National Park Service
U.S. Department of the Interior

CLIMATE*Friendly* PARKS

Natural Resource Stewardship and Science Directorate Climate Action Plan

October 2021

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Front Cover: Natural Sounds and Night Skies Division intern Dan Walsh takes notes on biological sounds heard near the Sushana Ridge acoustic monitoring station in Denali National Park. Photo Credit: NPS/Davyd Betchkal

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Employees reunite at a 2019 NRSS All Hands Meeting. Numerous interdisciplinary divisions and programs are administered under the NRSS Directorate, spanning over two hundred employees. Photo Credit: NPS/John Wullschleger

ACRONYMS

CCRP	Climate Change Response Program
CFP	Climate Friendly Parks
CLIP	Climate Leadership in Parks Tool
ERG	Eastern Research Group
GHG	Greenhouse Gas
GSA	General Services Administration
IMP	Inventory Management Plan
MTCO2e	Metric Tons of CO2 Equivalent
NPS	National Park Service
NRSS	Natural Resource Stewardship and Science Directorate
SOMB	Sustainable Operations and Maintenance Branch

NRSS employee Tim Watkins directs a science video at Indiana Dunes National Park with colleagues from the National Park Service and the United States Geological Survey. Photo Credit: NPS/Tim Watkins

INTRODUCTION

The NRSS Directorate

The National Park System protects many of America's treasured places, including natural areas of outstanding value and importance. Since 1916, the National Park Service (NPS) has been charged with preserving the System in perpetuity for the enjoyment of future generations. But the ongoing stewardship of parks often presents complex challenges that require a careful, multi-disciplinary approach. The NPS Natural Resource Stewardship and Science Directorate (NRSS) provides technical assistance to parks on a wide array of natural resources issues.

In collaboration with NPS regions and programs, NRSS helps solve difficult park management issues through the delivery of applied science, knowledge synthesis, and decision support. The National Park Service Natural Resource Stewardship and Science Framework (2016) articulates a rationale for providing support in a strategic, interconnected, science-based, and inclusive manner. The framework addresses day-to-day natural resource efforts, as well as activities that position the NPS to navigate an increasingly complex and dynamic future of continuous change.

The Climate Challenge

The NPS strives to protect parks "unimpaired" for the benefit of present and future generations, and past conditions often provide the touchstone against which impairment is assessed. But human-caused climate change is rapidly reshaping ecosystems in many units of the National Park System (Gonzalez, 2020). The overarching and omnipresent effects of a warming world challenge traditional tenets of park management, and may force the reconsideration of some conservation goals (National Park Service, 2021). In addition, climate change is the greatest public health threat of the century, requiring action from all sectors of society to reduce the catastrophic impacts to human health and wellbeing (Word Health Organization, 2020).

The NPS Climate Change Response Strategy (2010) identifies four key pillars of effective response: science, adaptation, mitigation, and communication. Recognizing the long-term, multifaceted implications of a warming world for parks, the Strategy encourages consistent consideration of climate change across all NPS operational capacities. The NPS Climate Change Response Program (CCRP)—a division within NRSS—works alongside NPS directorates, regions, and parks on holistic solutions to challenges presented by climate change.

Two Inventory and Monitoring Division interns collect growth data from five-needle pines on the Custer Gallatin National Forest in Montana. Photo Credit: NPS/Erin Shanahan

NRSS Commitment to Sustainability

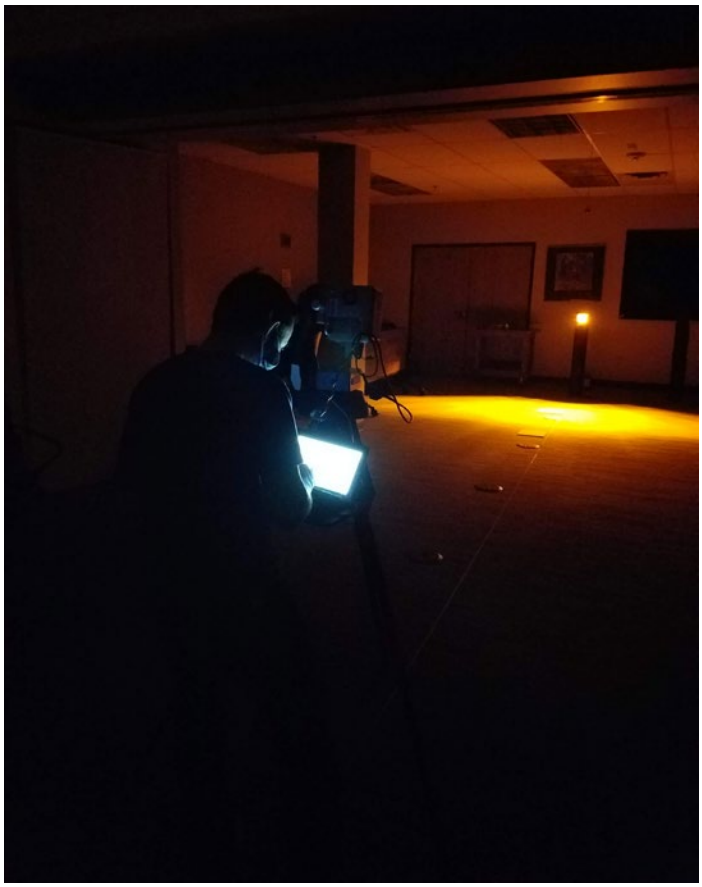
NRSS plays a key role in the NPS response to climate change. The Directorate informs park management and decision-making using long-term data, scientific analysis, and future climate projections. And through its work with the NPS planning, natural resource, and health communities, NRSS encourages climate-smart strategies to adapt to changes already in motion. Through participation in the Climate Friendly Parks (CFP) Program, however, NRSS also strives to reduce—to the fullest extent practicable—our own operational greenhouse gas (GHG) emissions and serve as a model for other offices within the NPS and Department of the Interior.

This Climate Action Plan presents the results of a baseline GHG emissions inventory of NRSS Colorado-based operations. Results from the GHG emissions inventory informed the development of strategies and related actions—contained herein—for reducing NRSS GHG emissions. These strategies and actions further support servicewide goals as articulated in the NPS Green Parks Plan (2016).

NRSS also recognizes that an effective response to climate change demands collective action. As such, this Climate Action Plan reaffirms the importance of communicating openly with others about NRSS efforts to address the issue. At all times, NRSS strives to lead by example to inspire and encourage sustainability and climate-smart action.

For the benefit of the National Park System, we commit to undertake—and share—climate-smart actions that minimize NRSS contributions to climate change.

Air Resources Division employee Mike Bell presents research on how air pollution affects national parks to forest managers at a 2019 conference. Photo Credit: NPS/Mike Bell



Natural Sounds and Night Skies Division employee Jeremy White measures light intensity and distribution. Photo Credit: NPS/Adam Beeco

BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

Inventory Reach

NRSS partnered with the NPS Sustainable Operations and Maintenance Branch (SOMB) and Eastern Research Group (ERG; a third-party contractor supporting the CFP Program) to develop and complete a GHG emissions inventory for NRSS operations as part of the CFP Program. The inventory informs the development of strategies and actions for greater operational efficiency, and provides a baseline against which to evaluate the success of intended efforts.

Typically, GHG emissions inventories are conducted for the most recent fiscal or calendar year for which reliable data is available. However, both 2019 and 2020 saw notable operational disruptions due to a prolonged federal shutdown and COVID-19, respectively. Therefore, NRSS selected a contiguous 12-month operational period between those interruptions (Figure 1) for its baseline inventory.

The NRSS workforce is comprised of NPS employees, contractors, partners, and volunteers stationed at locations across the United States. However, the majority of NRSS employees are concentrated at two office locations (Table 1) along the front range of Colorado. As such, the spatial extent of the NRSS GHG emissions inventory is restricted to only those personnel, operations, and vehicles tied to the two NRSS offices located in Fort Collins and Lakewood.

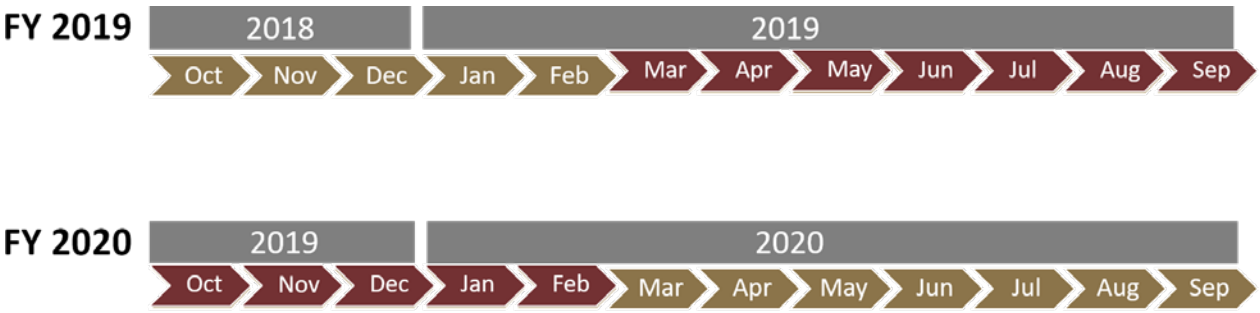


Figure 1. NRSS baseline inventory year. The baseline year was selected to "thread the needle" between two major operational disruptions: a federal government shutdown (ended January 25, 2019) and mandatory telework for all nonessential NRSS operations due to the COVID-19 pandemic (began March 22, 2020).

Table 1. Details for two NRSS Colorado office locations included in the GHG emissions inventory. *Note: NPS Occupied Space in Academy Place includes offices used for non-NRSS staff. For additional details, please refer to the related Inventory Management Plan, discussed on page 9.

Building	Location	Total Building Space (sq ft.)	NPS Occupied Space (sq ft.)	Number of NRSS Staff
Academy Place	Lakewood, CO	85,376	40,953*	64
Oakridge	Fort Collins, CO	68,756	51,004	141

Inventory Methods

More than 120 units of the National Park System have become member parks under the CFP Program since 2002. During that time, the NPS developed methods and the Climate Leadership in Parks (CLIP) tool to facilitate data collection and calculation of GHG emissions in parks. But NRSS facilities and operations differ considerably from those in parks. Thus, although the CLIP tool was used to organize and calculate data for NRSS, additional tools and methods were necessary to complete the analysis.

NRSS developed a detailed Inventory Management Plan (IMP) to document the methods and tools used to prepare the NRSS GHG emissions inventory. The IMP also carefully documents the data sources used and key assumptions made during the analysis. The IMP not only provides important transparency, it serves as a road map for conducting future GHG inventories with consistency.

Inventory Results

NRSS calculated annual emissions for nine (9) distinct GHG sources. Inventory results across all sources are summarized in Table 2. The table is ordered first by Scope, then by the magnitude of emissions within each Scope, which are presented in normalized units of Metric Tons of Carbon Dioxide Equivalent (MTCO2e). Please see the IMP for a detailed explanation of both Scope and MTCO2e.

Table 2. Summary of results for all GHG emissions sources. Values are rounded to the nearest tenth for simplicity.

Scope	Emissions Source	MTCO2e	% of Total
1	Mobile fuel combustion in fleet vehicles	57.2	3.9%
1	Fugitive refrigerants from mobile equipment	3.5	0.2%
2	None	0.0	0.0%
3	Purchased electricity consumption	751.5	51.6%
3	Employee commuting	233.9	16.1%
3	Air business travel	212.6	14.6%
3	Natural gas consumption	110.3	7.6%
3	Ground business travel (POV and rental cars)	57.4	3.9%
3	Contracted wastewater treatment	29.3	2.0%
3	Fugitive refrigerants from stationary equipment	1.7	0.1%
	Totals:	**1,457.40**	**100%**

Of all GHG emissions sources inventoried, purchased electricity consumption is the largest single source by far (representing 51.6% of emissions, as shown in the Figure 2). Employee commuting and air business travel represent the second and third largest contributions, respectively. Collectively, these three sources contributed more than 82% of all GHG emissions. Due to the disproportionate contribution of these three sources over all others, they are the focus of strategies and actions to yield meaningful emissions reductions over time.

NRSS GHG emissions for the baseline year total 1,457.4 MTCO2e. This number is notable when considered alongside earlier GHG emissions inventories conducted at various NPS units under the CFP Program.

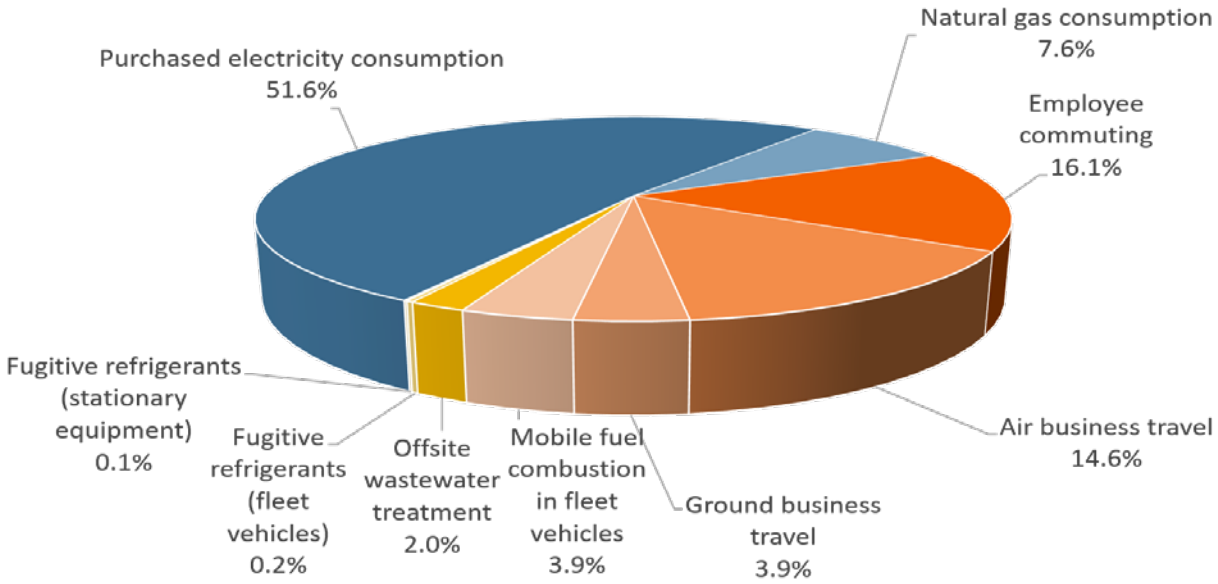


Figure 2. GHG Emissions profile of NRSS Colorado-based operations for the baseline inventory year.

Figure 3 shows NRSS emissions compared to those of other NPS units. Though not a park per se, NRSS operations result in emissions comparable to a mid-size park with moderate visitation, (like Big Cypress National Preserve) or a smaller park with high visitation (like Mount Rushmore National Memorial). Though key differences in operations and emissions calculation methods prohibit an "apples to apples" comparison, the comparison is helpful for illustrating the relative scale of NRSS emissions.

It should be noted that—due to limitations on data quality and/or availability—some sources of operational GHG emissions were not included in this inventory (e.g., emissions associated with municipal solid waste disposal). Additionally, processing emissions data often required the adoption of best-guess assumptions. As such, the inventory should not be interpreted as a comprehensive, infallible accounting of emissions from NRSS Colorado-based operations. Rather, the results provide a broad-brush overview of emissions from major sources using reproducible methods that are both reasonable in their burden and accuracy.

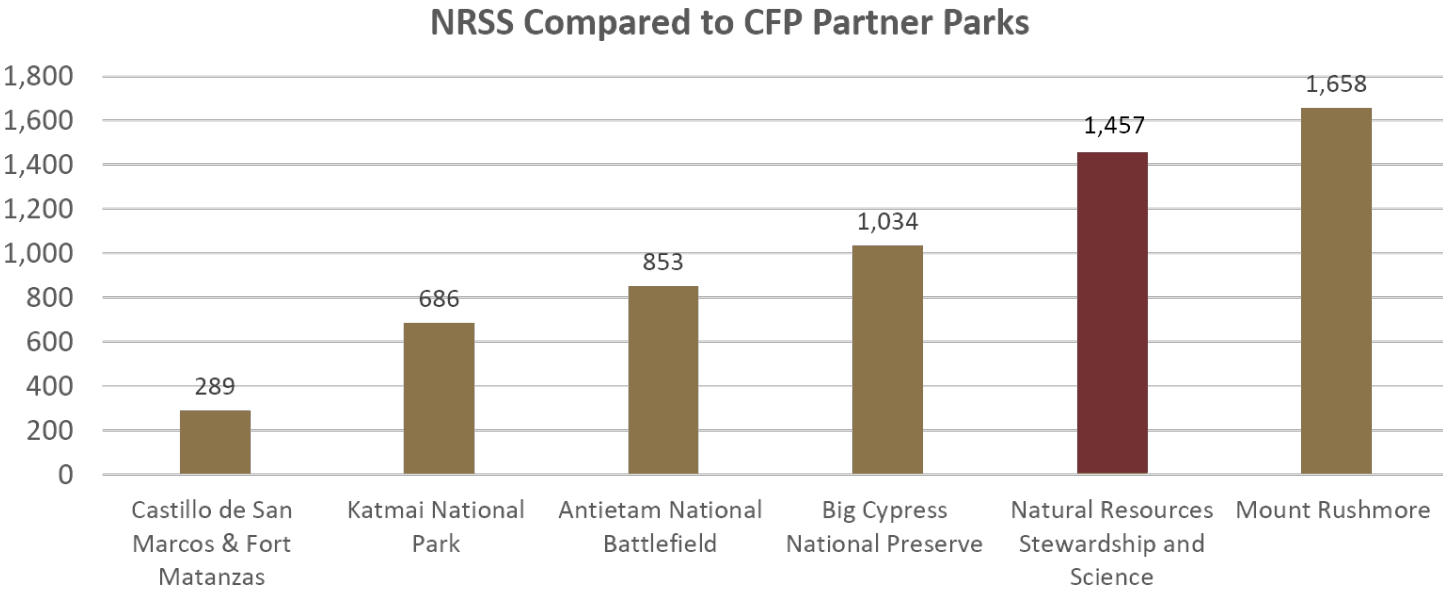


Figure 3. A relative comparison of NRSS emissions against select park units of the NPS, in MTCO2e.

STRATEGY 1: REDUCE OPERATIONAL EMISSIONS

The NRSS GHG emissions inventory revealed three key sources accounting for more than 82% of all emissions: purchased electricity, air business travel, and employee commuting. However, these three sources provide substantial opportunities for improvement. Thus, reducing emissions across each are distinct goals under this Strategy.

NRSS drafted recommended actions to promote better sustainability across each of the three largest emissions sources. These actions were then grouped into three distinct tiers (Easy & Immediate, Greater Commitment, and Big Picture), each requiring varying levels of time, effort, and/or funding. During a virtual CFP workshop in October 2020, GHG emissions inventory results and recommended actions were shared with all NRSS staff to solicit feedback and additional ideas. Recommended actions were reviewed and revised in light of comments received and incorporated as appropriate in support of each goal below.

The following goals and actions also support servicewide emissions reductions targets as articulated in the NPS Green Parks Plan. Specifically, the Green Parks Plan calls for a servicewide reduction of Scope 3 emissions by 23% by 2025. However, opportunities to reduce emissions differ considerably across NRSS Scope 3 emissions sources. Thus NRSS has identified measurable targets for each of the three largest contributors that result in an *average* emissions reduction of 23% by 2025, as noted in Table 3.

Goal: Reduce Emissions from Purchased Electricity

NRSS will pursue the following actions to reduce GHG emissions resulting from the purchase of electricity at leased office locations by at least 15% by 2025 from the 2019/2020 baseline. All actions advance the goals "Be Climate Friendly and Climate Ready" and "Be Energy Smart" within the Green Parks Plan.

Table 3. Based upon the opportunity/feasibility of emissions reductions for each, NRSS established targets and timelines to achieve an average 23% reduction in emissions across the three largest Scope 3 emissions sources.

Goal	Deadline	Target Reduction (%)
Reduce Emissions from Purchased Electricity	2025	15%
Reduce Emissions from Air Business Travel	2025	25%
Reduce Emissions from Employee Commuting	2025	30%
Average Scope 3 Emissions Reductions	2025	23%

Easy & Immediate

Support Continued Telework

NRSS Senior Leaders will support and actively advocate for liberal telework policies for all employees, where appropriate—including supervisors—that defray building energy demands and encourage personal energy efficiency.

Promote Climate-Friendly Work Habits

The NRSS Climate Action Team will promote and explore incentives for elective efficiency improvements and habits among NRSS employees (and other building tenants, as appropriate) to lessen electricity use during daily office operations.

Make Our Commitment Known

NRSS Senior Leaders will share this plan and convey our commitment to GHG emission reductions to our General Services Administration (GSA) representative, NPS Building Services Division, and building owners.

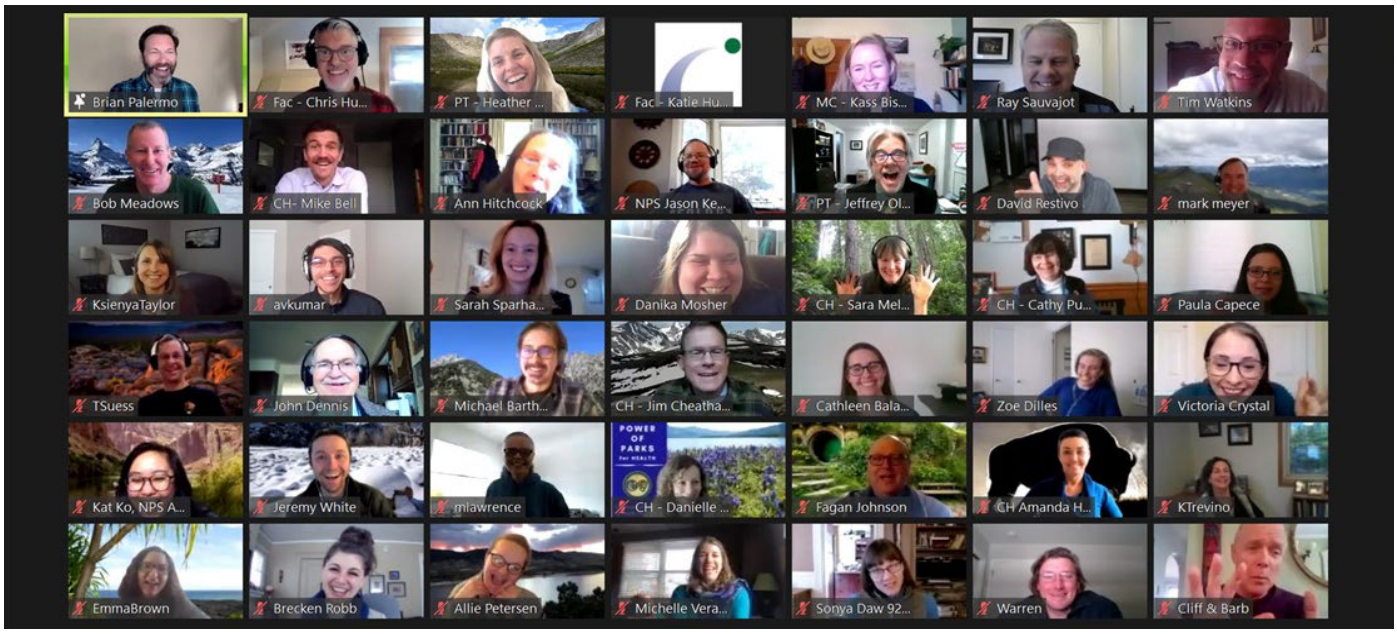
Greater Commitment

Make Efficiency Investments within Reach

NRSS Divisions will make opportunistic investments in available efficiency upgrades within their occupied space and span of control, such as surge protectors that minimize standby power, replace aging shared electrical equipment, etc.

Request Modest Efficiency Improvements

Through GSA building representatives, NRSS Senior Leaders will request modest investments in cost-saving building retrofits to reduce fossil fuel-based energy consumption, such as conversion to LED fixtures and lighting, and installation of timers and motion sensors. As part of this commitment, NRSS acknowledges the need to negotiate and discuss the logistics related to the scoping, funding, planning, and implementing of retrofits given the nature of the NRSS occupancy agreements.



NRSS hosted a virtual all-employee meeting in February of 2021. Widespread use of virtual meeting rooms and online collaboration tools was adopted in the wake of the COVID-19 pandemic. These same methods and technologies can now support the continued use of telework as a viable ongoing strategy. Photo Credit: NPS

Big Picture

Request Win-Win Investments with Lessors

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence—NRSS Senior Leaders will request moderate investments in building efficiency improvements and renewable energy use—such as upgrades to heating, ventilation, air conditioning system components, and photovoltaic arrays—of mutual benefit to building owners and tenants.

Set Expectations Through Contractual Negotiations

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence— NRSS Senior Leaders will clearly communicate commitment for GHG minimization measures in future lease negotiations.

Consider High Performance Sustainable Buildings for Future Leases

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence— NRSS Senior Leaders will communicate preference for ENERGY-STAR/LEED certified buildings in the acquisition of future office space. Where possible, consideration will be made in light of possible tradeoffs with other emissions sources—like employee commuting—with the aim to achieve a net decrease in overall operational emissions.

High-efficiency buildings are increasingly found in many NPS units, including these LEED Platinum-certified employee housing structures at Grand Canyon National Park. NRSS will work with the General Service Administration to consider potential high-efficiency options for future NRSS office space. Photo Credit: NPS/Michael Quinn

Goal: Reduce Emissions from Air Business Travel

NRSS will pursue the following actions to reduce GHG emissions resulting from air business travel at least 25% by 2025 from the 2019/2020 baseline. All actions advance the "Be Climate Friendly and Climate Ready" goal in the Green Parks Plan.

Easy & Immediate

Adopt Virtual Collaboration as the Preferred Option

Promote virtual collaboration as the preferred option over in-person meetings where feasible, and clearly communicate the GHG/cost savings to promote awareness, demonstrate action, and promote culture change. NRSS will invest in tools and technologies that promote successful virtual meetings and collaboration.

Greater Commitment

Investigate the Use of Carbon Credits

In consultation with SOMB, and the NRSS Office of Budget and Finance, the NRSS Climate Action Team will investigate the utility and feasibility of carbon credits to offset NRSS business air travel emissions. If deemed appropriate, the NRSS Climate Action Team will work in consultation with SOMB to develop guidelines and procedures for appropriate use.

Big Picture

Offset Air Business Travel

Should carbon credits be deemed an appropriate tool, NRSS Senior Leaders will consider if/how to purchase carbon credits to offset emissions related to necessary travel. Use of carbon credits will follow guidelines and procedures developed in close consultation with SOMB.

Climate Change Response Program employee Larry Perez films an instructional video for use in online workforce training modules. Collaboration with colleagues and partners through virtual meetings, workshops, and training opportunities can significantly help reduce the need for air travel. Photo Credit: NPS/Matt Holly

Goal: Reduce Emissions from Employee Commuting

NRSS will pursue the following actions to reduce GHG emissions resulting from employee commuting at least 30% by 2025 from the 2019/2020 baseline. All actions advance the "Be Climate Friendly and Climate Ready" and "Green Our Rides" goals within the Green Parks Plan.

Easy & Immediate

Support Continued Telework

Under normal operations, NRSS Senior Leaders will continue to support the liberal use of telework opportunities for all employees, as appropriate, that reduce emissions resulting from employee commuting.

Promote & Incentivize Low-Carbon Commuting

The NRSS Safety, Health, and Wellness and Climate Action Teams will promote and incentivize elective efforts and benefits—like existing bike commute and public transit subsidy programs—to encourage commuting options that reduce GHG emissions.

Greater Commitment

Explore Sustainable Commuting Benefits

The NRSS Climate Action Team will prepare recommendations for additional employee opportunities (time allowances, RTD Eco Pass, etc.) that promote the use of carpooling, public transport and/or non-motorized commuting.

NRSS offices are generally accessible through non-motorized transport and/or mass transit systems, such as the Colorado Regional Transportation District of Denver. Promoting and incentivizing alternative methods of commuting can bring multiple benefits, including physical activity, reduced air pollution, and fewer GHG emissions. Photo Credit: Regional Transportation District

Request Modest Investments to Encourage Low-Carbon Commuting

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence—NRSS Senior Leaders will explore opportunities with building owners to provide improved facilities necessary (showers, expanded bike racks, dedicated EV parking spaces, etc.) to encourage low-carbon commuting.

Big Picture

Request Installation of EV Charging Infrastructure

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence—NRSS Senior Leaders will engage in negotiations with building owners for the installation of electric vehicle charging infrastructure at both NRSS facilities in Colorado.

Consider Sustainable Siting for Future Office Leases

Through GSA building representatives—and in concert with other federal tenants within their sphere of influence—NRSS Senior Leaders will carefully prioritize buildings with convenient access to travel corridors and public transportation during the acquisition of future office space.

Electric vehicle charging stations are already in use at many NPS units, like this one at Mammoth Hot Springs Hotel in Yellowstone National Park. The installation and availability of similar infrastructure at NRSS facilities would allow for the gradual conversion of the NRSS fleet to electric vehicles. Photo Credit: NPS/Herbert

Additional Opportunities

NRSS will pursue additional opportunities to reduce GHG emissions beyond the three largest emissions sources. These actions advance the "Be Water Wise", "Be Climate Friendly and Climate Ready", and "Green Our Rides" goals within the Green Parks Plan.

Convert Vehicle Fleet to Primarily Electric

Upon the availability of reliable charging infrastructure, NRSS Divisions will consider replacing at least 75% of the existing gasoline-powered vehicle fleet associated with the two NRSS facilities in Colorado with electric vehicles as part of the normal vehicle replacement schedule.

Request Modest Water Efficiency Improvements

Through GSA building representatives, NRSS Senior Leaders will request modest investments in cost-saving building retrofits, landscaping, and irrigation upgrades to reduce building water consumption.

Alternative and Shared Position Duty Stations

Given extensive telework experience during the COVID-19 pandemic, NRSS Leadership will review the Directorate's remote duty station policy. Allowance for remote duty stations could potentially reduce the need for additional/existing NRSS office space over time.

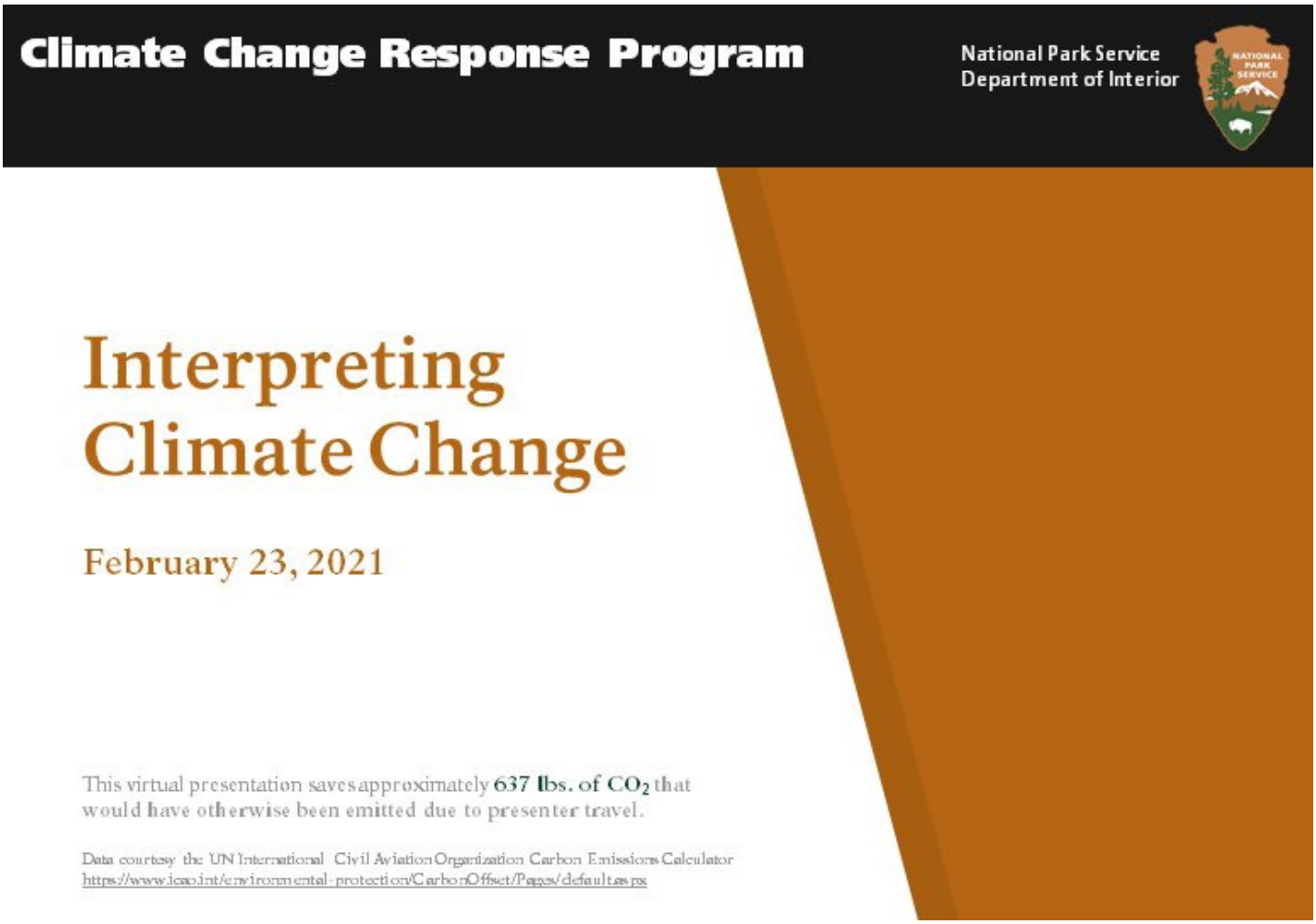
Natural Sounds and Night Skies Division employee Ashley Pipkin sets up an acoustic monitoring station at Lake Mead National Recreation Area. Pipkin is stationed permanently in Nevada. Such arrangements can provide greater reach for NRSS operations and require less business travel. Photo Credit: NPS/Ashley Pipkin

STRATEGY 2: COMMUNICATION & EDUCATION

Use Climate-Aware Messaging

As a Washington-level organization, NRSS does not enjoy the same multiplicity of audiences served by most parks in the form of in-person visitors, school groups, and local communities. Though NRSS maintains few public-facing channels for non-personal science communication, it does have a uniquely outsized reach across the NPS workforce through its operations. Thus, NRSS has a sizeable opportunity for climate change inreach to agency colleagues and collaborators, and can actively engage other operations and directorates to encourage parallel approaches.

As NRSS pursues the goals outlined in this Climate Action Plan, it will convey openly and transparently the climate-minded motivations behind each. In essence, NRSS will clearly articulate the "why" and incorporate behavior change techniques to maximize the impact of our actions in a broader community. Doing so is important for overcoming instances where pluralistic ignorance about the shared level of concern about climate change discourages productive discussions (Geiger & Swim, 2016). NRSS will share mitigation efforts using climate-aware messaging that encourages conversations about climate change topics, and inspires similar action in the National Park System and beyond.



Virtual presentations made by members of the Climate Change Response Program are regularly prefaced with an accounting of GHG emissions saved from avoided presenter travel. Doing so demonstrates intentionality, relates tangible benefits, and inspires similar action from others. Image Credit: NPS/Larry Perez

Share CFP Lessons Learned

The CFP Program has historically focused on conducting GHG emissions inventories and developing Climate Action Plans for parks. With this most recent effort, NRSS helped develop a new suite of tools, methods, and frameworks applicable to NPS office operations. This model may—with minimal modification—be reproducible across additional NPS directorates, regions, and program offices.

NRSS has carefully documented all activities related to this CFP effort. In particular, an Inventory Management Plan was prepared to detail the novel methods used to conduct the GHG emissions inventory for NRSS. In sharing the results of this effort, NRSS will also provide encouragement and support (through the sharing of materials, experience, and/or "lessons learned") to CFP Program leads, contractors and/or NPS offices that may wish to conduct a similar effort.

Support of Park CFP Efforts

The CFP Program has early roots in the Air Resources Division and has enjoyed long-time support from the Climate Change Response Program, both of which are part of NRSS. The CFP program has evolved to include consideration of—and planning for—climate change risk assessment, adaptation, and communication for some parks. NRSS lends support in the form of technical expertise to such topics whenever included as part of park-based CFP efforts.

As climate change impacts become ever-more evident, parks may increasingly request participation in the CFP Program. NRSS will continue to provide support to SOMB on future CFP efforts. In so doing, we will encourage a holistic, multi-disciplinary approach to climate change that reaches beyond mitigation alone.

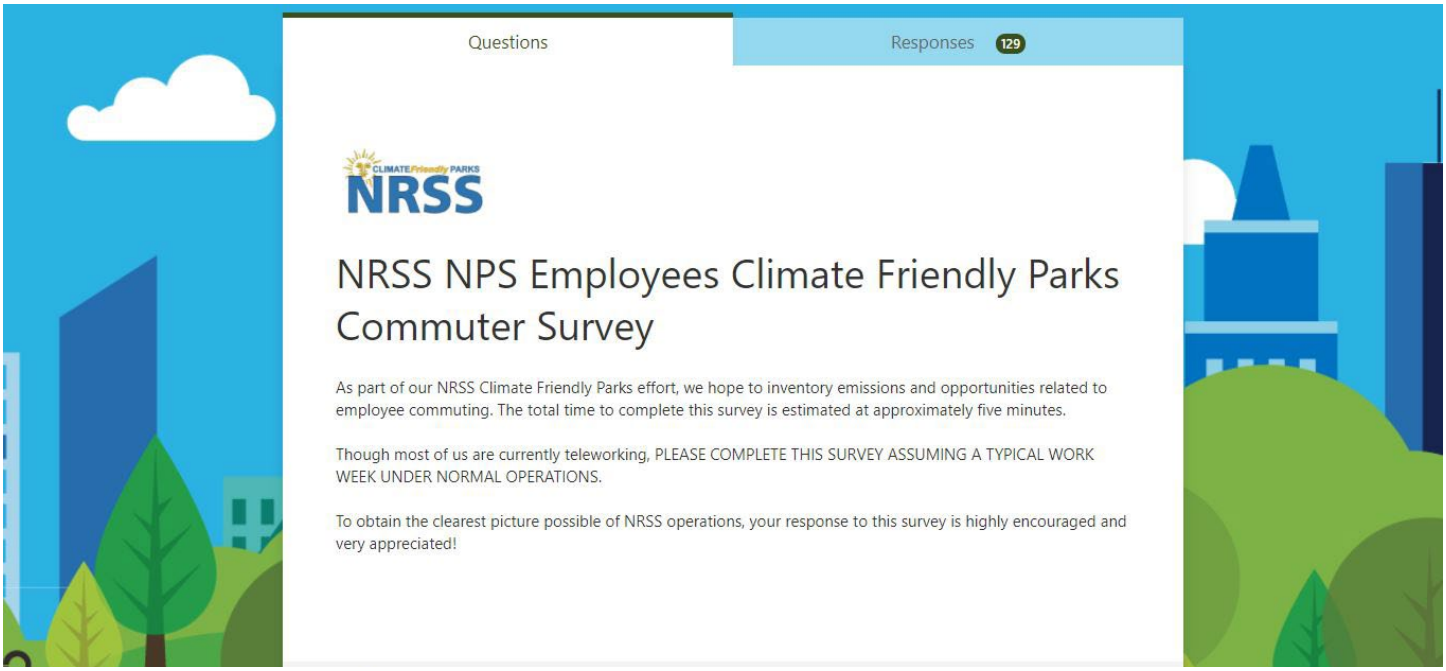
NRSS has a long history of collaboration with the Sustainable Operations and Maintenance Branch in the delivery of Climate Friendly Parks efforts at over 120 NPS units, like Sagamore Hill National Historic Site. As the program grows in the years ahead, NRSS will continue to provide technical expertise and professional experience to help additional parks make operations more climate-friendly. Photo Credit: NPS

STRATEGY 3: EVALUATE PROGRESS

The baseline NRSS GHG emissions inventory provides valuable insight into existing operations and guides the development of strategies to reduce emissions over time. However, evaluating success requires a commitment to periodic qualitative and quantitative review. NRSS should identify—perhaps through the NRSS Climate Action Team—opportunities to document progress and continually improve.

In the short term, NRSS can document success opportunistically using a variety of available metrics. These may include employee enrollment in alternative transportation subsidy programs, informal surveys of office practices, building energy use reporting, and a survey of employee commuting trends.

Along longer time scales, a second full GHG emissions inventory would provide the single best means to document progress. To provide the most comparable results, methods from the Inventory Management Plan should be replicated as closely as possible.



Simple employee commuter surveys provide one method to periodically assess emissions trends and identify new opportunities for greater sustainability. NRSS will continually seek to monitor progress on goals identified in this Climate Action Plan. Image Credit: NPS/Larry Perez

CONCLUSION

Large-scale environmental change presents numerous challenges to the National Park System. NRSS provides technical expertise necessary to help navigate particularly difficult management issues. In providing assistance on discrete issues, however, the employees of NRSS hope to contribute a long-term, net environmental benefit. Thus, NRSS strives to achieve the greatest degree of sustainability possible across the operations of the Directorate.

Climate change has significant consequences for the parks—and people—of the National Park System. Through this Climate Action Plan, NRSS reasserts its commitment to climate action, and strengthens its efforts to reduce its contributions to the problem. NRSS does so for the benefit of our parks, and for the benefit of our employees and visitors for generations to come.

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Above: NRSS veterinarian Danielle Buttke assists with placing a monitoring collar on a bison at Grand Canyon National Park. Photo Credit: NPS/Jesse Barden

Back Cover: Inventory and Monitoring Division employee Luke Gommermann maps populations of exotic plant species along a stream corridor in Capitol Reef National Park as part of the Northern Colorado Plateau Network. Photo Credit: NPS/Amy Washuta

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