In the heating mode, the circulating fluid takes natural heat from the earth and transfers it to the space where it is needed to heat a building. In the cooling mode, excess heat is absorbed and stored for future heating needs.

A geothermal system is being used in the new 2,000 square foot addition to the visitor center.

Energy Efficiency

- Did you know compact **fluorescent bulbs** consume 75 percent less electricity, last up to 10 times longer than standard bulbs and produce less wasted heat? They are quiet, flicker free and can be used for room lighting, accent lighting and reading.

  Compact fluorescent bulbs were used for new lighting, and in the exhibit room's replacement track lighting.

- The hand dryers, faucets and lighting fixtures in the new addition operate with **motion sensors**. These features save water and energy.

Flooring

- All **carpeting** is high-performance, commercial floor covering, using 100 percent recycled-content vinyl backing. The post-consumer carpet waste used in the manufacture of the backing eliminates millions of pounds of discarded materials from being incinerated or discarded in landfills.
- Recycled backing uses less energy to manufacture than new backing.
- Its dry, glue-free adhesive eliminates volatile organic compounds and makes the indoor environment safer.

  All of the new carpeting throughout the visitor center and dormitory is also 100 percent recyclable.

- **Linoleum** is made from natural materials consisting of linseed oil, wood flour, pine resin and dry pigments, which are mixed and applied to a natural jute backing.

  Linoleum replaces the vinyl tile floor in the exhibit gallery and has been used in the expanded library and storage areas of the visitor center.

- Various types of **tiles** were used throughout the visitor center and dormitory. Porcelain tiles were used on bathroom and entry ways. They are durable and were made from natural rock and clay. The ceramic tiles in the new restrooms utilize between 55-75 percent recycled and post-consumer glass from items like car windshields and bottles.
- **Cork** is a natural wood product, which can be sustainably harvested by stripping the cork from a live tree. The cork is able to rejuvenate without harming the tree, making it a renewable resource. Cork flooring has the warm feel of wood, but provides more resilience and sound absorbency.

  A cork floor has been installed in the new conference room in the visitor center.

Exterior/Landscaping

- **Ceracrete pavers** are a concrete product containing added mixtures of ceramic and fly ash, which are post-industrial wastes that are usually landfilled.

  Ceracrete was used to cast the frog rock floor pavers at the front entry of the visitor center.

- Using **clay pavers**, instead of cement or asphalt, creates a pervious surface and allows water to percolate slowly back into the soil below.

  Clay pavers were used on the exterior walkways at the visitor center and dormitory.

- Landscaping **mulch** was created by shredding used wooden pallets instead of using virgin wood.

  Recycled wood mulch was used to landscape the visitor center and dormitory.

Parking Lot

Grasspave² is a unique, recycled plastic grid system, which is placed several inches below the soil in parking areas. This turf reinforcement system allows vehicles to park, while protecting grass from compaction.

Grasspave² is a completely permeable surface, which allows stormwater to percolate slowly into the soil, rather than "running off." Pollutants, such as motor oil, which are carried in surface water, are consumed by active soil bacteria.

One third of the parking lot at the visitor center was converted from asphalt to Grasspave².

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Designing A GREENER BUILDING

Old Woman Creek
National Estuarine Research Reserve & State Nature Preserve

Welcome to Old Woman Creek National Estuarine Research Reserve & State Nature Preserve

We hope you'll notice the recently completed renovations to our visitor center and dormitory. In an effort to demonstrate sustainable design products and practices, we incorporated many recycled-content products and environmentally friendly building materials and construction techniques into our remodeling projects.

Sustainable Buildings Improve Communities

Sustainable architecture recognizes the impact buildings have on our natural resources and focuses on designing and constructing more ecologically friendly living and working spaces. Its benefits include: increased efficiency, fewer toxic chemicals, less pollution and healthier natural systems.

Building sustainable coastal communities is a goal of both the National Oceanic and Atmospheric Administration and the Ohio Department of Natural Resources, which supported the demonstration projects and techniques used at Old Woman Creek.

Take a look at the list of environmentally friendly materials and techniques featured at Old Woman Creek's visitor center and dormitory. We encourage you to take some of these ideas back to your own homes and communities.

Building Materials

- **Copper** is a natural, durable and long-lasting material.

  This natural material was specified for the visitor center porch roof, gutters and downspouts.

- **Fly ash** is a fine-particle residue resulting from the combustion of ground or powdered coal. It is a by-product of coal-fired electric generating plants. Using fly ash eliminates materials from the waste stream, reduces the amount of energy used, conserves raw materials and reduces carbon dioxide amounts. When added to most concrete mixtures, it improves workability, strength and reduces costs.

  A high fly ash content was required for all concrete used during remodeling.

- Certified **"green" wallboard** contains 99 percent recycled materials. It offers the same performance characteristics as natural rock gypsum, but is far more beneficial to the environment. Using recycled-content products reduces the amount of waste sent to landfills.

  All wallboard used here was certified "green."

- **Organic-based asphalt shingles** are manufactured with a felt base material made of recycled waste paper and wood. This product also contains a by-product from coal burning plants. These shingles contain about 40 percent more asphalt than other shingles, making them more wind resistant and durable than their fiberglass counterparts.

  Organic-based asphalt shingles were used for all roofing projects.

- New technology has developed a healthier, low-odor, **latex enamel paint**.

  Safer paint was used on all interior painted surfaces.

- Recycled phone books provided the base material for the **wallpaper.** Colors, random numbers and letters are still visible in this attractive, textured wall covering.

  Recycled wallpaper is featured in the new conference room.

- All **nails** used in construction of the new dormitory and visitor center consist of 99 percent recycled-content steel.

Recycled cedar siding was used to construct the reception desk inside the visitor's center.

Siding

Three kinds of siding were used at Old Woman Creek.

- **Cementious siding** is a fiber-cement composite siding used on the visitor center exterior. It offers a durable, attractive and fire-proof alternative to wood. This siding resists damage from extended exposure to rain and snow. Under normal conditions, it will not rot. Although it is made of cement, ground sand, cellulose fibers, additives and water, it imitates the texture of real wood.
- **Recycled vinyl siding** was installed at the new dormitory. It contains 80 percent post-industrial vinyl.
- **Recycled cedar siding** can be found, not outside, but inside the visitor center. Recycled siding was used to construct the reception desk.

Insulation

In most communities, paper makes up the largest share of the waste stream. Greater use of recycled materials by the construction industry could make a huge difference.

- **Cellulose insulation** is produced from recovered wood pulp—mostly recycled newsprint. It consists of 80 percent or more post-consumer recycled wastepaper, the highest for any insulation. Producing cellulose insulation requires less energy, which means less fuel consumption. It is typically blown directly into walls, which fills hard to reach places and eliminates gaps where air can infiltrate.

  All new wall construction was insulated with cellulose insulation.

Sustainable Lumber

Sustainable forestry is a passive management technique, which limits the harvest rate of native forests. Forests are able to supply needed trees indefinitely, while retaining their natural values.

Harvesting only the biggest and best trees alters the structure and composition of a forest, making trees more susceptible to disease. Irresponsible harvesting can also alter resident bird populations. In sustainable forest management, all grades of trees are considered during harvesting, rather than taking only the traditionally valuable species.

Sustainable lumber was specified for the ceiling deck at both the visitor center and dormitory additions.

Geothermal Heating and Cooling

Geothermal systems are some of the most efficient methods available for heating and cooling. They are environmentally friendly, not only for their inherent safety, but also because they do not emit ground or aquifer contaminants. Since geothermal systems run efficiently, they burn less fossil fuels, which also decreases carbon dioxide emissions.

How does it work? The geothermal heat pump moves heat from one place to another using the natural properties of the earth. At a depth of 15 feet or so, the ground temperature remains fairly constant, averaging between 42-77° F year-round. Buried in the ground, inside hundreds of feet of high-density polyethylene pipe, fluid transfers heat from the soil to the building in winter, and from the building to the soil in summer.