Appendix C: Supplemental Activities

Here are some additional activities from other environmental education programs that can supplement the activities presented in this guide. This annotated list is organized into nine elements of the Bosque Education Program (Field Trips, Journaling Activities, Discovery Activities, Science Exploration Activities, River Model Activities, School-based/Natural History Activities, Geology Activities, Water Activities, and Human Use Activities. Within each section, the activities are then organized by the other environmental education programs that offer complementary activities.

We selected the following resources because the materials are relatively inexpensive (often free for attending a workshop) and generally available. The activities listed here are age appropriate and relate to concepts/ideas of this Bosque Education program. Many other great activities and ideas can be found in these resources, as well as the many resources we did not include in this guide.

The following guides were used to compile this appendix:

- ☐ PLT(Project Learning Tree), Secondary Environmental Education Program: Introductory Handbook for the Secondary Modules. 1995.
- ☐ PLT: The Changing Forest: Forest Ecology. 1996.
- ☐ PLT: Environmental Education Activity Guide, Pre-K-8. 1998: sixth edition.
- ☐ Discover a Watershed: Rio Grande/Rio Bravo. 2001.
- ☐ Aquatic: Project WILD. 1992: second edition.
- ☐ Ecosystem Matters. 1995.
- ☐ Project WET. 1995. Includes a great Teaching Strategies section (pp. 3–21).

Field Trips

Discover a Watershed

Mind-Mapping (p.129): pre-assessment, planning, post-assessment tool for the study of the Rio Grande/Rio Bravo Watershed.

Aquatic Wild

Riparian Retreat (p. 34): Students describe (artistically, poetically) habitat characteristics of riparian areas. Good pre-river visit activity or to do at the River.

Water Canaries (p. 38): Students investigate a stream/pond/river using sampling techniques.

Project Learning Tree: Secondary Modules

Trees as Habitats (p. 34): Students discover how plants and animals depend on trees in many ways by examining and studying trees.

Ecosystem Matters

Wet and Wild World (p. 25): Through a sensory exploration of a pond community, students will improve their observation skills and their awareness of animals that depend on a pond community.

Hole Homes (p. 29): Through observation, comparison and evaluation of a habitat, students make predictions regarding appearances of animal homes.

Common Ground (p. 179): Through visiting places where habitats overlap, students explore the concept of ecotones.

Project WET

Life in the Fast Lane (p.79): Through a scavenger hunt and investigations of temporary wetlands in their neighborhood, students learn the benefits of and challenges to organisms living in temporary wetlands.

Stream Sense (p.191): Students use their senses to observe a stream, learning there is more to flowing water than meets the eye.

Journaling Activities

Discover a Watershed

River of Words (p. 307): Students create poetry and artwork to express their observations and experiences about the watershed, adding their voices to the rich chorus of people who have been inspired by the Rio Grande/Rio Bravo.

Project WET

Water Log (p.19): Students use a water log (journal or portfolio) to write or illustrate their observations, feelings, and actions related to water. The log serves as an assessment tool to monitor changes over time related to knowledge of and attitudes toward water.

Discovery Activities

Aquatic Wild

Water Plant Art (p. 12): Students identify aquatic plants as an important component of aquatic habitats and as a necessity to wildlife and humans. Can be done in school or on a field trip.

Science Exploration Activities

Discover a Watershed

An Invited Guest, that overstayed its welcome (p. 259): students learn about invasive plant species that often have been "invited" to the watershed and then bring serious consequences for native plants.

Aquatic Wild

Fashion A Fish (p. 88): Students classify fish according to body shape and coloration. Students design a variety of fish.

Project WET

Where Are the Frogs? (p.279): Through experimentation and a simulation, students learn how acidic water has endangered the quality of aquatic life in some parts of the country.

Project Learning Tree: Secondary Modules

Watch on Wetlands (p. 54): Students will learn more about wetlands and about how land-use decisions and legislation affect these areas.

Project Learning Tree: The Changing Forest: Forest Ecology

Adopt-a-Forest (p. 16): Students will identify a section of a local forest/wooded area to study and investigate the types of plants and animals that live there. Identify the biological and structural diversity within a forest ecosystem.

Cast of Thousands (p. 27): Students will make scientific relationships of organisms to their environment and determine the extent to which humans have an impact on forests in their region.

The Nature of Plants (p. 50): Students will learn the importance of photosynthesis to take place. They will also discover the factors necessary for healthy plant growth and the detrimental effects of environmental stresses.

River Model Activities

Discover a Watershed

Cardboard Contours (p. 160): Students use cardboard to create a three-dimensional model depicting the topography of a section of the Rio Grande/Rio Bravo.

Make-a-Mural (p. 301): Students create a mural depicting various aspects of the watershed, its landscape, its people, its cultures, and its plants and animal residents.

Aquatic Wild

Are You Me? (p. 14): Students recognize various young stages of aquatic animals. Can be done in the field or with the river model.

The Edge of Home (p. 68): Students identify characteristics of ecotones, transitional zones, etc.

Blue Ribbon Niche (p. 72): Students identify different organisms that live in riparian areas –their ecological role, basic characteristics of riparian habitats and evaluate potential positive and negative effects from change in riparian habitat.

Fishy Who's Who (p. 86): Students recognize and identify major species of freshwater fish; describe values of fish species in some aquatic communities and locate places (along the Rio Grande) where fish species occur. Can bring in Silver Minnow issues.

Aquatic Roots (p. 100): Trace origins of species of aquatic animals, plants, and categorize into native, exotic, etc.

Watered Down History (p. 116): Students describe human, plants, and animals life associated with a river over time.

Aquatic Times (p. 126): Students identify a diversity of issues related to aquatic organisms and habitats; and develop their own opinions concerning some issues involving aquatic life and habitats.

Dragonfly Pond (p. 154): Very interactive. Students evaluate the effects of different kinds of land use on wetland habitats and discuss life-style changes to minimize damaging effects on wetlands.

Watershed (p. 172): Students describe/measure characteristics of watersheds and discuss the role of watersheds in providing wildlife habitat as well as human habitats and give examples of how watersheds can be conserved and protected. Uses math.

Project Learning Tree: The Changing Forest: Forest Ecology

Understanding Fire (p. 82): Students will explore the patterns of change brought about by fires in a forest ecosystem. They will examine the environmental, societal, and political factors that influence forest-use decisions.

Ecosystem Matters

A Happy Forest (p. 21): Through dramatization and role-playing, students will become aware of the value of fire in a healthy pine forest.

On The Edge of Change (p. 115): Through an interactive game, students gain an understanding of how forest ecosystems change.

Project WET

Branching Out! (p.129): Students build a model landscape to investigate how water flows through and connects watersheds; predict where water will flow; describe drainage patterns in watersheds.

The Incredible Journey (p.161): With a roll of the dice, students simulate the movement of water within the water cycle.

Water Models (p.201): Students construct models of the water cycle to illustrate its major components and processes, and adapt their models to show how they think water would cycle in various ecosystems.

School-based/Natural History Activities

Discover a Watershed

The Electronic Journey (p. 134): Students use the Internet to gather information to build profiles of the Rio Grande/Rio Bravo basin that will contribute to the class's collective vision of the watershed.

Home Away From Home (p. 214): Students learn about the challenges of bird migration in the Rio Grande/Rio Bravo watershed.

Hunting for Habitats (p. 239): Students learn about ecological communities and apply this knowledge to the Rio Grande/Rio Bravo watershed by matching animal species with their habitat/plant community.

Aquatic Wild

Wetland Metaphors (p. 54): Students are presented with a selection of "hands-on" objects for investigation as metaphors for natural functions of wetlands.

Marsh Munchers (p. 58): Students use body movement and pantomime to simulate the feeding motions of marsh animals and identify their interconnectedness in a food web.

Migration Headache (p. 94): Students identify limiting factors affecting habitats and populations of migrating water birds.

Project Learning Tree: Secondary Modules

Environmental Exchange Box (p. 32): Students have a chance to learn more about their own region and the things that are special about it. Then, when they receive an exchange box from another region, they can compare environments, people, and much more.

Project Learning Tree: The Changing Forest: Forest Ecology

Home Sweet Home (p. 59): Students will identify "exotics" that have already been introduced into the Native American environment and will determine their effect. Students will gather information about a selected plant or animal species within their adopted forest and determine its natural range.

Ecosystem Matters

Career Critters (p. 37): Through a small-group activity, students evaluate how wild animals and plants can be used to manage some environmental problems.

Spinning the Ecoweb (p. 51): Through a physical activity, students discover the components and relationships of ecoregions and the role of ecosystem management.

Fowl Play (p. 83): Through a highly active simulation game, students discover how loss of habitat and nesting parasitism affect neo-tropical migrating songbirds.

The Incredible Journey (p. 105): Through an active simulation game, students learn characteristics of migratory shorebirds and the importance of wetlands to them.

Project WET

People of the Bog (p.89): Students construct a classroom bog and a mini-composter to observe the rate of decomposition in anaerobic (little or no oxygen present) and aerobic (oxygen available) environments.

Just Passing Through (p.167): In a whole-body activity, students investigate how vegetation affects the movement of water over land surfaces.

Rainy-Day Hike (p.186): Students are introduced to the concept of watersheds by collecting data about water flowing over school grounds.

Geology Activities

Discover a Watershed

Which Came First, the River or the Rift? (p. 195): Students build and manipulate geographic models that simulate the process that formed the Rio Grande Rift.

Aquatic Wild

Where Does Water Run Off After School? (p. 82): Students describe relationships between precipitation, runoff, and aquatic habitats. Uses math.

Water Activities

Discover a Watershed

Cycling the Rio Grande/Rio Bravo (p. 140): With a roll of a cube, students simulate the movement of water within the Rio Grande/Rio Bravo watershed and identify the water users dependent upon this river.

Exotic Hydrographs (p. 151): Students use stream-flow monitoring data to create hydrographs and then interpret them.

It All Adds Up (p. 166): Students explore upstream and downstream effects and learn about their cumulative influence on the river and those who depend upon it.

Aquifers of Two Countries (p. 172): Students will observe and learn about basic ground water principles as they create their own ground water system and apply what they learn to the Transboundary aquifers of the Rio Grande/Rio Bravo.

Tributary Tree (p. 201): Students observe the branching pattern of the drainages of the Rio Grande/Rio Bravo watershed via a relief map and build a "Tributary Tree." They also identify key features within the basin on a map by using latitude and longitude.

Water Quality, Rio Grande/Rio Bravo (p. 312): Students conduct investigations and plan classroom presentations to learn about the water quality issues of the Rio Grande/Rio Bravo watershed and discover that "what you can't see, can hurt you."

Washing Water (p. 324): Students investigate many methods of water treatment, explore the processes of mixing, coagulation, flocculation, filtration, and chlorination, and use common materials and a simple process to purify a sample of the river water.

Aquatic Wild

Aqua Words (p. 2): Students describe ways and reasons that water is important to people and wildlife.

Water Wings (p. 4): Students experience a simulated field trip and then create artwork and poetry illustrating the water cycle.

Ecosystem Matters

Don't Use It All Up (p. 17): Through using sponge pieces and water in a demonstration, students discover that the human population are resource consumers.

Project WET

Adventures in Density (p. 25): Students conduct investigations to discover how the density of water is affected by heat and salinity, and relate their "discoveries" to literary adventures and daily life.

H_2Olympics (p.30): Students compete in a Water Olympics to investigate two properties of water, adhesion and cohesion.

Molecules in Motion (p.47): This activity brings water molecules up to size (student-size!) by physically involving students in simulating molecular movements in each of water's physical states.

Aqua Notes (p.66): While singing simple songs about water in the body, students gain an appreciation for the many ways they need water.

Capture, Store, and Release (p.133): Students use a household sponge to simulate how wetlands capture, store, and release water.

Get the Ground Water Picture (p.136): Students learn about basic ground water principles as they create their own geologic cross section or earth window.

The Great Stony Book (p.150): Students create layers of buried fossils to learn how ancient, elevated ocean floors create a history book of stone. Demonstrate water's involvement in the processes of sedimentation and erosion.

Imagine! (p.157): Students usually learn about the water cycle through indirect approaches such as diagrams and experiments. In this activity, using their imaginations, students discover what happens to water as it moves above, over, and under Earth's surface.

A Drop in the Bucket (p.238): By estimating and calculating the percent of available fresh water on Earth, students understand that this resource is limited and must be conserved.

Human Use Activities

Discover a Watershed

One River, Many Voices (p. 266): Students will analyze and interpret the writings of diverse water users of the Rio Grande/Rio Bravo. They will match the water user with his/her "voice" that reflects the relationship of that individual with the river. Students will also research River Voices for authors who have written about the Rio Grande/Rio Bravo.

Naming Places (p. 283): Students gain an understanding of the history and cultural diversity of the Rio Grande/Rio Bravo basin by conducting research on specified place names within the watershed. Students write a report on their findings and present it to the class.

Whose Right? (p. 330): Students analyze different water rights policies in both the U.S. and Mexico to learn how water availability and people's proximity to the resource influence how water is allocated.

Use It, Don't Lose It (p. 337): Students simulate one person's consumption of water while trying to conserve a daily ration.

On the Edge (p. 345): Managing Transboundary Resources: Students play a game to simulate the process of negotiation, compromise, and cooperation involved in managing an international river.

Aquatic Wild

To Dam or Not to Dam (p. 134): Evaluate potential positive and negative effects from dams on rivers.

Deadly Waters (p. 146): Students analyze the pollutants found in a hypothetical river. Graphing is used.

Project Learning Tree: Secondary Modules

400-Acre Wood (p. 42): Students will play the role of managers of a 400-acre piece of public forest. Through these roles, students will begin to understand the complex considerations that influence management decisions about forest lands.

Democracy in Action (p. 50): Students learn about the roles/responsibilities of citizens' groups in environmental policies and decision making, and about how young people can become involved in the process.

Ecosystem Matters

If You Owned The Ecosystem (p. 135): Through role playing various wildlife species or humans, students make decisions about the use of natural resources within an ecosystem.

The Blind Men and The Ecosystem (p. 147): Through a parable, students learn that ecosystems are valued in diverse ways.

Mural, Mural On The Wall (p. 155): Through artwork and reading Aldo Leopold's "The Land Ethic" in *A Sand County Almanac*, students will develop a sensitivity for and understanding of the land ethic, determine the diversity and complexity of natural environments, and discover the impact humans create when they settle in a natural environment.

To Whom It May Concern (p. 159): After conducting research, students express their opinions about a controversial issues by writing a letter.

Mayhem in the Maldives (p. 197): Through role playing various career persons and community residents, students embark on a challenging simulation in which they develop solutions that must balance water needs, environmental issues, economics, and other societal needs.

Project WET

A-maze-ing Water (p.219): Students guide a drop of water through a maze of "drainage pipes" to learn how actions in the home and yard affect water quality; describe urban forms of pollution; provide reasons why people should monitor what they put on their lawns or in streets; identify ways to treat urban runoff.

Color Me a Watershed (p.223): Through interpretation of maps, students observe how development can affect a watershed.

Common Water (p.232): Students analyze the results of a simulation to understand that water is a shared resource and is managed.

Irrigation Interpretation (p.254): By conducting simulations, building models, and solving a mini-mystery, students compare the economic and ecological costs of different irrigation systems.

The Long Haul (p.260): Students work in teams to compete in a water-hauling game; develop awareness; appreciation; relate how easy access to water can encourage people to use large amounts of water.

Sum of the Parts (p.267): Students demonstrate how everyone contributes to the pollution of a river as it flows through a watershed and recognize that everyone's "contribution" can be reduced.

Water Meter (p.271): Students construct a "Water Meter" to keep track of their water use.

AfterMath (p.289): By calculating economic loss that results from flooding in a specific area, students investigate how people are affected by floods and other weather events.

Back to the Future (p. 293): Students analyze streamflow monitoring data to determine the safest location for a future community.

The CEO (p.300): Students assume the role of CEOs and analyze the relationship between economic profits and environmental quality.

Dust Bowls and Failed Levees (p.303): Through literature study, research, and writing, students gain a greater understanding of the effects of drought, flood, and other water-related events on people.

Every Drop Counts (p.307): Students identify and implement water conservation habits to learn how this essential resource can be shared with other water users of today and tomorrow.

Macroinvertebrate Mayhem (p.322): Students play a game of tag to simulate the effects of environmental stressors on macroinvertebrate populations.

Money Down the Drain (p.328): Through observation and simple calculations, students learn that a dripping faucet wastes a valuable resource.

Sparkling Water (p.348): Students describe the processes for treating wastewater; compare how water is cleaned in the water cycle to how it is cleaned in contemporary water treatment systems; list nontoxic household cleaning methods.

Wet-Work Shuffle (p.360): Students will sequence water-related occupations involved in transporting water to and from the home; describe various water resource careers.

Dilemma Derby (p.377): Students debate the pros and cons of different solutions to water management issues.

Additional water-related activities: Hot Water (p.388); Pass the Jug (p.392); Perspectives (p.397);:Water Bill of Rights (p.403); Water Concentration (p.407)_; Water Court (p.413); Water Crossings (p.421); What's Happening survey (p.425); Whose Problem Is It? (p. 429); Raining Cats and Dogs (water sayings, p.435); The Rainstick (p.442); Water Celebration (p.446); Water in Motion (artwork, p.450); Water Messages in Stone (replicate rock paintings, p.454); Water Write (writing/reading exercises, p.457).