Grist

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Solar Cooker Adds New Dimension To Interpretive Programs

By David Yale

The energy crisis and the growing interest in solar energy presents some fine opportunities for dynamic, original and creative programming in our park and recreation facilities. Both urban recreation centers and wilderness-oriented areas striving to add new dimensions to their interpretive programs, can develop facilities and activities involving solar cookers, ovens, water heaters and water distillation units.

A whole new segment of the public, the mechanically minded tinkerers and amateur scientists, can be reached and involved, perhaps for the first time, on their own terms.

Solar energy programs are a natural extension of interpretive programs already in existence. No matter how far your park area is from heavy population density, power plants, and coal mines, excessive fossil fuel consumption has affected its ecological balance in some way. You can sensitize your visitors to the role of strip mining, oil spills, and thermal, air and water pollution in the environmental chain. Then involve them in building and understanding alternatives.

Solar energy is not a mere curiousity; its practical applications are numerous. The U.S. Army Quartermaster Corps operates a huge high temperature solar furnace. The Solar Energy Conversion Laboratory at the University of Florida at Gainesville has built practical water heaters, steam engines, house heaters, and even refrigerators powered by solar energy; they are currently experimenting with a car that runs on solar batteries. And, of course, Big Bend National Park, uses a solar cell to power a message repeater, realizing a substantial saving over the cost of conventional equipment (*Grist*, 18:4).

At Shingle Creek Park-School complex in Minneapolis, we decided to start our pilot solar energy program with sun cookers made largely from recycled materials. The Park and Recreation Board hired a consultant to work with a fifth grade teacher both during and after the school day. As we built and tested the cookers, we tried to encourage an experimental attitude.

The first step was scrounging for large sheets of corrugated cardboard. The children had no trouble coming up with large quantities of two-wall cardboard, the kind ordinarily used in shipping cartons. If you have the funds, you can buy triple wall cardboard, which is a good deal sturdier, but two-wall works fine. As more than thirty children worked on cutting out baseplates and ribs, and gluing these together to form a bowl shape, creative chaos filled the classroom and spilled through the door outside to the park. There was a great deal of excitement and a high sense of adventure.

Next, the ribs were covered with light-weight cardboard salvaged from a printing firm's trash bin. The foil, shiny side out, was glued to the bowl with rubber cement, producing a modified parabolic reflector, which concentrates warmth into enough heat to cook with. Of course, a smoother, more reflective surface would produce higher temperatures and a more effective surface.

It took some patience and time to learn how to adjust the cookers to the correct angle for maximum collection of solar

Starting to make a solar cooker. The frame is made out of recycled cardboard cartons.

Cutting the backing pieces from lightweight recycled cardboard obtained from a printing firm's trash bin.

Attaching the backing pieces with masking tape requires really getting into your work.

(Continued on p.6)

Mr. Yale is a recreation consultant based in San Francisco, California.

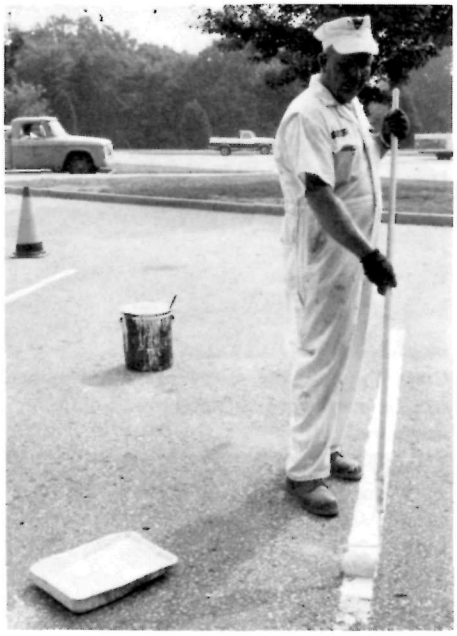
Recycling

With a little effort and imagination, we can recycle all sorts of things we find around us. As a regular feature, *Grist* will present new ideas for recycling materials your find around you. Send your ideas to Jim Burnett, Editor, *Grist*, Division of Federal, State and Private Liaison, National Park Service, Washington, D.C. 20240.

Roll Yourself A Parking Space

Before you throw away that old paint roller, take another look and see if you can't use it to paint stripes on a parking lot. Even though rollers are commercially available for this task—you might be able to get a little more mileage out of a roller you already own.

Maintenanceman C.B. Bell at Shiloh National Military Park suggests that you cut an old roller the desired width—and let her roll!



Recycling The Rear View!

Curtis Morgan, a tractor operator at Horsehoe Bend National Military Park has come up with a suggestion for recycling rear view mirrors.

Morgan suggests that the mirrors be welded onto tractor roll bars so that the operator can see approaching vehicles while cutting grass along busy highways.

Morgan suggests that old discarded mirrors or new ones be hinged so that they can be pulled out of the way while working in brush areas.

Poles Into Benches

Glen A. Asher, Superintendent at West Virginia's Chief Logan State Park, may have come up with a plan for the cheapest most durable trail benches in the country. For a total outlay of 65¢ per bench, Asher recycled old telephone poles into vandal-resistant trail benches for senior citizens to rest on the park's hiking trails.

The design is simple. Set two four-foot lengths of old telephone pole two feet deep in the ground and four feet apart. Square off the tops of the poles and span the legs with a four-foot length of 2 × 4 to make a simple, durable bench.

The bench is attractive, especially if stained a rustic brown with McCloskey's Lumber Life.

Asher recycled five gallon plastic cans by attaching them with wood screws to the side of the benches for litter, taking care to drill holes in the bottoms of the cans for rain water drainage.

Warning Light Cage

Shannon O. Williams, an automotive mechanic at Great Smoky Mountains National Park, has come up with a protective device for traffic warning lights using scrap metal.

The device, a simple cage, was developed by Williams after several $75.00 traffic warning lights were damaged by vandals.

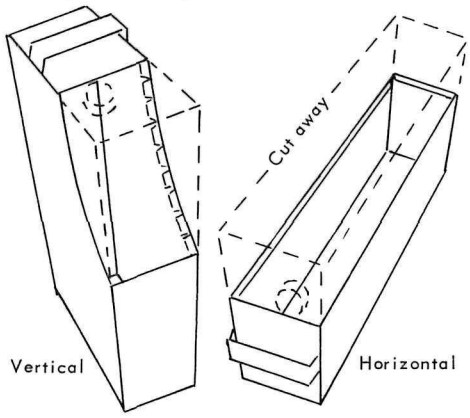
Here's how it works, the rotating beacon warning light is mounted on a steel post at the roadside to inform motorists of hazardous road conditions during the winter. The cage, using about $10.00 in scrap, welded together, is chained and locked over the light without impairing the visibility of the beacon.

Williams estimates that savings could run as high as $300 per year! His clever idea won him a $50 incentive award.

Storage Bins From Cans

Next time you try to track down some nails or bolts in your workshop, try this recycling idea from Ed Krebs, manager of Miramonte State Recreation Area in Colorado. Ed takes discarded Coleman gas cans, paint thinner cans or other excess gallon-type flat-sided cans and cuts away the edges for storage bins for small items in his workshop.

Ed recommends that you cut the side about 1/8" deep and roll the edge over 1/4" with pliers and hammer it flat. For an upright storage bin, start the cut about mid-way from the top of the can and 1/3 of the way up from the bottom using the same procedure to form an almost triangular storage bin.



Ingenuity

The following helpful hints will make your job a little simpler, a little more efficient. Send in your bits of ingenuity to us at *Grist!*

Traffic Counter Keeps Tabs On The Weather

Daily fire weather readings require park workers to count the buzzes of an anemometer for about 10 minutes. Each buzz of the device represents the revolutions of this wind-driven machine.

Until Fire Cashe Supervisor Edwin M. Peterson's new invention, parks people had to listen for 10 minutes of buzzing, divide by 10 and again by a factor which related buzzes to miles per hour in order to determine average wind speed.

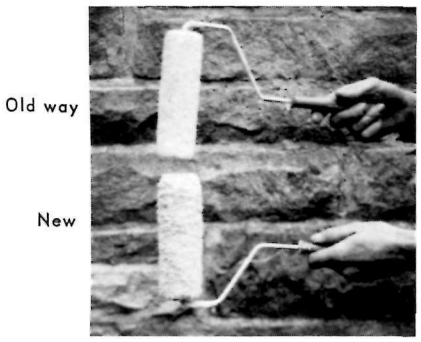
He wired an old traffic counter to the anemometer and let it count the buzzes for ten minutes. All he did was to hook up a 6-volt battery to the counter, saving the park the price of a more conventional totaling device.

Peterson's incentive award winning idea has been adopted at his own park, Grand Teton National Park, and in other areas as well.

Remedy For Old Paint Roller

Remember when you cleaned your paint roller and laid it up to dry for the night only to discover a hard flat nap the next day?

Kings Mountain National Park Maintenance Worker Jerry L. Bowen, has a better idea. Next time you use a roller, wash out as much of the paint as possible and finish cleaning it with a vacuum cleaner which fluffs up the roll like new.



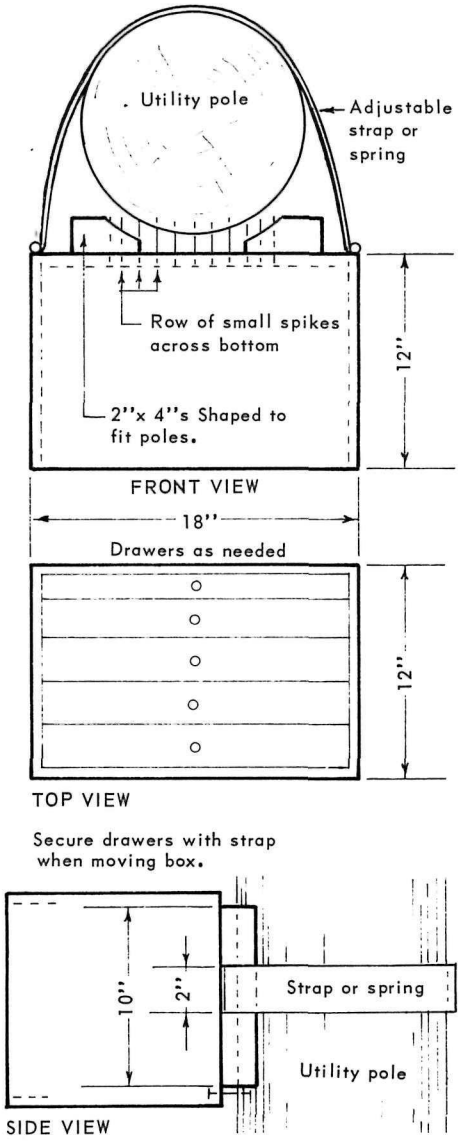
Mobile Tool Box

What do you do with your tools when you have to climb a wood pole to get to campground electrical fixtures?

When circuit breakers, outlets or wires need repair at D.H. Day State Park in Glen Arbor, Michigan, Assistant Park Manager Bill Kosmides and his staff have a handy solution.

They have devised a small box which can be attached to a pole to go up with the workers, providing all the necessary tools at hand.

The box is about 12 × 12 × 18 inches and can be fitted with drawers as needed. An adjustable strap or spring wraps around the utility pole. In addition, the top of the cabinet acts as a bench.



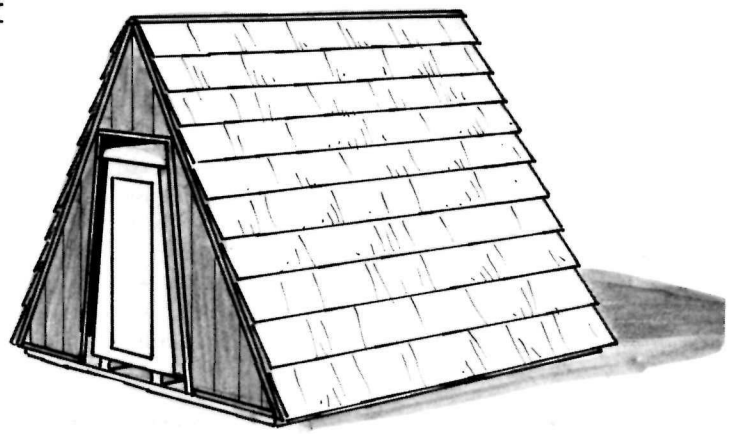
Vandal-Resistant Pathlights

Pathlights at Great Smoky Mountain National Park in Tennessee were ready prey for vandals until Fred W. Gerding developed a special cage for protection.

The materials used were conduit formed around the light and poured in concrete. The grill over the light is made of ⅝" reinforcing steel with a chain and lock to secure it. Park officials estimate that at least $500 was saved in maintenance costs over the past two years, making Gerding a $50 incentive award winner.

Restrooms

Being Discreet About A Portable Toilet



There is something disconcerting about being in the wild and coming upon one of those standard plastic portable johns in the midst of nature's splendor.

While these chemical toilets may be a step up from the standard outhouse, their exterior appearance often takes away from the general setting.

Staff people at the Medina, Ohio County Park District have come up with two good designs for housing those portable johns.

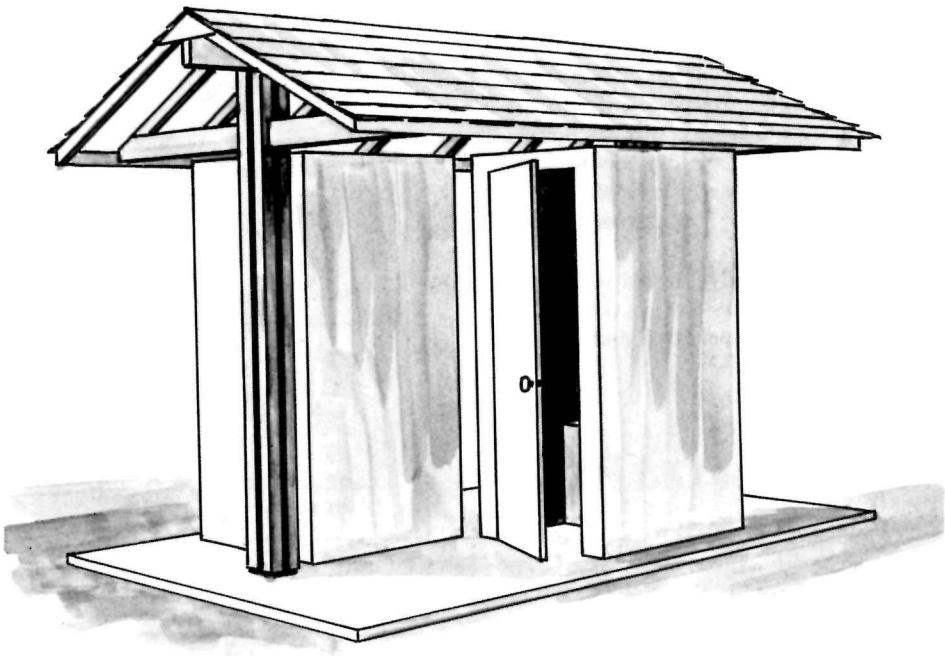
The first sketch, for two portable toilets, is essentially a gabled roof structure supported by a pair of timber columns under which two conveniences can be placed on a 10′ × 14′ concrete slab.

The supporting columns are made up of four 4 × 4 s fastened to a four-legged steel foundation base connection and pressure treated with creosote for protection against weather and bugs and to blend in with the natural surroundings. The roof is shingled with dark colored asphalt shingles and the exposed undersides of plywood sheathing are stained light brown.

A second design, also for two portable johns, is an A-frame structure, roofed in rough-sawn cedar shakes and finished at the ends with cedar siding and trim.

The slab, 10′ × 16′, holds two johns, bolted to the surface. The ridge beam peaks 12′-10″ above the slab and the horizontal A-bracing affords a vertical clearance for the toilets of nearly 8 feet.

This A-frame structure is entered from either side to accommodate two people at the same time.



Water Conserving Toilets

Interest in ways to conserve all our resources has extended to ways to conserve water by a controlled flush.

James R. Ivy of Galveston Island State Park in Texas has developed a simple modification of a flush toilet mechanism to save up to 50 percent of the 7 gallons usually consumed in a standard flush of a toilet.

Ivy explains his modification, "On the ordinary toilet tank, once the flush lever is depressed, all control is lost. The tank empties—all seven gallons of it. What is needed is a *controlled* flush so that only the necessary water is used, whether this is one gallon or seven or any amount between.

"Most of the toilet tanks now in service can be modified in about 5 minutes easily and simple. The only tools needed are a rule, a knife, and a short piece of ¼-inch inside diameter hose."

"First, measure the distance between the top of the tank ball and the bottom of the lift rod guide. Next, cut a piece of ¼-inch inside diameter hose 1 inch shorter than this. Then, unscrew the lift rod from the tank ball, lift it far enough so that it can be inserted through the short length of the hose, then screw it back into position. This can be done with the tank empty or full."

The idea was tested by Ivy himself in his own home for the past 3 or 4 years and has now been adopted at Galveston Island State Park by Superintendent Peter C. Peltier.

This homemade watersaving remedy can save as much as 40 percent of water formerly required, or about 20 gallons per person per day!

Minimum Water Outhouse

There are perhaps thousands of park and recreation areas, forests, campgrounds and other less populated spots in nature with little more than an outhouse to offer visitors.

The sign of the crescent moon need not evoke memories of unsightly, smelly johns if you follow a suggestion from *Equipment Tips*, a publication of the U.S. Dept. of Agriculture's Forest Service Equipment Development Center at San Dimas, California. The publication suggests that you install minimum water toilets, somewhat similar to the old railroad johns with a foot pedal flush.

The vitreous china units with elongated bowls and open front black plastic seats are 24-inches long, 14½" wide and can be installed directly over the old hole on which the wooden stool once stood. Connection to a water supply is made with a conveniently located union. Flushing is activated by a foot pedal, opening a water valve and at the same time, lowering a small, bowl-shaped pan at the bottom of the toilet bowl. Flushing will continue as long as the foot pedal is depressed. When the pedal is released, the pan and the valve close slowly, a small amount of water remains in the pan as a seal against odors escaping from the vault below.

Both the plumbing connections and the linkage connecting the foot pedal to the valve and pan are guarded against vandals by wrap-around plastic shields. The fixtures may be obtained for two ranges of water pressure, with water being fed by gravity from overhead tanks.

The big advantage of this type of outhouse fixture is that it is virtually odor-free, little water is necessary, the fixture is easy to maintain and clean and finally, it is much more akin to flush toilet fixtures attached to sewage systems.

For information on costs write the Duner Company, 128 North Jefferson St., Chicago, Illinois 60606.

Tailgate Spreader Gets New Use

Maintenance Foreman Garnet B. Sutphin and Maintenanceman Hubert P. Thompson at Natchez Trace Parkway have developed a way to carry material to hard-to-get places with a minimum of effort.

The men suggest placing a tailgate spreader on a dozer mold board by welding 4 brackets on the back of the spreader box to hang on top of the dozer mold board.

The idea came about when it was necessary to install several drains to carry water into a ditch line on a cut slope where slides had occurred on the Parkway. Several ditches were dug, a dozer fitted with a spreader box driven to the site, a lever pulled on the box, and 1' crushed stone for drains poured into the ditches.

"It would have required approximately 25-man days to place the stone in the trenches using wheelbarrows," say the men, "whereas the work was accomplished in 2 days by using the tailgate spreader mounted on the dozer mold board."

Fire Retardant Clothing

A firefighter's shirt of material reported to be five times as durable as cotton, is now available from the General Services Administration (GSA).

Made of the synthetic fiber, Nomex, the shirt, manufactured by the E.I. du Pont de Nemours & Co., Inc., will not melt upon continuous exposure to flame. It will, however, char. The flame retarding quality of Nomex will not be reduced through laundering or wear. The bright yellow shirt looks identical to a treated cotton shirt except cuffs and pockets are closed with Velcro (Tm) to keep out the heat, and a fly front protects the buttons from snagging and wards off heat.

In 1963, the Missoula, (Montana) Equipment Development Center and du Pont Textile Research Laboratory began working on Nomex firefighter's garments. A smoke-jumper suit of heavy Nomex duck was introduced in the early 1960's. Development of the Nomex work clothing for firefighters has been in the experimental stages concurrent with the development of light-weight Nomex fabric in the proper colors. Several areas around the country have helped to select fabrics and designs and have field tested prototype garments.

The Nomex shirts are available from the Federal Fire Suppression Equipment and Supplies catalog.

(Solar Cooker. . .from p. 1)

energy, and despite our attempts to instill an experimental attitude in the fifth graders, a number of the children wanted instant success. But then came the moment of truth; despite the variable cloudiness, the cookers worked. Hot dogs, speared and held at the focal point, simmered jucily. But marshmallows would not cook. We finally figured out, as a group, that white reflects light; the darker colored hot dogs absorbed light and therefore they cooked. After the marshmallows were wrapped in commercially available black paper bonded to foil, which absorbs the heat and reflects it inward to the food, they too, roasted.

Detailed instructions for making these cookers, as well as the other projects discussed in this article, appear in a marvelous, inexpensive book by D.S. Halacy, Jr., titled *Solar Science Projects*, published by Scholastic Book Services, TX407, New York, 1971, $.60. Another useful reference is the *Handbook of Homemade Power* by Mother Earth News, New York, Bantam Books, 1974, $1.95.

These cookers could be made in *any* recreation or park setting. Summer playground leaders, often working with limited supplies, can easily scrounge the cardboard and aluminum foil; the entire community can be invited to a picnic cooked by the children on their cooker. Don't forget to send out press releases!

Park and recreation areas could provide the necessary materials at low or no cost, and rangers or other recreation personnel could encourage visitors to build cookers and use them, on the spot. Because of the low cost factor, each family or group can make its own cooker, learning some basic principles of solar energy collection in the process. Whatever application suits your circumstances, be sure that the staff member working with the cookers has time to experiment with their design and use; it takes some time and errors before you get optimum performance.

Other projects using solar energy include a distillation system made from old window glass, scrap wood, and recycled copper tubing or a solar energy water heater made from largely scrap and recycled materials.

Solar energy presents many programming possibilities, let us know about your experiences with them.

The cooker starts to take shape as the backing pieces are taped into place. Aluminum foil will be glued to the bowl-shaped surface.

Hey!, It's hot! Someone bring me the mustard, please.

Radio Buffs Take Note

In the May/June, 1974 issue of Grist, *we published an article on frequency scanners. Ralph McFadden at the Denver Service Center of the National Park Service wrote to us about some of the important legal responsibilities which go with the use of the scanner. Here's what he recommends:*

1. If a park intends for another agency to receive and use its messages, two things should happen; i.e., a.) the frequency authorization for the park transmitter to be received by other agencies should be modified to include the additional receiving point in its frequency authorization, b.) the park should issue a letter or enter into a mutual aid agreement permitting the other agency to monitor and respond to its calls (for reasons given below).

2. By the same token, the park should not use information transmitted by other agencies without a letter of authority or agreement for doing so.

3. The use of scanners can be abused. There is no law prohibiting the interception of messages, but the Communications Act of 1934 clearly states that intercepted messages can be *used* only by the person for whom they are intended. The only exceptions to this are the public broadcasts in the AM, FM, and TV bands. Even to reveal the existence or support of a message that has been heard, is illegal to everyone except the addressee. For this reason, the documentation of items one and two above is advised. Park radio system managers are encouraged to obtain and read the Secrecy Provisions of Section 605 of the Communications Act of 1934 and Title III of Public Law 90-351, June 19, 1968. There is a brief summary of these rules in Park 5.3 of the USDI Radiocommunications Handbook.

4. Parks should also be aware that cross-band communications with scanners requires both base stations to monitor *all* transmissions of the other agency. This is often objectionable, particularly if the other agency's channel is quite busy, in that communications on that channel may detract operators from monitoring one's own frequency. Furthermore, most managers prefer that the other agency *not* have capability of hearing all their transmissions, some of which may be sensitive.

5. Parks are reminded that radio is to be used only where telephone facilities are inadequate or non-existent. It may be that cross-band communications is more troublesome than use of the telephone (especially where the need for cross-communications is not frequent). If cross-band operation *is* needed, consideration should be given to tone-operated control of the cooperating agency's loudspeaker, so that the other base station hears only those transmissions intended for it. The scanner is an inexpensive substitute if the objections of item 4 are not valid.

Maintenance and Safety

Goin' Fishing'?

Massachusetts Biologist Robert W. Franzen and Resource Specialist Henry J. Ritzer of the U.S. Dept. of Agriculture's Soil Conservation Service, have come up with some guidelines for building fishing peninsulas for small ponds. The specifications developed by the two men increase the safe fishing pond perimeter on small ponds.

When you plan to construct a fishing peninsula, keep these suggestions in mind:

*To permit safe, snag-free fishing, keep the distance between peninsulas at a minimum of 225'.

*The peninsulas should be 1' to 1.5' above the water line.

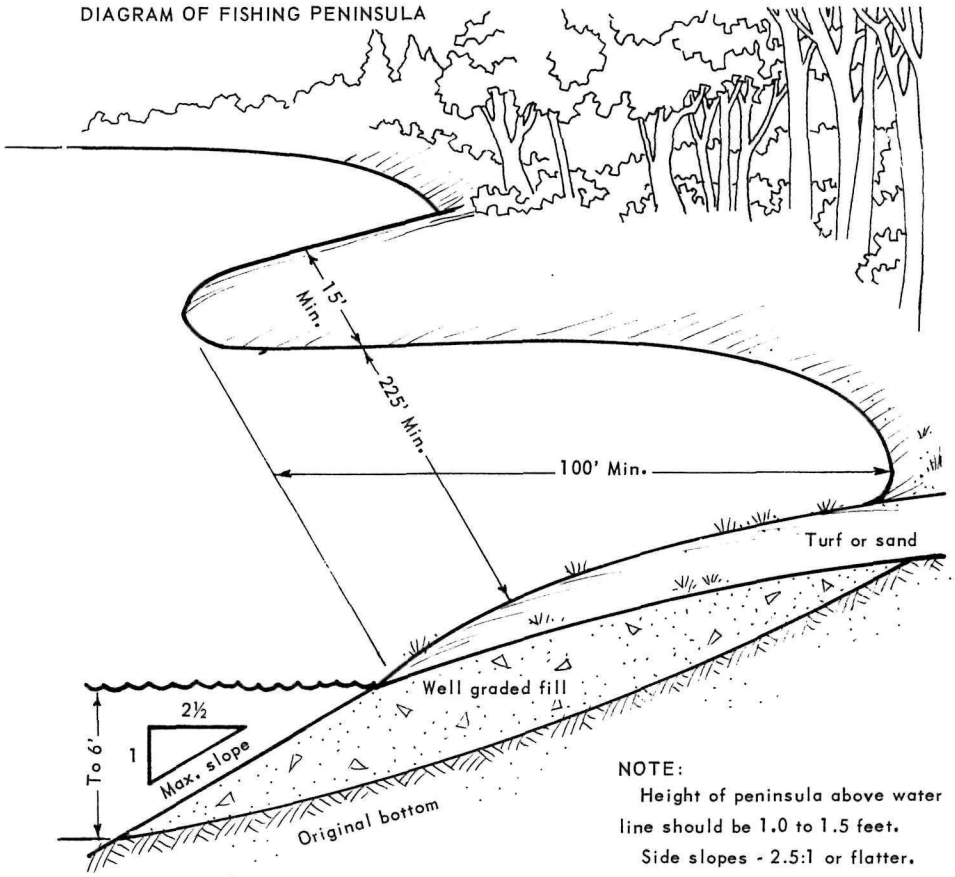
*Maximum width should be 15'

*The peninsulas should extend out to a minimum depth of 6'.

*The side slopes should be 2.5:1' or flatter.

*A depth of 6' is desirable.

DIAGRAM OF FISHING PENINSULA



Screen Saves Fish

The staff at Shawnee State Park in Pennsylvania has come up with a new way to control the water level at the park's lake earthen dam without killing fish.

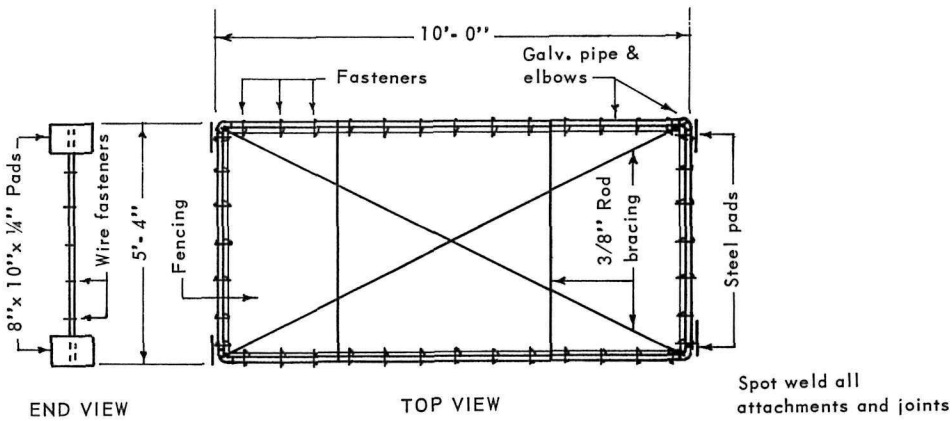
Several years ago, quite a few fish were killed when the dam's gates were opened. During Hurricane Agnes, the structure was damaged and the Army Corps of Engineers needed a draw down to repair the damage. The device developed by the people at Shawnee provides a better means of retaining fish life within the impoundment after the maximum draw down point has been reached.

An early effort to save the fish involved two sets of stop logs which blocked the water with a piece of steel plate nailed to weigh the logs down. A diver, hired for the occasion, had to place them once they were lowered into the stop log channel, costing the park large amounts of time and money.

A less expensive, equally effective solution was a screen system made up of a chain link fence, cut to the length of the stop log channel. The stop logs, pulled out to effect the draw down, were replaced by screens of chain link fence which fitted into the slotted guides in the channel, thus offering a side-to-side barrier against passage by other than a few small fish.

The screens are framed by 1½-inch galvanized pipe in 10' × 65" panels. The fencing is tack welded all around. Diagonal bracing was made by a ⅜-inch reinforcing rod. Four 8-x 10-x¼-inch steel "pads," one to each corner of the framework, and welded at right angles to the screen, serve as guides, fitting into slots in the side walls of the channel, and helping the screen to settle evenly to the bottom. A second screen is then fitted into the guides, and settles evenly on the one below.

The screens now protect the fish against a once costly environmental error.



Traveling Nature Center

If you're looking for a low budget interpretive facility, you might want to try setting up a mobile visitor center like the one developed by the people at Kickapoo State Park in Oakwood, Illinois.

Kickapoo's nature mobile, designed to fit on the back of any standard pickup truck, was built for under $100 (including labor) in 1973.

"The nature mobile was originally intended to advertise and create interest in the guided tours offered at the park during the summer months," says Assistant Park Manager Tom Vance. It soon, however, became a major program attraction itself, at times involving several hundred park visitors a day.

"The nature mobile was operated in the park by the weekend summer interpreter between scheduled guided tours. Operation involved driving through the camping and day use areas and stopping periodically when visitors were encountered. Usually, morning hours were spent in the campground and afternoons in day use areas when more day use visitors were present. At each stop, the interpreter would explain the displays to interested visitors, advertise scheduled tours and events, relate interesting facts about the park and answer any questions that visitors might have. The displays used during the 1973 season included mostly natural objects of interest found in the park. Live reptiles were collected for use during the summer and then released the following September."

Kickapoo State Park, in east-central Illinois, is a 1,685 acre multi-recreation park, making use of former strip mined land.

The mobile center, designed for a ¾ ton pick-up truck, includes two display shelves protected from weather by a roof, a canoe rack, and a brochure rack. An aisle inside the bed of the truck between the display shelves is used either for a large tank containing aquatic turtles, or to allow small children a closer view of the display items.

"Construction," says Vance, "consists of 2 × 4s making a frame 8′ × 6′ resting on the sides of the truck, with upright 2 × 4s added at each inside corner and along the sides in front of the tire wells. A gabled roof with a foot pitch and a 6″ overhang was added at a height of 2′ above the truck sides. The corner uprights are extended above the gables to form the supports for the canoe rack. Uprights extended into the bed of the truck and are braced laterally by 2 × 4 cross pieces and longitudinally by 1 × 4s. Two sheets of ½″ exterior plywood form the roof and another sheet cut into two 8′ sections forms the display shelves. Brochure racks were built in behind the tailgate using one inch lattice so that the brochures are exposed when the tailgate is lowered.

"The unit was made to be lifted off the truck when not in use thus freeing the truck for other uses," adds Vance.

The displays on the mobile center can be easily rotated to relate to different themes or different seasons of the year. In addition, to serving the needs of park visitors, the center can be taken into the city, to schools, county fairs, wherever people gather and interest is high.

The mobile nature center is a good budget-wise means to spread interpretive messages.

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