



## **Section B: Transitioning to Rio Manso**

Pass out the components for *Rio Manso* (the changed, tamed or altered river).

Following the time line below, have students restructure the river adding the new components and taking away older components as indicated by the timeline events. Check the final image of the model against the list of changes in “Discussion Questions After Rio Manso.”

### **Directions: Going from Rio Bravo to Rio Manso: Time Line for the Historical Rio Grande**

Here is a time line for making the transition from Rio Bravo to Rio Manso. (The dates are taken from Appendix D: Human Chronology). Items with ✓ give instructions for making changes to the model. This time line addresses the valley between Cochiti Dam and Elephant Butte, so it may need to be adapted for other locations.

2,000 years before present: The first agriculture was practiced here in the Southwest, mainly people planted seeds along upper canyons and washes and waited for rain to provide moisture for them to grow.

✓ *add one small agricultural field*

450 AD: First permanent settlements along the Rio Grande; corn was primary crop.

✓ *add one pueblo-style house*

1275–1300 AD: A major drought struck the Southwest and many areas without permanent water were abandoned. Because of its reliable water, the Rio Grande became a focus for settlement. The population of the valley increased. The people grew corn, beans, squash and melons.

✓ *add another pueblo-type house*

✓ *place a few agricultural fields*

1600s: The Pueblo people consolidated into a few villages; the abandoned areas were colonized by Spanish settlers.

✓ *add four more houses along the river*

1706: Albuquerque was founded.

1880s—: Large floods occurred in 1874, 1884, 1891, 1903, 1909, 1912, 1920, 1937 and 1941. There had been overgrazing in the hills; water sped off the land to the valley. There were few plants to hold the soil and slow the flow of water. Sediments filled the river channel. The water table of the valley was very high with standing water—fields were flooded and did not drain.

1885: A dike was built to protect “New Town,” Albuquerque’s downtown area where the new railroad had just been built. There was a lake in Los Ranchos for a month, but the soil was left enriched.



- ✓ *add five more houses*
- ✓ *(option) use levee material doubled up to build “small dike”*

1925: The Middle Rio Grande Conservancy District was formed to provide irrigation, drainage and flood control for the valley. Deep ditches called drains or clear ditches were built to remove standing water from farm fields. Levees were built for flood control.

- ✓ *place levees along each side of the river on the model. You should straighten and narrow the river as you do this.*
- ✓ *add the longest irrigation ditches just outside of the levees*
- ✓ *add more agricultural fields*
- ✓ *remove about 95 cattails showing a decrease in marsh areas*

1930: The first saltcedar/tamarisk was seen in the valley.

- ✓ *add introduced riparian shrubs and exotic trees*

1941: The levee was breached for the last time that century, and there were two months of standing water in town. If you walk between the levee and the river at the Rio Grande Nature Center many of the cottonwood trees you see sprouted during that 1941 flood year.

1957: There were major efforts to control the river after World War II. The levees were improved and protected by Kellner jetty jacks.

- ✓ *add jetty jacks to protect the levees and keep the river in its channel*
- ✓ *add the rest of the houses*
- ✓ *remove about 90 seedlings, since lack of flooding means reduced natural regeneration; leave remaining seedlings on sand bars and immediately adjacent to river*

1975: Cochiti Dam was completed and began filling.

- ✓ *add a dam at the up-river end of the model, or discuss that there is a dam upriver*
- ✓ *replace 19 cottonwood saplings with 10 additional mature cottonwood trees to show that no new tree recruitment is going on, but the trees in place are getting older*
- ✓ *remove three sand bars (Cochiti Dam traps sediment, so the water flowing through is clear until it picks up sediment from the channel downstream. This sediment scours the channel and decreases sand bar formation.)*

Some of the gradual changes since 1975:

- ✓ *add the burned snags: there are more fires with more people living in the valley*
- ✓ *add five more upland shrubs into the riparian area, because the water table is dropping and the bosque is losing its hydrological connection with the river allowing plants tolerant to drier conditions to become established.*

At this point, you may want to proceed on to Section C, *Transitioning to Rio Nuevo*, or you may want to continue Rio Manso-related activities: “Cottonwood Creation,” “Who Lives Where?,” “Who Grows Where?,” Working Water and “Bosque Chaos.”



### **Discussion Questions After Rio Manso**

What will happen to the cottonwood trees eventually if there are not enough new seedlings to take their place?

*They may die out and be replaced by non-native trees that do not rely on spring flooding for regeneration.*

Do you think the same animals can live in both river systems?

*No, because the habitat is different. Some animals may not find their habitat in the new system.*

What kinds of habitat were available in Rio Bravo that is not as available in Rio Manso?

*Wetlands, marshes, recently abandoned river channels...*

What are the differences between Rio Bravo and Rio Manso?

Students should have made the following changes to the model:

- *A great reduction in the number of cattails, since slow or standing water is harder to find (occasionally found near the sides of sand bars)*
- *A relatively straight river. Curves are there, but no large meanders, oxbows, etc. Sand bars are still present, but braiding is greatly reduced.*
- *A narrower river channel*
- *Levees on each side of the river channel (there should be only a few inches between each levee and the river bank)*
- *Jetty jacks between the river and levees to stabilize levees*
- *Irrigation ditches from the dam provide water to the valley*
- *The majority of the mature cottonwood trees are between the river bank and the levees. Some large trees can still be found elsewhere in the valley.*
- *A decrease in the number of cottonwood seedlings and saplings. Seedlings can be on sand bars, but are frequently washed out, so rarely reach sapling size.*
- *A reduction in native shrubs, and an increase in exotic shrubs, found primarily in the strip of land between the river and the levees*
- *Clumps of snags or burned trees within the bosque from human-caused wildfires (exotic shrubs are often underneath these snags)*
- *There should be a dam across the upper edge of the valley from upland to upland.*

Can Rio Manso become like Rio Bravo again?

*Probably not. For one it would flood people in places such as Alameda, Corrales, Old Town, Downtown, etc. Also, it would be almost impossible to eradicate all of the introduced plants. Many species are now extinct and can never come back.*

Do you think anything can be done to make Rio Manso more like Rio Bravo?

*Probably. Let students brainstorm. This is a lead into the next step: transforming the river to **Rio Nuevo**.*