Height (ft)	Streamflow (cfs)
1993	1993-06-07	6.49	7,210
1994	1994-05-11	6.65	7,050
1995	1995-05-25	6.35	6,570
1996	1996-06-27	4.48	2,690
1997	1997-06-08	6.21	6,270
1998	1998-05-09	5.32	4,060
1999	1999-05-28	5.79	4,920
2000	2000-08-20	3.92	2,040
2001	2001-05-22	5.83	4,970
2002	2002-09-10	3.94	1,770
2003	2003-03-21	4.04	1,880
2004	2004-04-03	5.14	3,590
2005	2005-06-03	6.51	6,780
2006	2006-07-09	5.42	4,030
2007	2007-05-21	5.32	3,810
2008	2008-05-25	6.31	5,400
2009	2009-04-14	5.91	4,940
2010	2010-05-22	6.17	5,140
2011	2010-12-17	4.71	2,710
2012	2012-08-17	4.91	2,510
2013	2013-09-13	5.74	4,350
2014	2014-08-02	5.50	3,770
2015	2015-05-27	5.54	3,070
2016	2016-06-07	5.96	3,950
2017	2017-05-10	6.59	5,660
2019	2019-06-18	6.73	5,720
2020	2019-22-21	4.86	2,630
2021	2021-05-31	4.81	2,250

Restoration Efforts

- Restoration projects have included actions such as vegetation thinning, creation of swales and backwater channels, re-planting of native species, and wetland restoration.
- Have significantly influenced the plant community within the Bosque.



Future Implications



Project Area	Well Name	2021	2020	2019	2018	2017
Alameda NE	1F Terrace	No Data	No Data	No Data	No Data	1.92
	1F Swale	No Data	6.41	4.91	5.43	4.43
	1H Terrace	No Data	7.36	6.05	6.29	5.41
Alameda SE	Diversion	10.75	10.56	9.47	10.72	9.59
	Badger	9.25	9.19	8.19	9.66	8.90
	Alameda	11.87	11.88	10.87	12.10	11.18
Calabacillas Arroyo	Calabacillas	6.60	7.30	6.33	7.85	6.10
	Minnow	6.35	6.77	5.87	7.54	6.02
	Bobcat	4.90	5.00	4.07	4.72	4.20
	Montaño	6.96	7.28	6.41	7.33	6.65
	Savannah	4.87	5.02	4.12	5.03	4.35
	Oxbow N Scallop	No Data	0.62	-0.19	0.64	-0.11
	Oxbow 2	N/A	1.61	1.59	2.16	1.85
	Route 66	6.96	7.28	6.49	7.33	6.67
	Central SW	Route 66 Inlet	N/A	1.89	0.57	1.36
Route 66 Outlet		N/A	N/A	0.47	1.51	0.64
Central SE	Bio Park	5.77	5.51	4.68	5.42	4.89
	4A New	N/A	3.68	3.11	3.68	3.35
Bridge SE	Hispanic Cultural Center	5.58	6.42	4.61	6.23	4.73
	5C North	N/A	N/A	0.20	1.81	0.55
	5C South	N/A	N/A	N/A	2.02	0.94

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- Changes in natural recruitment due to decreased peak flows and influx of non-native species.
- Bulk of cottonwood cohort reaching end of lifespan.
- May need to incorporate more xeric and drought tolerant vegetation into future plant pallets.