

A close-up photograph of three raccoons huddled together in a nest. The raccoons have characteristic black and white facial markings and dark eyes. They are positioned in a cluster, with one in the foreground and two slightly behind it. The nest is made of dark, textured material, possibly wood shavings or bark.

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# Achievement for Every Student

HAYES MIZELL

Most educators have now read about the landmark No Child Left Behind Act (NCLB) signed by President Bush in 2001.<sup>1</sup> Many are beginning to experience its effects, and more will do so in the years ahead. As the most recent incarnation of the Elementary and Secondary Education Act, the NCLB breaks new ground. For the first time in federal education policy, the law mandates that all students completing the eighth grade by the end of the 2013-2014 school year should perform at the “proficient” level. To achieve this goal, the NCLB creates an ambitious array of incentives and sanctions to spur schools, school systems, and states to creative action.

The NCLB is full of promise. We can hope it will cause states to significantly improve their standardized assessments. Perhaps schools at all levels will become more effective in helping students develop increasingly sophisticated literacy skills. Maybe the achievement of low-performing students will leap forward because they will finally have teachers who know how to successfully engage them in deep learning. The NCLB provides education leaders some financial resources and flexibility to achieve these great things, but a chasm stands between the law’s intentions and major improvements in student achievement.

As more than 35 years of Elementary and Secondary Education Act implementation has

demonstrated, no matter how powerful federal law may be, it pales in comparison to the control local educators exercise every day. Do I really mean that teachers and administrators have more power than the federal government? Yes, because each day individual educators make decisions that either advance or frustrate the intentions of federal policy to increase student performance.

It may strike readers as strange to suggest that teachers and administrators have real power. Educators feel so burdened by the complex and often conflicting requirements of policymakers that many teachers and administrators begin to believe they are victims, weak and always on the defensive. Every day, however, educators exercise their power in one of three ways: (1) they rise to the challenge of a new policy or law, and seize its opportunities to improve their practice; (2) they ostensibly accept the new mandate, but change their practice very little, if at all; or (3) they resist the new requirement and contribute to a climate that makes its effective implementation more difficult.<sup>2</sup>

The more than 1,000 pages of NCLB provide educators myriad opportunities to make critical choices. Contrary to what many teachers and principals believe, there is wide latitude for schools, school systems, and states to determine how they will use NCLB funds to increase the performance levels of both teachers and students. Indeed, many pages of the law include lists of possible educational interventions local schools and school systems should consider.

While NCLB provides guidance, it does not dictate direction; it is the responsibility of local and state educators to make the tough choices about which reforms are most likely to increase the performance of teachers and students. There may be strong differences of opinion about whether a school system should use NCLB funds to reduce class size or provide full-time, school-based staff developers for teachers. While the former may be a popular choice, particularly among teachers and their unions, a recent U.S. Department of Education study found that “71 percent of the students in middle-grade history

classes had teachers who did not report having a major in history or world civilization and certification in the field.” What do students need most, several fewer classmates or more high-quality teaching? Rarely will educators base their decisions on first-hand evidence, primarily because school systems and schools make little effort to collect and analyze data about how educational interventions impact student achievement. Though the NCLB requires education leaders to use “research based evidence” to justify their use of NCLB funds, many will instead select research that supports their professional judgment or personal preference.

During the first year of the NCLB’s implementation, educators and policymakers have devoted much attention to the law’s assessment, accountability, and student transfer provisions. Some policy analysts have rightly cited schools’, school systems’, and states’ lack of capacity to implement the law effectively, at least in the near future. There has been virtually no discussion, however, of the law’s ethical challenges to educators. Our system of public education invests in adults the responsibility to make decisions that will result in the education of every student. But what happens when educators’ preferences, prerogatives, and convenience collide with what is required of them to ensure that all students perform at the proficient level by at least 2014? The real challenge of the NCLB is not the bureaucratic nuts and bolts of its implementation, but the choices educators will make about whether and how they will use the law to increase student achievement. ☐

## Notes

1. The complete text of the No Child Left Behind Act is available on the Web at [www.ed.gov/legislation/ESEA02/](http://www.ed.gov/legislation/ESEA02/).
2. Hayes Mizell, *Shooting for the Sun: the Message of Middle School Reform* (New York: Edna McConnell Clark Foundation, 2001), [www.emcf.org/programs/student/shootingfortesuh.htm](http://www.emcf.org/programs/student/shootingfortesuh.htm).

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*Lookout Point* is an open forum. For consideration, send a response or an original essay to: Middle Level Learning, National Council for the Social Studies, 8555 Sixteenth Street, Suite 500, Silver Spring, Maryland 20910, or e-mail [ml1@ncss.org](mailto:ml1@ncss.org).

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Lower Colorado River Authority

MARILYN J. EISENWINE

Archaeology is the study of societies of the past using the clues of their material remains. It is a discipline that integrates methods and concepts from many fields of study to construct an understanding of people and cultures of the past.

Why emphasize archaeology in the middle school? Because of its melding of humanities and science, archaeology is an outstanding vehicle for interdisciplinary units of study.<sup>1</sup> Interdisciplinary instruction can address the intellectual and social needs of the middle school student. A unit on archaeology is also an opportunity for teachers in the different subject areas to work together as a team.<sup>2</sup> A recent study of curriculum integration in the seventh and eighth grades indicated that the practice is “socially desirable and educationally essential,” even though it can be demanding when teachers first create an integrated unit of study.<sup>3</sup> National standards for the social studies stress skill-based learning and the inclusion of primary sources.<sup>4</sup> Archaeological study is an excellent example of scientists using the raw data of history, such as artifacts and human remains, as the primary evidence of past

# Archaeology in the Seventh Grade

## An Interdisciplinary Unit of Study

events. Finally, archaeology is naturally a part of the usual social studies curriculum of state history (covered in the seventh grade in many states) and world history (often covered in the eighth grade).

### Conserving a Resource

Currently in the United States, an “uneducated public” is destroying (usually unwittingly) countless archaeological sites each year. According to Dan Potter, an archaeologist with the Texas Historical Commission, thousands of sites a year are destroyed in Texas alone.<sup>5</sup> Teachers and children are well aware of the problems of pollution and species extinction because of the massive educational and political efforts of citizen conservation groups over the last half-century. Archaeologists, too, need an educational campaign. Like some natural resources, archaeological sites are nonre-

newable. Adults and children are often unaware that it is not appropriate (and is usually illegal) to pick up and keep artifacts, such as arrowheads or broken pottery, found on public property such as a state or national park. As part of this unit of study, teachers can help make students aware of the importance of preserving archaeological resources as part of our national and world heritage.<sup>6</sup>

### A Team-Teaching Effort

Recognizing the importance of including archaeology in the curriculum, seventh grade social studies teacher Antonio J. Castro designed an integrated unit of study to be used with teachers on his team at Westview Middle School in Pflugerville, Texas. As the unit progressed, teachers from the other subject areas (math, language arts, and science) included their own

ideas in the lesson plans, using their preferred methods. Five professional archaeologists served as guest speakers during the course of the unit.<sup>7</sup> Students enjoyed these special presentations, which included slides of archaeological digs and artifacts.

Teachers assessed learning with worksheets during the unit and, at the conclusion, through student presentations. Also, a short survey intended to measure student attitudes, which was handed out at the end of the year, showed that most students responded favorably to the archaeological material and wanted to learn more about the discipline and the historical period studied.<sup>8</sup>

### Social Studies

Because archaeology is a subdiscipline of anthropology within the social sciences, much of the core course material was included in the social studies class. The lessons moved from concrete objects to more abstract concepts. The teacher began by introducing archaeological terms and vocabulary.<sup>9</sup> Students completed worksheets that included drawings of artifacts found in Texas, such as an atlatl, chert, a dart point, a firestick, a hearth, mano, metate, mussels, and a rabbit stick. Using line drawings of artifacts, students made games for vocabulary

review like bingo or concentration.

Next, the teacher discussed various methods for dating archaeological sites, including stratigraphy, tree rings, cross-dating, and radio-carbon dating (Handout Part 1). This was followed by descriptions of four time periods (Handout Part 2), using examples from a site in our state, the Nightengale Archaeological Laboratory site near Kingsland, Texas.<sup>10</sup> Students worked in groups to identify particular time periods for specific archaeological discoveries described by the social studies teacher (Handout Part 2). According to the attitude survey results, students especially enjoyed this activity.<sup>11</sup>

Finally, using a vignette (Handout Part 3), students applied information they learned about archaeological concepts by analyzing descriptions of a group of people known as “The River People.” Students gathered in small groups, listed artifacts that these people might have left behind, and described how archaeologists of today might learn about them. The groups then listed reasons why or why not a property where ancient people once lived should be preserved as a public park for people to visit in the present.

“The River People” were a group of prehistoric Native Americans who lived in the central Texas area, as revealed by discoveries at the Nightengale Archaeological Laboratory.

This center hosts field trips and, on its website, provides a free set of lesson plans. During the first year this unit was taught, the seventh graders were able to take a field trip to the site. Unfortunately, the district could not provide funding for the trip the following year. (Many state departments of education, parks, or history offer lesson plans and other materials about the early history of their state.)

Other activities might include students making a time line and illustrating it with drawings of artifacts from each period.<sup>12</sup> As an independent or group project, students could make models of archaeological digs. Students might be able to “visit” archaeological sites on the Internet that are hosted by state governments, historical societies, or universities. If a guest speaker is not available for a class, students might be able to interview professional archaeologists through e-mail, asking questions about their work, their career, their education, or anything of interest to the students (see Resources).

Students could choose a special topic of interest and read about it in one of the many good books about archaeology for youth (see Resources). Then, they could give reports to the class on their topics, increasing everyone’s knowledge of the field.



Lower Colorado River Authority

Students use an *atlatl* (spear thrower) during a tour at the Nightengale Archaeological Center in Kingsland, Texas.

## HANDOUT PART 1

### Dating Methods

**Stratigraphy:** The deeper an object is buried in the ground, the older it is likely to be. By studying the thickness and composition of different layers of sediment (or ice), archaeologists can approximate the date of an object found within a layer.

**Tree rings:** A tree grows one new ring of wood under its bark each year, which serves as a record of years passing. The wood itself may also show signs of stress—such as drought, flood, insect infestation, or fire—which can help peg exactly which years a tree was alive.

**Cross-dating:** Artifacts in a site can be compared with other artifacts that have a known date. For example, if gold coins (of known date) and glazed pottery (of unknown date) are found together beneath the floor of an old Spanish mission, they are likely to have been manufactured at about the same time.

**Radio-carbon dating:** Slow and regular changes in the element carbon (and some other chemical elements) can serve as an accurate clock that indicates the passage of hundreds or thousands of years.

## HANDOUT PART 2

### Placing Archaeological Findings in Time

Imagine that you are an archaeologist and that you have uncovered several different artifacts and organic remains in different sites in the Central Texas area. Using what you have just learned about these time periods, and what you already know about Texas history, write down what cultural time periods you think each finding represents. There is not always a clear right answer, but make your best guess. (Back in the lab, you plan to use carbon dating to get a more precise answer.)

#### Time Periods (BP means “before the present”)

Paleo-Indian:	12,000 to 9,000 BP
Archaic:	8,500 to 1,250 BP
Late Prehistoric:	250 to 300 BP
Historic:	300 BP to today

#### Artifacts and Organic Remains

1. At the base of a cliff, you have uncovered a large group of animal bones scattered and broken. The bones belong to bison. One bone is charred.
2. You unearth the ruins of what could be an old mission. You discover two arrowheads and a bullet.
3. You find several pieces of burnt rocks and traces of plants. Nearby is a stone weapon that looks like a spear point.
4. You discover the bones of a deer. Scattered among the ribs are two small arrowheads.
5. You gradually uncover eleven pottery shards that are decorated with various bright colors. Near the pottery are two gold coins.

## HANDOUT PART 3

### A Vignette for Student Analysis

#### The River People

For the River People, life had always been good. Along the river, where they lived, there was clean water, extensive grasslands, and an abundance of wildlife: mammals, fowl, and fish.

Three women sat down along the rocks. Holding small, smooth stones in their hands, they began crushing seeds against a large flat rock. After grinding the seeds (which were, in fact, maize) into tiny flecks, the women would add water and berries to make a food almost like pancakes. These could be cooked on other large, flat rocks near the fire. Close by the women, a boy and a girl played with a small turtle, placing it within a circle of shells from fresh water mussels and snails.

Meanwhile, some of the men of the tribe were in the grasslands, hunting. One small party was searching out small game like rabbits. They had small wooden sticks, shaped like a boomerang. This shape allowed the stick to hit its prey swiftly and forcefully.

The other group of men, further away, was searching for larger game. They hoped that a buffalo or a deer would approach the river to drink. They were carrying spears with dart points wrapped at the end and using a spear thrower called an atlatl, which was made of a long stick.



An archaeological site on the Lamapas River, located about 60 miles north of Austin.

## Science

The science teacher presented a warm-up activity based on overhead transparencies made from illustrations in the book *Motel of the Mysteries* by David Macaulay.<sup>13</sup> This humorous story describes an archaeological find in the year 2025 that satirizes our current way of life. The teacher asked students to identify the various “artifacts” from their own era and culture and to describe their use.

Students then learned about the field methods of archaeology. An archaeological team must decide where to dig, using clues from geography, the soil surface, and their knowledge of ancient cultures to guess at sites that might yield interesting discoveries. It must obtain permission from landowners to explore and dig at a site (or negotiate with the construction workers who stumbled upon the find!). The team members create a grid on the surface (measuring length and width) and also note the depth as they dig down, so that each item found can be carefully mapped against three axes. They slowly excavate a site, documenting precisely how and where each artifact is found. They stabilize and package each artifact for shipment to the lab for later analysis, cataloguing, photography, and possible display in a museum. They take soil samples for later sifting and analysis (are there seeds, stone

flakes, bone chips, charcoal, or hair in the soil?). Finally, before leaving a site, they must protect it from theft or erosion, or fill in the dig and restore a natural appearance.

One way that archaeologists make inferences about the activities of an ancient people is to categorize and count a collection of small items found at a site, such as seed grains, pottery shards, or stone flakes from tool making. To give students a feel for this method, the teacher leads them in cataloging the ingredients of small bags of trail mix. After passing out the bags and “lab analysis forms” (Handout Part 4), the teacher instructs the groups of students to describe, measure, and count each item in the bag (13 peanuts, 7 raisins, etc.). One student can compile the data from all the groups in a chart on the board. The class will then guess the proportions of the ingredients in the original recipe (two cups of peanuts for every one cup of raisins, etc.).

As a final activity, the science teacher distributed bags, each containing a “cultural artifact” she had created, to groups of students in a science lab.<sup>14</sup> (Line drawings of artifacts on cards could also be used for this activity). Following an instruction sheet, each group sketched one of the artifacts, measured it, and described it in detail. Then each group speculated about how it was made, how it might have been used, and what

sort of culture might have produced it. Finally, students matched the items in their bag with a time period, which they had learned about in social studies class.

## Language Arts

Two language arts teachers on the final team began their lessons with a discussion of ethics in archaeology. First, the teachers distributed a survey for students involving situations where archaeological sites and resources were endangered. Students could choose from a list of answers and write down why they made their choices about how each site might be managed. Next, teachers gave the pupils a fact sheet describing the proper procedure for reporting artifacts found by individuals and construction crews. Students learned that archaeologists are concerned about preserving the past. They encourage everyone who discovers an artifact to contact a nearby museum or university. For homework, students gave the same survey (and then the fact sheet) to at least ten other people. The following day, the teacher tallied the results and invited students to write an article for the school newspaper presenting these results and discussing the importance of conserving archaeological sites and resources.

Continued on page 9

## Analyzing a "Prehistoric Food Mixture" Sample

### Lab Form

Today's Date \_\_\_\_\_ Name of Laboratory (room #) \_\_\_\_\_

Names of Laboratory Technicians \_\_\_\_\_

Site Name: \_\_\_\_\_

Date of excavation: \_\_\_\_\_ Grid coordinates: x = \_\_\_\_\_ y = \_\_\_\_\_ z = \_\_\_\_\_.

Drawing of item	Description of item	Measurements in centimeters	Quantity in this Field Bag
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*Warning: Eating the raw data is frowned upon by professional archaeologists until after the analysis is complete.*

# References and Resources

## Organization Websites

- Archaeology on the Net: [www.serve.com/archaeology](http://www.serve.com/archaeology)  
Internet Guide for Archaeology: [archaeology.about.com](http://archaeology.about.com)  
National Geographic Society: [www.nationalgeographic.com/education](http://www.nationalgeographic.com/education)  
National Conference of State Historic Preservation Officers: [www.sso.org/ncshpo](http://www.sso.org/ncshpo)  
Society for American Archaeology: [www.saa.org/education/edumat.html](http://www.saa.org/education/edumat.html)

## Recommended Reading for Teachers (General)

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*Archaeology and Public Education* is a free Internet-based newsletter, posted four times a year, that features information on becoming involved in archaeology,

including archaeology programs, workshops and conferences, archaeology week celebrations, and field work opportunities. It also provides news on archaeology, Internet links, and book releases. It is published by the Society for American Archaeology, [www.saa.org/PubEdu/a&pe/news.html](http://www.saa.org/PubEdu/a&pe/news.html). Other print resources are available from Maureen Malloy, SAA Education and Outreach, 900 Second Street, NE #12, Washington, DC 20002-3557. Phone: 202-789-8200. E-mail: [public\\_edu@saa.org](mailto:public_edu@saa.org).

The SAA also provides a Roster of Network Coordinators, a list of individuals (representing nearly every state and province in North America) who can be contacted for details about local archaeology education resources and activities. Another organization that can help you contact archaeologists working in your area is the National Conference of State Historic Preservation Officers, online at [www.sso.org/ncshpo](http://www.sso.org/ncshpo).



## Ethics in Archaeology: A Debate

### The Heat is On: Archville in Rage over Construction Site

By Antonio J. Castro (Inspired by a lesson by Pam Wheat. “Archville” is a fictional town)

Archville was a quiet Texas town until business leaders decided to build a new road that would lead to Archville Lake. This road, business leaders said, would allow people to enjoy swimming and other water activities at the lake. However, construction workers building the new road recently uncovered a Native American burial ground.

Native Americans claim that the road is an insult to their cultural past. Archaeologists wish to excavate the site to learn more about the people who lived there.

The construction workers would like to get back to work. Now Archville is in a rage as people clash over how to handle the problem with the new roadway. Mayor Arch Anderson will have a town meeting today to listen to all sides of the issue.

## Student Time Capsules

Create a time capsule that could tell archaeologists of the future what your life is like today in school. You will be scored on how well you capture the different activities and people that are part of your culture. The minimum number of items needed in a time capsule for a passing grade on this project is five, and the maximum items permitted is eight. Insight and creativity will be rewarded.

You can be a careful observer of behavior and collector of “artifacts.” Can you find artifacts that indicate reading, writing, using computers, eating lunch, physical education, transportation, sanitation, administration,

first aid, safety, friendship, popular culture, or social control? Are there artifacts that represent students, teachers, custodians, administrators, vendors, and parents?

One point will be awarded for each ordinary item included in your time capsule, but up to three points for an item if it is not commonly found among the other students’ work. For example, one point for a pencil, but maybe two points for a Pokemon card. Your teacher will subtract one point for every missing item (if the total is less than five) or for every extra item (more than eight).

Another activity involved a mock debate set up between groups in a community that were arguing over what would be done with a historical site (Handout Part 5). Students worked in groups (playing the roles of business leaders, Native Americans, archaeologists, and construction workers) that initially took conflicting positions on the future of the site. The teacher served as a moderator (the mayor), listening carefully to the different perspectives. Students could also write a persuasive essay to defend the viewpoint of their group.

One language arts teacher had students read articles from an archaeology magazine distributed by a professional archaeologist who visited the school as a speaker. Students got into groups, read, and then reported on an article of their choice to the class. A different teacher designed a group project in which students created a time capsule to describe the culture of their school for archaeologists who might discover it in the future. Students responded very positively to the time capsule project, which was graded with a rubric (Handout Part 6).

Other ethical issues that could be the topic of an individual research project, class discussion, or debate include the ownership of ancient shipwrecks, the repatriation of Native American remains, and the delay of construction projects when artifacts are unexpectedly unearthed. For example, students read a hypothetical case history relating to the discovery of a Spanish galleon, took a position on the issue of ownership, and defended it in writing.<sup>15</sup> Then they read about the French ship *La Belle*, part of La Salle’s expedition, which was discovered off the Texas coast in 1996.<sup>16</sup> (When the remains of a French sailor were found on the *La Belle*, should they have been studied by Texas archaeologists or sent back to France for study there? Are there other possible outcomes?)

Most archaeologists consider pre-Columbian, Native American remains and artifacts to be scientific evidence, but some Native Americans view them as sacred objects. In 1990, the Native American Graves Protection and Repatriation Act established a process for claims, to be administered by the National Park Service.<sup>17</sup>

When one of the oldest skeletons in our country was discovered near Kennewick, Washington, in 1996, eight scientists filed suit to secure the right to study it. A federal judge has recently ruled that they be allowed to do so.<sup>18</sup> One Native American said, “They’re holding those peoples’ spirits captive.”<sup>19</sup> Such ethical dilemmas in archaeology provoke interesting questions that students can discuss and debate.

### Math

Both math lessons came from the book of archaeology lesson plans entitled *Intrigue of the Past*.<sup>20</sup> One involved making a grid of an archaeological site, and the other described how to compute the circumference of a pot from broken pieces. After plotting where artifacts were found at an archaeological site using a grid, students discussed possible reasons for the location of certain types of artifacts (Why might charcoal be found near broken pieces of pottery?) Besides using the worksheets found in the book of lesson plans, students also measured pieces of broken flower pots and calculated the circumference of the



whole. The math teacher designed a worksheet with the required formula to assist students in their calculations.

To include a more active lesson for students, the teacher might have them measure and grid off a mock archaeological site. Although no actual digging should be done on public land (even in a school yard) without consulting with a professional archaeologist, students could do the necessary calculations to mark off one-meter squares in the ground with sticks and strings, and chart what they see on the surface.

## Discussion

The discipline of archaeology is “one which most people, young and old, find intrinsically interesting.”<sup>21</sup> The teachers who worked on our archaeology unit of study found that they could create innovative and motivating lessons for seventh grade students. Perhaps as a result, students responded favorably to the archaeology material, as well as indicating on attitude surveys that they would like to learn more about history. This finding appears to contradict previous studies of subject preferences of secondary students, in

which social studies topics ranked low.<sup>22</sup>

Conservation and preservation of archaeological resources should be a priority for teachers and students, as it is with professional archaeologists. Stewardship of nonrenewable archaeological resources is paramount. In the words of archaeologist Brian Fagan, “My grandchildren and great grandchildren may never listen to the voices of the past.”<sup>23</sup> Fagan goes on to describe the importance of the study of archaeology in learning about heritage, cultural diversity, and respect. An interdisciplinary archaeology unit of study provides an excellent opportunity for middle school teachers and students alike to learn about history, to practice new skills, and to grow in respect and responsibility. 📖

## Notes

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# Sharing Space:

## URBAN WILDLIFE AND HUMAN SOCIETY

JANE MANASTER

As roads, housing tracts, and shopping malls devour more of the countryside and the wilderness areas each year, adults may worry that their children will miss opportunities to consort with nature. At a first glance, wild animals seem absent from the confusion of high-rise buildings, traffic jams, supermarkets, and the tidy suburban neighborhoods. Yet if the truth be told, the cities and suburbs are teeming with wildlife, which presents a learning opportunity for the social studies teacher.



Erica Heary/Fund for Animals

Skunks are happy to co-exist with people — and are largely misunderstood creatures.

### Close Encounters

Whether urban wildlife is a benefit or a problem for humans depends on the animal in question—and your point of view. Traffic engineers, construction workers, agricultural extension agents, health officers, street cleaners, exterminators, gardeners, tree surgeons, and linemen fixing the cables strung between utility poles—there is a long list of people who have daily encounters with the reality of urban wildlife. For example:

- A single fawn is as cute as the fictional Bambi, but due to our land-use practices, and without natural predators, thousands of deer “get into trouble” in America’s suburbs each week. The carcasses of white-tailed deer on the roadside reveal the danger of collisions with cars. Unauthorized urban “hunters” who take pot shots at deer from car windows are a new threat to safety. In some communities, police officers occasionally hold a “Bucky” stake-out, placing a partially concealed, plastic decoy (replete with a nice rack of antlers) near a road to lure the unlawful drive-by shooter.
- In Banff, Canada, elk are having close encounters with human residents. As the horse-size animals wander along the streets to avoid wolves, they munch on flowers and bushes and may act aggressively towards spectators if they perceive a threat to their calves or if people approach too closely.
- In New York’s Central Park, a coyote was recently seen. In southern California, coyotes are loping into city parks and have attacked pets in broad daylight.
- Beavers gnawed the cherry trees along the Tidal Basin beside the Jefferson Memorial in Washington DC.

- In the arid Southwest, javelinas (also known as collared peccaries) roam about the suburbs. Homeowners are warned to trim bushes and keep pet food inside to avoid javelinas taking up “permanent residence” in their yards.

When humans encroach in a major way on the landscape, it is not always bad news for wildlife. Some will stay and multiply, taking advantage if food is readily accessible and predators are absent. Animals other than mice and rats can benefit from the change: peregrine falcons have been observed producing bigger and harder clutches of chicks when they build homes on the top of a city building rather than in the wild where other predators, like weasels, can reach their nests. Another odd example: The world’s largest colony of black-capped vireos lives on a military base in Fort Hood, Texas. Signs advise people to keep quiet and stay away from nests so as not to disturb them, although the birds seem unfazed by howitzers and tanks that are often blasting away.

### Interdisciplinary Learning

The dilemma of urban wildlife is richly provocative, an ideal arena for students to learn how a social issue, the management of wildlife, can be seen from several perspectives. How can this rich subject be integrated into the social studies classroom? Students can explore the historic, geographic, sociological, economic, and public policy dimensions of human attempts to manage urban wildlife, addressing the local, state, national, or international stage. Urban wildlife is also an ideal topic for integrating the disciplines in a middle school setting. The fictional literature of urban wildlife tucks snugly into language arts; zoonotic or animal-borne diseases become an

issue for health class; the growth and decline of wildlife populations can be graphed in math; and the ties to the life sciences are easy to find.

## Background Work

There are many resources available for teachers who might consider bringing the study of urban wildlife into their lessons or curriculum. Students can follow the local news section of the newspaper for a month and note articles about the challenges of wildlife management. In small groups or as a class, students could choose one animal or problem to study in depth, using some of the resources listed below. They could seek information from a local government agency that is responsible for managing wildlife, as well as help from a school or public librarian. Then, the class could hold a panel discussion on a specific example of urban wildlife in which various students represent particular interests in the community, such as a land developer, an animal

rights activist, a public health officer, a county wildlife agent, and the director of an animal shelter. Launch the discussion by presenting a problem that has occurred recently because this animal must share its living space with humans, and vice versa (see page M16). How does each person describe the problem? What sort of action do they propose?

## Guest Speakers

After the students have learned some of the basics of the issues in your region, invite a guest speaker to address the class. There are urban wildlife biologists with some state fish and game agencies. They usually work out of the endangered/threatened species program. There are also wildlife extension specialists who are usually associated with the agriculture or wildlife departments of state universities (such as land grant colleges). Some large, urban counties have their own urban wildlife specialist. A member of the local chapter

of the Audubon Society or Sierra Club or state wildlife rehabilitation association might present yet another perspective on citizen involvement in urban wildlife issues.

Toward the end of a presentation, someone might ask as guest speaker what college degrees would provide useful training for their field. If a professional speaker is not available, students could research career possibilities with degrees that combine biology and the social studies.

Throughout the country, dedicated individuals and organizations are working to enable students to cultivate backyard nature habitats, enjoy innovative park programs, and enliven classrooms with interesting lessons, activities, and opportunities for service learning. Let a little wildness into your classroom. 🐾

Jane Manaster is a writer and editor living in Austin, Texas.

Cover photograph: Erica Yeary/Fund for Animals

# Resources

Government agencies such as local parks and recreation departments, county agricultural extension offices, state wildlife departments, and federal agencies often have resources at the ready for educators on the topic of regional wildlife management. Be sure to investigate local government agencies and local chapters of citizen groups that may offer guest speakers for schools. A few national and state organizations and resources are listed here.

## Websites and Organizations

The **National Wildlife Federation** has activities that relate to urban wildlife and urban habitats, including a schoolyard habitat program. Some resources are free. The activities cross grade levels and disciplines and are well organized and varied. Check out the website, [www.nwff.org/education/](http://www.nwff.org/education/), or write National Wildlife Federation, 8925 Leesburg Pike, Vienna, VA 22184. Tel: 703-790-4000. The Federation also offers a number of teacher workshops with topics like Use Your Schoolgrounds as a Teaching Tool, and Crossing the Curriculum with the Environment. Send an e-mail message to [wildlife@nwff.org](mailto:wildlife@nwff.org) for more information.

The **National Project for Excellence in Environmental Education** provides guidelines for quality lessons, programs, and curricula. There are also critical reviews of educational resources at the site. Visit [www.naaee.org/npeee/](http://www.naaee.org/npeee/) or call 706-764-2926.

The **National Audubon Society** has some ready-to-go bird activities, mostly for younger children, but easily adapted for middle school students. [www.audubon.org/educate](http://www.audubon.org/educate).

The **U.S. Fish and Wildlife Service** has interesting links at its website, [endangered.fws.gov/](http://endangered.fws.gov/), such as Invasive Spe-

cies, Kid's Corner, Contacts in Your Area, and En Español.

The **Nevada Fish and Wildlife Office** has an excellent website at [nevadafwo.fws.gov/UrbanWildlife/urban.htm](http://nevadafwo.fws.gov/UrbanWildlife/urban.htm) that has suggestions on dealing with the bears, mountain lions, and burrowing owls in your neighborhood.

The **Illinois Department of Natural Resources** has produced Living with Wildlife, a comprehensive series of lessons for grades 6 through 8. Download them from [dnr.state.il.us/lands/education/wildlife/intro.htm](http://dnr.state.il.us/lands/education/wildlife/intro.htm).

**Wildlife Services of the U.S. Department of Agriculture** has free tips on reducing wildlife damage to property. Find out how to keep raccoons out of your garbage; and how to keep mountain lions from eating your cat, at [www.aphis.usda.gov/oa/pubs/lww/html](http://www.aphis.usda.gov/oa/pubs/lww/html).

The **Centers for Disease Control** has plentiful information on zoonotic diseases such as rabies and hanta-virus. Encourage older students to explore the site. [www.cdc.gov](http://www.cdc.gov).

The **Texas Parks and Wildlife Department** has produced a series of Internet field trips, some of which deal with urban wildlife. The Department has designed a delightful urban wildlife poster that

comes with 18 information cards and costs \$7.50 including. [www.tpwd.state.tx.us](http://www.tpwd.state.tx.us).

The **National Association for Humane and Environmental Education** has the mission of getting animal issues into primary and secondary school curriculums. It is online at [www.nahee.org](http://www.nahee.org), or call 860-434-8666.

Many zoos have resources available about wildlife that live in the surrounding landscape. For example, the **Friends of the National Zoo** have a "Backyard Biology" activity guide (\$5.00) that covers positive and negative aspects of human-wildlife interactions. Call 202-673-4955 or visit [www.fonz.org](http://www.fonz.org).

## Videos

*A Matter of Perspective.* Texas Agricultural Cooperative Service, Box 1209, Bryan, TX 77806. Tel: 979-845-6571. (24 minutes) \$20.00. The coyote is described as a nuisance and as a symbol of the wild from rural and urban perspectives.

*Who Owns the Land? When the Environment Collides with the Constitution.* American Land Foundation, PO Box 1033, Taylor, TX 76774, Tel: 800-452-6389. (23 minutes) \$19.00. E-mail: [amlandfound@austin.rr.com](mailto:amlandfound@austin.rr.com). Though not about urban wildlife per se, this video presents a sober but provocative look at the complexities

of ownership of land when it is home to endangered or protected wildlife.

## Readings for Students

Jacobs, Shannon. *Healers of the Wild.* New York: Coyote Moon Press, 1998.

*Urban Wildlife Problems and Solutions* (8 fact sheets, 8 species). The Fund for Animals. PO Box 3665, Amity Station, New Haven, CT 06525. Tel: 203-389-4411. Website: [www.fund.org](http://www.fund.org).

## Readings for Teachers

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Hadidian, J. et al. *Wild Neighbors: The Humane Approach to Living with Wildlife.* Washington, DC: Humane Society of the United States, 1997.

Landau, Diana and Shelly Stump. *Living with Wildlife: How to Enjoy, Cope with, and Protect North America's Wild Creatures Around Your Home and Yours.* New York: Sierra Club Books, 1994.

# Conserving the Caracara: Working with Birds and People

JOAN L. MORRISON

There are two sides to animal species conservation. One side is the biology: learning everything we can about an animal such as what it eats, how it cares for its young, what other plants and animals it depends on to live, and its favorite habitat, or where it likes to make its home. The other side of animal conservation is social studies: learning how human activities affect the animal and its habitat and discovering what we can do to improve a species' chance for survival if it is threatened or endangered.

## The Crested Caracara

The caracara is a raptor, or bird of prey that is almost as large as a bald eagle. Generally black overall with a white head and neck, the caracara is a striking bird, sporting a regal cap of black feathers, a bright yellow-orange face, and long yellow legs. In the United States, crested caracaras reside in southeastern Texas, southwestern Arizona, and south-central Florida. During the last ice age, these populations were probably all connected because the sea level was lower than it is today, and much of the Gulf of Mexico was dry land. When the glaciers retreated and the sea level rose again, Florida's population of caracaras became isolated from the others.

My research involves ecological studies of these unique raptors and their life history, nesting activity, habitat associations, and population biology in Florida.<sup>1</sup> Our small team of scientists lure caracaras into a net using a captive caracara. "Clyde," as we call him, was injured by a car, and so cannot be returned to the wild. When we place him on the ground, caracaras nearby perceive Clyde as a territorial intruder, so they fly down to check him out. Once a new bird is captured, we weigh it, measure its length and wingspan, take blood samples, and place a tiny radio transmitter on its back like a backpack. Then we let it go.

Once a month during field studies, we conduct an aerial survey to locate our twenty-five or so radio-tagged caracaras. We fly in a



one-propeller plane, pinpointing each caracara's signal and marking its location on a map. Then we study individual caracaras more closely on the ground.

Caracaras are quite social birds. Large groups (up to fifty) of mixed-age (one- to three-year-old) caracaras gather in pastures along the floodplain of the Kissimmee River, which runs through central Florida. We often saw smaller

groups of five to ten caracaras chasing each other, fighting, and vocalizing. The caracaras may gather to visit areas with particularly good food resources, or they may be looking for suitable mates.

## Birth and Death

Occasionally, when we track down a bird, we find that it has died. Also, some people living in the area are kind enough to call us if they find a dead caracara with a radio transmitter. Thus, we have learned that collisions with cars seem to be the major cause of death. Caracaras eat carrion in the form of animals that have been killed by cars, and some drivers do not seem to care about slowing down to avoid hitting a caracara that is feeding in or at the edge of the road. In some cases the caracaras were shot, probably by people who don't understand that birds of prey are important to a healthy environment and so should be protected.

A key aspect to securing the survival of the caracara is learning about their nesting behavior. Interestingly, caracaras in Florida nest in the winter, from November through April! While the northern states are blanketed in snow, the weather in Florida is warm enough for caracaras and many other birds to nest successfully. Typically, a pair of caracaras will build a large nest of sticks near the top of a palm tree, and the female then produces one to three cinnamon brown eggs. Both parents incubate the eggs for about a month. When the nestlings hatch, they are covered with a yellowish, fuzzy down and have little brown caps. This fuzzy cap gives them the appearance of having "bad hair"! The nestlings grow quickly, sprouting feathers at three weeks of age. When they are two months old, the young caracaras are fully feathered and ready to leave the nest. Before their first flight, however, they spend several days jumping up and down on the side of the nest, exercising their wings. After they leave the nest, the young caracaras stay with their parents in their home range for another two



or three months. From their parents, the young birds learn how to find food, avoid danger, and find other caracaras. Caracaras usually nest only once a year, but if a rain or windstorm blows the nest out of the tree, a mated pair will sometimes start over, producing a second clutch in the same year.

#### **Habitat and Land Use**

Over five years, we have captured, banded, and tracked fifty-five adult crested caracaras and over 100 young caracaras. We have found that caracaras prefer large areas of open, short grassland habitats with scattered palm trees for nesting. Caracaras with the smallest home ranges (with a radius of about 1.5 miles) live on large

cattle ranches, where there is a good mixture of habitats including improved pasture, groups of oak and palm trees, and lots of wetlands of varying sizes. Caracaras often feed in wetlands. They like to wade in shallow water, looking for frogs, fish, and invertebrates to eat. Caracaras that nest in less desirable locations (for example, in a tree in a small field near the edge of a town) have to travel farther to find food or a mate, and thus have larger home ranges (radius up to 3 miles).

Currently in Florida, most crested caracaras live on privately owned cattle ranches, where they hunt for food and build their nests. Apparently, land management activities carried out by the ranchers keep the habitat in a condition suitable for caracaras. We have found nests as close together as one-half mile. While they maintain separate nests, neighboring caracaras often feed together in the same areas. Crested caracaras are diet generalists and, in addition to small wetland animals, they often feed on the insects associated with cattle dung.

Unfortunately, the crested caracara is threatened as its habitat falls victim to Florida's rapid urban and agricultural development. Habitat destruction happens when cattle pastures are converted into shopping malls, trailer parks,



## Questions for Class Discussion

Read aloud or hand out this article. Then ask the class to discuss some or all of these questions.

1. Why would a biologist studying a wild animal also be interested in aspects of human society like technology, economics, and population growth?
2. What human activities reduce the habitat of the caracara in Florida?
3. Why do cattle ranches in Florida make a better habitat for caracara than do orange groves?
4. Why might Florida cattle ranchers be interested in designating part of their land as a conservation easement?
5. What is meant by the term “sustaining?” What does a sustaining habitat for the caracara in Florida look like?
6. What appears to be the main cause of adult caracara mortality in Florida today, and what might be done about this problem?

roads, and housing developments. There are 16 million people living in Florida, and almost 900 people a day move into the state. The population will likely double to 32 million in 30 years, so habitat destruction will likely continue.<sup>2</sup>

Citrus (orange and grapefruit) plantations now cover more than 800,000 acres of land in Florida; sugar cane covers more than 460,000 acres.<sup>3</sup> Every year, more and more prime caracara habitat is converted to plantations of these agricultural crops. Although the caracaras are able to feed on insects in these agricultural fields during parts of the year, the fields do not contain any suitable trees for nesting. Citrus plantations and sugar cane fields cannot be sustaining habitats for caracaras because this use of the land does not support the bird throughout its life cycle. Also, it is unclear what effects agricultural chemicals such as pesticides may have on caracaras, but we hope to learn more about this question.

The caracara is not endangered yet, but it is on a federal watch list for being threatened. This means that without our help protecting its nesting sites and habitat, the caracara could begin to slide towards extinction.

### Allies in Conservation

I am able to conduct my research because of cooperation with public and private land owners (including cattle ranchers and citrus growers) who allow me to step onto their land. As a result of my studies, I have come to believe that cattle ranchers will play a key role in the conservation of the caracara. By leaving nesting trees such as

palms and pines in cattle pastures, ranchers can help save this unique bird of prey.

Many ranchers are signing conservation easements for parts of their properties that are particularly valuable for wildlife. *Conservation easements* are legal agreements between the private landowner and the state or a conservation organization. These agreements allow the ranchers to continue managing the land for cattle grazing, but limit or prohibit their options to develop the land (say, for shopping malls) or change its use (to plant citrus trees). This is good news for Florida’s caracaras because the birds’ long-term persistence may depend on the continued presence of cattle ranches in this part of the state. Ranchers agree to the easements because many of them wish to continue cattle ranching despite pressures from developers to sell off their land. Conservation easements allow ranchers to receive generous tax breaks, which helps the economic activities of their ranching remain stable. Also, many ranchers simply enjoy keeping and working on their land. They appreciate the wildlife and the habitat, and the free-range beef they produce is considered top quality.

When I meet with ranchers, we discuss land management practices that are compatible with the caracara’s survival. Preserving trees for nesting and wetlands for feeding are major goals. The caracaras’ relationship with the cattle ranchers is a good example of a threatened species actually benefiting from certain human activities, in this case cattle ranching. Together, we hope that cattle ranching in Florida can be a sustainable,

economically viable activity that also conserves native habitats and wildlife species.

### Not a Simple Matter

Conservation of wildlife involves many complex relationships between animals, their habitats, and human activities that change those habitats. Wildlife can persist with some, but not all, human changes to the land: the crested caracara in Florida is a good example. It can find food in citrus groves, but it cannot build nests there, and so citrus groves are not a sustainable habitat for this bird. Cattle ranches with mature palm or pine trees do provide for the caracara to feed and reproduce. It is important to continue studying these relationships in order to find a balance between human activity and the needs of wildlife. 📖

### Notes

1. The Florida caracara research project is supported by the University of Florida at Gainesville, the U.S. Fish and Wildlife Service, the South Florida Water Management District, and the MacArthur Agro-ecology Research Center of Archbold Biological Station.
2. Floridians for a Sustainable Population, [www.flsuspop.org](http://www.flsuspop.org).
3. Michael J. Aerts and O. Norman Nesheim, “Florida Crop/Pest Management Profiles” (University of Florida), [edis.ifas.ufl.edu/BODY\\_P1036](http://edis.ifas.ufl.edu/BODY_P1036); Rosa M. Muchovej and Robert A. Gilbert, “Profitable and Sustainable Sugar Cane Production in Florida” (University of Florida), [extension.smp.ifa.ufl.edu/fl129.htm](http://extension.smp.ifa.ufl.edu/fl129.htm).
4. Learn more about caracara on the web at [southeast.fws.gov/vbpdfs/species/birds/acca/pdf](http://southeast.fws.gov/vbpdfs/species/birds/acca/pdf) and at Dr. Morrison’s page at [www.tincoll.edu/~jmorris2/](http://www.tincoll.edu/~jmorris2/).

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# Life on the Wild Side:

## Suggested Issues for Research and Discussion

JANE MANASTER

### Coyotes

Coyotes are moving into suburban areas and are blamed for eating cats. There is a motion at the town council meeting to have all of the coyotes killed by a trapper. At a town meeting, these issues are debated:

- What is our responsibility to try to co-exist with natural predators?
- To what extent should cats be allowed to roam free, given that they are not indigenous and prey heavily on songbirds and small mammals.
- What exactly are the conflicts with the coyotes? Are some of the problems based only on fear and rumor? How many cat deaths can be clearly attributed to coyotes as opposed to disease, cars, and being lost?
- What kinds of non-lethal solutions might be used to resolve particular problems?
- Compare national accident statistics to humans from coyotes and from domestic dogs. Dogs kill approximately 17 people each year in the United States, and more than 300,000 people are treated for dog bites in emergency rooms annually. Typically, coyotes bite fewer than 7 people annually. Why might our tolerance for wildlife be different than that for domestic animals when it comes to human safety?

### Rabies

News stories might lead one to believe that rabies is a major killer of humans, but human fatalities from the disease number only 2 to 3 a year.

- Why is so much money put into rabies control when other diseases are so much more of a human health threat?
- Why are most human deaths to rabies in the United States a result of bat strain rabies?
- Bats are extremely beneficial animals, and play a major role in crop pollination and insect control (see [www.batcon.org](http://www.batcon.org)). Should bats be allowed to roost in people's attics? If not, what is the best way to evict them?



Erica Yeary/Fund for Animals

The defensive behavior of the opossum may lead people to wrongly believe that it has rabies.

### Alien Species

Today, New Orleans is being eaten by billions of Formosa termites, transported from China in the early 1940s aboard wooden packing cases on ships. Starlings were first brought to this continent by a fan of Shakespeare who wanted to see all of the animals mentioned in his plays represented in America. Now they number in the millions.

- What are some of the destructive alien species in America today, how did they get here, and how are we trying to control them?
- What is our responsibility toward solving a problem created by humans?

### Wildlife Rehabilitation

Wildlife rehabilitators are volunteers who are licensed by their state fish and game agencies to care for orphaned and injured animals.

- Can humans teach wild animals the survival skills they need? How would you teach a wild animal to find natural foods? To avoid predators?
- What might be some of the challenges in raising a baby fox or bat for later release in the wild?

### Co-existence of Humans and Wildlife

As development converts woods to suburb and city, wild animals lose habitat. Yet some species have found ways to adapt to urban environments.

- How are the needs of wildlife met in the city? New York City has one of the highest densities of raccoons in the state. What do they live on? Red foxes are often seen in suburban backyards, active by day. What might compel this opportunistic species to adjust their normally nocturnal behavior?
- If someone does not want a rabbit nest in their yard, should a rehabilitator take the baby rabbits, or should the homeowner be asked to leave the nest alone until the young rabbits leave?

Source: *Urban Wildlife Problems and Solutions* (New Haven, CT: Fund for Animals, 2000).



Jane Manaster

Students have a close encounter with urban wildlife (an opossum) supervised by the Texas Parks and Wildlife Department.