

Who's in Control: Water or Us?

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"If there is magic on this planet, it is contained in water." (Eiseley 285)

Academic Setting

This is a nine-week unit designed for eleventh grade American Literature. The unit can easily be fit to any curriculum that includes a study of water issues in the Southwest. In the English class, we will explore the issue of water through literature. We will study the theme of water in nonfiction and fiction American writing. This unit can be adapted to a science curriculum by concentrating more on the environmental aspects of the issue or a social studies curriculum by concentrating on water as shaping the history of the Southwest.

The academic setting for this unit will be at West Mesa High School in Albuquerque, New Mexico. The school is situated on the west side of the city commonly referred to as the West Mesa. This is a high, mainly desert section of town west of the Rio Grande. The students at this school come from low socioeconomic to middle-class areas. The school is predominantly Hispanic, 74%. The rest of the school population is 14% Anglo, 6% Native American and other.

The students of this school have fairly low-test scores and are at risk for dropping out. Students at this age are also somewhat egocentric and need to feel connected to what they study in order to be interested. This unit seeks to do that by giving them an issue that is vital to their existence in this area. The issues and questions that this unit raises have a direct affect on their lives. The need for sources of water in the Southwest shaped history both personal and political. The students, in order to understand what it means to live here, should understand how water shaped Southwest civilization and how it might shape the future of the Southwest. They have only to look in their yards, their neighbors' yards and at the monthly water bills to make a connection to this unit. After establishing this connection, students will gain an interest in and question and think critically about water issues in the Southwest and Albuquerque.

The students can learn how to responsibly affect change through knowledge and activism on an individual, local, and global level. The theme can then be compared to views that other regions have about water. As Marc Reisner says,

In the West, lack of water is the central fact of existence, and a whole culture and set of values have grown up around it. In the East, to "waste" water is to consume it needlessly or excessively. In the West, to waste water is not to consume it — to let it flow unimpeded and undiverted down rivers. Use of water is, by definition, "beneficial" use... To easterners, "conservation": of water usually means protecting

rivers from development in the West, it means building dams.
(Reisner 436)

Water is a commodity in the West and the demand for it is big business. Students enjoy questions and debates of right and wrong. The idea of this unit is to see the issues around water from many perspectives and debate the perspectives which are not clear-cut, black and white, and are too far reaching to have easy answers in an open setting. How do we find common ground for an issue with so many perspectives? Because every student has a stake in the issue of water, everyone should have an opinion. We must explore the perspectives in order to form knowledgeable opinions. Through different forms of literature, students will gain knowledge of different perspectives of the water issue.

The issue of stewardship is a common theme in environmental literature. We will explore this theme in relation to water. Our sense of place is irrevocably bound with our need for water in the Southwest. Some live with the water nature provides and some seek to recreate the place that was left behind through using water to "green" the Southwest. The issue of stewardship is one we will see throughout the literature. How do we use and at the same time conserve and preserve the scarce water resources? I hope to have the students discuss and consider these themes as we read and respond to the literature. Through finding their sense of place in the Southwest, the students will want to formulate plans for the stewardship of this place. What is unique about this environment? What is unique about a civilization in the desert? How do we balance the two? By exploring the themes of place and stewardship, the students will be able to knowledgeably respond to the questions.

Students can't change or undo what has been done, but this unit seeks to help students understand what we might do in the future to divert us from destroying ourselves and further degrading the environment. Water needs to be seen as the precious life giving and life taking resource it is. It is only by knowing the nature of water that we can understand what must be done. How do we change our ways? What can we do? How do we balance our need for water with the need to preserve our rivers and conserve our aquifer? These are all questions we will discuss in class. The questions raised are ones that we all should ponder in the Southwest. The students will use the information others have written and their own observations to formulate their own opinions and ideas. They will then respond to the questions with action plans and narratives. This exhibits the ability to synthesize information and form opinions based on that information. They will then use critical thinking skills to debate and discuss the information and try to solve the problems that the questions raise.

Water is necessary, but how much of our use is unnecessary? If a student walks down a street any summer day in Albuquerque, how many green lawns will he or she see? Will he or she see someone washing a car in the heat of the day? Will he or she see sprinklers merrily quenching the thirst of pansies, tulips, or roses or perhaps providing entertainment for a bathing suit clad youngster? The student

should think beyond the immediate gratification of the water use to the far-reaching theme of the sacrifice of a very limited supply of water for something that is not only unnecessary, but also unnatural in the desert. What does the water use say about the people who live here? What does it say about the society that creates this need? Through the following ideas and literature, students should become, at the very least, thoughtful members of a desert environment and at the most, activists.

Narrative

We view other planets with a telescope, with satellites, with our eyes, wondering if there is life. How do we decide, then, if life exists or has existed? We look for signs that there is water. Where there is water, we propose there is life. Why look at water at all? Water exists and will always be coming out of faucets, flowing in the rivers, coming down from the clouds. Will it really? How can we be sure of that and make sure of that? This unit is designed to look at water not only as an essential element to sustain life, but also water as destroyer, devastator, and eroder; water as symbol or idea and, finally and most presently worrisome, water as commodity.

This unit will demonstrate how vital the issue of water is through all cultures that strive to exist and thrive in an environment hostile to most species of life. We are connected through this issue across the Southwest. Students will come to an awareness of the issue of water as both an environmental and a societal issue. First, they will look at the way the history of the Southwest was shaped by the need for and use of water. The history is one of using the water that nature provides to the control, redirection, and commoditization of water. Water will then be viewed in the context of the natural environment — the fragile balance the need for water has created for indigenous plant and animal life. Water is also a destructive force. There are massive flash floods that sweep away life. Water erodes even the hardest rock over time. It both creates and destroys in the same downpour. Students will finally look at water in their own backyard (figuratively and literally). Politically, it is a powerhouse of an issue in New Mexico. Next, they will look at water in the context of sustaining a false environment, i.e. lawns and non-indigenous plants. The greening of the Southwest is a part of both the history of civilizing the desert and a currently contested issue. How do we become controlled by the very resource we seek to control?

History of Water Use

For this particular unit, water will be viewed in the context of the Southwest. The history of the Southwest can be viewed as a history of water. Easy access to water was the primary factor in sustaining life both human and non-human. According to Calvin Ross, "The present era of life in the Southwest may be summed up in succinct words: Sky determines the underground water supply, and deep wells have made it available" (285). For many centuries, it was almost impossible to sustain human and domestic animal life in the desert mesa lands of New Mexico.

Those who wished to civilize the land had to have access to water. Water was found only along the river valleys and even then, the land adjacent to these river valleys was still quite arid. Those who lived in this arid place relied heavily on nature to survive. The rainfalls were few and far between. The human inhabitants of this place watched for patterns in nature to predict rain and figured out ways to survive years with scant rain. In *We Fed Them Cactus*, de Baca describes the methods used to predict rain. Most of them were based on hope.

We faithfully watched the moon for rain...and if no rain fell by the end of April, those versed in astrology would tell us that could still expect rain in May if the April moon was delayed...Whether these signs worked or not, we believed in them thoroughly. To us, looking for rain, they meant hope, faith, and a trust in the great power that takes care of humanity...no one has yet discovered a method to bring rain when wanted or needed. (De Baca 13).

To depend on the rainfall was foolhardy to say the least. Those who lived there had to accommodate. Those who wanted to civilize and settle the desert had to find more water than rain and springs provided.

What civilized the desert was the ability to access water through wells, irrigation and, finally, pipelines. Springs were few and far between providing at times only a few drops of water or a trickle. The remains of those who attempted to forge trails through the southwestern lands can ascertain this. "But wells were inextricably associated with trails, and the two must be treated together. Without wells and springs at intervals, trails were impossible; and without trails, population would have continued to be anchored" (Ross 285). For civilization to grow and move, trails had to be traveled. In order to forge trails, water had to be found to sustain the travelers. This was the problem in the desert southwest. Where did you find water where there is no water? Windmills draw up water from deep wells. As Reisner says,

Everyone had always known there was water below. If you sank a well and erected a windmill-driven pump, you got enough for a family and a few head of stock. But windmills could bring up only a few gallons a minute and offered no clue as to how much water was actually down there. (436).

Irrigation was another way to bring water to the settlers. John Wesley Powell reported to congress in 1871 "that two-fifths of the United States has a climate that generally cannot support farming without irrigation. On top of that, irrigation could reclaim only a fraction of that" (Reisner 45). Congress at the time wanted the Southwest settled and provided for the damming and irrigation of rivers to contribute to this. This created a whole set of water rights problems, which exist to

this day.

With the advent of the wells and then irrigation, the Southwest had a valuable commodity in water. Water and the control of water became the foundation of civilization in the Southwest. According to Marc Reisner,

Thanks to irrigation, thanks to the Bureau (the U.S. Bureau of Reclamation)...states such as California, Arizona, and Idaho became populous and wealthy; millions settled in regions where nature, left alone, would have countenanced thousands at best; great valleys and hemispherical basins metamorphosed from desert blond to semitropic green. (2)

This greening of the Southwest was what settlers envisioned although some who foolishly believed in manifest destiny thought that rain would follow civilization. John Wesley Powell knew that the weather would not change but set forth the idea that man could change the flow of rivers to irrigate fields. Powell knew that the water in the rivers would transform only a small segment of the Southwest, but, according to Reisner,

Powell failed to appreciate the vast amount of water sitting in underground aquifers...But even this water...will most likely be gone within a hundred years-a resource squandered as quickly as oil (5).

Water and the Southwest Environment

Water, water, water...There is no shortage of water in the desert But exactly the right amount, a perfect ratio of water to rock, of water To sand...There is no lack of water here, unless you try to establish A city where no city should be (Abbey 159).

This second section is a move away from the idea of water in civilization to water and the environment. This is difficult because civilization in the Southwest is based on the ability to find and control water. In the desert, there is enough water to sustain the balance of life indigenous to the desert. Edward Abbey and Craig Childs studied desert water. Both concluded that there are numerous springs, water holes, and natural cisterns that can be found if one knew where to look. Craig Childs in *The Secret Knowledge of Water* mapped desert water holes. For 37 days, he looked for water and mapped the water holes and conclude,

By the end of my time here, I would have found 52 individual water holes...In all I had found about fifty-five hundred gallons of water. This mountain range, parched as table salt, has water. Contrary to every impression you gather from looking across this country,

there is a way to survive (Childs 36).

Childs looks neither at business nor civilization, but at the idea of sustaining existence of the individual human or non-human.

To the developer or the farmer, the southwest landscape is an inhospitable land that must be conquered, controlled and mined. As Abbey says, "They would never understand that an economic system which can only expand or expire must be false to all that is human" (160). The desert environment is a careful balance between maintenance, sustenance, and destruction. All of these are necessary. Expansion is not necessary to the environment. Drought and deluge alike help to maintain the balance of the desert ecosystem. Man seems to be the only force that can upset the balance so carefully achieved, but this is only temporary. Long after many returns to the dust, the desert will return to its natural state and balance.

There are many different types of water in the Southwest. There are the rivers, which sustain abundant life, the creeks that flow underground from the aquifers, or, during rainy seasons, flow through the desert landscape until the intensity of the sun makes it impossible to continue to exist above ground. It does rain in the desert and for a moment, the dry surface becomes moist. Streams run, gulches overflow. Moments later, the land resumes its inhabitable nature.

Permanent springs or waterholes are likewise few and far between though not so rare as the streams. They are secret places deep in the canyons, known only to the deer and the coyotes and the dragonflies and a few others. (Abbey 142)

Water in the desert is secreted away like the rarest treasure. There are springs that trickle through rocks and crevices but rarely does the water reach the surface. This water is greedily sucked up by the roots of plant life and hidden by caves and rocks to be consumed by animals with a stronger sense of smell and sound than humans could ever hope to possess. Abbey thinks that man could develop the smell and knowledge of water if forced to survive a long enough time in the desert. Childs, Abbey, and Mary Austin all write about the nature of water in the Southwest and how there is enough water for those who belong and adapt to the desert.

Another source of water in the desert is the rain. The rains do come in a deluge. They refill natural cisterns, creeks, and streams. They fill the empty waterholes and give birth to amphibious creatures and plant life. The life forms are of short duration, lasting only as long as the water hole or puddles long enough to ensure that their species will rise again with the next rain. As Abbey says, "The rest survive, mate, multiply, burrow, estivate, dream, and rise again. The rains will come; the potholes shall be filled. Again. And again. And again" (158). Life in the desert comes and goes with the availability of water. It never ceases to exist, just waits to exist time and time again.

The Destructive Nature of Water

There are two easy ways to die in the desert: Thirst or drowning. This place is stained with such ironies, a tension set between the need to find water and the need to get away from it (Childs xiv).

Lack of water is an obvious destroyer in the Southwest. Water is scarce. The springs, cisterns, and holes are few and far between. Man, beast, and fauna wither and die sapped of their most necessary element. This is by far the greatest environmental danger of the Southwest. Drought is no danger to the desert. Even in years of no rain, life continues far away from the eyes of man. When there is no water, life forms retreat to where there is water or hibernate until water returns. Drought is actually a danger to man and the animals of man. The environment again achieves a balance. If there is not enough water to sustain the life in existence, individuals will perish and those that remain will survive until water returns. Does life cease to exist simply because it is not apparent to the human senses? What functions do drought and deluge serve in the desert ecosystem? The readings should bring students to question of controlling water. To what extent do humans really control the desert environment?

Water becomes more destructive in the eyes of man. In the desert, there are many waterholes and springs. Only a handful of them are potable. There are two perennial springs in Arches National Monument according to Abbey: "Salt Creek and Onion Creek, the first too salty to drink and the second laced with arsenic and sulfur...This poison spring is quite clear. The water is sterile and lifeless. There are no bugs, which in itself is a warning sign" (142). Abbey warns to look for water that is teeming with life forms of bugs, algae, and more. The clear water is deadly water. Salt water is another way to die from water. If a person drinks from a salt creek thinking that water is water, he will soon dehydrate as the body releases more fluid to get rid of the salt intake. These are two ways that the desert can kill with water.

One of the most destructive forces of all is water. The irony is that the very thing we crave, hope for and pray for will destroy. This is rain. As Cabeza de Baca says, "The rain kept coming down in torrents...We pray for rain and when it comes we get full value for our prayers; then we wish it would be portioned over a period of months instead of one night" (39). In the desert, rain becomes dangerous because of the barren dryness. There is very little to slow the force down and the water comes too quickly for the hard, dry land to absorb it. Water creates life, makes life flourish, then sweeps it away in seconds.

This give and take is never subtle. Water in a flood means exactly what it says. It has no hypocrisy. Even as it murders, it leaves life behind...It is the same water that will sit complacently in a hole for months or years...the same that fiercely consumes children and tears the walls

from titanic canyons (Childs 172).

Be it torrential downpours or slow trickles, water is destructive in another way. Water erodes. Land is swept away under the flooding that follows rain leaving crevices. The landscape of the desert continually shifts and changes. Rocks fall, canyon walls are torn down, trees and shrubs are swept away. Whole populations are destroyed in a moment. More quietly, but no less erosive are the trickles of water from the hidden springs that drip by drip cause holes in the hard rock. Childs gives an example of the way a flood destroys and changes the desert:

A small Sonoran creek...took a March flash flood twenty thousand times higher than normal flow, excavating over thirty thousand cubic feet of earth in less than an hour. The springs were destroyed. The entire geometry of the creek, with gentle descents and almost no exposed bedrock, became a ladder of boulders, waterfalls, and smoothed granite floors. Half the pools vanished. Few plants remained...(171).

The slow wearing away of rock is less dramatic, but no less a force to be reckoned with. The difference to us as humans is time. An instant and a thousand years are the same to the desert. A crevice becomes a canyon given enough time and the steady drip of water. We have controlled water for our own use but can never really control the destructive force of water.

Current Issues

Albuquerque has a vast aquifer that is replenished by mother nature at varying rates each year, but insufficient to keep up with use. A single farmer, by irrigating his fields during a particularly dry spell can lower the aquifer as much as five feet in a year. How do we get this back when nature, in a wet year, only replaces as much as one half an inch? Who gets the water? This is the question heatedly debated by our legislature. Ranchers, farmers, big business are all thirsty customers as are homeowners and the city of Albuquerque. Rivers and the aquifer are the two sources for water in New Mexico. Neither has enough to sustain the rate of growth in New Mexico. The common misconception is that there will always be water. The aquifer is not limitless, and the rivers are being drained by irrigation.

Daily the Southwest draws from the vast but limited aquifer while we also dam and redirect rivers for the use of the growing civilization. There is a delicate balancing act attempted by our government. How does a state encourage growth and attract big business — both of which are necessary for economic viability — while at the same time protecting the balance of nature, endangered species and the supply of water? As the *Albuquerque Journal* says, "Water is scarce in the New Mexico desert. Today, expanding cities and mounting realization that the Rio Grande ecosystem may be in serious trouble are straining water supplies even more"

(Taugher and Soussan A1). Every group points fingers at the other while all are part of the problem and as yet no one seems to be part of the solution. The irrigation system on which the greening of the Southwest is founded is an archaic system that the Southwest continues to use without updating. Most users of irrigation ditches pay a flat fee to flood their fields or even backyards with water. Then according to the *Albuquerque Journal*,

Huge slugs of water must be drawn from the river and shot down unlined ditches to ensure fields at the end of the line are irrigated. At the farms, the water is spilled out across the land where it can evaporate as if it were in a wide pan out in the sun (Taugher and Soussan).

We really do not know how much water is being used nor can we even regulate it. Irrigation depends upon the use and recycling of river water. As the water flows through the ditches, silt, arsenic, and salts are removed from the water. The water becomes used in fields and trickles down to replenish the aquifer and rivers. The aquifer becomes filled with pure water. The problem now is that far more water gets used and drained from the river than is put back. To sustain small communities, irrigation is an excellent, reciprocal relationship. The reciprocity for large cities is dangerously non-existent.

It is easy to blame our water woes on one group, but the students must see all sides of the issue. Big business needs water to survive and thrive. Businesses are not going to move here without unlimited access to water. New Mexico economy needs big business to develop and sustain us. $A+B=C$. We will let them have water. "New industries could be discouraged from coming to New Mexico if there is not enough water to supply them. In fact, those who are already here either in cities or on farms could lose water to the minnow" (Taugher). This fight illustrates the balance we need to find. How do we keep everyone happy, economically viable, and hydrated while protecting the silvery minnow and maintaining the integrity of the Rio Grande river and valley? The immediate reaction is to stop big business from coming to New Mexico. Limit the water use of the businesses already here. That, unfortunately is not a politically viable option. Money brought to the state means votes for the public officials. Money talks, and the silvery minnow will have to learn to walk.

In 1993, the Rio Grande was the most endangered river in the United States. Today, it is seventh on the list. This is because other rivers have become worse, not because Rio Grande is better off. Saving the river has become a necessity, not a wish. It is in danger, and we keep sucking it dry. Only half of the indigenous species of fish still exist, and many of the animals that lived off the river have gone. "Biologists say that if nothing is done, the Rio Grande will eventually become nothing more than a sand wash in the desert" (Taugher). The water rights to the river have far exceeded the supply of water. The aquifer can not be replenished except by the gradual trickling down of nature's ground water. We can

do nothing for it except conserve and wait. We can save the river.

By far the most wasteful, least conscionable water parasite is the individual. The farmers, the ranchers, the businesses, the silvery minnow use much less as an entire group than the collective use of the residents of New Mexico. We have to have green lawns, clean cars, high use toilets, swimming pools, at least one or more showers a day, etc., etc., etc. We, the individuals, are the best at pointing fingers and the worst at conserving. Not one of us wants saving the river, preserving the aquifer, or limiting water use to infringe on our own lives. How do we combat such a gross and personal abuse? This is the main problem in water conservation and the least likely to be drastically changed. "The average Albuquerque resident uses 142 gallons of water a day" (Soussan). Multiply this by the population of Albuquerque then by 156. This is the yearly personal water use of Albuquerque. Can an individual make a difference? The students in this unit will attempt to address the water use of individuals and try to make a difference.

To come full circle, from the historical issue of water through the environmental views of water, we must now come back to man and his control of water. Humankind has created, through deforestation, and building in flood plains, a greater stage for the destructiveness of water. Every downpour sweeps more land away without the roots of the removed trees and shrubs to cling to the earth and keep it intact. Our building in flood plains creates a greater scope for the damage to ourselves. We dig arroyos to compensate, but these become death traps for the foolhardy and the children when the water sweeps down. Through the circle, we see that man creates his own doom when he seeks to civilize the desert. By seeking to control water, he becomes a puppet controlled by his need of water. The students will be left with the question: Do we control water or does water control us?

Implementation

Eleventh grade English concentrates on American literature. The idea of finding a sense of place in the wilderness and the idea of civilizing the wilderness while at the same time keeping wilderness intact as an idea are central themes. This will be a nine-week unit concentrating on the issue of water as a theme in literature. The need to find and use water is necessary to civilization and place. We will introduce the unit with a discussion of "place," "wilderness," "stewardship," and "civilization." The students will come to a conclusion that in the Southwest water is a necessary element to all of these ideas. The literature will cover a variety of genres including a novel, environmental essays, media writings and poetry. They will all express the ideas of Americans about water and the need for stewardship of water in order to preserve both wilderness and our own sense of place. This unit will require students to write and speak in a variety of styles in order to express their own opinions and the opinions of others. All of the readings and assignments will meet the following performance standards set by the State Department of Education.

Standard 1: Students will understand and use Language Arts for communication.

Standard 3: Students will listen and read for a variety of purposes.

Standard 5: Students will speak clearly and write effectively for a variety of audiences and purposes.

Standard 6: Students will speak and write clearly, effectively and correctly.

Standard 7: Students will respond personally, analytically, and critically to written and spoken language, and other media.

This unit will have students learn a wide range of environmental vocabulary to read about, observe, discuss, debate, and write about the issue of water. This vocabulary list is included in the lesson plans. Students will have to read a variety of environmental writings, interview other people, and read about the issues involved in water rights. They will then have to analyze, interpret, and evaluate the information in order to form their own opinions, questions, and action plans. Students will debate each other from different perspectives on the same issue. They will study the way the media views this issue and how personal stake creates bias. They will study the issue of water in the Southwest from a variety of different perspectives from the information that I provide and from what the students research on their own. Students will use higher level thinking skills to synthesize all of the information then use the learned vocabulary to write persuasive essays, narratives, and letters to environmental groups, and the state legislature.

The students will become aware of the many sides of the water issue by tracing the history of the Southwest through its use and control of water. Students will read from *Cadillac Desert* by Marc Reisner, *Rivers of Empire* by Donald Worster, and *We Fed them Cactus* by Fabiola Cabeza de Baca. The readings will give students a solid background and history from which to study water issues today. The historical basis is necessary to understand water as a political and social issue. In many ways, the history can be seen as a series of misunderstandings about the desert environment then the compensation for the ignorance through damming, irrigation, and tapping into the aquifer.

For the entire nine weeks of this unit, students will read *We Fed the Cactus* by Fabiola Cabeza de Baca. There is some freedom in the choice of novels read in Junior English, which is a study of American literature. The district would like to see some multicultural elements in the curriculum. This novel will take students through the settling of the Southwest in the early 19th century to the era of the Dustbowl of the 1930's. The daughter of a Hispanic rancher tells the story. Students will also read "Introduction" and "A Country of Illusion," from *Cadillac Desert*. I believe that non-fiction writing is ignored in favor of fiction and would like to introduce more non-fiction and, in particular, environmental literature.

For the first three weeks of the unit, the students will respond to these readings through essays through which they discuss the mistakes that were made when "civilizing" the Southwest. The students will be graded on the clarity with which they express and address the mistakes made. They will be graded also on the use of the learned vocabulary. I will ask the students to keep an ongoing list of questions that arise in their minds from the reading and we will use this list for our discussions. I will then ask students to write a letter to the Congress that created the Homestead Act. They will be proactive letters to solve the problems before they come into being. The students will present these letters to class as if addressing the Congress. They will be graded on the persuasiveness of the letters.

Through the historical readings in the first three weeks, students should begin to get a framework of the water issue. The misuses that they find now are rooted in the past. Part of the unit will be to form conclusions and find solutions. In order to do so, the students must know the whole story. The more difficult it is to find answers, the more critical thinking students will have to use. In finding solutions at the beginning of the problems, perhaps students will find it helpful to realize solutions today. Reisner says, "Americans were making a Procrustean effort to turn half a continent into something they were used to. It was a doomed effort. Even worse, it was unscientific" (45). What should have been done then? How do we apply that to today?

In the next three weeks students will study literature pertaining to water in the natural environment of the desert. The students will have readings from *Desert Solitaire* and *The Land of Little Rain* as well as selected poems. This section of the unit will move away from the human control and use of water. We will still be reading *We Fed them Cactus* through the unit. The novel covers the historical and environmental aspects of water that, of course, provide the framework for the current water issues. Students will read about water in the desert landscape. Students should come to the conclusion that the desert maintains its own balance of water and life. Students will see that both drought and deluge provide necessary functions to create this balance. Students will examine the quote from *Desert Solitaire*, "Water, water, water... There is no shortage of water in the desert but exactly the right amount." They will, after readings, observations and our field trip to the Rio Grande Nature Center, write an essay testing the validity of this quote. This essay will be graded on the ability of the students to use their observations to study, deconstruct, and evaluate another writer's statements and conclusions.

Students will read water in the desert landscape and write their own poetry based on what they observe. They will have a water poetry book with five poems. One poem will be about hidden water. The second poem will be about rain. The third will be about water as life. The fourth will be about the destructive force of water. The fifth will be about humans and their need for water. The students will illustrate their poems.

In the final three-four weeks of the unit, the students will study the issue of water

use and misuse as a social and political issue by researching newspapers, the Internet and periodicals. They will be answering the question, How much of our water use is unnecessary? Students will keep personal water use journals and an observation journal. They will observe and document uses of water that they see and read about on a daily basis for two weeks and then write a narrative about their own use. They will question their own uses of water in the narrative then come to conclusions about the necessity of how much they use. They will try to find ways to limit their own water use then create a budget of water and see if they can stick to it for one week. After this week, they will revise the narrative to include the new understanding of how much water they need for comfort. Students will use the observation journals to document unnecessary uses of water that they see in their own neighborhoods. They will use these observations to create a questionnaire, which they will use to interview neighbors and businesses. We will compile the information in class and they will create personal essays to demonstrate the problems.

In the final week of the unit, we will break into groups. Using the information researched by the students and the responses to the personal use journals and questionnaires, we will create action plans to draft and send to the various environmental groups that they found in their research. We will draft a class letter to the State Legislature as well. Students will be graded on the quality of their research. The quality will be judged by the usefulness it provides to the student and the clarity of the article. Students will be expected to find at least five sources of information.

The students will come full circle back to the idea of water and the desire to control and use water. After studying the various perspectives of water, the students to conclude their portfolio will end with a concluding piece of writing. The students will be allowed to choose the genre. It should reflect their understanding of the nature of water. They need to address the following questions: Do we control water or does it control us? Is it folly or progress to try? How do we achieve the balance between use and conservation that nature achieved? The students will turn in the portfolio of all of their writings bound together with a title for the entire book. Their final grade will be based on this book. They will contain all of the writings previously graded and the final piece of writing. The book will be graded on the content and quality of the work and how well the conclusions they come to are supported.

Vocabulary

List:

1. Acequia
2. Aquifer
3. Aridity
4. Cisterns
5. Civilization

6. Conservation
7. Desert
8. Drought
9. Dry
Farming
10. Ecosystem
11. Environmental
12. Erosion
13. Flood
plain
14. Greening
15. Homestead
Act
16. Indigenous
17. Irrigation
18. Landscape
19. Manifest
destiny
20. Mesa
21. Nature
22. Place
23. Potable
24. Preservation
25. River
basin
26. Springs
27. Stewardship
28. Wells
29. Wilderness
30. U.S.
Bureau
of
Reclamation

This vocabulary list can be used partly at the introduction of the unit to discuss general environmental concepts and then throughout the reading. I would suggest dividing the list according to the reading in order to make the words more significant to the students.

Introductory Lesson-1st 2 days of the unit

This lesson is designed to introduce students to environmental concepts in literature. Students should be introduced to the general terms used in environmental literature. The terms "place" and "stewardship" are central to man and his relationship to the environment. Through the readings in the teacher bibliography, teachers can get ideas of what these terms mean then introduce them to the students by having them imagine the place where they feel most alive and centered. Discuss this with them then relate it to their place in the environment. Discuss the issue of "stewardship." When man controls the environment, does he become a steward or a conqueror? Ask students to brainstorm examples of both.

After the initial discussion of terminology, ask students what nature is and have them write a paragraph about their ideas. This should take no more than 15 minutes. Have them share this with the class. For homework, students should write down ideas about the role nature plays in American Literature. Why is it an important concept?

Introduction Day 2

Students will be introduced to the theme of water in environmental literature. We will first have a 15-minute sharing of the homework then introduce the theme of water as it pertains to literature of the Southwest. Why would water be a major theme in southwest literature? We should discuss the need for water and the ways to control and manipulate water. Give the students the introduction to *Cadillac Desert*. If there is time, read this in class. If not, have them read it for homework then come back with questions.

Letter to Congress

Week 3

After reading the excerpts from *Cadillac Desert* and *Rivers of Empire*, the students should be acquainted with the historical context of the settlement of the Southwest. They should also have read the first part of *We Fed them Cactus*. The students will have had discussions about the problems of settling the desert environment. The need for water was great but the ability to find sources of water was difficult. Using the context of the Homestead Act and the requirements for settling the land, have the students write letters to the historical Congress setting out a workable plan for settlement and water rights. The students should present these letters to the class (playing congress) who will then be able to ask questions about the proposal. Students will be evaluated on the workability of the plans.

Water Use Journals

Weeks 6,7,8

Students will document their own personal use of water for two weeks. They will

document the time and date of the use and the length of the use. They should provide the context of the use as well.

Example:

June 29, 2000

10:00pm

Left water running for 2 minutes while brushing teeth.

At the end of the two weeks, students will write a narrative based on what they see as a misuse and necessary use of water. They will need to draw conclusions from their use, create a plan to cut down on the misuse, provide a larger context for their conclusions. By this I mean, what does a single person's use probably tell us about the society? After this, they will document their use for one more week then revise the essay based on their ability to regulate their own use. How much water do they need to sustain their level of comfort?

Questionnaire

Week 8 and 9

Students will create a questionnaire as a class based on their research, observations, readings, and discussions. I will make copies of this for the students. They will interview neighbors, family, and businesses about their water use, conservation, and preservation. In-groups, they will compile the information the draft a narrative explaining the context, the problems then brainstorm solutions to the problems of use and conservation. The question they will keep in mind is how to balance the need for water with the need to conserve water. The students will then create an action plan and draft letters to various environmental groups and the State Legislature based on their observations, information and conclusions.

Final Project

Week 9

The final project of this unit will be a debate. The teams will be based on different perspectives of the water issues. These teams can be anywhere from two-four people. The teams as I envision them to be will be Ranchers, Farmers, Businesses, Politicians, Environmentalists, and the Environment (this can be species of life, the river, or the aquifer). Part of environmental literature seems to be the projection of human characteristics into nature (anthropocentrism). The students will be knowledgeable about these perspectives and have the information necessary, but they will have three days to get their information together and create arguments on behalf of the group that they represent. The teams will debate each other over a number of questions and issues that the narrative poses. The students will evaluate each other based on the quality of the arguments, the persuasiveness and the need for water. This is a great way to conclude the unit and personalize the information. Students get to finally take sides in the issue in order to evaluate the numerous perspectives.

All of the literature in this unit is American literature due to the nature of what I'll be teaching. The unit can be adapted to many curriculums both in language arts and in other disciplines. If one were to use this unit in social studies, a teacher could adapt the unit to concentrate on the historical aspects and the anthropological perspectives. Science could concentrate on the environmental aspects and the balance of water in the environment. Math could quantify the use of water and use this unit to calculate percentages of water use and water availability. This would be an interesting interdisciplinary unit with each discipline taking various perspectives.

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