National Park Service
U.S. Department of the Interior

CLIMATE*Friendly* PARKS

New River Gorge National River Action Plan

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NEW RIVER GORGE NATIONAL RIVER BECOMES A CLIMATE FRIENDLY PARK

As a participant in the Climate Friendly Parks program, New River Gorge National River belongs to a network of parks nationwide that are putting climate friendly behavior at the forefront of sustainability planning. By conducting a greenhouse gas (GHG) emission inventory, setting a GHG emission reduction goal, developing this Action Plan, and committing to educate park staff, visitors, and community members about climate change, New River Gorge National River provides a model for climate friendly behavior within the park service.

This Action Plan identifies steps that New River Gorge National River can undertake to reduce GHG emissions and mitigate the impacts of climate change. The plan presents the Park's emission reduction goals, and associated reduction actions and strategies to achieve the Park's goals. Strategies and action plan items were developed by working groups at New River Gorge National River's Climate Friendly Parks Workshop.[1] While the plan provides a framework needed to meet the park's GHG emission reduction goals, it is not intended to provide detailed instructions on how to implement each of the proposed measures. The park's new General Management Plan (GMP/EIS) (in draft as of March 12, 2010) considers climate change, and this plan provides the detail necessary to turn the general principles contained in the GMP/EIS to action. The park's Environmental Management System will be updated to incorporate these actions, and will describe priorities and details to implement them. The park will also develop the project management information statements needed to find funding to makes these actions happen.

New River Gorge National River aims to:

Reduce GHG emissions from its operations to 30% below 2008 levels by the year 2016 by implementing GHG emission mitigation actions identified by the park.

To meet this goal, the Park will implement strategies proposed in this plan that relate to the Park's current and future emission inventories. Specifically, the plan recommends three strategies:

Strategy 1: Identify and implement mitigation actions that the park can independently take to reduce GHG emissions resulting from activities within and by the park.

Strategy 2: Increase climate change education and outreach efforts.

Strategy 3: Monitor progress with respect to reducing GHG emissions and identify areas for improvement.

THE CHALLENGE OF CLIMATE CHANGE

Climate change presents significant risks and challenges to the National Park Service and specifically to New River Gorge National River. Scientists cannot predict with certainty the general severity of climate change nor its impacts. Average global temperatures on the Earth's surface have increased about 1.1°F since the late 19th century, and the 10 warmest years of the 20th century all occurred in the last 15 years. The single leading cause of this warming is the buildup of GHGs in the atmosphere—primarily carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) —which trap heat that otherwise would be released into space.

[1] Original notes from the workshop, including detailed action items not presented in the final plan have been archived by New River Gorge National River and are available upon request.

The continued addition of CO_2 and other GHGs to the atmosphere will raise the Earth's average temperature more rapidly in the next century; a global average warming of 4-7°F by the year 2100 is considered likely.[2] Rising global temperatures will further raise sea levels and affect all aspects of the water cycle, including snow cover, mountain glaciers, spring runoff, water temperature, and aquatic life. Climate change is also expected to affect human health, crop production, animal and plant habitats, and many other features of our natural and managed environments.

At New River Gorge National River, increasing temperatures, and changing precipitation patterns may alter park ecosystem, changing vegetation communities, habitats available for species, and the experience of park visitors. Climate and weather directly influences short-term processes in forests, such as frequency of storms and wildfires, herbivory, and species migration. Severe storms events are not uncommon to New River Gorge. In 2001, the park Gorge experienced a 500 year rain event that resulted in several dozen landslides, which subsequently contributed to the rapid expansion of exotic plants colonizing these newly disturbed areas. In the past, the forests of the New River Gorge have exhibited a high degree of resilience and capacity to absorb disturbance, such as those associated with the 20th Century Industrial Period, and have retained their basic forest function and structure. However, their ability to withstand the affects that climate change may bring to the forest is largely unknown.

There are some long-term assumptions that can be made specifically to the New River Gorge. Increases in the frequency and severity of storm events resulting from climate change could radically change the forest composition beyond the normal range of variability. The conventional wisdom is that as the climate becomes hotter and drier, one result could be more frequent and larger wildfires. However, climate is probably less important than the associated changes in vegetation in determining fire frequency. As forest types migrate northward, it can be expected that the New River Gorge will transition from a moist mixed hardwood forest, to a drier oak-hickory-pine forest where wildfires are more frequent.

The New River Gorge is at the core of one of the most diverse forested ecosystems in the world. As stewards of this globally significant resource, it is imperative that we maintain biological diversity and ecosystem resilience. Listed below are a few of the challenges facing resource managers as they try to maintain an ecosystem that is resilient to the changing climate.

- Some species may be 'left-behind' as they are unable to change distribution fast enough. Fragmenting features could pose additional obstacles to species' adaptation.
- Insect outbreaks, especially exotic forest pests such as gypsy moth and hemlock woolly adelgid, may become more prolific and difficult to manage as the climate becomes warmer and drier. Currently, abundant moisture and low minimum winter temperatures are natural stressors on these troublesome pests.
- A warmer and drier climate could negatively affect amphibians and other ephemeral pool dependent species; it could also change the insect composition such that insectivores could be negatively impacted.
- Some disjunct species are particularly vulnerable. NERI has documented 70 rare plant species, some of which are 'state' records and are especially sensitive to minor changes to their environment.
- Some plant communities or species associations may be lost as species move and adapt at different rates.
- Increased invasions by exotics may occur, as conditions become more suitable for invasive plants (For example: kudzu vine and hemlock woolly adelgid thrive in warmer climates).

[2] IPCC 2007. Climate Change 2007: The Physical Science Basis. Intergovernmental Panel on Climate Change, Geneva Switzerland. Available online at < http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>

- Many plant communities act as carbon 'sinks' (store carbon), which helps to offset carbon emissions. However over the next century, the effect of climate change on plants may mean that many terrestrial sinks may become sources (For example: moist, diverse, cove hardwood forest conversion to drier, less diverse oak-hickory-pine types that are prone to higher wildfire frequencies).

- Changing temperatures may affect the suitability of abandoned mines as hibernacula for bats.

GREENHOUSE GAS EMISSION INVENTORY AT NEW RIVER GORGE NATIONAL RIVER

Naturally occurring GHGs include CO_2, CH_4, N_2O, and water vapor. Human activities (e.g., fuel combustion and waste generation) lead to increased concentrations of these gases (except water vapor) in the atmosphere.

Greenhouse Gas Emissions

GHG emissions result from the combustion of fossil fuels for transportation and energy (e.g., boilers, electricity generation), the decomposition of waste and other organic matter, and the volatilization or release of gases from various other sources (e.g., fertilizers and refrigerants). To develop this Action Plan, New River Gorge chose to inventory emissions resulting directly from park operations during FY 2008. In the future, the park hopes to expand its inventory and planning process to include sources and impacts of visitor-produced emissions within the park as well.

The inventory conducted at New River Gorge National River is the result of a collaboration between all the divisions of the park. Data reviewed to create the inventory included:

- Electric bills
- Fuel usage bills for every stationary combustion system used in the parks (primarily propane and natural gas heaters)
- Wastewater treatment bills and water use records
- Inventory of cooling units and types of Freon used in each
- Greening of the Interior reports on waste diversion rates and green purchasing practices
- Fuel use and monthly mileage records for G-tag (leased) and I-tag (purchased) fleet
- Acreage data on forest types within park boundaries
- Records of landscape management practices

In 2008, GHG emissions from New River Gorge National River's Park Operations totaled 1,633 metric tons of carbon dioxide equivalent ($MTCO_2E$). For perspective, a typical single family home in the U.S. produces approximately 11 $MTCO_2E$ per year.[3] Thus, the emissions from Park Operations are roughly equivalent to the emissions from the energy use of 146 households each year.

As Figure 1 shows, the largest emission sector for New River Gorge National River is energy, totaling 891 $MTCO_2E$ (Fig 1 and Table 1). The majority of New River Gorge's energy emissions came from purchased electricity, which totaled 798 $MTCO_2E$ (see Table 1). The remaining emissions from energy consumption came from stationary combustion (primarily propane and natural gas heating systems), contributing a relatively small portion of emissions at 93 $MTCO_2E$. Emissions from transportation (gasoline and diesel vehicles) produced 438 $MTCO_2E$, just under half the amount resulting from energy consumption.

[3] U.S. EPA, Greenhouse Gases Equivalencies Calculators – Calculations and References, Retrieved , Website: http://www.epa.gov/RDEE/energy-resources/calculator.html

Waste sent to landfills by New River Gorge National River produced 283 $MTCO_2E$. The National River landfills its waste at a facility that practices methane flaring, a process which turns methane, a powerful heat-trapping GHG, into carbon dioxide, which is a less powerful GHG. As a result, the $MTCO_2E$ for park-produced waste was lower than it would have been at a landfill that does not practice methane flaring.

Emissions from wastewater, cooling and refrigeration accounted for a small portion of the National River's overall emissions.

FIGURE 1

New River Gorge National River's 2008 Park Operations Greenhouse Gas Emissions by Sector

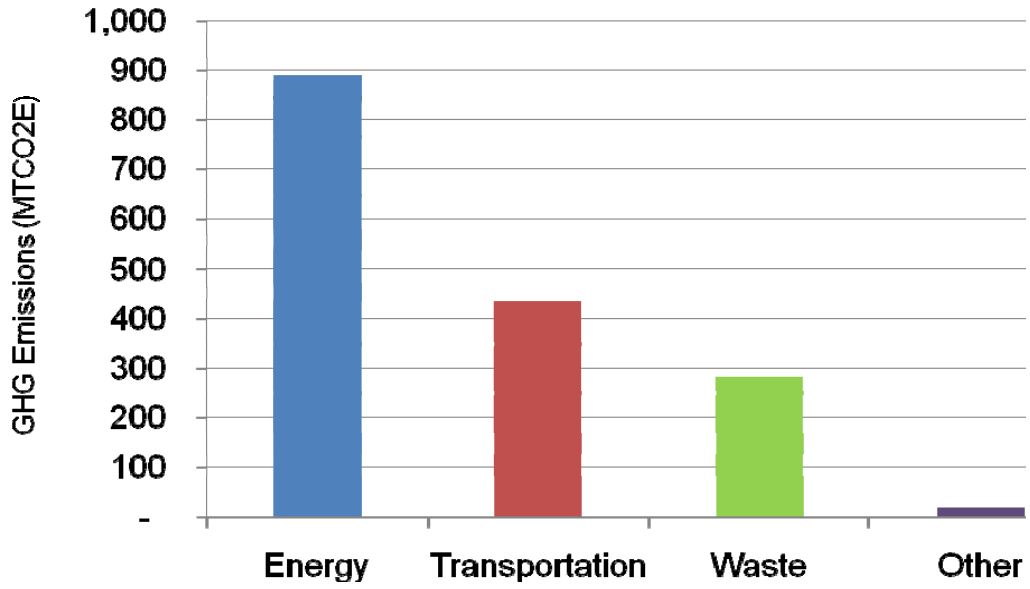

TABLE 1

New River Gorge National River 2008 Park Operations Greenhouse Gas Emissions by Sector and Source

	MTCO2E
Energy	**891**
Stationary Combustion	93
Purchased Electricity	798
Transportation	**438**
Mobile Combustion	438
Waste	**283**
Landfilled Waste	282
Wastewater	1
Other	**21**
Refrigeration and Air Conditioning	21
Total	**1,633**

Note - Totals may not sum due to rounding

Not applicable data sources represented by "-"

New River Gorge National River Responds to Climate Change

The following actions were developed during the CFP workshop hosted by New River Gorge National River on November 4th and 5th in order to meet the park's climate change mitigation goals.

STRATEGY 1: REDUCE GHG EMISSIONS RESULTING FROM ACTIVITIES WITHIN AND BY THE PARK

New River Gorge National River has developed a set of actions that the park will consider taking in order to reduce GHG emissions from activities within and by the park. These strategies will be prioritized based on a qualitative assessment of a set of criteria including: GHG emission reduction potential, cost-effectiveness, feasibility, co-benefits, regional impact, and ability to rapidly implement. Actions that New River Gorge National River will take have been presented below in order from highest to lowest priority within each sub-category.

Energy Use Management

Emission Reduction Goal: Reduce park operations' energy use emissions to 35 percent below 2008 levels by 2016.

Improving energy efficiency and implementing alternative energy sources reduces park-based fuel use, lowers GHG emissions, decreases electricity consumption, and offers monetary benefits for the park. Emissions inventory results indicate that 55 percent of the park's GHG emissions from park operations are from energy consumption. Consequently, New River Gorge National River identified actions it will consider to reduce energy-related emissions. Presented below are the actions that are currently under way and which comprise the park's progress to date, as well as those actions the park will pursue.

Progress to Date

- Default all computers to print double-sided.
- Continue to weatherize the headquarters building.
  - Caulk all the windows and increase insulation.
- Use the Glade Creek Restroom as an alternative energy demonstration project by running the aerator off of photovoltaic energy instead of a diesel-fired generator.
  - Evaluate other remote campground facilities for off-grid, renewable energy opportunities.
- Install an entryway (vestibule) outside of the headquarters side door to eliminate AC/heat loss as people enter the building.
- Encourage conservation behavior among staff.
  - Conduct staff education activities regarding emissions reduction and conservation on Earth Day
    - Hold challenges and competitions encouraging conservation behavior in areas such as energy consumption, carpooling, and vehicle use.

Energy Use Management – Planned Actions

1 Promote energy efficiency and energy conservation in the park through behavioral change

- Encourage energy conservation in all park activities.

- Achieve a 20% reduction in electricity consumption for non-visitor centers.
- Increase energy efficiency in all park buildings and housing by encouraging conservation and efficiency behaviors, e.g. shutting off lights and using sleep features.
- Identify "vampire energy users."

- Make sure that all staff change their computer power settings to automatically enter sleep mode.
  - Work with the education and outreach group to properly communicate the new computer power management policy.
  - Develop a best practices document for computer settings, battery chargers, printing, use of powerstrips, and distribute to offices.

- Develop a mandatory energy-saving training program.
  - Post monthly building energy consumption information on building doors; note changes in usage, costs and savings.
  - Include information on costs and energy savings for highest performing buildings; attribute energy costs to buildings by division so that savings can be held within divisions and applied to other priorities.
  - Ensure that any building upgrades or changes include an educational/training component that informs all occupants of new technologies and best management practices for building operation.

- Establish an Operations and Maintenance (O&M) schedule that evaluates energy use across the entire park.
    - Conduct an energy audit of all maintenance activities.

- Instruct janitorial staff to turn off the lights in buildings after cleaning.

2 Upgrade lighting options

- Conduct a lighting audit on all park buildings.
  - Include proper location of light switches to make sure they are easy to turn on/off.
  - Replace all incandescent light bulbs with CFLs, ensuring that an adequate recycling/disposal plan is in place for used CFLs and fluorescent bulbs.
  - Right-size lighting (building by building).

- Replace high-power lighting fixtures in park headquarters with energy efficient fixtures and install motion sensors.

- Evaluate outdoor lighting and replace existing installations with more efficient technology.
    - Review interior and exterior security lighting to ensure that lights balance the security needs with energy efficiency concerns.
    - Continue with pilot project at Thurmond Depot.

- Make sure that new building projects emphasize natural lighting.

- Develop Meadow Creek and Burnwood campgrounds according to LEED lighting and siting principles.
- Make sure night lighting systems are night-sky friendly.

- Increase daylighting with conventional glazing, light shelves, skylights, and clerestory windows.
  - Incorporate skylighting in new buildings and roof renovations.

3 Improve building HVAC systems

- Train park staff to operate building automation systems (BAS) and HVAC systems in new and renovated buildings.
  - Work with contractors to include a guarantee of initial and follow-up training for any HVAC installations in new and renovated buildings.
  - Train an individual ("energy czar") to understand and practice proper operation of programmable thermostats; connect with staff and maintenance crews to determine appropriate settings for thermostats.
  - Assess occupants' tendency to open/close windows and include recommendations on the best use of AC vs. natural cooling options.
- Hire a contractor to evaluate existing HVAC systems and recommend appropriate operation and maintenance for maximum comfort and efficiency.
  - Inspect the HVAC systems in the Sandstone Visitor Center and Headquarters buildings.
  - Address heating and cooling issues in the front Headquarters vestibule and surrounding offices.
  - Assess the relative efficiency of individualized heating/cooling units for each office
- Consider relocating individuals in the Grandview fire building, Burnwood Cabin (old ranger station), etc. as well as other low-staffed buildings as appropriate to limit overheating/cooling of low-staffed buildings.
- Reconfigure workstations to accommodate the heating and cooling preferences of individuals.
  - Adapt workstations and office configuration to HVAC systems.

4 Switch to more efficient electronics and devices

- Install Smart Strip powerstrips throughout park buildings and facilities.
- Purchase only energy efficient electronics.
  - Refer to the Federal Energy Management Program guidelines for purchasing energy efficient appliances in accordance with federal procurement procedures.
- Install energy meters in Thurmond housing and track energy use.
- Evaluate the need for hot water in all buildings and customize building operations accordingly.
  - Set temperature to meet current demand; turn off water heaters that are not being used; upgrade water heaters that are needed, but are inefficient.

- Replace park's existing boiler or furnace with an energy-efficient model.

5 Improve building structures and envelopes

- Weatherize park buildings by upgrading insulation and adding R-values to improve insulation effectiveness.
- Replace old windows with new windows that provide better insulation and solar selectivity.
  - Retrofit Dun Glen housing with dual-pane windows. Continue to upgrade windows in Thurmond.
  - Look for spectrally selective glass, double-glazed, low-e systems, gas filled windows, and electrochromic windows.
- Include weatherization in systematic upgrades of park buildings.
- Inspect insulation in Headquarters, Glen Jean Bank, and other buildings to determine if R-value is appropriate.
  - Increase the R-value and upgrade insulation as needed.
- Evaluate new construction projects for opportunities to install green roofs.

6 Utilize alternative energy sources

- Purchase electricity from a renewable energy provider.
  - Investigate potential to purchase renewable electricity through Allegheny Electric Power to reduce electricity emission factor.
- Install solar hot water heaters.
  - Investigate opportunities to install solar hot water heating at Headquarters and Canyon Rim.
- Install photovoltaic panels on park buildings, parking lots, & open areas.
    - Find grant funding to install solar photovoltaic PVs on park buildings.
  - Investigate opportunities for installing PV systems in Thurmond temporary housing.
- Install solar thermal and PV systems at the Canyon Rim Visitor Center.
  - Include interpretation explaining the benefits of using solar energy at New River Gorge National River.
- Install PV systems on the Sandstone Visitor Center restroom roof.
  - Install skylights or light tubes in the restroom.
- Install geothermal heating systems.
  - Consider installing geothermal supplemental heating in new construction projects.
- Work with the Corps of Engineers to purchase renewable energy from the new hydroelectric dam.

7 Other Energy Management Actions

- Conduct an energy audit for all park buildings.
  - Collaborate with the local utility if necessary to conduct the energy audit.
- Incorporate LEED principles into the development of Camp Brookside.
  - Include solar thermal hot water systems.
- Incorporate green building practices in the moving and renovation of the Grandview Visitor Center.
  - Use local materials for exterior, upgrade insulation, reorient the windows for maximum efficiency (include shading), and plant native plants and trees.
  - Evaluate the costs and benefits of a small grid-tied PV system and consider moving the PV system to the visitor gazebo.
- Adhere to LEED EB principles in the renovation of the Cliffside Amphitheatre building.

Transportation Management

Emission Reduction Goal: Reduce park operations transportation emissions to 30 percent below 2008 levels by 2016.

Reducing vehicle miles traveled, improving vehicle efficiency, and using alternative fuels can significantly reduce New River Gorge National River's emissions. As the inventory results indicate, GHG emissions from transportation comprise 27 percent of park operations emissions. Presented below are the actions that are currently under way and which comprise the park's progress to date, as well as those actions that the park will pursue.

Progress to Date

- Replace two-stroke engines with more efficient four-stroke engines in boats, snowmobiles and other equipment.

Transportation Management – Planned Actions

1 Transportation-related behavioral changes

- Reduce visitor vehicle idling.
  - Post signs and information with Park idling rules to prohibit visitor vehicle idling; first educate drivers about idling, then enforce an anti-idling policy.
    - Create an anti-idling policy for buses at the park visitor centers.
  - Investigate alternative power units (APUs) for buses to use that burn 0.2 to 1 gallons per hour.

- Encourage staff carpooling.
  - Develop carpooling information and support services for staff.
- Reduce staff idling.
  - Prohibit staff vehicle idling unless required for vehicle maintenance.
  - Create dashboard idling guidelines and post in all park-owned vehicles.
- Promote telecommuting and more flexible scheduling to reduce staff VMT.
  - Implement maxi-flex scheduling for some employees.
- Encourage smoother acceleration/deceleration when driving.
- Reduce meeting travel.
  - Use webinars/conference calls to avoid excessive travel, both within and outside of the park.
  - Purchase necessary equipment for teleconferencing and videoconferencing.
  - Use the IT department to ensure that staff are appropriately trained on available technology.

2 Reduce fuel consumed by visitor vehicles

- Investigate and encourage the use of alternative transportation systems.
  - Re-instate the old shuttle service; work with Gauley River National Recreation Area on a comprehensive alternative transportation system.
    - Use the Gauley River developmental concept plan (DCP) to help guide the planning of sustainable visitor traffic patterns in the park and the surrounding area.
  - Identify and implement the most efficient transport of river users to the river from off-site.
  - Investigate the potential for using rail to transport visitors.
- Improve tracking of visitor transit data.
  - Explore opportunities to collect data on visitor transportation patterns, vehicle occupancy, and ridership.
- Partner with surrounding state and local communities on alternative transportation opportunities for visitors.
  - Link in-park transportation systems to public transportation whenever feasible, through cooperation with public transportation agencies and gateway communities.
  - Use river rafting companies to pick up visitors at specific points for put in and take out from river; establish an off-site parking lot where shuttles pick up for river trips.
  - Research grant opportunities for community transportation plans using alternative fueled shuttles.

3 Replace NPS vehicles and equipment

- Right size the vehicle fleet by the number and type.

- Use a Vehicle Allocation Methodology (VAM) to achieve a fleet that is the right size and type.
- Create a fleet management team with representatives from each division to address specific needs and share best practices for fleet efficiency.

- Increase fleet-wide mile per gallon (mpg) average.
  - Benchmark existing fleet-wide mpg average and raise the average through vehicle replacement with models that exceed California's fuel economy standards.
  - Conduct a fleet management study and implement recommendations.
- Develop and implement a vehicle replacement plan.
  - Evaluate AFV options: Hybrid electric vehicles (HEVs), electric vehicles, compressed natural gas (CNG), and biodiesel.
  - As older vehicles come up for replacement, order alternative fuel vehicles.
  - Substitute trucks with smaller utility vehicles.
  - Replace small utility vehicles with electric and hybrid models.
- Improve the fuel efficiency of grounds and support equipment.
  - Assess the feasibility of switching to electric powered UTVs.
- Investigate new vehicle technology that is not currently available.
  - Investigate efficient small diesel cars as part of a park fleet plan; work with GSA.
- Use biodiesel in diesel fuel vehicles.
  - Convert heavy-duty road grader equipment to run on biodiesel.
- Use alternative fuel vehicles in demonstration projects.
  - Showcase new AFV technologies.
- Equip LE vehicles with LED emergency lights that can be run without the engine on.

4 Vehicle maintenance

- Develop and maintain a fleet maintenance schedule.
  - Keep vehicles in top mechanical condition: rotate tires every 5,000-miles, check tire pressure, do not top off tank, get regular tune-ups.
- Use synthetic lubricants.
  - Continue to compare the environmental impacts of recycled motor oil versus bio-based versus synthetic lubricants.
- Operate all fleet vehicles using re-refined engine oil.

- Use re-refined oil with a minimum 25% PC content.

5 Transportation Infrastructure

- Use existing train tracks for visitor transport.
  - Use existing park rail infrastructure and investigate the feasibility of an electric train for visitors.
- Develop electric vehicle charging infrastructure in the park.
- Plant trees and local grasses/shrubs in unused parking lots to sequester carbon.
  - Include unused strip roads, ATV trails, logging roads in re-vegetation efforts.

6 Other Transportation Management Actions

- Consider moving the Dun Glen maintenance building closer to headquarters.
  - Reduce the amount of driving required of maintenance staff, who meet and commute at Dun Glen, but work primarily near headquarters, 20 minutes drive away.
- Provide a metered opportunity for employees to purchase power for electric vehicles.
- Put division vehicles into a common park-wide pool so that they can be used by anyone on staff who needs to check out a vehicle.

Waste Management

Emission Reduction Goal: Reduce park operations waste emissions to 20 percent below 2008 levels by 2016 through waste diversion and reduction.

The connection between waste and GHG emissions may not be obvious. However, waste management—in the form of source and solid waste reduction—can dramatically reduce GHG emissions. Landfills are the largest human-generated source of CH_4 emissions in the United States. Reducing the amount of waste sent to landfills reduces CH_4 emissions caused by decomposition as well as the GHGs emitted from the transportation of waste. The less the park and its visitors consume in terms of products and packaging, the less energy is used and fewer GHGs are emitted.

New River Gorge National River's park operation activities emitted 283 $MTCO_2E$ from waste management in 2008. Diverting or reducing the park's waste stream through increased recycling efforts and waste management will reduce the amount of waste sent to landfills and resulting emissions. Presented below are the actions that are currently under way and which comprise the park's progress to date as well as those actions that the park will pursue.

Progress to Date

- Reduce purchasing through reuse.
  - Specify materials recovery (reuse and recycling of materials and components) in both building-removal bidding and in property-redevelopment process.
- Coordinate procurement practices so that surplus materials in one unit may be used by another unit.

- Repurpose rather than discard surplus materials.

Waste Management – Planned Actions

1 Decrease waste through behavior change

- Require that construction contractors reuse or recycle materials used during building renovations and new site construction/remodeling projects.
- Engage staff to reduce and manage waste at work.
  - Make it easy to recycle and compost waste; ensure that containers fit the environment (e.g., animal-proof, rust-proof/salt air -resistant/moisture resistant, and proper size).
  - Make ceramic plates, bowls, mugs, and silverware available for employee use in lieu of disposable products.
  - Institute paperless office practices.
  - Consider packaging when purchasing, printing, and reduce office waste in general.
- Train maintenance staff on waste reduction initiatives.
  - Continually inform maintenance crews about recycling and composting policies.
  - Require an annual training on waste reduction and green procurement.
- Train custodial staff in most efficient use of cleaning products.

2 Establish new plans and policies that promote waste reduction.

- Measure baseline solid waste generation (tons).
  - Collaborate with waste management facilities to estimate tonnage based on dumpster size and the type of trash being disposed; also work with the State Solid Waste Management Board.
  - Measure, track, and report waste stream data (record landfill waste and recycled waste in a spreadsheet tracking system) to monitor reductions and success in diverting waste from the landfill.
- Incorporate Waste reduction into Green Office Practices.
  - Reduce purchases where possible and avoid duplicate purchases.
  - Purchase CPG office supplies with maximum recycled content, avoid PVC supplies.
  - Purchase durable, reusable supplies, always print double sided, reuse office supplies when possible.
- Communicate park waste policy to staff and concessionaires.
  - Create an orientation packet and provide information on policies and practices for recycling, green procurement, and other aspects of the park's waste management policy.
  - Conduct brown bag lunches and training seminars for all park personnel on topics related to waste reduction.

- Include information on park sustainability, green procurement, and recycling policy in new employee orientations.

- Reduce waste generated at meetings and employee functions.
  - Establish guidelines for waste minimization: use durable, reusable utensils and mugs, buy in bulk, use items with reduced packaging, and provide recycling receptacles.

- Create a materials exchange program.
  - Materials that can be repurposed should be catalogued and stored or exchanged, e.g., brick and wood waste. Old equipment that cannot be repurposed can be donated or recycled.

- Install automated hand dryers in headquarters, ranger's stations, Burnwood, Grandview, and any other buildings that use towels.

3 Implement recycling and composting practices

- Partner with vendors to reuse and recycle park waste.
  - Encourage theatre to use more sustainable materials; reduce Styrofoam, purchase biodegradable disposable cutlery, and recyclable plastics for cups and food packaging.
  - Encourage reuse and recycling in all food service facilities.

- Start a comprehensive recycling outreach campaign aimed at park visitors.
  - Institute a glass ban to keep glass away from the river.
  - Work with local schools to conduct an interpretive recycling program (integrate with environmental education program and into interactive programs: wildlife viewing, etc.).
  - Use bulletin boards to post information and email information through shelter reservation system.

- Continually increase the amount of waste material at your park that can be recycled.
  - Recycle cardboard, aluminum, scrap metal, glass, white paper, and no. 1 PET and 2 HDPE plastics.
  - Add mixed paper, tin, other plastics (including film), and pallets.
  - Find reuse opportunity or donate unwanted items. Look into cooperative waste disposal or recycling to increase volume and reduce costs/traffic.
  - Investigate REAP grants to improve recycling.

- Recycle or donate old computers and electronics.
  - Recycle unusable computers and electronics.
  - Donate old equipment to schools, senior centers, etc.
  - Practice cradle-to-grave recycling to ensure toxic components are properly managed. Purchase electronics with less toxic components.

- Practice environmentally responsible deconstruction.
  - Reuse or recycle decking at Grandview.
  - Continue to recycle and reuse old building materials in new campgrounds and other projects.
- Eliminate non-recyclable Styrofoam/food service ware.
  - Use biodegradable cornstarch utensils (Earthshell) and biodegradable foam "peanuts."
- Install easy-to-use recycling containers throughout park facilities.
  - Purchase containers with recycled content. Place trash and recycling containers next to each other.
  - Evaluate signage; use graphics.
- Implement a construction waste management plan and job site recycling policy.
  - Require a Construction Waste Management or Recycling Plan; track quantities of recyclables.
  - Make sure contract language addresses waste plan/recycling. Check on "take-back" policies (e.g., ceiling tiles, cardboard, carpet, and drywall).
  - Reuse construction waste on-site, reuse elsewhere, or sell for recycling materials of value including lumber/wood, drywall, metal, rubble, cardboard, fixtures, hardware, and wiring.
  - Require drywall contractors to recycle waste.
  - Work with haulers to prevent contamination of waste sorting. Ensure no illegal dumping occurs off job site.
- Responsibly dispose of dumped tires found in the river.
  - Look for partners and identify markets for recycling tires found in the park.
- Use recycled oil and recycled coolant and other fluids in auto shop.
  - Work with maintenance to recycle oil, antifreeze and other fluids in vehicles and small engines.
- Send used florescent bulbs to reclaim/recycle service center.
- Institute alkaline, lithium battery recycling locations in every office building.
  - Put recycling boxes in each building. Email staff and educate them about the new recycling boxes.
- Purchase retreads for big equipment when replacing tires.

4 Reduce waste through green procurement

- Evaluate current purchases and reduce redundant products.
- Reduce amount of packaging used in products sold and used in the park.
  - Have visitor centers purchase products with reduced packaging, purchase different bags for purchases (i.e. recycled paper bags or biodegradable bags).

- Charge for or ask if they people need a bag. Let vendors know your packaging preference.

- Incentivize contractors to practice green procurement practices.
  - Use innovative contracting techniques and encourage contractors to follow CPG and purchase environmentally preferable products.
  - Incorporate environmental considerations into all aspects of a solicitation package: construction waste recycling, sustainable products, and energy/water efficiency standards. Specify green products in specs.
  - Require all bid documents to be printed on double-sided, recycled-content paper.

- Continually increase the recycled content of purchased materials.
  - Focus on office supplies, gift shop concessionaires, building supplies, furniture and maintenance equipment: hoses, mulch, edging, timbers, posts, and compost with recycled content.

- Use post-consumer recycled paper in all park publications.
  - Use 100% post-consumer (PC) content, processed chlorine-free (PCF) copy paper. Consider alternative fibers (i.e., non-wood) and water-based or vegetable-based ink. Target paper reduction.

- Train staff on green procurement practices.
  - Encourage procurement staff to take OFEE's online green purchasing training.
    - Schedule a day-long training with a Regional Procurement specialist for staff in charge of purchasing decisions.

- Adapt a list of pre-purchase questions to guide greener procurement.

- Develop a catalogue of sustainable products for purchasing department.
  - Develop a preferred list of green and locally sourced products for purchase cardholders and provide the list to park employees.
  - Look into each division for division-specific purchasing guidelines.

- Adhere to Federal, NPS, and PWR Guidance for Procurement.

- Inventory and substitute all cleaning supplies with non-toxic products.
  - Conduct an inventory and review of all cleaning supplies. Substitute products containing hazardous/toxic chemicals with non-toxic products.
  - Look for Green Seal Certified products and other green attributes when procuring cleaning and maintenance equipment.

- Use low/no-VOC insulation, carpets, paints, and adhesives.

- Manage waste associated with computers and fax/printers.
  - Purchase remanufactured toner cartridges.

- Purchase LCD monitors instead of CRT, which use less toxic substances.
- Reduce the printer-to-employee ratio by maximizing shared network printers.

- Develop a schedule for replacing existing materials.
  - Conduct an inventory of potential replacements and begin to phase out older, inefficient products for energy star products.
- Implement petroleum product substitution program.
  - Increase the use of biobased products; audit the biobased products in use and look for opportunities to incorporate new products.
- Promote the use of recycled content products and materials procurement within the NPS.
  - Raise awareness to field operations personnel, procurement officials, supply and requirements personnel, as well as to charge card purchasers.

5 Reduce and reuse wastewater

- Install low-flow faucets.
- Replace toilets with low-flow models.
  - Install water efficient technology, e.g. composting toilets and waterless urinals.
  - Look at installing composting toilets at park comfort stations.
- Conserve water used in grounds maintenance.
  - Use drought-tolerant grass and native plantings.
  - Mow less grass and grasscycle (leave mowed clippings in place to fertilize).
  - Do not overwater.
  - Avoid watering during the hottest time of day and do not use fine spray sprinklers. Maximize permeability of surfaces to allow site to absorb water.
  - Use rain catchment techniques.
- Monitor and reduce point source wastewater.
  - Inventory maintenance wastewater sources and discharge routes.
- Manage non-point wastewater.
  - Prevent pollution and use green products. Keep storm drains clean. Clean up spills but do not hose into streets.

STRATEGY 2: INCREASE CLIMATE CHANGE EDUCATION AND OUTREACH

Climate change is a complex and easily misunderstood issue. New River Gorge National River can play an integral role in communicating the issue of climate change to a vast audience. A better understanding of the challenges and benefits of reducing GHG emissions can motivate staff, visitors, and community members to incorporate climate friendly actions into their own lives. New River Gorge National River recognizes that the greatest potential impact the park can have on mitigating climate change is through public education. Thus, the park sees public education as an end goal of any climate initiative. From increasing the efficiency of public transportation to developing a green purchasing program, the actions New River Gorge National River takes to address climate change serve as opportunities for increasing the public's awareness of climate change. Presented below are the actions that are currently under way and which comprise the park's progress to date, and those actions that the park will pursue.

Visitor Outreach

Understanding climate change and its consequences is essential to initiating individual behavioral change. New River Gorge National River realizes that it has a unique opportunity to educate the public in a setting free from many of the distractions of daily life, but in a way that helps visitors connect climate change issues back to their daily lives. By using existing materials, developing park-specific materials, highlighting what the park is currently doing about climate change, and encouraging visitors to reduce emissions, New River Gorge National River can play an important role in educating the public about climate change.

New River Gorge National River staff recognize the many different audiences that visit the Park, including recreational and non-recreational park visitors, "virtual visitors" who visit the park online, school-aged visitors, local and out of town visitors, local tribes, and external audiences. Reaching these various audiences with climate change information and engaging them in the park's efforts requires appropriately focused messaging. The park has developed a number of strategies to reach these various audiences effectively. These strategies include:

- Incorporate climate friendly information into park educational programs and work with school systems to develop school-based educational programs on climate change.
    - Incorporate climate change education into New River Gorge National River's strong existing outreach programs in local schools.
    - Consolidate existing curricula on climate change from EPA and other agencies, and make it locally appropriate for delivery by interpretive staff. Make these curricular resources available to local teachers.
    - Incorporate environmental responsibility and sustainability topics into Junior Ranger and Public Lands Corps programs. Emphasize careers in natural resources and environmental fields, i.e., "green jobs."
- Educate visitors about their recycling options at the park and at home.
    - Increase signage around recycling receptacles.
- Create demonstration projects and exhibits to convey Park sustainability message to visitors.
    - Provide information to the public on how the park is becoming more sustainable and the benefits of climate-friendly actions.
    - Post park energy savings and monetary savings on our Web site.

- Consider the installation of solar panels in front of each visitor center.

- Develop a “Do Your Part” program for online visitors.
  - Create low-cost incentives and prizes (e.g. NPS visitor’s pass) for local participation in Do Your Part!

- Educate visitors about climate change.
  - Encourage use of park resources by community groups working on climate change education and sustainability; post relevant community educational events hosted by local organizations promoting sustainability at visitor centers and kiosks.

- Develop plan for interpretation on shuttle buses.
  - Partner with rafting companies to place materials on their buses.

- Develop and distribute Do Your Part! materials.
  - Pass out business cards, posters, stickers, bumper stickers, post cards etc.
  - Target "low hanging fruit" groups such as NRAC, with messaging about personal responsibility and the sacrifices West Virginia has made for the energy economy.

Local Community Outreach

The gateway communities, agencies, vendors, and volunteers surrounding New River Gorge National River can play a significant role in supporting the park’s climate change mitigation goals. As such, when appropriate, park staff will assist local communities with incorporating climate change messages into community events and find partners to promote climate change education at those events, and engage with surrounding agencies to coordinate effective outreach and education efforts. Potential actions include:

- Work with the surrounding community to address climate change.
  - Develop and deliver locally appropriate messaging on sustainability and climate change.
  - Outreach language will incorporate local Appalachian culture of self-sufficiency, monetary savings / economic benefits and other positive aspects of sustainability.
  - Leverage partnership with Public Broadcasting Service.

- Communicate with local community groups, park visitors, and local media about actions they can take to reduce GHG emissions.
  - Encourage internal and external stakeholders to reduce their carbon footprints using tools like Do Your Part!

- Set up a Do Your Part! table at local events.
  - Collaborate with local organizations to promote Do Your Part! at events.

- Include community members in climate change discussions.

- Consider the local economy in procurement and other areas.

  - Schedule a daylong training with a regional procurement specialist for those staff in charge of purchasing decisions.

- Host climate change education workshops.
  - Focus presentations on climate change priorities and talk about success stories.
  - Host workshops to train teachers in climate change education
  - Provide trips to the park as a reward for school contest winners, promote events at visitor centers, and provide spaces for environmental education activities.
- Educate local community about what your park is doing to manage waste.
  - Improve signage and recruit volunteers to conduct public education about recycling and local opportunities for waste diversion.
- Collaborate with park partners on climate friendly actions.
  - Work with park concessioners, Tribes, Friends Groups, local environmental groups, representatives from the local tourism/community business board, representatives from the state environment/energy departments, teachers, representatives from the regional transportation authority, and local university partners.
  - Bring key community stakeholders to "Balancing Nature and Commerce" training.
  - Work with the Boy Scouts of America on volunteer projects.
- Host distance learning events on climate change.
- Develop and leverage relationship with other agencies and entities to create opportunities for workshops on climate friendly activities.
- Identify partners to broadcast success stories of sustainability and energy efficiency in the community.
  - Inform school systems about Wyoming County's energy management program.
- Create entertainment and community events at park facilities to open opportunities for public education.
  - Work with PBS, NPR, and NPCA.
  - Host movie nights, picnics, and community talks.
- Partner with tourism businesses to educate visitors about climate change and sustainability.
  - Engage local companies—particularly rafting companies—in developing and implementing a plan for public education and regional sustainability.
  - Create a training and certification program for rafting guides in sustainability education that businesses can use in their marketing. Park staff could train tourism industry personnel in sustainability practices.
- Work with rafting businesses to improve sustainability of shuttle services to river sites.
  - Work to connect rafting businesses with biodiesel resources.

- Disseminate information about climate friendly actions New River Gorge National River is taking at conferences and regional workshops.
- Help encourage the formation of a collaborative working group to address New River Gorge-area sustainability issues.
  - Help to facilitate and convene local organizations with common interests to encourage leadership.
  - Foster competitions for energy savings in gateway communities; hold movie nights; host speakers on climate change at Rotary clubs and other local groups; engage with churches and other groups to broaden outreach.
- Create a clearinghouse of resources to help citizens take steps towards sustainability.
  - Highlight success stories, e.g., Wyoming County Public Schools.
- Work with local entities to incorporate sustainability into regional preparation for future development of large projects in the region.
- Hold annual event to encourage community groups to stay involved with sustainability and climate change issues.
  - Hold social events featuring directed conversation on a sustainability topic.

STRATEGY 3: EVALUATE PROGRESS AND IDENTIFY AREAS FOR IMPROVEMENT

By taking the actions established in strategies 1 and 2 above, New River Gorge National River plans to reduce its emissions to the specified goals and mitigate the impacts of climate change. Achieving these goals will require an ongoing commitment by the Park, which may include subsequent emission inventories, monitoring success, additional mitigation actions, and revaluation of goals. As part of this strategy, New River Gorge National River will:

- Monitor progress with respect to reducing GHG emissions and preserving natural, cultural and physical resources. This will include subsequent emission inventories to evaluate progress toward goals stated in this action plan.
- Develop additional GHG emission mitigation actions beyond those listed in this plan.
- Periodically review and update this plan.
- The park will track climate friendly actions through the environmental management system.

CONCLUSION

New River Gorge National River has a unique opportunity to serve as a model for over one million recreational visitors annually.[4] This report summarizes the operational actions the park commits to undertake to address climate change. Specifically, the park realizes its ability to educate the public and serve as a valuable model for citizens. By seriously addressing GHG emissions within the park and sharing its successes with visitors, New River Gorge National River will help mitigate climate change far beyond the park's boundaries.

The National Park Service faces an uncertain future due to the possible effects of climate change. However, by seriously addressing climate change impacts and reducing emissions, New River Gorge National River will reduce its contribution to the problem while setting an example for its visitors. The strategies presented in this Action Plan present an aggressive first step towards moving New River Gorge National River to the forefront of Climate Friendly Parks.

[4] New River Gorge National River: Park Statistics. Available online at: http://www.nature.nps.gov/stats/viewReport.cfm

APPENDIX A: LIST OF WORK GROUP PARTICIPANTS

The table below lists the participants of New River Gorge National River's two-day workshop, who all contributed to developing the content for this Climate Action Plan.

Name	Organization	Title
Benjy Simpson	Passages to Adventure, Inc.	
Billy Strasser	New River Gorge National River	District Interpreter
Candace Tinkler	New River Gorge National River	Chief of Interpretation
Carl Thompson	West Virginia State Extension	
Chris Steuer	ICF International	
Chuck Noll	New River Gorge National River	Park Ranger
Clif Bobinski	New River Gorge National River	Park Planner
Dave Bieri	New River Gorge National River	District Interpreter
Debbie Niday	New River Gorge National River	Administrative Assistant
Deborah Darden	New River Gorge National River	Deputy Superintendent
Doug Arbogast	Travel Green Appalachia	
Doug Maddy	Southern Convention and Visitors Bureau	
Elizabeth Crisfield	Pennsylvania State University	
Erin St. John	National Parks Conservation Association	
Ernie Kincaid	ACE Adventure Resort	
Fannie Pannell	Region I Planning and Development Council	
Frank Sellars	New River Gorge National River	Supervisory Facility Operations Specialist
Gabe Pena	Fayette County Green Advisory Team	
Gary Hartley	New River Gorge National River	Chief Ranger
Gene Coccari	WV Department of Environmental Protection	
Greg Malcolm	New River Gorge National River	
Greg Phillips	New River Gorge National River	IT Specialist
Homer Lilly	New River Gorge National River	Maintenance Worker
Jamie Fields	New River Gorge National River	Outdoor Recreation Planner
Jamie Keach	New River Gorge National River	Park Ranger
Janice Cooper	New River Gorge National River	Budget Analyst
Jenny Noll	New River Gorge National River	Park Ranger
Jesse Purvis	New River Gorge National River	Fisheries Biologist
Jill Watkins	ZMM Architecture	
Joe Brouse	Natural Capital Investment Fund	
John Perez	New River Gorge National River	
Julia Corby	National Park Service	Environmental Protection Assistant
Julie McNamee	National Park Service	Air Resources & Climate Change Liaison
Karl Keach	New River Gorge National River	Park Ranger
Kathy Holloway	New River Gorge National River	Park Ranger, Interpretation
Levi Rose	Plateau Action Network	

Mark Graham	New River Gorge National River	Wildlife Biologist
Matt Marshall	Pennsylvania State University	
Matt Sherald	Power In My Backyard (PIMBY)	
Mike Hartsog	New River Gorge National River	
Richard Segars	New River Gorge National River	Architect
Robin Perry	New River Gorge National River	Secretary to the Superintendent
Ron Banks	New River Gorge National River	Maintenance Worker
Savanna Lyons	Citizens Conservation Corps of West Virginia	
Scott Cooper	New River Gorge National River	Biological Technician
Scott Fanello	New River Gorge National River	AmeriCorps*VISTA
Scott Stonum	New River Gorge National River	Chief of Resource Management and Planning
Sherri Clendenin	New River Gorge National River	Program Specialist, Commercial/Special Park Uses
Sid Howard	Southern Soil and Water Conservation District	
Sophia DeMaio	New River Gorge National River	
Teresa Cantrell	Great Smoky Mountains National Park	
Terry Polen	WV Department of Environmental Protection Ombudsman's Office	
Terry Tilley	Wyoming County Public Schools	
Thomas Poore	New River Gorge National River	Trails Worker
Tomoko Tamagawa	West Virginia Sustainable Communities	
Vicki Fenwick	Canaan Valley Institute	