FINAL REPORT

DEVELOPMENT OF THE ENERGY CONSERVATION THEME FOR USE IN NATIONAL PARKS

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June 30, 1976

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ACKNOWLEDGEMENTS

I am grateful to William Dunmire, Chief of Interpretation, National Park Service, and Roy Graybill, Interpretive Specialist, for their enthusiastic and never-failing support and for their many helpful suggestions; to Alan Mebane and John Tyers, Chief and Assistant Chief Park Naturalists, Yellowstone National Park, for allowing me to pick their brains and giving me flexibility of schedule; to Dr. Norman T. London, Chairman, Department of Communication and Theatre, The University of Vermont, who encouraged me in many ways; to Marie Schwenn, Administrative Assistant, Department of Communication and Theatre, The University of Vermont, for keeping my accounts straight; to the University of Vermont for granting me a sabbatical leave; to all those who were willingly interviewed; to family and friends with whom I visited and found renewal on my journey; to two seasonal park interpreters who were helpful in the formulation of this project, Dr. Jean Merriman and Dr. Breyne Moskowitz; and to Lesa Lyon and Clay W. Moore who so carefully and accurately typed this report.

INTRODUCTION

This report is the result of a concern over the consequences of a rapidly dwindling supply of energy in the world today. It has become increasingly obvious over the last several years that the world's energy consumption cannot continue to increase at its present rate. This is particularly true for fossil fuels, which near exhaustion and are irreplaceable. If civilization, as we know it, is to survive, it will be necessary not only to conserve energy, but also to find alternative sources of energy. If these two objectives are to be met, there needs to be a major change in attitude, in lifestyle, particularly in the United States where 6% of the earth's population consumes 35% of the world's energy.

If attitudes and lifestyles are to be changed, innovative methods will have to be discovered because current methods of sensitizing the public to the need for energy conservation have been overused almost to the point of nauseum. Inasmuch as preservation of natural resources and the maintenance of ecological balance are two of the most important values which the National Park Service has been charged to uphold, it seems that the National Park Service should play a vital role in fostering energy conservation.

If the National Park Service is to fill this role, it is important for it to know:

1. What is already being done in park areas to encourage the public to conserve energy, for that which is effective in one park may also be in another.
2. What the attitudes of National Park Service personnel are toward

energy conservation, for unless they are convinced that the subject is important, no meaningful attitude change on the part of the public is likely.

3. Some innovative ways in which a seemingly dull subject can be presented in interesting ways.

4. If a soft-sell or hard-sell approach would be most effective.

5. If it would be better to intergrate energy messages into larger contexts, or to have them stand by themselves

In the spring of 1975, I approached William W. Dunmire, Chief of Interpretation, National Park Service, with a proposal to undertake a project which would provide the National Park Service with information which its personnel could use in the interpretation of energy. (See Appendix A for a copy of this proposal.) The proposal was approved, and this project report is one of the results. The report is based on information gathered during an 8-month tour covering the period August 21, 1975 to April 26, 1976, during which I visited 49 National Park Service areas, 3 Canadian national parks, 4 Forest Service areas, 4 museums, 4 state parks, 1 county park, 2 city parks, and 4 universities, for a total of 71 places altogether. (See Appendix B for a complete list of places visited.)

PROCEDURE

There were 36 NPS units listed in the original proposal, and I visited all of them except Fort Jefferson National Monument. While I was at the Everglades National Park, which administers Fort Jefferson, I discovered that there is no interpretive program at Fort Jefferson *per se*, so I decided to conserve the energy it would take to either fly or take a boat there.

The procedure I followed in visiting the 35 NPS areas is as follows:

1. Several weeks ahead of my scheduled arrival at each park area I would send a letter of introduction written by William W. Dunmire, (See Appendix C for a copy of this letter.) and a copy of the project proposal.

2. Upon arrival at each park area I would spend some time becoming acquainted with the area and its programs.

3. After familiarizing myself with the area I would interview the superintendent whenever he or she was available, and members of the staff as recommended by him or her. This always included the person or persons responsible for interpretation in that area, and frequently maintenance and law enforcement individuals. I also talked with seasonal interpreters and park visitors. These interviews were either tape recorded or notes were taken.

4. I participated in a wide variety of interpretive activities whenever they were available, activities which varied from a conducted hike to the top of Sable Mountain in Mount McKinley National Park to a conducted canoe trip at Everglades National Park. I explored visitor centers, walked self-guiding nature trails, read park brochures, pamphlets, books and roadside exhibits.

5. I took many slides which I shall use to prepare an audio-visual energy conservation presentation.

Section I of this report contains an account of my findings in the 35 contract park areas. Section II is a report of some of my visits to other areas. These areas were not notified I was coming, nor did I always conduct interviews in them. Section III is a summary of my findings and recommendations.

AMISTAD RECREATION AREA

Located on the Mexican border, near Del Rio, Texas, Amistad Recreation Area provides the recreational activities of fishing, boating, swimming, hunting and primitive camping. It would appear that Amistad has difficulty in attracting visitors to the traditional type of interpretive activity. This difficulty is also being experienced by two other national recreation areas that I visited--Lake Mead and Padre Island National Seashore. It is interesting to note that of the 9,280 persons contacted through audio-visual programs put on by Amistad interpretive personnel, only 377 (4%) were contacted within the boundaries of the recreation area itself. The others were contacted at schools, civic clubs, at military areas, or in commercial campgrounds. The annual interpretive report for 1975 says that although two contact stations were manned during the summer months by interpretive personnel, that they received "little or no use by visitors." This background information on interpretation at Amistad is not meant to be an evaluation of the program there, but rather an indication of the problems of making that particular public aware of the need to conserve energy. It would appear that the average visitor to Amistad comes to recreate, period! Visitors to Lake Mead and Padre Island seem to be in the same category. Part of the problem lies, of course, in the fact that Amistad does not want to be (is not allowed to be) in competition with commercial campgrounds for visitors. While 1,548 persons were contacted at commercial campgrounds through audio-visual programs, only 377 were contacted at the headquarters building, Governor's Landing and the swim beach.

One of the most rewarding interview sessions I had was at Amistad. It was

rewarding in the sense that the superintendent, (Edward Rodriguez, Jr.) called in his staff, (Harold Timmons, Chief I&RM; James Johnson, Chief of Maintenance, and Emery Lehnert, Park Naturalist) and as a group we brainstormed the question of how Amistad could make the public more aware of the need to conserve energy. Since it has been difficult for Amistad to contact the public at all, this was no easy task. In the following paragraphs, some of the ideas that came out of the meeting are indicated.

Cushman scooters, used in other National Park Service areas for picking up trash could be used in Amistad. Since the public doesn't seem to want to hear a traditional message, perhaps they would be impressed by an example.

Provision could be made in the recreation area for non-boat users such as hikers, picnickers, shore fisherman and walkers. At a relatively low cost, shuffleboards could be provided at Diablo East. The energy consumed in this sport would be considerably less than motorboating.

Certain areas on the lake could be restricted to the use of sailboats and canoes only. This also, would promote the use of low energy consuming activities.

A windmill could be put in at Governor's Landing to pump drinking water and thus demonstrate alternative (non-fossil-fuel-consuming) energy.

A solar energy unit could be used at Governor's Landing to keep the battery charged up that is used in connection with the present audio-visual program presented there.

Advantage could be taken of some of the good energy-savings decisions that

have already been made at Amistad. For example, a restroom was recently moved from beach level to a slightly higher elevation nearby. This was done so the sewage could move by gravity, and wouldn't have to be pumped, thus saving energy. An interpretive sign could be put on the restroom indicating why it had been moved, and thanking the public for walking to help save energy and to do their bodies a favor.

When horses are used for patrol, the public could be made aware of the fossil fuel being saved.

A new headquarters building could use solar energy for heating and refrigeration. A patio display could use solar energy and make the public aware of its value.

Solar energy could be used to power interpretive displays at Panther Cave and at other remote locations where electricity, in the conventional sense, is not available.

The design of new buildings could utilize the native adobe construction which would save considerable energy over the glass-cage type of construction.

BIG BEND NATIONAL PARK

Big Bend was the only park area I visited which had an exhibit powered by an alternative energy source. At their exhibit of fossil bones, far from any conventional source of electricity, a solar energy cell atop the exhibit feeds a trickle of electrical energy into a battery which, in turn, powers a tape playback unit which provides an audio message when a button

is pushed. The exhibit is designed so natural light enters through the top of the enclosure. Part of the audio message could tell the public that the words they have just heard have been brought to them courtesy of a non-fossil source -- the sun.

One of the most impressive nonverbal displays of energy conservation I saw during my travels was near the Santa Elena Crossing of the Rio Grande where a windmill is connected to a watertank which in turn is connected to a drinking fountain. It was a graphic way to illustrate an alternative power source. Park visitors may be jaundiced by too many verbal energy conservation messages, but here was a nonconventional display of the idea.

If one crosses over the Rio Grande to the Mexican village of Santa Elena, one cannot help but be impressed by the difference in life style. By contrast, the lower energy consumption by the Mexicans is obvious. The experience of being rowed across the river in a flat bottomed boat sets the stage for what follows. The streets are not paved with fossil-fuel-based blacktop. The adobe homes absorb the day's heat, but the walls are thick enough so that the heat is not released until evening. Clothes hang on lines in most yards drying in the sun instead of in the electric dryer and outhouses were common. In the self-guiding trail guide for the Castolon area, the following is found under the Santa Elena Crossing section:

> "Unlike most well-known border towns, this village is unspoiled by commercialization, and here you can become aware of real frontier atmosphere. Such conveniences as electricity and plumbing, which we take for granted, are considered the utmost in luxury to the dwellers of this Mexican village."

It seems to me that this is a fine example of the soft-sell approach to making the public aware of energy consumption difference, and may well cause a questioning of one's own consumption.

Before crossing to Santa Elena, I had gone on a guided nature walk. After watching some birds along the Rio Grande through their binoculars one member of the group trained his glasses on the Mexican village of Boquillas and commented: "He just moved a leg". Apparently, he was watching a siesta taker. After some of the members of the group had made a few more remarks implying how lazy they thought Mexicans were, someone in the group suggested that maybe they had the right idea after all. A good discussion followed which seemed to leave the group feeling that maybe the frenetic pace of life in the area north of the border might be more appropriate as a target of ridicule.

In the Castolon self-guiding trail pamphlet, an interesting reference is made to an energy saving type of construction.

> "GARLICK HOUSE . . . Here you see a typical representation of adobe brick type houses used by early Big Benders. The thick walls of adobe are very useful to residents of this area, as they are excellent insulators against the heat. Even during the hottest days, you will find it quite cool in the evening. The six-inch thick roof, made of soil, wood and corrugated roofing, helps to keep the interior cool."

According to Park Superintendent, Joe Carrithers, the primary emphasis on energy conservation at Big Bend has been on water. He referred to a talk given by one of the interpreters on the subject: "A Day in the Life of a Raindrop" as one of the ways in which the public was made aware of the need to conserve water.

Water may be thought of as energy in and of itself, and supplying water to the visiting public requires the expenditure of energy. The park visitor, by and large, gives little thought to where the water comes from, or where

it goes to, for that matter. It seems to me that one of the best ways desert areas can make the public aware of the need to conserve energy can be through a discussion of water sources. The basin area in Big Bend, for example, is dependent on a spring that fluctuates widely in its output. With an increase in visitation and a decrease in water supply, there could be a serious problem.

The Superintendent said plans to use solar energy to provide 65% of the visitor center-headquarters building heat have been made; that the remaining 35% will be supplied by conventional means. He referred to some plans which had been drawn up by Malcolm Wells, author of Solar Architecture, for a new visitor center for Big Bend. The plans were very interesting from an energy conservation point of view. Most of the building was underground to provide insulation. Power was provided by sun, windmill, and by park visitors walking on a treadmill as they approached the building.

The Basin Campground of the park was high in the Chisos Mountains, and yet it was warmer at night than the camp 2,000' lower on the Rio Grande. This heat difference caused largely by the absorption of heat by the rock formations around the Basin Campground during the day and released at night could lead to an interesting discussion of heat pumps, insulation and many other energy related concepts.

Hot springs are found in several places in Big Bend, and could be used as the starting place for a discussion of geothermal energy as an alternative power source.

Frank Deckert, Chief Park Naturalist, pointed out that in the campfire talk

entitled "Indian Lore and Legends", energy conservation was emphasized by showing grain grinders, by pointing out how the Indians lived off the land and in harmony with it.

One of the Big Bend naturalists had given a solar energy workshop a few times and had abandoned it because she felt a need to know more about the subject before continuing it.

Big Bend is planning to use a windmill at Dugout Wells to run an audio device similar to the one now in use at Fossil Bones.

A natural history book similar to those done for Saguaro and the Everglades, will soon be published for Big Bend. As a result of my visit, the Chief Park Naturalist said he would talk to the author of this publication about including energy conservation messages in context. Also, a book about the Sierra Madre Mexicans will soon be published and it will contain much information about energy consumption lifestyle of these people.

I attended two campfire programs and one guided walk during my visit to Big Bend. My impression of these events is that they were of barely acceptable quality. They were old-fashioned in their approach and did not involve the public in a meaningful way. I was favorably impressed with Frank Deckert, who was new in his job. Perhaps with time, he will improve interpretation there. It needs it.

CABRILLO NATIONAL MONUMENT

Located on a peninsula overlooking San Diego harbor, Cabrillo looks east over an airport to the city of San Diego, south to the harbor entrance,

and west to the open ocean. It is thus in an ideal location for a variety of things to interpret. The California grey whale migration, for example, is easily seen from overlooks. This migration could easily and effectively be interpreted from the point of view of energy. Every fall, the whales leave their Arctic feeding grounds and travel about 10,000 miles to winter in the warmer seas off Baja where, according to a very well-written handout on the whales available at the Point Reyes National Seashore, "... their energy requirements are not so demanding and where there are shallow protected waters for bearing their young." The handout also indicates that "Gray whales don't eat on their long migration nor in their wintering grounds, and are not known to sleep during this time." A comparison of the whale's life style to man's could help sensitize man to his methods of keeping himself warm.

Other comparisons of life styles are being made at Cabrillo, as the public is made aware of differences between members of the Cabrillo sailing expedition and modern man. It is pointed out that Cabrillo's method of locomotion was wind-filled sails and that he used the crossbow which required only muscle energy. A discussion of his food and clothing is also done. Additional comparisons are made as the life style of the early Indian inhabitants of the San Diego area is explained. Further, one of the chief interpretive methods used at Cabrillo is living history at the 1854 lighthouse. Food of the period is cooked on wood stoves, and such things as the problem of hauling fresh water over bad dirt roads by horse drawn wagon are discussed. Any activity which makes park visitors more aware of their highly consumptive society should be helpful in sensitizing the public to the need for energy conservation.

Although Cabrillo is on the San Diego city bus line, very few visitors use the system. The Chief of Park Operations, Marty Andersen, theorizes that this is because the buses run only during limited times of the day.

Visitors to Cabrillo used to be able to drive to the lighthouse, but as visitation grew, it became necessary to require people to walk from the parking lot. This in turn conserves energy. An electric shuttle cart is available for the handicapped if they are unable to walk the short distance to the lighthouse.

When people call in reservations for the tidepool walks at Cabrillo, they are encouraged to either use a bus or to form a car pool, an effective energy conservation message. As the tidepools are explored, it could be pointed out that the amount of life exsisting there is largely dependent on the amount of energy available--that the same thing applies to people.

Erni Escalante, Interpretive Supervisor, and Terry Di Mattio, Historian, suggested several ways in which Cabrillo could help make the public aware of the need to conserve energy. They pointed out that there is a weight-driven clock in the lighthouse that could be used to point out the value of renewable energy sources. Also, while people are watching for whales from the bluff overlooking the ocean, they become acutely aware of the value of standing out of the wind behind the shelter. They thought this experience could be used to help people understand the value of adequately insulated homes. They said there were plans to build an Indian hut at the Cabrillo area, and that they could use it to point out the differences in life styles then and now.

As one looks over the San Diego area, at the golden haze which overhangs the city, at the ships sailing in and out of the harbor, at the planes flying in and out of the airport, one quickly becomes aware of the energy that

is being consumed, and it provides an excellent site for contemplating and/ or discussing energy consumption in our society today.

All in all, Cabrillo seems an ideal place to help people become aware of the need for energy conservation.

John Tucker, Assistant Chief of Park Operations, said it's quite a challenge to interest visitors in energy conservation because they think that the energy shortage issue is a phoney one--that just as soon as the oil companies succeeded in raising the price on gasoline and heating oil, there seemed to be plenty of it. This is undoubtedly a wide spread belief and one which will need to be overcome with evidence if the public is to be convinced. Another large obstacle to the understanding of the need to conserve energy comes from the widely held belief that we don't need to worry about energy because science will find a way of providing other energy sources when our present ones are depleted.

The interpretive staff at Cabrillo seened both capable and concerned. I believe that the nudge I gave them in the direction of energy interpretation will result in an improved program there. If there is a weakness in the interpretive program at Cabrillo, it lies in a too heavy dependence on the use of film at the visitor center. The staff claims their visitors come to Cabrillo to see films. It is my opinion that the public would be better served by a larger number of roving interpreters.

CARLSBAD CAVERNS NATIONAL PARK

According to Philip F. Van Cleave, Interpretive and Enviromental Specialist

for Carlsbad and nearby Guadalupe Mountains National Park, a cave is an ideal place in which to discuss energy and energy use. For example, he says "We have many, many people saying we should have more light in the cave. This is not only excessive use of energy, but it works to the disadvantage of the cave's climate." It would seem that an explanation of the management of the caverns would be an important way in which Carlsbad and similar areas could help make the public more conscious of the need to conserve energy. The addition of heat through the operation of lights in the caverns, for example, raises the temperature allowing organisms to flourish that were not previously there, upsetting the delicate balance that existed originally. According to Van Cleave, electrical energy is the most intrusive source of energy being introduced into the caverns. Second is the heat given off by visitors, and third is the effect of water piped in for the restrooms and drinking fountains as well as its removal as sewage. By introducing elevator shafts into the caverns and using the cooler air from below for air conditioning the visitor center, 22,000 gallons of water were being lost annually from the caverns. This has been "corrected" by installing revolving doors between the elevator exits and the caverns. It has been necessary to recharge some of the pools in the caverns with water to bring them back to "historic levels." Park visitors also contaminate the caverns through the discharge of urine along the trails. When this gets into the pools, a black growth begins to line the bowl of the pool.

I found the information about the management of the caverns to be very interesting and highly relevant to conservation of energy, and so I was surprised

to find that it is not available in print, nor is it presented to the public in exhibits, or slide programs. Nor is it included in any of the 43 taped messages available to cavern visitors via the radio antenna loop system which carries the bulk of the interpretation for this park.

Energy is found in the caverns in the form of bat droppings, and is trapped in the limestone in the form of bacteria that need only water and limestone to survive. A discussion of these items could lead to a larger discussion as to the nature of energy in general.

Plans have been made to heat the visitor center with solar energy when the funds are budgeted. When that happens, an exhibit of solar energy is "probable" according to Van Cleave.

The superintendent, Donald A. Dayton, said that florescent lights are replacing incandescent lights in the caverns because they consume less energy, that wind and solar energy are planned for Guadalupe Mountains National Park, that a shuttle bus system between White City and the Caverns is being planned, and that leaky cables and transformers are being replaced to conserve energy. All these items are commendable, and if shared with the public might help raise their energy consumption consciousness.

I personally did not like the antenna loop radio system of interpretation. It was annoying to have to hold the receiver up to my ear. If this kind of a system must be used, it would be desirable to have the receiver attached to one's waist with a single earphone on a headset allowing for more freedom of movement. While I realize that safety and vandalism messages are important, I felt I was overloaded with them. It was something like listening

to the radio and not being able to get away from the commercials. I used the receiver my first day in the caverns, but did without the second day and liked it much better. I found that the constant message inhibited my aesthetic sense. I would have liked the messages better if the voices had not been the same ones I had heard other places in the park service. Some southwestern voices would have been appropiate to the occasion.

I realize that the radio system was adopted because the large numbers of visitors to the caverns made it impossible to any longer give guided walks. I feel it would be better to restrict the numbers of people entering the caverns, although I realize how politically difficult such a situation is. The interpreters stationed throughout the caverns look like guards in an art museum, and I guess they are, in a way, but this must be very boring for them, and counter productive as far as interpretation is concerned. This boredom leads to frustration, and it was my observation that the interpretive personnel were often clustered together to keep each other company. I expressed this observation to one of the underground staff, and he responded that I was just in a very delicate place and it took more people to be there to protect it.

CHACO CANYON NATIONAL MONUMENT

About 1,000 years ago, Chaco Canyon was the center of a flourishing agricultural society numbering about 7,000 persons. The largest of the pueblos in which they lived was Pueblo Bonita which was four to five stories high and housed 1,000 people in its 800 rooms. But, shortly after it reached its peak in population, it went into a rapid decline, being totally

abandoned. This abandonment raises interesting questions as to why this happened. While one cannot be absolutely certain, it would appear that a change in the energy available to this area was a major factor. According to a display at the visitor center, the inhabitants stripped the land free of trees to make the supports for the roofs of their pueblos. As the rain came, denuding erosion occurred. This, followed by a lessening of water for their crops, forced the group to vacate the area. They went to the Rio Grande River where a reliable source of water was available. In the interpretive program at Chaco, according to Dale Peterson, Chief of Interpretation and Resource Management (I&RM), a parallel is drawn between Chaco's early inhabitants and society today. Are we depleting our energy sources so rapidly that life as we know it will have to be abandoned? The Chaco Indians had the Rio Grande to go to. Where can modern man go?

Walter Herriman, superintendent at Chaco, told of a naturalist at Chaco who, when he takes groups on walks through the ruins ask the group to close their eyes and imagine their hometown. He then likens life in the pueblos to life in their hometowns as they have imagined it. This experience touched off an idea I think would work in areas where ruins are being interpreted. The group could be asked to imagine that they were at the ruins of their deserted hometowns sometime in the future, and that their task was to write a self-guiding booklet in which they explained why the town had been abandoned. One of the stops on the trail could be the town's power plant which was abandoned because fossil fuel became unavailable. Another stop could be the "typical" kitchen of the period with all of its electrical appliances. The message, of course, is that by over consuming

their resources, the inhabitants of the hometown were forced to abandon it.

James Mount, archeologist at Chaco, pointed out that diversity within a society is necessary for it to survive. When the one method of life sustenance is removed, the society collapses as it did when the Chaco Indians, who were entirely dependent on irrigated crops, lost their food supply. Wilson Clark discusses today's agricultural methods as being similarly non-diversified in his book Energy for Survival: The Alternative to Extinction, in a chapter entitled "Agriculture and Energy Use: From Soil to Oil."

> "Monocultural systems--e.g., a single crop of wheat or corn stretching for many square miles--are deprived of the natural genetic protection. The pesticides and other chemicals are applied in hopes of compensating for natural protection." p. 173

Again, the parallel between then and now can easily be made.

Environmental living, which could incorporate role playing in the kivas, is an interpretive device (fully described under the John Muir National Historic Site section) which could be used effectively here. It would be exciting to have a group assembled in the magnificent Casa Rinconada and ask them to devise a fitting ceremony for the location. This would be after the group had been given adequate background for the occasion.

Unfortunately, there was no interpretation other than at the visitor center during my visit to Chaco, but I was very highly impressed with the staff amd their description of what goes on in interpretation during the summer. The self-guiding trail guides are well written in that they are both stimulating and interesting.

CRATER LAKE NATIONAL PARK

At Crater Lake I talked with Superintendent Frank Betts and James P. Wiggins, Chief I & RM. Subsequently, I had correspondence with the Chief Park Naturalist, George Morrison. It would appear that there are several possible ways in which energy conservation could be incorporated into the program there.

The park currently gives a living history program in which the prospector who discovered Crater Lake is depicted. His life style could be compared with today's consumptive life style.

A periodical newspaper, which suggests to park visitors how they might use their time while in the park, could run energy conservation articles in each issue.

An energy message could be appropriately included in the geology talk given at the rim of the lake as the lake was formed by a great release of energy.

Indian legends told to park visitors could be the source of energy messages.

Cross-country skiing could be promoted as an energy saving alternative to snowmobiling.

A guided canoe trip would emphasize a low energy consuming activity, and sailboating could be encouraged.

The park brochure, under the heading of "How to See the Park," does a fine job of encouraging visitors to make use of the trails.

The interpretive program was in winter hiatus at Crater Lake during my visit in late October, so I don't have much of an impression as to its quality. I did feel that the superintendent, who had only recently arrived in his new job, was much interested in energy interpretation, and that the results of my visit there will be positive.

DEATH VALLEY NATIONAL MONUMENT

According to James Thompson, superintendent at Death Valley, Scotty's Castle is currently the only place where energy conservation is being discussed with the public. It is a natural place to discuss and demonstrate the subject, as the structure was originally designed to be powered by electricity generated by a waterwheel and water was to be heated by solar energy. Plans are now afoot to restore the waterwheel to generate enough electricity to provide energy for the outside lights. This would not only save fossil fuels, but would demonstrate an alternative energy source to the 200,000 people who visit Scotty's Castle each year. The solar water heater could serve the same function, and will be installed Thompson said, when the necessary $50,000 required is available.

Plans have also been made to use solar energy to heat and cool various structures at Death Valley. This would be an appropriate place for such a demonstration as there is so much sunshine there.

Although the superintendent has tried to encourage public transportation in the valley, the bus company which was providing service has dropped service for some reason that is not presently clear.

A shuttle bus system connecting the Texas Springs campground area to the Furnace Creek area is being considered.

No effort has been made to discover places in the valley where energy conservation themes could be developed. I suggested that a logical place was at the sand dunes where water (energy) is found only a few inches under the sand. The sand keeps the water from evaporating, and thus demonstrates the value of good insulation.

One of the problems at Death Valley, according to the superintendent, is that the visitors during the winter want to be entertained rather than to learn anything. They are older people who don't want to hear about the environment--about energy conservation. People are tired of hearing about the environment and frustrated because they can't do anything about it. There's a tendency on the part of the National Park Service to preach. Interpretation is too factual at present. It's purpose should be to discover. These comments were frequently heard at southern areas where winter visitation is heavy. It would seem that a lot of creative innovation is required. (See the discussion under Everglades National Park for a discussion of suggestions regarding interpretation for older visitors.)

Under the initiative of Breyne Moskowitz, a Volunteer-in-the-Park at Death Valley, a group of seasonals and permanents gathered at Emmigrant to discuss how the park visitor could be made more aware of the need for energy conservation. The discussion was freewheeling and fruitful. Here are some of the resultant ideas:

1. Solar energy could be used to heat water at residences.

2. A shuttle bus could be run to Scotty's Castle from Furnace Creek. Buses not in use during the winter at Yosemite could be used in Death Valley.

3. Visitors to Death Valley aren't loners and could be appealed to by group activities.

4. Present Park Service construction is poor from an energy conservation point of view. We need to set the proper example. It would be a good idea to use masonry cemented together like the rocks in Mosaic Canyon.

5. Adobe construction already in the park has held up well and could be extended.

6. A solar heater panel over a trailer would provide shade and coolness as well as hot water for the trailer.

7. Composting toilets could be used.

8. Windmills could be used to generate electricity for a recording thermometer or some other small device to illustrate the value of the windmill as an alternative energy source.

9. The diesel generators at Wildrose could be shut down at night as electricity isn't needed for several hours. The refrigeration units could survive the shutdown.

10. Solar cookers could be demonstrated in the campgrounds with the campers invited to share hot chocolate with the demonstrator.

11. Motorcycle and bicycle patrol by rangers would be a good idea.

12. The bulletin board at Wildrose could be lighted by electricity generated by harnessing the overflow from the water tank.

13. Efforts at recycling could be made.

14. Tape recordings of flushing toilets could be made available at composting toilets for those who need the sound.

While all of the above ideas may not be practical, it was exciting to be part of such an innovative group.

I also talked with Bruce Kay, South District Park Technician, who supervises the operation at the Furnace Creek area. He said that while no specific program on energy conservation was being given, that he thought it was probably being worked into a variety of programs. He thought that an ideal place to include an energy conservation message would be during the weather walk. This walk is given each afternoon when the readings are taken at the weather station. Since the weather is taken at all the NPS areas I know anything about, this would be a natural and efficient walk as two purposes could be accomplished at once--taking the weather, and helping the public to understand the weather and its relationship to energy conservation.

On the walk given at the Borax works, it could be pointed out that the works were located close to energy sources.

The adaptation of plants and animals to an area where the rainfall

averages only 2 inches a year, could be used as a cue to talk about man's adaptation to his environment. The creosote bush, for example, adapts to its environment by putting enzymes into the soil which prevents other creosote bushes from growing too close if there's not enough water.

The tamarisk tree is a problem at Death Valley, as in many desert areas, as this exotic plant uses large amounts of water, thus denying the native vegetation of water and drying up ponds where other life once lived.

There is also a wild burro problem in Death Valley. These animals, introduced into the area largely by prospectors, are competing for water with the native big horn sheep and other animals. There is a plan to fence the boundaries of Death Valley and then to trap, shoot, and sterilize the burro.

The two problems described above are primarily energy problems, and could be used to put energy conservation in a larger context.

The Death Valley brochure gives great emphasis to seeing the valley by car. There is hardly any emphasis given to walking or hiking, both very pleasant activities in the winter months.

The interpretive program at Death Valley is strangely organized. There are 3 positions on the Superintendent's staff with interpretive functions: Chief of I&RM, I&RM Specialist, and an Interpretive Specialist. These positions overlap in function and authority to such an extent that nobody appears to be in charge. The seasonals complain that they do not know who to go to for help. The day-to-day operation of the Furnace Creek section of the park is run by a less-than-fulltime

park technician. The seasonal staff complained that their training had been inadequate, that they were not getting the support they needed to do their work.

A faculty member from UCLA offered her assistance to Death Valley as a VIP. They assigned her to Stove Pipe Wells, 25 miles from Park Headquarters, and told her to develop her own program. During the several months she was there, none of the park staff attended any of her programs to give her suggestions or help. When I arrived, she was eager for critique. I audited a guided walk and a campfire talk she gave, and she was grateful for the suggestions. She finally quit her position for lack of support, and was replaced by a salaried interpreter.

At Death Valley, I observed the worst talk I have ever seen. It was the weather walk I have referred to earlier. The walk began as the interpreter hollered across the visitor center that she was leaving to take the weather now, and was out the door before it was very clear what was happening. Five of us scurried after her, catching up with her near the weather station. She made a number of inane remarks such as, "I'm now taking the maximum temperature. I'm now reading the minimum temperature." I asked her a series of questions to try to get some life into the situation, but her replies were mono-syllabic whenever possible. She seemed to resent being interrupted by questions. She did not know who I was. There were long pauses with no explanation of what she was doing. She had no theme. In no way did she relate what she was doing to the people in the group nor to Death Valley.

Her conclusion was, "That's all." I'd pay a high price to have had that activity on videotape as it's the only interpretation I've ever seen that was 100% bad. It had not one redeeming quality.

In summary, I would say that the interpretive program at Death Valley needs a great deal of improvement. While there are some excellent seasonals on the staff, they are not getting the support and supervision they need.

EVERGLADES NATIONAL PARK

I found more examples of direct references to energy conservation at the Everglades than any other park area other than Yosemite. An evening program entitled "Consume or Conserve" had been given by Chris Duschesne at the Flamingo Campground. After giving the program 3 times, Chris abandoned it, saying that she was receiving too much adverse comment from her audience.

Since this program illustrates so well many of the problems which will be encountered in energy conservation interpretation, it will be analyzed in some detail. A joint interview with Chris Duschesne and Patrick Crosland, Assistant Chief Park Naturalist, revealed that the adverse comments may have been caused by the following factors:

1. No visuals were used in order to conserve electrical energy. Park visitors, accustomed to the use of slides and films, may have been disappointed.

2. Conservation of energy will cause people to change their life

style, and most people are very threatened by change and become resistant.

3. A relatively hard sell approach was used.

4. The audience was primarily made up of older people who were wintering in Florida, and they may not have been interested in such a controversial and threatening subject.

5. This was Chris' first year as a seasonal interpreter, and thus had had no previous experience in moderating a controversial discussion.

The negative response may have been ameliorated if:

1. She had used less electricity rather than none at all.

2. She had emphasized that small changes now may prevent precipitous and devastating changes later on.

3. She had softened her approach by not letting her audience know immediately where she was headed with her topic. An indirect approach showing how dependent life in the Everglades is on energy may have been more effective.

4. She had realized that although some older people may not want to hear about contoversial matters, this is certainly not the case with all older people. She could have appealed to them by pointing out how character building the olden days were when people provided their own entertainment instead of relying on television, for example.

5. She had had the advice of more seasoned naturalists who have had experience with heckling.

I believe that Chris is to be commended on her attempt to present a program on such a touchy issue. She may have been more effective than she supposed. Because some of the audience were obstreperous is no reason to suppose that many were not enlightened.

The Everglades seems better equipped than most park areas to give people low energy consuming activities. At Shark Valley, for example, bicycles are available at no charge for visitors who wish to take the 15-mile round trip using a self-guiding pamphlet. Of course, less distance could be covered, if desired. At the same location, backpacks are available on a loan basis for those who take the conducted overnight hike to one of the hammocks. Also available, at low cost, is a tram which provides a ride over the 15-mile loop road. Availability of equipment and transportation at little or no cost is beneficial to the lower income visitors to the area, and to those who come to the park not knowing what to bring to maximize their experience.

I also participated in the all-day canoe-a-cade which is a fine low energy consuming activity. While the park doesn't have canoes for free use by visitors, they are available for rent from the concessioner.

The Everglades uses pin-on buttons in their activities for children. Each button in the 15-button series has an illustration on it representing some aspect of life in the everglades such as the vulture, a turtle, some mushrooms, fire, grass, sun-rain-soil, a mosquito, a bulldozer being driven

by a man, etc. Each button has the words, "I belong" written alongside the illustration. Pat Crosland says these buttons are used in the discussion of food chains, energy flows, relationships, or when doing role playing. Since energy conservation fits logically within the context of any of the above activities, these metal, 5½ centimer (we're joining the metric world) diameter, colored buttons cost about 8¢ each. Each park area could have illustrated buttons especially appropriate for that area.

One of Everglades' interpretive staff, Sandi Whitehead, has been assigned to do environmental education activities in the Keys. Two of her programs involve energy and its conservation. One is entitled "Energy--Where Does It Come From?" and the other is "Energy--How Can We Make It Last?" The programs are given to elementary school children. Her lesson plans, which are excellent, may be found in Appendix E.

The greatest threat to the Everglades would seem to be loss of its water, a form of energy. Conservation of water energy on the part of the populations bordering the park, would be highly beneficial to the park. Continued increase in the amount of energy denied the Everglades will result in the demise of the park.

I had expected to find a high quality of interpretation at the Everglades, and I was not disappointed. All of the interpreters with whom I had contact impressed me favorably. George Robinson and Pat Crosland are obviously very able in their work. The staff had gone through a month-long training period at the beginning of the season. The concensus seemed to be that although parts of the training were helpful, it was far too long. Also, it was felt that too much emphasis had been put on process and not enough on

content. I was very impressed with the scope and variety of the books used in the training process.

I was disappointed in a campfire talk given on the sun. Ah, I thought, here will be an activity which will stress the sun as energy, but it didn't happen. It was mostly a program of exquisite slides showing sunsets and other such beautiful things.

FORT CLATSOP NATIONAL MONUMENT

Located near the mouth of the Columbia River in Oregon, Fort Clatsop was the winter home of the Lewis and Clark Expedition. When Mike Gurling, in charge of interpretation at the fort, was interviewed, he said that, "No energy conservation proselyting is going on here at all." The rest of the interview was primarily a brainstorming session in which possible ways in which the energy conservation theme could be worked into the Fort Clatsop interpretive program. Following are some of the ideas discussed:

1. One of the trails at the fort leads to the canoe landing which Lewis and Clark used and where there is replica of the dugout canoe they used. The energy requirements of the canoe could be contrasted with that needed by today's powerboats.

2. The living history program at Fort Clatsop could talk about the hardships of the expedition compared with the luxury of today--and the price we're paying for it.

3. Nothing was wasted when Lewis and Clark shot an elk. A discussion

of how each part was used could be compared with waste today.

4. Part of the trail goes by the spring from which the expedition members carried their water. The luxury of piped water that runs hot and cold could become more noticeable. It could be pointed out that less water is used when it's carried. The members of the expedition probably smelled a lot by today's standards as they bathed infrequently.

5. During periods of light visitation, the visitor center lights could be turned off until visitors enter the building. Then, a point could be made of telling the visitors that the lights were turned on just for them, that it's the fort's way of conserving energy.

The thrust of interpretation at Fort Clatsop in the winter is interpretation for school groups. Since none came while I was there, I did not have an opportunity to observe the program in action. I was very impressed with Mike Gurling as a historian, and as an innovative thinker.

FORT UNION NATIONAL MONUMENT

A key station on the Santa Fe Trail, Fort Union provided protection for travelers and was a supply depot for the military forces. Its potential for integrating the energy conservation theme into its interpretive program, according to an interview with Ella S. Rayburn, Interpretive Park Technician and Robert J. Hoff, Chief Ranger, lies primarily in then-and-now comparisons. Since Fort Union was a supply depot, the supplies needed in "those days" could be compared with now. Entertainment at the fort,

dancing, debating, acting, story telling, all required low energy outputs compared with the energy required for entertainment on military posts today. Some then-and-now comparisons may cause some difficulty as Ella said she had a very negative reaction from a group last summer when she described childbirth as it was experienced at the fort. The food people ate then, could be compared with the food eaten now. The means of locomotion, then-and-now could be discussed. The horses which pulled the wagons, for example, got their energy from plants, a renewable resource. Today's trucks use fossil fuel, a non-renewable resource.

At Fort Union, as at Fort Clatsop, the exhibit lights are turned on only when visitors are present.

When the first train pulled into Santa Fe in 1880, the Santa Fe Trail, according to the park brochure, was "...just a memory and some ruts on the plains." This shows an adaptation to a change in the environment. How will mankind adapt to fossil-fuelless environment? While many view this as a "doomsday" question, it is possible that life could be improved by such an environment.

Interpretation during my visit was limited to the visitor center and to the self-guiding walk through the ruins of the fort. The self-guiding walk is enhanced by the use of sound effects. Occasionally a bugle will blow, or the sounds of a sergeant drilling the troops will be heard. It's sort of spooky, but very effective as it adds life to the area.

FORT VANCOUVER NATIONAL HISTORIC SITE

Superintendent Donald Gillespie was about to depart for a series of meetings on community matters when I arrived, but before he left he said that he thought interpretive walks in historical areas should contrast life styles then-and-now. Fort Vancouver is ideally situated for this kind of comparison, lying as it does near the center of the city of Vancouver. From the partially restored fort, one can see a large suspension bridge with heavy traffic on it. The railroad is between the fort and the Columbia River, and the Portland (Oregon) International Airport is just across the river.

While at the visitor center, I observed Robert Amdor, Park Naturalist, working with a group of visiting schoolchildren. He had them sitting on the carpets among the visitor center's fine new exhibits, and was having them role play early users of the fort. He divided them into three groups, trappers, Indians, and representatives of the Hudson Bay Company and asked them to see what deals they could work out, trade for. He reminded them that they couldn't trade for anything that runs on gasoline or electricity. The session went very well with the children becoming aware of how different life was then by getting involved.

When discussing then-and-now ideas with Bob, he pointed out that the trade stores weren't heated---to protect goods and to cut down on energy consumption. Diaries, he said indicated people didn't bathe too frequently. He quoted one as saying; "I went to the river today for the first bath of season." There was no running water in the fort, and it all had to be carried from

a common well--which, unfortunately, was too close to the sewage disposal area. The sawmill and grist mill ran off water power. The bakery at the fort has been restored, and bread is often baked there to demonstrate then-and-now processes.

GRAND CANYON NATIONAL PARK

The superintendent of a park often has the opportunity to address influential groups such as Rotary Clubs, Kiwanis Clubs, Chambers of Commerce. When Merle Stitt, superintendent at Grand Canyon, is invited to address such groups, he often tells them of steps taken at the park to conserve energy. He refers to the shuttle bus system at the park which not only directly conserves energy, but indirectly as well as it has reduced the litter problem. Since he is responsible for both rims of the canyon, and since it's a 440 mile round trip by car from rim to rim, he saves fuel and time by helicoptering across in 16 minutes. He has cut the number of ranger patrols, and substituted horses for cars in some cases.

Bill Madison, an engineer for the park who has been put in charge of energy conservation, gave me a number of excellent ideas. Chief among them came quite by accident. We were talking about the water supply for Grand Canyon. I was intrigued to learn that the water consumed at the South Rim is pumped across the canyon from the North Rim, that it takes about 1/7 of all the electricity consumed at the South Rim to pump this water. He told me how he recently had some special training in corrosion engineering and showed me a piece of corroded aluminum waterline pipe that came from the system used to pump water across the canyon. He feels that this country will face

a metal shortage before it feels an energy shortage. Then, he told me that he occasionally gives a talk to the public at the visitor center on how Grand Canyon gets its water. It suddenly occurred to me that we have been missing a big bet by not involving our maintenance division personnel more in our interpretive programs. This would make an excellent source of talent to help the public understand the need to conserve energy. Programs on sewage disposal, road building, construction, could be as interesting and pertinent as programs on animal management.

Madison also suggested that an article about the short supply of water at the South Rim be put in each issue of the Grand Canyon Sama, the newsprint schedule to interpretive activities. He pointed out that the concessioner puts cards in each of the hotel rooms asking people to conserve water and turn off lights. He told of the recirculating mineral oil system used in the privies down in the canyon. The oil, being lighter than the wastes, floats to the top of the tank, and can be used again and again to flush wastes into the tank. The wastes are drained out the bottom of the tank and hauled out of the canyon by mule to be disposed of in the regular sewage disposal system. He also said that he has a request in for solar collectors for the visitor center, but that they are way down on the priority list. There's lots of wind at Grand Canyon which could be converted into electricity, he continued. His final suggestion was that solar cookers could be demonstrated in the campgrounds if personnel could be found for that purpose.

Jack O'Brien, Chief Park Naturalist, said that while nothing specific is now being done to promote energy conservation through the interpretive

program, that there are several things that could be done. He suggested a list of activities for park visitors if they had 2 hours to spend, 4 hours, 6 hours, etc. It was his thought that the suggestions would all be ones which would encourage people to get out of their cars and walk. He said it would be helpful if materials on energy conservation were made available to the interpretive staff. He has hopes that the new visitor center to be constructed at Grand Canyon will demonstrate alternative forms of energy.

Since most of the time I was at Grand Canyon was spent backpacking, I did not have much of an opportunity to observe the interpretive program in action, although I did get some sense for the way the interpretive program was organized. Jack O'Brien told me that if I wanted to have an impact on the park as far as energy conservation was concerned, I would have to talk to each of the three district naturalists; that there was no central organization; that the three districts did not even do their training together. It would seem to be highly desireable to have more cooperation and coordination than that.

GUADALUPE MOUNTAINS NATIONAL PARK

There is very little interpretation in this park, especially in the winter. There is a self-guiding nature trail into Pine Canyon, and the trail booklet is very well written. I liked its lively style. As I hiked the trail and read the booklet, I was impressed by the way in which it described the adaptation of the Catclaw Mimosa to its environment.

"To the left of the Cholla is the Catclaw Mimosa. This sprawling plant has been named for its cat-like spines. It has also been called the wait-a-minute plant! These sharp spines are modified branches and they protect the shrub from browsing. The catclaw loses most of its leaves in very dry weather and becomes dormant. This prevents water loss through the leaves during periods when the roots are unable to take up much water. When the rains come, the catclaw sprouts new leaves and begins to grow again."

So like the ocotillo and other desert plants, the catclaw goes into dormancy when it's supply of energy is reduced. Does man have this option? How will he adapt to reduced energy?

The booklet, Guadalupe Mountains National Park: Its Story and Its Scenery by John Barnett is very well written as is his companion booklet for the Carlsbad Caverns National Park. The section of the booklet on "The Delicate Balance of Life" has much material in it that could be well used by a naturalist who wanted to interpret energy conservation as it applies to Guadalupe.

The "campground" at Guadalupe is a model of energy conservation through non-development. It is essentially a flat rectangular parking area with practically no services. While camped there, I experienced 60 mph winds. It would be a good place to demonstrate wind power.

GULF ISLANDS NATIONAL SEASHORE

I interviewed Paul de Kozan, Administrative Officer for the Seashore and who heads its committee on energy conservation. I also had a group meeting with Mary Dodd, Chief Park Naturalist, and two of her staff, Ann Castellina and Frank Walker. I discovered that heat pumps are being used at headquarters and in some of the residences, making this the only Park Service area which mentioned the use of these energy saving devices. I also found

electrical outlets at the NPS campground, probably a holdover from the time when the area was run by another govermental agency.

The interpretive program at the Seashore is very imaginative and innovative. The 4-page booklet on "Things to See and Do" listed a lot of exciting, but low energy consuming, activities one could be involved in. One could, for example, participate in the "Seeing Sealife" program described as follow:

> "See with whom you are swimming. Collect selected marine life, then take a close look in the lab."

or, "Children's Fishing" sounded intriguing:

> "For kids 13 and under. Learn how to catch bigger fish than dad! We provide equipment. Meet at the fishing pier."

and the description of the campfire program was surely non-traditional:

> "Enjoy an informal discussion with a Ranger and meet your fellow campers, roast marshmellows, swap stories. Meet at the picnic pavillion."

At Fort Pickens, a living history program involving a soldier who gives a 25-minute program in first person does a then-and-now program that includes the energy conservation theme. Children are helped to make candles and soap as in the olden days. Another living history program contrasts farming then-and-now.

Roving interpretation on bicycles is part of the program at the Seashore, and bicycle tours are part of the regularly scheduled program. It's interesting to note that two interpreters travel with the bicycle tour--a naturalist and a historian.

The most popular program at the Seashore is called "Civil War Ramblings" in which a couple of living history Union soldiers sit around the campfire

inside Ft. Pickens with "Confederate prisoners" and tell stories in first person. Hardtack and coffee are served to the audience. Energy conservation is worked into the program.

A lantern tour of Ft. Pickens emphasizes our dependence on electrical energy.

The interpretive staff reports that the living history role playing works as a vehicle for talking about energy conservation because the public is so jaded with the usual sort of messages.

Kite flying contests are held during appropriate seasons, a fine low energy activity that also illustrates wind power.

Because of limited time (I was typing my interim report), I was not able to participate in the interpretive program, but I was very pleased with the staff. They were innovative, creative, imaginative, very much alive. It was especially pleasing to find such a positive attitude here. In other recreation areas I usually found a defeatist attitude. This staff seemed to be having fun doing its job.

HORSESHOE BEND NATIONAL MILITARY PARK

Upon my arrival at this out-of-the-way place, Superintendent James F. Kretschamann called his staff together to hear what I had to say. As in most of the parks I visited, no one could think of anything they were doing to make the public more conscious of the need to conserve energy.

Horseshoe Bend has a number of ways in which it could approach the subject of energy conservation effectively. The most dramatic approach would be a discussion of why the Creek Indians chose to fight at that location. Tactically, it was a very poor spot as they had the river on three sides of them and a barricade in front. The river cut off any opportunity for retreat. The Creeks chose this place because their medicine men told them they would be invincible there. By putting their trust in an unreliable (as it turned out) source, nearly 100% of the 1,000 Indians involved were killed compared with a loss of only 49 of Andrew Jackson's forces. As I traveled the country, I often heard people say that we don't need to worry about the energy shortage because "science will find a way." Is it possible that we are putting our trust in science today in much the same way that the Creeks put their trust in their medicine men?

There is an environmental education center at Horseshoe Bend run by Frank Wilson, Park Ranger, who was the most impressive member of the staff. He suggested some ways in which the center could put emphasis on energy conservation. He said he could emphasize it to the fourth, fifth and sixth grade students how economical and thrifty nature is.

A flintlock demonstration is given during certain times of the year. This could be used to contrast the amount of energy used by a flintlock compared with today's weapons.

There's an interesting nature trail (Cholocco Litabixee) with a rather handsome trail guide that could use the plants and animals it describes to illustrate the energy cycles.

JOHN MUIR NATIONAL HISTORIC SITE

Located in downtown Martinez, California, the John Muir National Historic Site is a vivid contrast of energy use in John Muir's time with today. Within a short distance of the site, huge oil refineries spew their noxious wastes into the atmosphere. Looking out of the tower window in the John Muir home, one can see cloverleafing expressways in two directions. Overseeing the operation is Superintendent Doris Omundson, a bright, concerned and charming person. She hurried back to the site from a National Park Service function in San Francisco so as to keep her appointment with me. About half the visitation at the site is from school children who usually spend about 1½ hours touring the place. The other half are mostly bay area residents who have public transportation access to the site via Bay Area Rapid Transit (BART).

There are ample opportunities to talk about energy use at the site. The film shown at the visitor center describes John Muir's backpacking and canoeing experiences and the small amount of energy he consumed in these activities. The house had rain water collectors, the water stored in cisterns being used primarily to fight fires. A windmill was used to pump water, but it lies

dismantled in a storage area at the edge of the property. Ms. Omundson says there are plans to restore the windmill to a functioning condition.

Of all the activities that are happening at John Muir, the most exciting and most relevant to energy was the "Environmental Living Project". In a publication called "Strangers in a Strange Land", written in 1973 by Ms. Marti Leicester, a Volunteer-in-the-Park, the project is "primarily an expanded role-playing situation enlarged into simulated historical reality". She continues:

> "Children, by living as closely as possible to the reality of another time, period, or culture, become more acutely aware of both the elements of a past environment and of their own. In both environments, they can and will have to solve many problems of living. Thus 'Environmental Living' emphasizes three ideas:
> 1. Awareness of the site in the physical, natural, historical, and aesthetic environment.
> 2. Our relationship to that environment.
> 3. Our relationship to our own environment.
>
> It focuses on the following questions: 'What are the elements of this environment?' 'Given these, how would you plan a day and a night of your life?' and 'What might be your needs?'"

The project program is divided into four stages. In the first stage, the teachers come to the site for a workshop, and go through an experience much like the children will later on. Teachers are given bibliographies of materials to use in their classrooms as they prepare their students for the experience of spending a day and a night at the historic site. In this workshop, during the discussions concerning life in the times of John Muir, it would be possible to point out the differences in energy consumption then and now. The second stage is to plan the environmental living experience with the class. As children are assigned roles (field hands, domestic foreman, Chinese domestic workers, John Muir, Chinese cooks, Chinese herbalist,

Chinese merchant), an excellent opportunity is presented to discuss differences in life styles in different cultures and different periods of time. The third stage is the experience at the site itself which is followed by the fourth stage which is a followup in the classroom. The significant thought to be deposited in the fourth stage, according to Ms. Leicester is: ". . . we will close on 'How does all this relate to me and my environment?'" She continues:

> "An added thought--you have just experienced life in a closed or contained system: another time, another culture, in a natural setting that has changed over the years in numerous ways. What parallels--similarities, differences, interrelationships--are there today for the past? Are things really different now? Or, have we just looked at living in a different kind of space on our spaceship earth?
>
> What will be here tomorrow?

It's interesting to note that the environmental living apparently originated at Petaluma Adobe State Historic Park, Sonoma, California and at Fort Point National Historic Site, San Francisco. This type of activity is also being conducted at Tubas State Historic Park, Tubas, Arizona; at Tumacacori National Monument, Tumacacori, Arizona; Fort Bowie National Historic Site, Wilcox, Arizona; Coronado National Monument, Hereford, Arizona; Turlock State Recreation Area, LaGrange, California; and Fort Tejon State Historic Park, Lebac, California.

LAKE MEAD NATIONAL RECREATION AREA

Located only a few miles from Las Vegas, Nevada, Lake Mead is a special situation with regard to energy, according to David Huntzinger, Chief of OEI&R. He said that the lake has on it the most powerful boats in the world guzzling

huge amounts of gas, that in Las Vegas there is a billboard for which the electric bill is $10,000 a month and that during the gas shortage crisis a few years ago there was always plenty of gas at Las Vegas. He felt that it was practically impossible to present conservation of energy messages at Lake Mead. The emphasis there was on safety, he said, because their accident and death record is poor. The thing that bothered Huntzinger the most about energy was the federal government which is not setting the proper example of energy conservation. He can't get an economy car, for example, and the Government Services Administration (GSA) is a terrible waster of energy. He felt there was a close relationship between environmental education and the conservation of energy. His seven years experience with environmental education at Olympic National Park convinced him that environmental messages needed to be subtle, woven into a larger fabric.

In spite of the fact that there were large numbers of people visiting this area during the time I was there (March 25 - 29, 1976), an interpretive program was practically non-existent. Hikes were conducted on Sundays, but I didn't discover this until during my interview with Huntzinger. He said there was a sign at the visitor center. In the "What to See and Do" section of the mini-folder for Lake Mead there is no mention of the fact that guided walks are available. It does say that illustrated talks are given in the evening on a seasonal basis. None was given while I was there. As a matter of fact, although I camped there for four days, the only ranger contact I had occurred early one morning at Overton Beach when a ranger drove up in a patrol car, turned on his loudspeaker, gave the weather forecast, and wished everyone a good day.

The illustrated programs at the visitor center which advised people how to use their time at Lake Mead all emphasized the use of motorized vehicles. There was no emphasis on walking, hiking, bicycling. Swimming is not promoted at Lake Mead because there's too much danger involved, according to Huntzinger. He also said that sail boating and canoeing are not promoted but they're increasing anyway. There is an interpretive canoe trip offered down the Colorado River below Hoover Dam. The self guiding nature trail in front of the visitor center was excellently related to habitat. The relationship between habitat and energy could easily have been made. Huntzinger pointed out one evening program they give which could include an energy message. Entitled "A Changing Way of Life" the talk discusses life in the Lake Mead area over the last 10,000 years - how the life of the native was changed by the pressure put upon them by European man with his greater energy resources and consumption.

There is great potential for energy interpretation at Lake Mead. Campers at Lake Mead have the phenomenon of having the whole western sky lighted up by the glow from Las Vegas. Huntzinger thought that sun, wind and hydro-thermal power could all be demonstrated, at Lake Mead. I think that we have to stop taking such a negative view of visitors to national recreation areas. The idea that they've come merely to recreate, and won't listen to interpretive messages needs reexamination. Maybe what the public is really telling us is that we need to adapt the messages, the kinds of programs we give, to the particular area. Whiskeytown National Recreation Area and Gulf Island National Seashore have lots of participation in their programs which are innovative and creative.

MOUNT McKINLEY NATIONAL PARK

The northernmost of the various areas I visited on my investigative tour, Mount McKinley was also the first area where I interviewed National Park Service personnel regarding energy. Those I interviewed all felt that the shuttle bus system was the primary way in which energy conservation was being demonstrated to the public, and yet in the "How to Travel in Mount McKinley" brochure which describes the 85-mile public transportation system, energy conservation is not included in the brochure's answer to the question: "Why a public transportation system?" Superintendent Daniel Kuehn said when the brochure was written, an energy conservation shortage was not as apparent, that in future issues energy conservation would be listed along with (1) less impact on wildlife, (2) aesthetics, and (3) safety.

Superintendent Kuehn also said he was quite skeptical that the National Park Service has any significant impact on the way people think. He hasn't seen any evidence from other crusades, such as environmental education, in which the NPS has been involved. He feels that if we lecture and crusade too much, we really turn people off. He thought if we were to be effective we need to be light and entertaining, and that the government ought to get into energy conservation in a big way to demonstrate how savings could be made. He especially recommended that GSA make less energy consumptive vehicles available and that VIP trips be curbed.

Gary Brown, Chief Ranger, in addition to giving many interesting facts about the shuttle bus system, pointed out the dog sled program as an energy saving way to do winter patrol in the park. Part of the interpretive program is a twice-daily dog sled demonstration. I attended one of

these demonstrations and enjoyed it a good deal, but no mention of energy conservation was made. It was one of many examples of opportunities missed that I observed during my tour.

Bill Truesdale, newly arrived Chief Park Naturalist, thought that the shuttle bus system was the "biggest thing" they were doing in energy conservation, admitting that energy conservation is not really pushed in their interpretive program. He thought that the Alaska pipeline could be tied to energy conservation as it related to the permafrost. He raised the question as to whether park visitors really want to hear energy messages. It was his experience in the Everglades that they gave so many environmental messages the visitors complained, that more harm than good might have been done. He suggested the Eskimo was in harmony with his environment because there were so few of them; this would be a good lead-in to a discussion of the relationship between population and energy.

Bill Garry, Park Ranger, told of a naturalist who lighted a candle instead of a campfire as his way of demonstrating energy conservation. He pointed out those who visit McKinley have either used a lot of energy getting there from the lower 48, or they are Alaskans where the development of energy is seen as essential to the state. This makes for an extra sensitive audience regarding energy, one which might not be too favorable to the notion of energy conservation.

I made good use of the shuttle bus system while I was at Mount McKinley and was impressed with it not only as an energy saver, but because it allowed me to see an excellent display of animals: caribou, moose,

grizzlies and dall sheep. If people had been allowed to use their own cars, and had gone walking across the tundra for the closer view, they would have forced the animals far from the road. The drivers of the buses are concession employees who showed a real concern for helping visitors see the animals. When the NPS takes over direct operation of the buses, as it plans to do in the future, there will be more of an opportunity for interpretation. When that time comes, it will be possible to relate the animals to their environment. Many eagles were spotted while in McKinley, for example, and an explanation could be made that the number of eagles in any habitat is directly dependent on the amount of energy available to it. It would not be difficult to move from that fact to an interpretation of how the population of man is dependent on energy available to it, and to raise the question as to what happens to man when his fossil fuel becomes depleted.

I attended several guided walks, illustrated programs at the hotel, campfire programs, and a conducted all-day hike. The quality of programs ranged from very good to poor, the all-day hike being in the latter category. The interpreter giving the hike exerted no control over her group's staying together at all. Consequently, at least a mile often separated members of the group. She made no attempt at telling the group anything unless a question were asked. On the other hand, an illustrated talk given at the hotel on the value of wilderness was very nicely done. It is too bad that there is no better facility for illustrated talks than the hotel dining room where columns greatly impede one's view of the screen, and where the crowding and ventilation are counter productive.

MOUNT RAINIER NATIONAL PARK

Mount Rainier was an exciting place to be, not only because of its great beauty, but because of the people on the staff. John Parks, Chief of Operations, was especially interesting. He had obviously done a lot of thinking about the energy problem and shared some "far out" ideas regarding alternative forms of energy particularly. He was the first to suggest the possibility of harnessing the energy in ocean waves by floating empty barrels on them. As the barrels moved up and down they could be made to operate a crankshaft below which could generate electricity. He talked about the possibility of putting dams in front of moving glaciers and converting this force into electricity. He theorized about driving a shaft into Mount Rainier's core and using the heat to generate another form of power. He had tried to get enough methane gas from manure to operate his truck, but it took too much manure to be practical. He pointed out, all of the power at Longmire (park headquarters) had once been generated by water power; there had been enough to help two nearby towns with their power requirements. Inexpensive commercial power replaced the hydro-electric plant, however, and consumption soared. He suggested the old power plant could be used as the destination for a guided walk devoted to energy interpretation.

Superintendent James Tobin was also very energy conscious. The amount of plowing required at Rainier to keep the road open to Paradise in the winter is tremendous, thus requiring a lot of energy. He said he'd communicated this problem to the public directly and by use of mass media. He is contemplating plowing the road less wide and closing the road

for 3 days in the middle of every week. He's investigating the use of solar cells, and thought that backpacking demonstrations were a fine way to sensitize people to how much energy one absolutely needs. He had considered putting some of his isolated units on hydro-electric power instead of diesel power, but when he considered the energy it would take to put in the lines, he decided not to. He suggested the NPS could set a goal of 50% reduction of fossil fuel in 5 years and accomplish this goal by (1) closing things up earlier, (2) using bicycles and electric carts, and (3) using alternative forms of energy such as solar energy. He had tried to get mass transit to provide transportation to Rainier, but it had failed as the public apparently doesn't want to travel that way.

Wayne Corbit, Chief of Maintenance, discussed with me the details of narrowing the road to Paradise to save energy. Although he favored it, he realized it was a tough political decision for the superintendent. He suggested running buses from the park entrance to Paradise to save energy, particularly in the winter. He said he was using a Franklin stove in his quarters and that many others on the staff were thus using non-fossil fuel that way. One of the most negative examples of energy use is to be found at Rainier. The visitor center at Paradise is designed so that the roof has to be heated to melt the snow off or it will collapse. The heating process requires large amounts of fuel oil that converts to electricity to heat. Each transfer of energy from one form to another reduces the efficiency of the operation. It will be difficult to expect the park visitor to conserve energy when such an example flies in the face of the conservation message.

Pete Thompson, Park Ranger, said he thought huge patrol cars were high energy consumers and should be dispensed with. He had an interesting thought about the nature of the people who work for the National Park Service. He described them as rural folk. He has a good point. It may be more difficult for rural folk to communicate effectively with urban folk, expecially in the area of energy. He thought energy conservation was primarily a matter of political decision making, and there was little NPS interpretation could do to change things. Our whole value system is against energy conservation, he said. He did suggest the NPS could set up a demonstration town or village showing how energy could be saved.

The district naturalists suggested a demonstration of the relationship between animal behavior and energy might be a good idea. They had in mind why and how animals nest, how they develop fur cover, where the hummingbird gets its energy and how it uses it. A parallel could be drawn between animal homes and the homes man builds for himself. As to things they are already doing, they said they made a serious effort to get people to car

pool for attendance at interpretive activities at sites away from the campground. They also had erected an oversize thermometer behind the visitor center desk at Paradise to indicate the temperature in the visitor center was kept at 65° F to conserve energy.

The park brochure does a very fine job of emphasizing hiking and other low energy activities. All in all, Mount Rainier seems a very energy conscious park and I expect they will accelarate their effectiveness in making the public aware of the need to conserve energy.

NATCHEZ TRACE PARKWAY

Bruce Black, Assistant Superintendent, arranged a meeting which included himself, John Mohlhenrich, Chief Of Interpretation and Visitor Services; Ray Claycomb, Park Interpreter; and David Baker. Several important things were determined as a result of the meeting:

1. Natchez Trace Parkway is very much involved in energy conservation, but practically no effort is being made to share this information with the public. For example, lighting in the visitor center at Tupelo has been reduced 50%, hot water in restrooms has been shut off, heat in the restrooms along the parkway has been reduced, lights in these same restrooms are turned off during the daytime, a speed limit on the parkway of 50mph saves 25% fuel consumption, 4,000 tires have been recycled into a repaving project covering a 5-mile stretch of the parkway, the "Women of Natchez Trace" collected $100 worth of paper for recycling, bicycle lanes are being installed over bridges and will eventually be built all along the parkway, a Swedish composting

toilet has been installed on the south end of the parkway, coffee grounds from the offices at the administration building are going into a compost pile, the purchase of aerosol products has been banned, the grass along the parkway is being mowed less frequently, buildings have become better insulated. Obviously, much is going on which, if shared with the public, could help raise consciouness levels regarding energy conservation.

2. There is an environmental center at Tupelo which mentions energy conservation. The group felt that more emphasis could be put on it. John Mohlhenrich told of an illustration he uses at the center when discussing energy savings which I thought was effective. He turns on the hot water tap in his home in the morning when he brushes his teeth, combs his hair and shaves. Since the hot water heater is at the other end of the house the water doesn't begin running hot until he's ready to shave.

3. Sometimes the federal government itself stifles energy savings. For example, Natchez Trace Parkway wanted to use recycled paper, but was prevented from doing so by a budget office in Philadelphia.

4. Unfortunately, the interpretive program was largely in a state of winter hibernation while I was there, but photographic evidence, brochures, and conversation with this group gave me the impression that when the program is in full swing in the summertime (May-October), it is very effective. There is ample opportunity to utilize these activities to talk about energy. Some examples:

a. Living history is perhaps the major thrust of interpretation at Natchez Trace. Contrasting the life styles of the period would be

an excellent way to show the difference between energy consumption then and now. Soap making, gardening, outdoor cooking, spinning, crafts, folk music, sorghum making are but a few of the demonstrations offered which easily lend themselves to then-and-now energy comparsons.

b. One of the unusual "exploration walks" offered is called the "Sand Creek Splash." Photographs show that this activity consumes little non-renewable energy, and that splashing through the water gives an excellent opportunity to talk about water as energy.

c. The self-guiding nature trails are either excellent or terrible. There seem to be no in-between ones. The terrible ones have interpretive signs that are practically illegible and are primarily identifications. The parkway is aware of this problem and is in the process of improving the situation. Two self-guiding walks which are especially good, as far as energy interpretation goes, are: (1) One walk explains the demise of the Eastern hardwood forest, describing the way in which European man raped the forest while seeking hardwood energy. (2) The other tells how the Indians made use of the local plants in order to survive. They were not dependent on materials which had to be shipped in. They did not waste the energy that was available to them.

d. Role playing is used at the environmental camp at Mount Locust. This gives a fine opportunity for making use of the then-and-now theme.

Overall, I was very much impressed with what was happening at Natchez

Trace. The staff is very energy conscious and has an interpretive program which has ample opportunity for energy interpretation.

NORTH CASCADES NATIONAL PARK, LAKE CHELAN NATIONAL RECREATION AREA, AND ROSS LAKE NATIONAL RECREATION AREA

Unfortunately, the interpretive program, except for informaton stations, had closed for the winter by the time I arrived (September 26 - October 1). The information station I visited appropriately emphasized the trail system in the area. I obtained copies of 101 Hikes in the North Cascades and "Main Trails and Backcountry Camp Areas, North Cascades Complex, Washington" and was on my way to some of the finest hiking I experienced in my 28,000 mile journey. If one wishes to explore North Cascades National Park, it is necessary to hike. There are no paved roads in the park itself and dirt road access is minimal. This management of the park encourages the use of energy sources (muscles) that are renewable. Anyone who backpacks into this park has an opportunity to discover how little energy is required for survival when one has to carry it.

Mass transit is currently being used at Stehekin in two ways: (1) the only way to get into that area other than by trail, is by boat or plane, and (2) a shuttle bus takes visitors to trailheads and other points of intrest. Superintendent Lowell White said a shuttle bus system for the Cascade Pass is being considered. Other plans under consideration are using bicycles for campground patrol, energizing radio repeaters with solar power, and using an electric car at Stehekin which could recharge its batteries in times of low use. White said he thought that environmental

education and energy conservation are very closely related. He also said that the three areas he administers have a special problem in talking about energy conservation because non-fossil fuel electrical power is so abundant in the area. As far as he knows, no energy conservation messages are now being given in interpretive programs.

One cannot drive through the Ross Lake NRA without being aware of dams, power lines, transformers, etc. These are excellent cues to talk about electrical energy. The size of the historic electric generator at Diablo gives emphasis to the size of the huge generator now at that site. Seattle City Light, which generates electricity at Diablo and Ross Lakes is seeking to increase the height of the Ross Dam to generate more power, which in turn raises the question of what environmental impact this will have on the area.

Gary Kuiper, Management Assistant, recommended the demonstration of a solar hot dog cooker and a charcoal starter that uses old newspapers as possible ways of encouraging energy conservation. Also, various receptacles could be recycled.

Other things at these three areas related to energy include: irrigation by gravity flow at the historic Buckner Ranch in the Stehekin area, raft trips run by the Stehekin Lodge, a wood-heated school at Stehekin, canoeing and sailboating on the three lakes, cross-country skiing, a sign at the Colonial Creek Campground encouraging visitors to burn their paper waste and to compact what won't burn so as to reduce the energy it takes to haul their waste off. Pikas are common in the area. Reference could be made to the way in which they use solar energy to dry their "haystacks" as they prepare for winter storage of food energy. Historically, Indians

used muscle-powered dugout canoes. This could be used in historical talks.

OLYMPIC NATIONAL PARK

Every park has its unique problems of communicating the need for energy conservation to its public. Olympic is surrounded by a timber-oriented, antagonistic community. The superintendent, Roger Allen, tried to inaugurate shuttle buses from Port Angeles to Hurricane Ridge, but lost out because the local population felt this move infringed on their "individual rights," and because of opposition from Greyhound. Allen recommended that it would be best to demonstrate energy conservation, to show by example; that the public doesn't want to be lectured to. He felt that it would be difficult to demonstrate energy conservation in the summer because "we're going full tilt." He thought that trying to help the public understand the need for energy conservation by using the park's interpretive program would be of limited value because so few visitors are contacted that way. The park has taken a number of steps to conserve energy such as less travel, reducing hours that visitor centers are open, reducing the heat at visitor centers. In a brainstorming situation with the superintendent and John Douglass, Chief Park Naturalist, the following were suggested as ways in which energy conservation might be integrated into the interpretive program:

1. The obvious clearcutting around the park could be a cue to talk about the energy stored in a tree.
2. Life in the park's tidal pools is limited by the amount of energy available.
3. The use of tidal power to generate electricity could be discussed at coastal sites.

4. Walking instead of riding in cars could be encouraged.

5. The Indians' use of energy contrasted with other societies could be instructive.

6. Compact vehicles, bicycles, and Cushman scooters would use less energy than vehicles now being used.

Reed Jarvis, Assistant Superintendent, thought the biggest problem in getting parks to "promote" energy conservation was that of convincing National Park Service people that there is a problem. He expressed a fear that if all of the parks emphasize energy conservation that the public will get sick of hearing about it. He had some interesting suggestions on how energy could be saved, and that by example--rather than preaching--the public could be made aware of the need for energy conservation.

1. Hitch-hiking could be encouraged.

2. Less of the parking lot at Hurricane Ridge could be plowed in winter.

3. The Forest Service and the National Park Service could get together and give a demonstration of water power.

4. Heat could be cut off in restrooms.

5. Get the rangers out of their "metal cocoons."

6. Demonstrate wind power generation.

He also said that during the skiing season a report is given daily over two Port Angeles radio stations on skiing conditions and that this report is always accompanied by a strong recommendation in favor of using the car pool when going skiing.

Sherman Knight, Chief of Maintenance underlined what the superintendent had said about the use of public transportation to get to Olympic. They had tried

to encourage people to come by ferry and bus, but people did not like to ride "stinky" buses, and that the shuttle bus concept broke up the family unit. He suggested that parks really need to emphasize how they are different from recreational areas; that the public should be encouraged to use Forest Service areas closer to the cities for recreation.

Unfortunately, the interpretive program was functioning only in visitor centers while I was there (October 2-8). The impression I had was that there had been a very weak program which was gaining strength under the leadership of John Douglass who had recently arrived and assumed the newly created position of Chief Naturalist. I especially liked the idea he had started of having a roving back country naturalist. As use of the back country continues to increase, it will become more and more essential to have back country interpreters, for protection of the natural resource is best accomplished through understanding it.

ORGAN PIPE CACTUS NATIONAL MONUMENT

The Superintendent, Ray Martinez, Jr., showed a lot of interest in the conservation of energy project, but he had been at the monument for only two months at the time of my visit and had not thought too much about the subject prior to my arrival. Consequently, most of the time with him was spent suggesting ways in which energy conservation could be interpreted in his area. The Chief of I&RM, Irwin C. Cowley, who had been designated the energy conservation person for the monument, seemed very disinterested in energy interpretation. He said: "I haven't given too much thought to the inclusion of energy conservation in our programs." Even though the monument is a

desert environment, nothing was being done to encourage the conservation of water. He said nothing was going on in interpretation that had anything to do with energy conservation. I had, however, attended the evening program the night before and heard two excellent references. One had to do with the way in which the roadrunner absorbs heat during the daytime and dissipates it at night to keep warm--very much like the heat pump some people use. The other was a reference to the kangaroo rat covering up its entrance with sand to conserve water energy. I suggested the possibility of using shuttle buses around the two scenic drives in the monument (Puerto Blanco and Ajo Mountain). Cowley said it had been tried and abandoned, but he didn't know why. When I asked about the possibility of demonstrating wind energy, he said he didn't know how much wind they had, that they had just put up an anemometer. I suggested the possibility of demonstrating a solar cooker in the campground, but he didn't think that would be a good idea.

Not everything was negative. The superintendent pointed out that everyone is trained to do everyone else's job so that less traveling is necessary. This might be shared with the public and thus help them understand a way in which energy can be conserved. Plans are afoot, the superintendent said, to use solar heat for the visitor center. Since Organ Pipe borders Mexico, I suggested that a contrast in the two life styles might be appropriately discussed or demonstrated, and the superintendent agreed. Since windmills were used historically to pump water, the superintendent thought they might be able to go back to that. He also liked the idea of demonstrating solar stills and having native Indians show how fruit and meat could be dried by the sun. He also liked the idea of contrasting the energy used by those who first travelled that way with that being consumed today in the campground.

He thought that it would be helpful to point out to the visitor that the big horn sheep stores water better than camels, that desert animals are active primarily at night, that the scorpion never drinks water, but gets moisture from the bodies of its prey, and that the pack rat gets water from the cholla cactus.

My feeling was that the new superintendent would be making some changes which would enhance the interpretation of energy.

PADRE ISLAND NATIONAL SEASHORE

I was disappointed to find that interpretation occurs here only in the summer. I had thought that a place as far south as Padre Island would have some winter interpretation, but such was not the case even though there was quite a bit of visitation. I was told that it's hard to get people to come to interpretive events in a recreation area. Maybe the interpretation would be better received in the winter than summer. There are more out-of-staters visiting in the winter and it's cool enough to walk, canoe and bicycle. I was told that summer weather is so hot nobody wants to move. The summer interpretation consists of a lot of "How to . . ." programs such as how to net, surf fish, identify shells, birds and "other debris." Candles are cast in the sand, fish printing is done, and people come to the seining demonstrations primarily "to see the girls /naturalists/ get wet."

There was generally a negative reaction to the idea of interpreting energy on the part of the superintendent and his staff. Such comments as the following were made: "We've been trying to include bicentennial messages,

but it's tough." (The implication here is that messages on energy are just one more burden to carry.) "It's tough to encourage energy conservation after people have driven a long way to get here".

I found a huge parking lot along the beach ablaze with lights all night. Only 3 vehicles were in the lot. When I asked about this, I was told that the seashore had a fixed contract for its electricity so it didn't save anything by turning the lights off. Besides, they had a vandalism problem. Down the beach 100 yards there were scores of cars not protected by the lights. Surely the National Park Service is setting an improper example here, squandering electrical energy just because it doesn't increase the size of the bill.

My visit to Padre Island was not a total loss. Some interest was shown in some of the suggestions I made. The superintendent, John F. Turney, thought that a windmill might be set up to run a generator to record weather information, that the oil drilling platforms off shore could give an opportunity to talk about the depletion of fossil fuels. Of all the suggestions I made, the one that met with the most favor was the idea of encouraging the use of bicycles at the seashore. So much enthusiasm was shown for cycling that I'd be surprised it does not come about.

PECOS NATIONAL MONUMENT

Of all the places I visited, Pecos has the least intrusive visitor center and headquarters building. The small adobe structures give a feeling of real frontier life. The nearby outhouse adds to the authenticity. The

buildings are heated by native juniper burning in fireplaces. While a fireplace is not the most efficient way to heat a building, it at least uses a renewable form of energy. Tom Jarvis, superintendent, says that the primitive operation at Pecos comes as an eye opening surprise to people. It results in a feeling of warmth, friendliness, pleasantness, and cheerfulness. The use of an outhouse is not by choice, but at least it makes charging an entrance fee unnecessary. Jarvis has worked to keep development out. He made plans to use wind and solar energy as well as low energy materials in the design of a new visitor center, but was "shot down." The current design for a new building has lost the frontier simplicity that was in the original. The only way to see Pecos is to walk, and the superintendent says that most people walk the trail. The trail includes many places where energy could be interpreted. An example would be the garden where the mission fathers, responsible for the operation of the nearby church, grew crops. The energy flow from the sun to the plants to the churchmen, the role of water, nutrients and other forms of energy could effectively be presented. Ventilation of the kivas by natural airflow could be contrasted with today's high energy consuming air conditioning.

But perhaps the most moving of all the interpretive possibilities at Pecos was shared by Arnold Herrara, Park Ranger, who is a native American. His account of how his people have always used energy in moderation, with respect for future generations had a large impact. He suggested that energy conservation be related to everything else, that it not stand alone. He thought it was important to relate the past and present, something he always does in his interpretive work. He likes to start by talking about today

and then going back in time. He thought that a demonstration of primitive fire making methods would give an opportunity to talk about energy. Pecos is considering installing a windmill which could give the excuse to talk about alternative forms of energy. One of the techniques he uses with children is to ask them to imagine they were living at Pecos 400 years ago and they needed a shirt. How would they get one? This serves to show how dependent we have become on others and on the use of high energy synthetics.

I arrived at Pecos one morning at 8:00. Only the maintanance man was around. After awhile others began to drift in and begin the work of the day. No one seemed in a hurry, but all seemed concerned, interested, involved. It was in stark contrast to the frenzied activity that so often marks the beginning of a day. I liked the quiet flow of human energy at Pecos.

POINT REYES NATIONAL SEASHORE

When I asked Ron Thoman, Chief Naturalist, what was being done to make the public aware of the need to conserve energy, his reply was that "Nothing is going on." By this, I presume he meant no specific messages on the subject were being presented for I found many subtle energy messages here. It was the only place I visited, for example, which allowed bicycles on some of the hiking trails. One of the best experiences I had during my 8-month tour was cycling down the Bear Valley Trail to the coast, up the coast to a point near Limantour Beach where I used the Limantour Road to return to park headquarters. I encountered only 4 people on the trail plus a Sierra Club group. They were all surprised to find a cyclist on the trail, pleasantly so, it seemed to me. Apparently not too many cyclists take

advantage of this trail at Point Reyes for when I asked Thoman for advice as to riding along the coastal trail, he wasn't sure whether it could be done. The 16-mile loop I made was exhilarating and consumed only muscle energy. Perhaps the National Park Service ought to reconsider its banning of bicycles from trails. Bicycles are for rent at nearby Olema Ranch Campground area.

I found another subtle energy message at the visitor center when I asked Pat Irwin for a handout on the geology of the area and received a well-written one-pager. I than asked if there was a handout recommending how one could profitably use one's time while in the area. Sure enough, one was available. When I asked what other handouts she had, Pat showed me 15 of them on subjects ranging from climate, human history of the area, the California grey whale to restaurants, campgrounds, and state parks in the area. Having this information in separate handouts made it possible to give only the information needed by the visitor. I feel that we often overload the visitor with far more information than can be used.

A third subtle energy message comes to mind when one looks over the map of Point Reyes National Seashore and discovers that all of the campgrounds are of the walk-in variety. The only campground available to motorized vehicles is a commercial operation, one mile from park headquarters.

A fourth subtle energy message is found in the shuttlebus schedule. Not only does the schedule encourage the use of public transportation, but it's shirt pocket size (5 x 9 cm) suggests conservation of paper energy.

The chief naturalist said that Point Reyes was difficult to interpret for a number of reasons: (1) there are no ready-made audiences because there

are no lodges or similar places within the seashore, (2) traffic is mostly on weekends, (3) visitors come primarily from the bay area and are very sophisticated. Campfire programs are given one night a week at the commercially operated Olema Ranch Campground, a roving interperter is located on the Bear Valley Trail, and interpreters are to be found at the visitor center. This is the extent of the interpretive program as far as personal contact goes.

Many field seminars for college credit are held at Point Reyes which may delve into energy. Some of the subjects covered include: whales, Indians, ecology, birds, mammals.

Thoman said there were plans to recreate an Indian village and that the then-and-now energy consumption theme could be used there. There is an environmental eduction center at Point Reyes where energy cycles are often discussed.

While I liked the subtlety of the energy messages at Point Reyes, I felt that there was a great deal of untapped potential.

REDWOOD NATIONAL PARK

This new (1968) national park seems to be having a hard time discovering its identity. Driving north along U.S. Route 101 from Trinidad to Crescent City, one is in and out of the park at least 4 times. There is a temporary, inadequate visitor center at Orick, and a newly constructed visitor center--park headquarters building at Crescent City several miles beyond the north boundary of the park. As there are no campgrounds inside the park, evening

programs are given either at the park headquarters building or in one of the state parks adjacent to the park. It's significant to note that the park only employs 2½ seasonal naturalists, which seems woefully inadequate especially when you consider they must also run the visitor centers.

There are 2 self-guiding nature trails. One is at the Lady Bird Johnson Grove and the other is the Yurok Loop Trail along the Coastal Trail. The Yurok Loop Trail guide is well-written, with good emphasis on environmental interpretation. It would be easy to include an emphasis on energy as well.

Homer Leach, Chief I&RM, and acting superintendent while I was there, said nothing is being done directly to make the public more aware of the need to conserve energy, but that there's a lot in the planning phase. The park, for example, is trying to work out a public transportation system. He thought that an energy message could be put in the newsprint Redwood National Park Visitor Guide, summer, 1976. Native Americans now give demonstrations in basket weaving and canoe making. These could be used to talk about the natural energy that goes into these processes. He also thought that the Indian's life style could be compared with modern man's and suggested comparing fishing practices. The park offers an overnight guided trip in the Prarie Creek Redwoods State Park to Golden Bluffs. This would be a good opportunity to talk about the energy a backpacker carries. Storms and rivers are energy which could be interpreted as well as the relationship of animals to energy consumption.

Linda Finn, Interpretive Specialist, said that nothing had been done to encourage the inclusion of energy conservation in any of the interpretive

messages, but that she thought a comparison of life styles of 200 years ago with today would be a good idea. She pointed out that the concessioner at Jedediah Smith Redwoods State Park rented bicycles, but that the shoulders of the roads were not wide enough to make cycling too safe. Redwood National Park is an ideal place for cycling except for the safety problem. A bicycle trail would certainly be a fine idea.

The park gives beach tours in the summer and visitors are encouraged to pool rides for these.

It would seem to me that having a fairly large staff of roving interpreters would help give the park the identity it needs and would increase the opportunity for the interpretation of energy.

RUSSELL CAVE NATIONAL MONUMENT

It was at Russell Cave that the relationship between energy concentration and civilization came clear for me. The cave records occupancy by man for about 8,000 years. For the first 6,500 years, its occupants survived by hunting and gathering wild plants. They were a very primitive people living only to an average of 28. There is no archeological evidence that during this 6,500 year period that ornaments were made, that there were any religious ceremonies or political organizations. But around 500 B.C. a dramatic change is observed in the life style of the cave's inhabitants. Pottery appears for the first time, shell and bone ornaments are found, as well as evidences of political and religious institutions. What caused this "sudden civilization"? While the answer is complex, it would appear that two major factors were

responsible, both of them energy related. Projectile points suddenly became smaller, indicating the use of bow and arrow instead of the throwing stick. Simultaneously, the inhabitants learned to concentrate the energy of the sun into crops. Having more energy available to them, they were freer to develop those things which we have come to think of as essential to civilization. If energy concentration and consumption are vital to the development of civilization, what will happen to civilization when the energy sources become depleted?

Demonstrations at the cave include atlatl throwing, projectile point making, corn grinding, etc., all intended to sensitize the public to another way of life. I suggested to David Hannah, Interpretive Specialist in Archeology, that a contrast in life styles could surely be used to make a point about energy. He agreed and tried it on the next group to come through the visitor center. There was only a sentence about energy, but I felt it made a strong impact.

David Hannah was one of the most interesting persons I met on my journey. Having been notified of my impending arrival, he studied up on the subject of energy, and had a lot of material ready to share when I came. He'd be a good person to include in a brainstorming session as many of his ideas are very "far out." Nevertheless, he was very stimulating. Here are some of his suggestions:

1. The government should make a conspicuous display of solar cells, flat plate collectors, windmills and other alternative energy sources.
2. Grass that doesn't grow very high should be planted along parkways to cut down the energy used in mowing.
3. Caves could be used as part of heat pumps.

4. Summer heat should be stored in large underground containers for release during the next winter.

5. Dutch kitchen homes which have bedrooms above the kitchens absorbing heat during the day could be recommended.

6. Glass panes with polystyrene pellets between them could provide good insulation. When visibility was desired, the pellets could be vacuumed out.

7. Visitor centers could use more skylights with venetian blinds to divert hail, light, etc.

8. Wood stoves could be used in more NPS buildings.

9. Lots of heat could be saved by putting fans in the upper corners of a room blowing the hot air back down

10. Vegetables could be grown as the Indians grew them.

I thought that the interpretive program at Russell Cave was both imaginative and effective.

SAGUARO NATIONAL MONUMENT

The superintendent, William Lukens, had been at Saguaro for only two months at the time I talked with him (January 21, 1976), so he didn't know too much about what was happening there as far as making the public aware of the need to conserve energy. He had come to Saguaro from Chiricahua National Monument and he said they were using a shuttle bus there to take people up to trailheads so they could walk back down. Using chains on the shuttle bus saved plowing costs (and energy). He thought that a shuttle bus for Saguaro might be a good idea. A solar energy proposal for the visitor

center has been submitted. He suggested that the public could be shown ways to have fun with the sun, wind and water. He thought it would be helpful to use adobe contruction in a desert setting, that energy messages need to be adapted to the local area, that a natural history approach to energy would work, that it could be pointed out how the hillsides absorb heat in the daytime to be released at night, and that underground drip irrigation could be demonstrated.

Les Gunzel, Chief Park Ranger, said that solar energy had been used at Saguaro to run radio relays and to charge up handi-talkees for the last 9 years with excellent results, and he looked forward to the time when the visitor center would be operated with solar energy. He didn't know any way energy was being interpreted at Saguaro.

In the self-guiding booklet for the "Cactus Forest Drive," there is a reference to energy that could be developed. It reads: "The rocky slopes aid young saguaros in their struggle for survival, offering protection for seedlings from nighttime frosts as they re-radiate heat absorbed during the day." And, the park brochure describes how the saguaro responds to varying amounts of water energy as follows: "A mature plant, weighing several tons, can absorb a great deal of water following the first heavy summer rain. During extended dry periods, it gradually uses its stored water, shrinking in girth and decreasing in weight."

SEQUOIA AND KINGS CANYON NATIONAL PARKS

Unfortunately, the notes of my interviews with Stanley T. Albright, Superintendent, and John Palmer, Chief Park Naturalist, are missing. I recall that Albright had been superintendent for only 3 weeks at the time of the interview (December 8, 1975), and that we talked about Alaska from where he had recently come. A 7-mile stretch of electrical line at Mount McKinley had jumped in cost from $100,000 to $500,000. The cost of electrical energy may soon reach the point where there will be no alternative but to conserve. He asked me to suggest some ways in which energy could be interpreted and I recounted some of the ideas I had encountered up to that time.

During my interview with John Palmer, he mentioned that his father-in-law, Hubert Bebb, was visiting him; that he was an architect who was much interested in solar energy; and asked if I would like to meet him. When I met him, it turned out that he had just finished making a solar cooker out of cardboard and aluminum foil. Mrs. Palmer graciously demonstrated its

use and in no time had a pot full of water steaming away. I was so impressed that I suggested the construction of such a cooker in many of the parks I visited and recommended that it be demonstrated in the campgrounds by a park person having lunch, or as part of a larger demonstration of solar energy.

While the parks' interpretive program was largely quiescent in December, it would appear from the newsprint schedule for August 12 - August 26, 1975 that many activities are conducted which would lend themselves to energy interpretation. Prominent on the front page of the schedule is an article entitled: "Cedar Grove is a Great Place for Bicycling." The article states that guided bicycle hikes are conducted 3 times each week and that rental bikes are available.

I was also pleased to see on the front page of activities schedule a bus schedule for public transportation to and from Fresno.

John Palmer recommended the film "Freedom of the Hills" as one which emphasizes the conservation of resources, but I have not had the opportunity to preview it.

The park brochure puts a fine emphasis on the value of hiking. Speaking of the high country, it says: "Only by trail can you gain acquaintance with this rugged but friendly country."

SITKA NATIONAL MONUMENT

According to Kenneth Adkinson, an interpreter at Sitka, nothing specific

is being done to interpret energy conservation for visitors. It would be easy to do so for the visitor center lends itself to interpreting the ways in which three diverse cultures--the Tlingit Indians, the Russian settlers, and the early Americans--all viewed the consumption of energy. It would also be possible to contrast the past with the present.

The visitor center includes demonstrations by Indians making their various crafts. This process is largely non-energy-consumptive and a point could be made of this. As the native carver of the totem pole works, he could discuss how his ancestors and peers view nature.

As Sitka is a busy port, the type of ship then and now could be discussed as well as the changes in cargo.

Sitka has a special problem in interpretation. About 85% of its visitors come from tour ships and have only abut 20 minutes to spend at the visitor center. School groups, which have more time, might make a better audience for messages on energy conservation.

Energy in the form of ice was once shipped to San Francisco from Sitka. It would be interesting to contrast the making of ice then and now.

VICKSBURG NATIONAL MILITARY PARK

I found Vicksburg to be a depressing place to visit as it seemed to glorify war. The visitor center was not so bad in this respect as it did emphasize some of the suffering that took place there, but as I drove around the park and was confronted with thousands of monuments and signs (not counting the ones to be found in the adjacent cemetery) cluttering the landscape, I felt

that the emphasis was in the wrong direction. I tried to get some pictures of what actually happened there, but there was so much detail that it was impossible for me to see the big picture. I spoke of my feeling that the park was too cluttered with monuments and signs to the superintendent Daniel Lee. His reply was that anyone who wanted to put up another monument was welcome to do so. I suggested to him that an "Environmental Living Project" would be especially appropriate for Vicksburg, that the children could have the experience of eating the low rations (low energy), not being able to wash etc., that the Confederate soldiers and citizens experienced during the siege of Vicksburg, but he didn't seem to think much of the idea.

In a meeting with Lee, Tom Pardee, Chief Ranger, and Bovie Lanford, Chief Interpreter, it came clear that while a number of things had been done to conserve energy (a motorcycle was being used to patrol the roads instead of a car, heating and air conditioning were turned down at night, travel to meetings had been cut down by one-third), nothing was being done in energy interpretation as far as the public goes, my suggestion of using role playing was received with marked unenthusiasm. I suggested the use of solar energy to power several interpretive tape devices now located along the drive through the park, but was told that such installations would only be vandalized. My encouragement of bicycling was met with the objection that it would be unsafe.

All was not negative at Vicksburg, however. Public transportation around the park in a 10-passenger bus which uses an approved interpretive tape is available. The living history program, which functions only in the summer season, done in first person, could contrast the life style of the

soldiers then-and-now, the group thought. And, maybe some reference could be made to energy when hard tack and boiled peanuts are distributed to the visiting public as part of the living history interpretation.

WHISKEYTOWN NATIONAL RECREATION AREA

Superintendent Leone Mitchell thought it would be difficult to "sell" the concept of energy conservation as long as fuel is as plentiful as it is, and that the federal government is going to have to do more to set energy conservation policy if anything meaningful is to happen. The government, he said, has had its head in the sand, along with all the rest of us. While he couldn't think of anything specific that Whiskeytown was doing to make the public aware of the need to conserve energy, he thought of a number of possibilities:

1. There is already an 86 decibel limit on boats used on the lake. If the horsepower were also limited, energy could be saved.
2. Swimming, backpacking, horseback riding, sailboating, tubing and other quieter sports which consume little energy could be promoted.
3. The interpretive program could be promoted.
4. The park staff could turn down requests to travel to speak to community organizations.
5. The NEED and YCC programs could receive more emphasis by the NPS.

He pointed out that the YCC participants made a decision to flush toilets only when absolutely necessary in order to save the 4½ gallons of water required for each flushing.

Bob Grom, Chief Park Naturalist, wondered if the NPS really wants to get

involved in energy conservation when it already has so much else to do, but as we talked it came clear that the NPS is already involved in many ways. Whiskeytown is deeply involved in the NEED and YCC programs which are heavily related to energy interpretation. Here are some ways in which energy and the two programs are related:

1. Wood burning, coal and oil consumption are already being discussed.
2. The necessity for reducing litter is part of the two programs.
3. A large bulk dispenser of milk is used at meal facilities to save the paper that would be required for individual containers.
4. Sierra cups are given to each YCC participant with the date, the name of the participant, and the name Whiskeytown inscribed. This not only makes a nice momento, but since use of the cup is required during the 8-week program, much glass, paper and plastic energy is conserved.
5. "International lunches" are sometimes served.
   a. U.S. lunches are fancy box lunches with 2 sandwiches, fruit desert, bag of chips, napkin, silverware, all in plastic.
   b. Spanish lunches contain two plastic cups, one with dried fruit and the other with granola.
   c. India lunches contain granola only.

   Participants draw for the lunches. Trading is allowed. The exercise shows the high rate of energy consumption in the U. S. Amounts left over are collected to demonstrate waste energy.

Grom recommended the expansion of the YCC program, for of 2 million eligible, only 660 are enrolled. It was his feeling that this would be a fine way to promote energy conservation.

Some of the interpretive programs at Whiskeytown which have energy interpretation potential are gold panning demonstrations, "Drown Proof Your Child" swimming instruction, rafting, kayaking, and evening film programs in the campgrounds. He said that many of the films used during the past summer had emphasized energy conservation. Considering the fact that Whiskeytown has only one seasonal interpreter in the summer, its interpretive program is doing remarkably well.

YOSEMITE NATIONAL PARK

Yosemite and Everglades were the two parks visited which were doing the most with energy interpretation. It was heartening. Leonard McKenzie, Chief of Interpretation, said that energy conservation messages were integrated into a variety of activities in admittedly indirect and oblique ways. Here are some examples:

1. During the living history presentation at the history center at Wawona, an early day ranger talks negatively about horseless carriages.
2. Bicycling, skiing, snowshoeing, and foot travel are encouraged.
3. Articles on energy conservation are frequently put in the newsprint Yosemite Guide. One by John Krisko II appeared in the Guide which was current during my visit. A couple of sentences are worth quoting: "Lights of man reveal the expenditure of energy in the production of heat and light--energy from the consumption of irreplaceable natural resources from lands both near and far..... How long will the lights of man burn?--as long as man understands that he is a part of distant lands and distant stars."

4. All activities recommended by the visitor center slide program, which orients new visitors, are non-motorized.

5. The astronomy program emphasizes that the earth is all we've got.

6. Energy conservation is incorporated into the Jr. Ranger program.

Bruce Fincham, Valley District Interpreter, gave additional examples of energy interpretation:

1. Ecology float trips are conducted which use innertubes and other floating devices. They totally involve about 30 people each trip. Energy flows are discussed. Stream riffles and their relationship to the production of O_2 which is important in recycling are examined. Predator--prey ratios are discussed and a marsh with its energy is examined.

2. Hypothermia is discussed in terms of energy as its prevention is really conservation of energy. It is pointed out that 70% of a body's heat energy is lost through the head. This is related to how heat can be saved at home. One of Bruce's notable quotes: "Maybe the whole culture is suffering from cultural hypothermia." Since we're using up irreplaceable energy at such a rapid rate, perhaps we may be in the initial stages of cultural hypothermia.

3. A walk called "Ecology Ramble" includes a discussion of the natural environment in terms of energy flow. What is the flow of energy in plants compared with the flow of energy in people? How efficiently do we use energy? What are the sources of energy? Energy is expendable, Everytime transfer of energy occurs from one form to another, energy is lost.

4. The construction of Indian dwellings is compared to our own.

5. Animal behavior can be compared with human behavior. Some animal behavior that might be discussed includes: the grouse who dive bombs into the snow for the night to utilize the natural insulation of snow, the racoon which dens up to get warmth, the bees and lady bugs that cluster for warmth, the bumble bee which beats its wings to keep warm.

6. In a walk called "In the Good Old Days" it is pointed out that Yosemite's valley floor is less developed today.

7. In one of the ecology talks, a warning is given that a cold cycle of weather is coming.

Fincham had some excellent recommendations on how energy should be interpreted:

1. It's important to clarify values instead of to challenge them.

2. Since no one wants to hear a doomsday message, here's a better approach: This is the problem we have and these are the alternatives. If we do this, then . . . if we do that, then . . . if we don't do anything . . . .

John Krisco, Environmental Specialist, said he preferred a holistic approach to energy, that it would be a mistake to single it out, to set it apart. He told of the use of solar energy to heat shower water at camps in the high Sierras. He thought that the environmental living program was a good way to sensitize people to the nature of energy, and that there was a group in this program at Wawona last summer (1975) and that several are planned for the summer of 1976. He was concerned with the effect of so much CO_2

being released to the atomsphere through our consumption of energy. He recommended the movie "Tragedy of the Commons" as one being appropriate for energy conservation discussions. He kindly provided me with a copy of A Manual of Environmental Activities for the NPS Employees which he had written as part of his graduate work at George Williams College. I have read it, and am enthusiastic about its use by park interpreters. I hope it can be widely available. Krisco said that no one wants to listen to the prophets of doom, but that he personally feels that man is an endangered species.

John Good, Assistant Superintendent pointed out Yosemite's shuttle bus system as their prime example of energy conservation. Propane powered, it doesn't pollute the atmosphere. In a brochure describing the system, several reasons are given for using the shuttle bus, but unfortunately energy conservation is not among them. It would be an easy matter to add this reason when the brochure is printed again. Good also pointed out several other ways in which energy conservation was being interpreted, or could be interpreted:

1. The interpreters give ''Freak Shows'' to young people who are interested in the preparation of food and the use of resources in such a way as to have a minimum impact on the environment.
2. Yosemite generates nearly all of the electrical energy it uses in the valley by a hydro-plant on the Merced River just outside the park.
3. The Indians living in the valley in 1776 are being compared with those who are there in 1976 regarding their life styles. Whereas the Indians were self-sufficient, using only what was in the valley, today's

valley visitors use only the water. Everything else is shipped in. "The contrast," Good said, "is profound."

4. The mines at Tuolome give the opportunity to talk about renewable resources. Good thought that the idea of husbanding resources instead of always looking for new ones is an important concept to talk about.

5. He suggested that various tax rules could be made to favor energy conservation, but that the public wasn't ready for them yet.

6. Yosemite runs an institute for high school students and solar energy was considered for the camp, but it was considered too expensive. The idea of using composting toilets was rejected for the same reason--too expensive.

7. In a living history program, Indians demonstrate chipping obsidian and making baskets. The contrast between then and now could be heightened by asking people to look at what they're wearing and eating and compare it with what the Indians are wearing and eating.

8. Much can be learned from a study of animal behavior. Large vultures cannot fly early in the morning as they are dependent on the formation of thermals. The smaller vultures, however, do not have as much need for the thermals and are able to survive by flying and feeding before their competitors are airborne.

9. "If the eagles can't garner enough energy, they aren't going to make it--and neither are we."

10. Yosemite was going to build some wells in "Little Yosemite," but decided hikers could get by without this service and dropped the plans. This non-development carries a subtle energy message.

As can be seen from the foregoing, Yosemite was a very fruitful place for ideas and examples of energy interpretation.

SECTION II

ARCHES NATIONAL PARK

I stopped here on my way back to Yellowstone, taking in the visitor center and the trail to Delicate Arch. Unfortunately, I did not have time to do more. Based upon my brief experience there, I would say that a more positive attitude to taking trails could be taken in the park brochure. The sentence: "You can get to most of the scenic features of the park from the road, but the trails will yield much that is missed by motorists" only weakly and apologetically favors trail taking. Surely a stronger series of statements could be used to encourage people to get out of their energy consuming cars and onto inspiring trails. The other statement about trails in the brochure, "Trails, much less intrusive than roads, lead to many of the park's most impressive features," is followed by 3 sentences of safety messages. While safety is surely important, so is the pleasure of hiking the trails.

BANDELIER NATIONAL MONUMENT

I spent two days at Bandelier on my way from Pecos National Monument to Chaco Canyon National Monument. I was very much impressed with the introduction to the self-guiding booklet for the trail to Tsankawi Ruins. It is worth repeating here as it indicates the kind of soft-sell approach that I think is so vital to "selling" energy conservation.

> "The prehistoric inhabitants of Tsankawi were totally dependent upon their environment. Everything they owned--their homes, clothing, and tools; all of their food; everything came directly from their 'mother earth.' Then after many years of occupancy they suddenly vanished. Why? Archeologists tell us perhaps they ceased to live in harmony with their environment.
>
> Are we today with all our technical advances any less dependent

on our environment for survival? What will be our history if we live without regard for the laws of nature?

Some of these issues may come to mind as you take this trail."

I took the trail to the Frijoles Ruins and was impressed that the nature trail and the archeological trail were separate from each other. That is, you first walked the archeological trail, and, then, if you wished, you could return to the visitor center by way of the nature trail. Since the historic inhabitants were totally dependent on their environment, as stated in the Tsankawi trail guide, it would have been more effective to have integrated the nature and archeological trails--to show how the historical inhabitants used the energy that was available to them.

I was most favorably impressed with Jan Wobbenhorst, Chief Naturalist at Bandelier. She was obviously very bright, concerned, kind and thoughtful. The camaraderie among the staff at Bandelier was also obviously very high. Jan was previewing films one of the nights I was there, and she had invited everyone to come. There were half a dozen persons present including the superintendent and one of his children.

CANYONLANDS NATIONAL PARK

As I camped in the campground at Canyonlands I found a fine example of an nonverbal message regarding the scarcity of water energy. A tank truck containing water was parked alongside the pit toilets. It was an eloquent message as to the scarcity of water in this desert area. As one reads the literature, one finds that even this luxury of a water truck is available only at the Squaw Flat Campground; that water everywhere else in the park

must be provided by the park visitor. Water in this context becomes a commodity to be treasured, not squandered.

A statement about the plants and animals found in the park brochure gives rise to a perplexing question. First, the statement:

> "Many animals avoid the rigors of their surroundings by moving or changing their habitats, but some also have evolved method of conserving or even manufacturing water. Some plants also have evolved elaborate ways to collect and conserve water in the arid environment of Canyonlands."

The question which arises is: What evolutionary process will man go through to adapt himself to an environment in which fossil fuels are no longer abundant?

CAPITOL REEF NATIONAL PARK

Capitol Reef has a fine single-page handout which is a guide to 12 short hikes in the park, but one has to ask for it at the visitor center desk. It is not advertised or displayed anywhere. It succinctly, but accurately (judging from the 4 trails I hiked) describes each trail in a positve, encouraging manner.

Capitol Reef, as so many other areas in the Southwest, once had a population of prehistoric Indians. After cultivating crops for about 250 years (A.D. 950 to A.D. 1200), they left. Their departure is discussed in an interesting way in the publication Capitol Reef: The Story Behind the Scenery.

> "Why, then, did they leave? One theory is that, as climatic conditions changed and the amount of rainfall gradually diminished, the people became deculturized--having been farmers, growing their squash, beans and corn in the fertile river bottom, they now turned to

seed-gathering and hunting. This change in occupation led to a nomadic life of constant search for other areas having more bountiful game and seed crops."

This relationship between culture and the availability of energy kept cropping up over and over again whenever I visited an area where prehistoric peoples had lived. An in-depth discussion of this relationship may be found in the Russell Cave section of the report.

The interpretive program was confined to visitor center operation during my visit to Capitol Reef (April 13-15).

COLORADO NATIONAL MONUMENT

Margaret Short, Chief Naturalist, like nearly all the other chiefs interviewed, reported that nothing special was being done at Colorado National Monument to sensitize the public to the need to conserve energy. In conversation, it appeared that Colorado National Monument could emphasize the value of water as energy, contrast the life style of those who now live in the valley below the monument and the original inhabitants of the area, compare the adaptation to the environment of the plants and animals of the monument with the adaptation of man to his environment, and promote low energy activities such as hiking the fine trails within the monument. As a matter of fact, the orientation slide program shown in the visitor center auditorium does an excellent job of promoting seeing the monument afoot--probably the most effective in this regard of any I saw in all of my park visits, and the Monument Canyon Trail was one of the most impressive I encountered in 8 months of travel.

The interpretive activities were confined to visitor center operation during my visit (April 16-17).

GLACIER BAY NATIONAL MONUMENT

The flight on a large jet from Juneau to the primitive airfield at Gustavus drops you from a relatively civilized world into a wilderness setting. The tiny, shack-like airport building on the side of the runway seems incongruous to the large jet idling its motors waiting for the well-packed busload of passengers to arrive over the bumpy, muddy, washboard road from the Glacier Bay Lodge. One could hardly wish for a more effective contrast in energy sources.

After arrival at the lodge, one is back in rustic civilization. But the nature trail nearby soon hides all traces of civilization and one is free to explore the rain forest with its luxuriant mosses and lichens, a fine example of the interplay and exchange of energy.

The next day, as the bay itself is explored on a tour boat, eagles are seen frequently and seals now and then. It becomes clear that life in this wild remote and beautiful place is dependent on energy: The number of seals which can survive in this habitat is limited by the amount of energy available to this population. Rounding Muir Point it comes to mind how John Muir plied these waters by canoe 83 years earlier, what a small amount of energy he used,how little impact he made on the environment. Reading the park brochure, it is reassuring to find positive emphasis on hiking and camping. It points out that the tour boat will provide transportation for wilderness

hikers. Shortly, the boat nears an ice dotted remote shoreline and picks up a rain soaked hiker who has been out for 5 days. He has enjoyed the solitude of the place while using a miniscule amount of energy--fossil energy, that is. Glacier Bay is a marvelous place in which to discuss energy conservation.

The woman naturalist who met the jet at Gustavus to welcome us to Glacier Bay was wearing a white raincoat and a white rainhat. She had a small NPS insignia sewed to her raincoat. It was difficult to believe she was really connected with the National Park Service. I felt she could have gathered the group and given us some idea what to expect in the area, to give us some suggestions on how to use our time wisely. Instead, she contented herself to be involved in a few conversations.

On the tour boat, a naturalist gave a running commentary on the area. He was obviously well informed, and that was one of his problems. He wanted to tell us everything he knew. I felt it would have been better to give us an overall view at the beginning of the boat tour when the scenery was less exciting than later on, and then just hit the highlights, answering specific questions if people raised them.

GOLDEN GATE NATIONAL RECREATION AREA

The most impressive park area brochure I encountered in 8 months was found here. Its breezy, friendly, intimate style, coupled with an interesting use of color and humorus sketches set just the right kind of context for the area it described. I was delighted to find a total emphasis on the

use of public transportation. Not only that, but after arrival at any one of the places recommended, one is invited to be involved in a variety of activities, none of which require fossil fuel. One is invited to fly a kite, beachcomb, surf fish, picnic, hike, walk, stroll, romp, explore, ride a bicycle, watch the boats, sit in the sun, enjoy the street musicians, wade, bask in the sun, chase the waves, watch people.

While at the Golden Gate National Recreation Area, I had lunch with Bill Taylor, Enviromental Specialist, Glen Birch of the California State Parks, and Steve Heath, Chief Park Naturalist. The discussion centered primarily on the environmental living program, and their ideas are incorporated in the discussion of this subject under the John Muir National Historic Site section.

I also toured Alcatraz Island. No energy conservation reference was made by the park interpreter, but I didn't expect there would be. The interpretation of that area seems far removed from the energy conservation theme, unless one wishes to be philosophical about the potential human energy which was lost through the incarceration that occurred there.

MENDENHALL GLACIER

Shiela Helgath, an interpreter for the U. S. Forest Service at Mendenhall Glacier near Juneau, Alaska, was a veritable gold mine of suggestions for interpreting energy within the Alasken context. Here are some of her excellent ideas.

(a) Relate how animals cope with winters here - concepts such a a porcupine being able to walk on snow with a surface temperature

below 0° by recycling heat in their legs. The cooled blood coming from the feet is warmed by the warm blood descending down to the feet.

(b) Relate the extreme energy costs of a person living in a Northern environment. Most people are trying to live as they would in the lower 48 which requires a lot more energy. This could be pointed out by comparing heating requirements for homes in Fairbanks, Seattle, and San Francisco. Comparisons could be made in energy units and cost, etc. Ways in which these life styles could be modified to reduce energy consumption could be discussed.

(c) How did the primitive cultures survive? Vilmar Stephansson's book My Life With the Eskimos gives excellent examples of heating and warmth. His conclusions were that clothing not the building were how the Eskimo coped with staying warm. How can these be related to modern cultures? Perhaps by emphasizing more sweaters and less space or central heating.

(d) The dietary requirements of people in the North historically reflect the need for more energy such as oils and fats.

(e) I think the NPS at McKinley should put up a display showing the energy saved because of busing as opposed to everyone driving their own vehicle into the park.

(f) Nature walks could be defined in terms of energy - How many calories or other energy units were used during the walk, what would have been used if the person bicycled, and/or drove a car the same distance.

(g) Snow could be discussed as it related to insulation and survival for animals.

SECTION III

SUMMARY OF

FINDINGS AND RECOMMENDATIONS

FINDINGS

General

1. All park areas except for Yosemite and Everglades reported they were doing nothing special to encourage the public to conserve energy.

2. Upon close examination, it appeared that each area was already doing more in energy interpretation than it realized.

3. While all parks have made considerable savings in energy, most have not shared this information with the public. Sharing, in these cases, may be influential as examples. For example, at Amistad a restroom had been moved from the lake shore to the top of a small hill so sewage flow could be by gravity rather than by pump. This decision could have been shared with the public by putting a sign on the restroom explaining the reason for the move and thanking them for walking to conserve energy and to improve their health by exercise.

4. Negative attitudes on the part of NPS personnel toward developing an energy conservation theme fell into 7 categories:

   a. It's one more thing we have to do. We're already required to give safety messages, environmental messages, bicentennial messages, etc.

   b. The public is here on vacation, and, therefore, they don't want to hear serious messages on controversial issues.

   c. Our primary audience is made up of elderly, retired people. They

only want to be entertained.

d. There's nothing an individual can do about energy conservation. It will take governmental decisions to solve the problem.

e. We need to practice energy conservation in the National Park Service before we can preach it.

f. The energy shortage is a phony issue.

g. Science will solve the problem.

5. All who were interviewed felt that a soft-sell approach must be used in developing the energy conservation theme. We must be subtle, they said, and I agree.

6. There was generally favorable reaction to my visits. I would usually begin the interview with "What are you doing to make the public more aware of the need to conserve energy?" and end it with a brainstorming session on what could be done in that particular area. Most interviewees remarked at the end of the interview that they now had a much clearer view of what energy is and how it could be interpreted.

7. Many saw a close relationship between energy conservation and environmental education. I feel that much of that which is now occurring in environmental education could be developed into energy conservation themes.

8. All who expressed an opinion, felt that energy conservation themes should be integrated into larger contexts.

9. There is a great paucity of interpretation in winter months even in

parks which have considerable visitation.

10. Alternative forms of energy are growing rapidly in use. A Sonoma County (California) park visitor center is completely powered by electricity generated by a windmill.

Examples of Energy Interpretation

1. Offer activities which do not consume non-renewable energy such as canoeing, biking, wading, rafting, atlatl throwing, walking, hiking, swimming, drawing, contemplating.

2. Alternative forms of energy can be easily and effectively demonstrated:

   a. A naturalist could eat a lunch cooked by a solar cooker or heat some hot chocolate and share it.

   b. Windmills could be used to pump drinking water.

   c. Hydrothermal energy could be demonstrated in many park areas.

   d. The force of water in its many forms could be demonstrated.

3. Solar energy could be used to power exhibits, and the public could be informed that "This message is brought to you courtesy of the sun."

4. Use maintenance personnel to explain where the drinking water comes from, where the sewage goes to, what's involved in providing electricity, etc.

5. Recognize differences in energy consumptive lifestyles among various cultures.

6. Discover parallels between the natural world and a man's world. There are myriads of examples. Dozens will be found in the body of this report, but here are three examples for purposes of illustration:

a. The number of eagles at Mount McKinley is directly related to the amount of energy available to them. In the same way, human population must be limited by the amount of energy available to it.

b. The roadrunner absorbs heat during the daytime to release at night to keep itself warm. Man could use this principle by making use of heat pumps.

c. The creosote bush "poisons" the soil around it to prevent enroachment on its territory. Will man need to create similar barriers when energy becomes scarcer?

7. Lifestyles of yesteryear could be compared to the present. The then-and-now theme would be especially appropriate for historical areas.

8. Environmental living programs could be used more extensively to give people the opportunity, through role playing, of experiencing other lifestyles.

9. Living history programs are especially appropriate for the development of the then-and-now theme which could contrast consumption practices.

10. Use management policy decisions to illustrate principles of energy conservation. The decision as to how much light there should be in Carlsbad Caverns would be an example of this.

11. Use examples showing how man in the past has suffered because he

extracted too much energy from the environment. This approach could be especially effective in southwest park areas.

12. Use Indian legends to illustrate how they conceived of energy.

13. Put articles on energy in the newsprint activity guides for the park area.

14. Give a weather walk and use it to emphasize various forms of energy (sun, wind, water) and their relationship to plants and animals.

15. Use potential antagonism to your advantage. If an older audience, for example. doesn't want to hear about the energy controversy, talk about the virtues of independence and self reliance found in the good old days.

16. Use historical events to clarify what's happening in the world today. Just as the Creek Indians at Horseshoe Bend put too much faith in their medicine men, we may be putting too much faith in science as the answer to our energy dilemma.

17. Use history to show how civilization and energy consumption are related. (See discussion under Russell Cave.)

18. Take advantage of the cues around us to talk about energy. Examples are off-shore drilling rigs at Padre Island, Alaska pipeline at Mount McKinley, all-night glow in the sky from Las Vegas as seen from Lake Mead, clear-cut forests around Olympic, the airport across from Fort Vancouver.

19. Find ways of giving unique twists to old customs such as the interpreter

who lighted a candle instead of a campfire.

20. Backpacking demonstrations can emphasize how our energy requirements diminish if we have to carry our energy with us.

21. Approach hypothermia and other such maladies from an energy point of view.

22. Clarify values instead of challenging them.

23. Use a reasoned approach to energy interpretation instead of the doomsday message. Try: "This is the problem we have and these are the alternatives. If we do this, then . . . if we do that, then . . . if we don't do anything . . . ."

24. Present special programs to those with unique interests such as those who might wish to prepare food so as to get the most energy from it.

25. Define nature walks in terms of energy: How many calories have we used? How many would have been used if we had used bicycles, cars?

RECOMMENDATIONS

1. The use of public transportation should be encouraged.

2. The use of shuttle buses should be expanded.

3. Composting toilets should be adopted service wide. They are now expensive primarily because they are not mass produced.

4. Park personnel should be provided with vehicles that require smaller amounts of energy.

5. Think of energy as more than gasoline, oil and electricity. Energy is the food we eat, the water we drink, the waste we excrete, the air we breathe, etc.

6. Construction of buildings in parks should be adapted to the local climate, utilize alternative forms of energy, and use materials that require little energy to produce and maintain.

7. Car pooling could be better encouraged. Lists of people needing rides could be more effective than hitch-hiking. Transportation centers could be arranged where people could meet to share rides.

8. Low energy activities such as sailing, canoeing, swimming, cross-country skiing should be encouraged.

9. Emphasize the positive values of hiking. Avoid the overkill of too many safety messages.

10. De-emphasize the value of seeing a park area from one's metal cocoon.

11. Provide bicycles, backpacks and other equipment to encourage participation in low energy activities if they cannot be provided inexpensively by the concessioner.

12. Preserve through underdevelopment.

13. Encourage more over-the-snow travel so less plowing will have to be done.

14. Use wood stoves where practical.

15. Provide opportunities for recycling.

16. Use recycled paper.

17. Consider allowing bicycles on some of our trails.

18. Make more use of single page handouts so people receive only the information they want.

19. Encourage field seminars in which energy concepts are treated.

20. Increase the size of interpretive staffs. The staffs at some places, Redwood National Park, for example, were pitifully small.

21. Provide more interpretation during the winter months.

22. Arrange for a traveling demonstration of alternative sources of energy.

23. Use films which emphasize energy conservation themes.

24. Make it possible for more people to be involved in the YCC and NEED programs for they have great potential for developing energy conservation themes.

25. Emphasize in brochures, slide programs, and visitor center exhibits that the park is best seen by non-motorized transport.

26. Integrate human and plant history to show the interrelationships.