

**The Santa  
Cruz River,  
Its People and  
Environment**

**A Fourth through Eighth Grade  
Teacher's Guide**



# P.A.R.K.S.

*Parks as Resources for Knowledge in Science*

## The Santa Cruz River, Its People and Environment

**A Fourth through Eighth Grade Teachers' Guide**

Principal Author and Editor

**Roy B. Simpson, Park Ranger**

**Tumacácori National Historical Park**

Graphics By

**Mary Simmie, Russ McCrackin**

**and Zackery Zdinak**



SANTA CRUZ VALLEY  
UNIFIED SCHOOL  
DISTRICT # 35



Friends of the Santa  
Cruz River



U.S. Fish and Wildlife Service

# Acknowledgments

Special recognition to the following persons and organizations for their help with organizing, curriculum development and support:

To our sponsors, the Exxon Corporation and the National Park Foundation for providing the funds to make this worthwhile idea a reality and for providing the funds to carry it out, the Tumacácori Mission Land Development Ltd. for allowing us access to and use of the river, the Kazaam Nature Store in Patagonia for their aid in purchasing quality binoculars, the U.S. Fish and Wildlife Service who provided funds through a Partners in Wildlife grant to fence and develop a ten-acre study site, and to the Hewlett-Packard Company for their generous donation of a computer.

To teachers, Michelle Titcomb and Mark Gilbreath, for their expertise, dedication and hard work in helping to design, edit and pilot this guide.

To all the editors, Anita Badertscher, Mary Connors and Don Garate, for their outstanding editing skills and the patience to work through this project's multiple drafts.

To Lou Patterson, Paul Speasl and Joan Sumner for their hard work in getting this project on the computer and learning the Quark program in order to accomplish this.

To Volunteers-in-Parks Michael Alcala, Roxy Brown, Anna Curfmann, Lou Paterson, Mary Simmie and Clar Speck, who were not afraid to sing silly songs and bravely pilot and develop activities in and outside of the classroom and for their enthusiasm, love for children and dedication to education.

To fourth-grade teachers at the Mountain View and A.J. Mitchell Schools who kindly helped pilot the student activities and gave us frank feedback on how to improve the program.

To Ann Rasor, Don Garate and other park service staff who generated the support I needed and allowed me to put together this project and for their support of the environmental issues and their commitment to education.

To Santa Cruz School District 35 for its support, encouragement and permission to work with local schools.

To the many others too numerous to mention, who provided valuable support and assistance in the preparation of this Guide, Thank You.

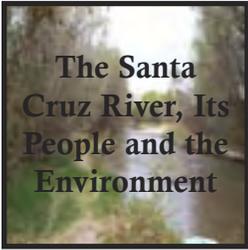
\*\*\*\*\*

**2nd Printing April 2004,  
Internet version August 2005  
Tumacácori, Arizona**

**Whereas all activities may be photocopied for educational purposes,  
please note that certain graphics are copyrighted and may not be  
reproduced commercially without permission from the artist.**

\*\*\*\*\*

# TABLE OF CONTENTS



<b>FOREWORD</b>	<b>i</b>
<b>HOW TO USE THIS BOOK</b>	<b>ii</b>
<b>ARIZONA STATE STANDARDS</b>	<b>iii-iv</b>
<b>RESOURCES AND REFERENCES</b>	<b>v-vi</b>



## **1 SPANISH GIFTS**

The meeting of the Indians and the missionaries brought profound changes. Through listening to a story and matching activities, students will classify, compare and contrast introduced and native goods and discuss how they both helped and hurt the Indians and the environment.

**Page 1.1**



## **2 FERNANDO'S BIG ADVENTURE**

Students will follow a storyline while participating in a science experiment that defines water pollution and demonstrates how human activities affect water quality. We will also discuss Santa Cruz River issues, how current human practices affect water quality and potential solutions.

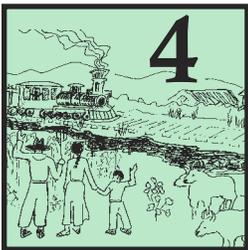
**Page 2.1**



## **3 AN APACHE WAY OF LEARNING**

Through participation in one or more activities, students will gain a personal relationship to their environment while learning about how the historical Apache people related to their natural environment.

**Page 3.1**



## **4 RAILROADS, CATTLE, COTTON FIELDS AND THE ENVIRONMENT**

Students will gain an understanding of the local environment through time by participating in a game that demonstrates how historical events affected the natural environment in the Santa Cruz Valley.

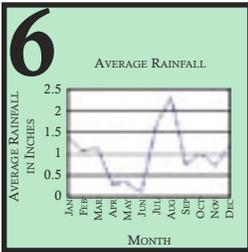
**Page 4.1**



## SANTA CRUZ RIVER CARDS

Students will participate in activities that enable them to identify and review general characteristics of various animals (amphibians, arachnids, birds, insects, mammals and reptiles) found along the Santa Cruz River.

Page 5.1



## WHY THE SANTA CRUZ?

By graphing rainfall and temperature patterns and comparing data in two specific sites, students will learn how environmental conditions affected human settlement along the Santa Cruz River.

Page 6.1



## PEOPLE AND THEIR ENVIRONMENT

Students will hear accounts of the river environment during different time periods, visualize and depict, through drawing, each time period and record and discuss the potential impact people had on the environment of the Santa Cruz Valley.

Page 7.1



## RIVER ISSUES AND YOU

Students will learn about specific issues relating to the Santa Cruz River, assert their opinion about each and participate in a debate using knowledge gained.

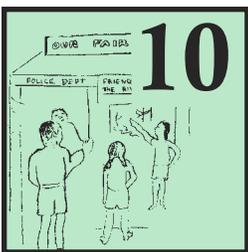
Page 8.1



## OWLS AND CROWS

Through playing a physically active quiz game, students will demonstrate their knowledge gained of the river, the environment and local, present-day cultures.

Page 9.1



## SANTA CRUZ COUNTY - 2050!

Students will become members of a hypothetical local agency in the year 2050. Based on knowledge gained, they will design and construct an informative display regarding their agency's concerns and the future for the area.

Page 10.1

# Foreword

For many years, the Friends of the Santa Cruz River organization has been involved in environmental education efforts and has sponsored many events such as river day camp, tours, school presentations and clean up days. With further involvement and support from the staff at Tumacácori National Historical Park, more effort has been given to providing education regarding the river, resulting in on-going school programs. This partnership led to a generous grant from the Exxon-Mobil Corporation and the National Park Foundation, essentially forming a “marriage” between the park with its cultural resources, the Friends of the Santa Cruz River organization and the river.

The resulting program is designed to teach students about the river’s ecosystem, the local historical cultures and their reliance on the river as well as how they affected its environment. It is also designed to encourage respect and stewardship for the river and its resources. Two teachers’ guides are now available that compliment this one: *Life Along the Santa Cruz River* (primary grades) and *Birds, People and the Santa Cruz River* (middle school grades). In addition, classroom slide presentations, field trips and monitoring programs about the river are available to local schools, K-12.

The teachers’ guide offers activities specifically focused on the Santa Cruz River and its local cultures. The guide has information, resources and activities that will inform and allow teachers to focus on the local environment and historically related cultures, and will enhance the study of science and history. Because the guide is locally based, it introduces students to the beautiful environs in our own back yard and, hopefully, will be able to instill pride and appreciation for the place we call our home. The ultimate goal of the curriculum is to create informed future citizens that love and care for the place in which they live, for generations to come.

Although the activities are based on the environment and the history of the Santa Cruz, the lessons may be modified to encompass other areas, particular southwest river environments.

The lessons in this guide are sequentially ordered to cover aspects of the river and culture appropriate to fourth through eighth grades. The thematic skills included are: social studies, environmental science, multicultural education, art, and critical thinking. The lessons can stand alone, but, if used sequentially, they will give the teacher and students a solid background on the river, its environment and its related cultures.

## Note about this Guide

This teachers’ guide is available free to all teachers in all Santa Cruz County schools. It is also available for loan as part of the Encounters Teachers’ Resource Box located in area schools and Pima-Tucson Public Libraries. Educators outside of this area may borrow the book at any time and photocopy all or part for non-commercial educational purposes. Copies will also be distributed by Tumacácori National Historical Park for the cost of reprinting.

For more information contact:

**Tumacácori National Historical Park**  
**P.O. Box 67, Tumacácori, AZ 85640**  
**(520) 398-2341, extension 0**  
*tuma\_interpretation@nps.gov*

or

*www.nps.gov/tuma*

# HOW TO USE THIS GUIDE

<b>LESSON #</b> 	<b>LESSON OVERVIEW</b> A brief outline of the general theme and concepts -- what and how the lesson will be accomplished. Very useful if you wish to scan the different lessons.
<b>Subjects</b> Whereas most of the lessons will be in science, other disciplines such as art, English, etc. may be covered. <b>Standards</b> National Standards will be listed here, while Arizona State Standards will be listed on <b>Pages iii</b> and <b>iv</b> . <b>Objectives</b> Measurable actions to be accomplished. <b>Preparation</b> Includes a list of materials and what steps need to be taken to prepare for the lesson. <b>Time</b> The amount of time it will take to complete the lesson. <b>Vocabulary</b> A list of key or foreign words.	<b>LESSON TITLE</b> <b>TEACHER BACKGROUND INFORMATION</b> <b>Useful background information to be read by the teacher and/or students prior to, or as part of, the lesson.</b>  <b>1. Step by step instructions.</b> <b>2. Numbered and clearly written.</b> <b>3. Augmented by graphics and other useful information.</b>  <b>Enrichment</b> Suggestions or other activities appropriate to further study lesson concepts or themes. Located at the end of the activity instructions.

LESSON # - MASTER PAGE #

Master Pages contain activities that are essential to complete the lesson.

In most cases they are student worksheets and will need to be photocopied.

Sometimes only a teacher copy will be needed.

## STATE OF ARIZONA - SCIENCE STANDARDS

ACTIVITY	AZ State # 1 N.S.T.A. A SCIENCE AS INQUIRY	AZ State # 2 N.S.T.A. G HISTORY AND NATURE OF SCIENCE	AZ State # 3 N.S.T.A. F SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES	AZ State # 4 N.S.T.A. C LIFE SCIENCE	AZ State # 6 N.S.T.A. C EARTH SCIENCE
1. Spanish Gifts		2SC - F1, PO1	3SC - F3, PO1	4SC - F1, PO1/2	
2. Fernando's Big Adventure	1SC - F2, PO1/2 1SC - E1, PO1/2 1SC - E2, PO1/2	2SC - F3, PO1/2 2SC - E4, PO1	3SC - E3, PO1 3SC - E3, PO1/2/3		
3. An Apache Way of Learning		2SC - F2, PO1	3SC - F3, PO1/2		
4. Railroads, Cattle, Cottonfields and the Environment		3SC - F3, PO1/2 3SC - E3. PO1/2/3	4SC - F1, PO1/2 4SC - F7, PO3 4SC - E7, PO2/3		
5. Santa Cruz River Cards			3SC - F3, PO1/2	4SC - F3, PO1/2 4SC - F4, PO2 4SC - E1, PO1/2	
6. Why the Santa Cruz?	1SC - F3, PO1 1SC - E1, PO4 1SC - E3, PO1/2/3	2SC - E4, PO1	3SC - F3, PO2		6SC - F7, PO3 6SC - E7, PO1

**STATE OF ARIZONA - SCIENCE STANDARDS**

ACTIVITY	AZ State # 1 N.S.T.A. A SCIENCE AS INQUIRY	AZ State # 2 N.S.T.A. G HISTORY AND NATURE OF SCIENCE	AZ State # 3 N.S.T.A. F SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES	AZ State # 4 N.S.T.A. C LIFE SCIENCE	AZ State # 6 N.S.T.A. C EARTH SCIENCE
7. People and Their Environ- ment	1SC - F3, PO2	2SC - F1, PO1 2SC - E2, PO1/2	3SC - F3, PO1/2 3SC - F4, PO1/2	4SC - F1, PO1/2 4SC - F7, PO3 4SC - E7, PO3	
8. River Issues and You			3SC - F1, PO1 3SC - F2, PO1/2/3 3SC - F3, PO1/2 3SC - F4, PO1/2 3SC - E1, PO1 3SC - E3, PO1/3	4SC - F1, PO1/2 4SC - E7, PO1/2/3	6SC - F5, PO1/2/3 6SC - F6, PO2
9. Owls and Crows				4SC - F1, PO1 4SC - F7, PO1/3 4SC - E7, PO1/2	
10. Santa Cruz County - 2050!	1SC - E6, PO1	2SC - F3, PO1	3SC - F2, PO1 3SC - F2, PO1/2/3/4 3SC - F3, PO2 3SC - E1, PO1 3SC - E3, PO1/2/3		
River Field Trip to Tumacacori National His- torical Park	1SC - E1, PO4	2SC - E1, PO1 2SC - F3, PO1	3SC - E1, PO1 3SC - E3, PO3 3SC - F1, PO1 3SC - F2, PO1/2	4SC - E1, PO1 4SC - E7, PO1-4 4SC - F1, PO1/2 4SC - F4, PO1/2 4SC - F7, PO1/3	AZ #5 N.S.T.A. B PHYSICAL SCIENCE 5SC - E1, PO1/26 6SC - E7, PO1-4 6SC - E4, PO1/2 6SC - F1, PO1/2 6SC - F5, PO1 6SC - F6, PO1/2

# RESOURCES AND REFERENCES

## LESSON 1: Spanish Gifts

*Seeds of Change: The Story of Cultural Exchange after 1492*, Sharryl Davis Hawke and James E. Davis, Addison Wesley Publishers, 1992.

*Chilies to Chocolates*, Nelson Foster and Linda S. Cordell, eds., Univ. of AZ Press, 1992.

## LESSON 2: Fernando's Big Adventure

*A Sanitary Code, Rules and Regulations, Solid Waste*, Chapter VII, pp. 140-143, Santa Cruz County Health Department, Nogales, AZ 85621, Contact Person: Ben Stepleton, Director, phone: 761-7800.

**Friends of the Santa Cruz River**, P.O. Box 4275, Tubac, AZ 85646, (520) 398-9093.

**Household Hazardous Waste Program**, Office of Public Works, Santa Cruz County, Nogales, AZ 85621, Contact Person: Norma Northcross, HHW Coordinator, phone: 761-7800.

**Nogales Wastewater Treatment Project**, 777 N. Grand Ave., Nogales, AZ 85621, (520) 287-6571.

## LESSON 3: An Apache Way of Learning

*Sharing Nature with Children (1979)*, *Listening to Nature (1987)*, *Sharing the Joy of Nature (1989)*, and *Journey to the Heart of Nature (1994)*, Joseph Cornell, Dawn Publications, Nevada City, CA.

*What's a Chiricahua and Chiricahua: Much More Than You Think*, Roy Simpson, Chiricahua National Monument;

*Project Learning Tree*, American Forest Council, Wash. D.C.

*Ranger Rick's Nature Scope*, National Wildlife Federation, Washington, D.C.

## LESSON 4: Railroads, Cattle, Cotton Fields and the Environment

*Adventures in Arizona*, Kate Ruland-Thorne and Linda Lawrence, Thorne Enterprises Publications, Inc., Sedona, AZ, (520) 282-7508.

*Arizona: A History*, Thomas E. Sheridan, U of A Press, 1995.

*Cochise*, Edwin R. Sweeney, Univ. of Oklahoma Press, 1991.

*Geronimo*, Angie Debo, Univ. of Oklahoma Press, 1976.

*Hispanic Arizona: 1536-1856*, James E. Officer, U of A Press, 1987.

*Tubac*, Richard Wormser, The Tubac Historical Society, 1981.

## LESSON 5: Santa Cruz River Cards

*A Natural History of the Sonoran Desert*, Arizona-Sonora Desert Museum, University of California Press, 2000.

*Birds: A Guide to Field Identification of North America*, Chandler S. Robbins, Bertel Bruun and Herbert S. Zim, Golden Books, New York, 1966.

*Easy Field Guide to Common Desert Birds*, Richard and Sharon Nelson, Primer Publishers, 5738 N. Central Avenue, Phoenix, AZ, 1996.

*Field Guide to the Birds of North America*, National Geographic Society, 1987.

*Mammals of the Southwest Deserts*, George Olin and Dale Thompson, Southwest Parks and Monuments Association, 1988.

*Watchable Birds of the Southwest*, Mary Taylor Gray, Mountain Press Publishing Company, Missoula, MT, 1995.

## LESSON 6: Why the Santa Cruz?

*Project WET*, (Contact Kerry Schwartz at the University of Arizona), 792-9591

*Project Learning Tree*, 1111 19th Street, Washington, D.C., 20036 or contact Arizona Association for Environmental Education (AAEE), 520/319-1741.

“Kino’s Unforeseen Legacy,” Dr. Thomas Sheridan, *Smoke Signal*, Issue #49, 1988.

## LESSON 7: People and Their Environment

*A Kino Keepsake*, Kieren McCarthy, editor, Friends of the AZ Library, Tucson, 1991;

*Arizona*, Thomas Sheridan, U of AZ Press, 1995.

*The Changing Landscape*, James Hastings and Raymond Turner, U of AZ Press, 1965.

“The History of Tubac -- 1752-1948,” Doris Bent, from Tubac Presidio State Park’s archives.

*Sonora*, Ignaz Pfefferkorn, U of AZ Press, 1989.

*Treasure Land: A Story*, John George Hilzinger, Arizona Advancement Co., Tucson, 1897.

*Tubac through the Centuries*, Henry Dobyns, AZ State Museum, Tucson, AZ, 1958, 1959.

*They Lived in Tubac*, Elizabeth R. Brownell, Westernlore Press, Tucson, 1986.

## LESSON 8: River Issues and You

*Sonora: Its Geographical Personality*, Robert C. West, Univ. of Texas Press, Austin, 1993.

*They Lived in Tubac*, Elizabeth R. Brownell, Westernlore Press, Tucson, 1986.

*Tubac*, Richard Wormser, Tubac Historical Society, 1975.

*Water in the Hispanic Southwest*, Michael C. Meyer, Univ. of AZ Press, Tucson, 1996.

**Anza Trail Coalition**, P.O. Box 396, Tumacácori, AZ 85640.

**Friends of the Santa Cruz River**, P.O. Box 4275, Tubac, AZ 85646, (520) 398-9093.

**Nogales Wastewater Treatment Project**, Nogales, AZ 85621, (520) 287-6571.

## LESSON 9: Owls and Crows

*Adventures in Arizona*, Kate Ruland-Thorne and Linda Lawrence, Thorne Enterprises Publications, Inc., Sedona, AZ, (520) 282-7508.

*Arizona: A History*, Thomas E. Sheridan, Univ. of AZ Press, 1995.

*Hispanic Arizona: 1536-1856*, James E. Officer, Univ. of AZ Press, 1987.

*Sharing Nature with Children*, Joseph Cornell, Dawn Publications, Nevada City, CA, 1979.

*Tubac*, Richard Wormser, The Tubac Historical Society, 1981.

## LESSON 10: Santa Cruz County - 2050!

“Community Profiles” from Tubac, Nogales and Santa Cruz River Valley (see Encounters Box, Green Section, or contact the Chambers of Commerce).

**AZ State Government Water Resources**  
(520) 761-1814.

**AZ Department of Agriculture**, (520) 287-7887.

**AZ Department of Environmental Quality**  
(800) 234-5677.

**AZ Department of Health Services**  
(800) 221-9968.

**AZ State Parks** (520) 398-2252.

**Nogales Chamber of Commerce**, (520) 287-6570.

“Santa Cruz County Study,” a study paper by students of Dr. Don Wilkin, U of A, spring 1996.

**Tubac Chamber of Commerce**, (520) 398-2704.

**U.S. Fish and Wildlife Service**, (520) 823-4251;

**U.S. Forest Service** (520) 281-2297.

**U.S. Office of Mineral Resources**,  
(520) 670-5504.

**National Park Service, Tumacácori National Historical Park** (520) 398-2341.