



# NIEHS Sustainability Report 2015





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# Introduction: Transforming Ideas Into Action

## Mission

The National Institutes of Health (NIH) mission is to seek fundamental knowledge about the nature and behavior of living systems, and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability.

The mission of the National Institute of Environmental Health Sciences (NIEHS) is to discover how the environment affects people in order to promote healthier lives.

## Vision

The vision of NIEHS is to provide global leadership for innovative research that improves public health by preventing disease and disability.

## Sustainability

With continued efforts in basic and targeted research, along with response to environmental disasters, our institute provides knowledge and insight with a sustainable future in mind. Sustainability in our own operations aligns with our mission, by generating awareness and an understanding of the relationship between the environment and human health.

To excel in operational performance, while supporting research, can be a challenge. The federal government has made significant commitments to sustainability. As a federal agency, our reduction and conservation efforts must be top priorities. As the NIH leader for environmental health, it is even more important that we lead by example.

This report demonstrates our continued efforts to strive for a sustainable balance in our operations and in our research. We look forward to continuing the charge toward a healthier, more sustainable future.

We welcome your feedback on this report. If you have questions or comments, please contact the chief of the Health and Safety Branch.



## A Message From Our Director

Sustainability is important to us. At NIEHS, we continuously seek new opportunities to reduce our environmental impact. In all of our operations, we engage with staff to set measurable goals that focus on reducing harm to human health and the environment, promoting responsible business practices, and improving efficiency.

We start with a strong commitment from leadership. But the key to success is engaging our diverse population of employees to constantly question how we can best pursue sustainability, as well as our scientific missions. Their creativity has helped us overcome a number of complex problems, allowing the institute to make considerable progress in meeting its sustainability objectives.

We have continued to invest in new technology and have increased our focus on saving water and energy. For example, since 2012, we have:

- Reduced water consumption by another 27.7 percent (total 54 percent since 2007).
- Reduced electricity by 13 percent (total 24.5 percent since 2007).
- Reduced total vehicles in our fleet to 36 (5 percent decrease).

Through collaborative efforts with our community and other NIH institutes, as well as initiatives on our own campus, we have enhanced programs and heightened awareness about recycling, composting, wildlife habitats, invasive species, pollinators, green chemistry, hazards in the laboratory, and more. Examples of enhanced programs include the following.

- A “Clean-Sweep” initiative to rid labs of aging or unnecessary hazardous chemicals.
- An awareness campaign on invasive aquatic plant species and use of a carefully selected fish species to control unwanted plant growth in the campus lake.

For this year and beyond, we are committed to building on our past successes and further integrating sustainable practices into our operations. We are proud of the dedication demonstrated by our employees, each and every day, to making NIEHS a better and more sustainable research institute.

*Linda Birnbaum*

Linda Birnbaum, Ph.D.  
NIEHS Director



## NIEHS People Power: Community and Culture

An open dialogue with our external stakeholders is an important part of our mission. Meetings, summits, and community forums provide opportunities to create and share information and knowledge with the public, while gaining valuable feedback that can lead to positive growth and change. Our employees commit not only to the research and support they provide to the mission, but also to occasions that represent our institute in a holistic and generous way.

### Research, Outreach, and Engagement

As a research institute, investigation and discovery are part of everyday life. Our talented and creative staff enjoys not only finding new things, but also sharing them with others. In 2013 and 2014, our people power reached new heights, with accomplishments in science communicated through publications, educational opportunities, and special events.

In 2013, NIEHS expanded [training](#) in the aftermath of Hurricane Sandy, to increase public awareness of safety issues and provide more advanced training for responders. Also that year, the National Toxicology Program (NTP) published a web-based [atlas](#) that will help standardize nonneoplastic lesion diagnoses for toxicologists and pathologists all over the world.

In 2014, NTP contributed to the investigation of the Elk River chemical spill near Charleston, West Virginia, and is conducting additional toxicity studies. NTP also prepared the 13th Report on Carcinogens for U.S. Department of Health and Human Services (HHS) and Secretary Sylvia Burwell.

In 2013, NIEHS was designated a World Health Organization (WHO) Collaborating Centre, under the direction of John Balbus, M.D., and in 2014, it was officially launched.

Finally, one employee, Rick Fannin, walks the talk by embracing [alternative](#) transportation for his daily commutes.

Collaboration is a vital part of research. Sharing data and ideas spurs innovation, and sparks new challenges and frontiers, while tackling some of science's toughest issues. NIEHS holds, and participates in, many training and education events throughout the year. Some of those include the following.





## Training and Workshops

Meetings	Conferences	Workshops
Env Health Disparities	Women’s Env Reproductive Health	Alternatives Assessment
141st American Public Health Association	Flame Retardants	Health impacts on Children From E-waste Recycling
Exposome	Gulf Oil Spill and Ecosystem Science	Contaminants in Drinking Water
Environmental Health Literacy	53rd Society of Toxicology	Arsenic Research and Human Health Impacts
Autism Virtual Forum Meetings	Healthy People 2020 Webinar	Enabling Public Health Research During Disasters

## Awards and Recognition

As we acknowledge achievements demonstrating the success and contribution of our staff, we highlight their many talents and the overwhelming pride of our institute. The NIEHS [Green and Fit Retrofit Team](#) earned a Green Champions award in Sustainable Design and Facilities in 2014.

In 2013, our director, Dr. Linda Birnbaum spoke at the 2nd Annual White House Women and the Environment Summit, and was also a keynote speaker for the EPA Earth Day celebration. At the annual meeting of the American Public Health Association (APHA), Birnbaum received the Homer N. Calver [Award](#) for environmental health leadership. Also in 2013, Sharon Beard earned the Lorin Kerr Award for leadership in establishing high impact safety and health training programs for low-income workers.

Michael Resnick, Ph.D., was [elected](#) as an American Association for the Advancement of Science fellow, and Thomas Kunkel, Ph.D., was [inducted](#) into the American Academy of Arts and Sciences. And finally, Samuel Wilson, M.D., [received](#) the prestigious 2014 SER-CAT Outstanding Science Award.



FOCUS  
**Just What  
the Doctor  
Ordered**  
Using Parks  
to Improve  
Children's Health



## Public Access

Engaging the public is a top priority at NIEHS. We have increased our Facebook and Twitter following, with 9,700 likes on Facebook and more than 11k followers on Twitter.

We also added new pages for our ALERT system, AlertNIEHS.

Alert NIEHS Facebook: <https://www.facebook.com/alertniehs/info>

AlertNIEHS Twitter: <https://twitter.com/AlertNIEHS>

Both provide another outlet for valuable information in an easily accessible way, **along with** our mobile site launched in June 2013 to increase outreach to smartphone users.

We have more than doubled our postings on YouTube with more than 52 available videos and 228 **subscribers**. The NIEHS **Partnerships** for Environmental Public Health launched a new podcast series in February 2013 which explores how environmental exposures affect our health. This brings our total to five regularly scheduled **podcasts**.

Publications and reporting are the tangible basis for our scientific knowledge. Our researchers and grantees continue to publish in peer-reviewed journals at high levels. For 2013, our intramural scientists published 671 articles and the grantees published 3246 articles in peer-reviewed journals.

Similar numbers were reported for 2014, with 581 intramural articles and 3249 extramural journal articles.

We proudly support the publication, Environmental Health Perspectives (EHP) as it continues to improve its impact on the world of environmental health science. EHP has an impact factor of 7.98, is ranked 2nd of 87 journals in Toxicology, 3rd of 162 journals in Public, Environmental, and Occupational Health, and 4th of 221 journals in Environmental Sciences.

## Natural Resources

During the last two years, our campus has changed in many ways. Unfortunately, they are not always positive changes. We have made strides, however, against unwanted invasive species in Discovery Lake and began cataloguing those existing on land. We have also become aware of the Emerald Ash Borer, an invasive species of insect that decimates ash trees. This insect was discovered in the U.S. in 2002 and has destroyed untold numbers of trees along its path. Despite efforts to halt their migration, the movement continues, likely as hitchhikers in shipping materials or firewood.

We estimate about 10 acres of our forest is ash trees. We are considering preservation of those trees that may have architectural or aesthetic appeal, as well as seed banking, but we must investigate further all options along with the potential success rate.

An increased effort by the Environmental Awareness Advisory Committee and the Wildlife And Industry Together program to create new opportunities in habitat development, employee awareness, engagement, and education will aid in preserving the natural landscape of our campus and our surrounding communities.

The images on the left show how sterile grass carp helped reduce water primrose in our lake in less than a year.







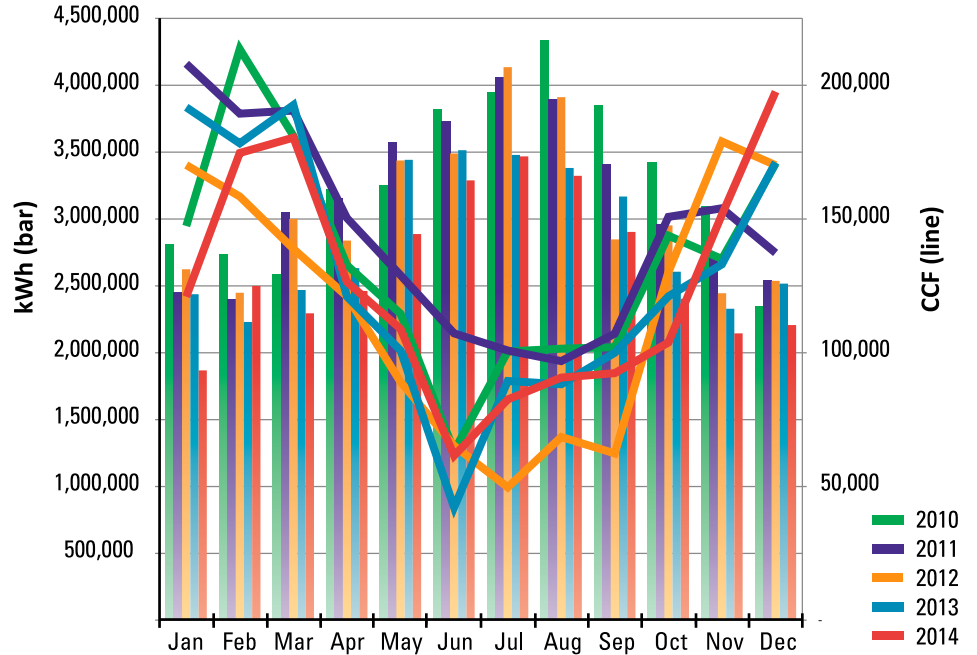
## Energy

Research is energy and resource intensive. Trying to find more ways to conserve is definitely challenging. When considering sustainability measures, sometimes a positive change in one area becomes a burden in another. Fluorescent and digital technologies, for example, have created tremendous new opportunities to reduce chemical toxicity and waste. Now, through smaller scale experiments and robotics, we can improve productivity through expanded working hours, replicative data sets with reduced margin of error, and reduced exposure. Most new technologies have eco-friendly features meeting Energy Star criteria to help reduce their overall impact, but the net energy usage is greater compared to manual labor.

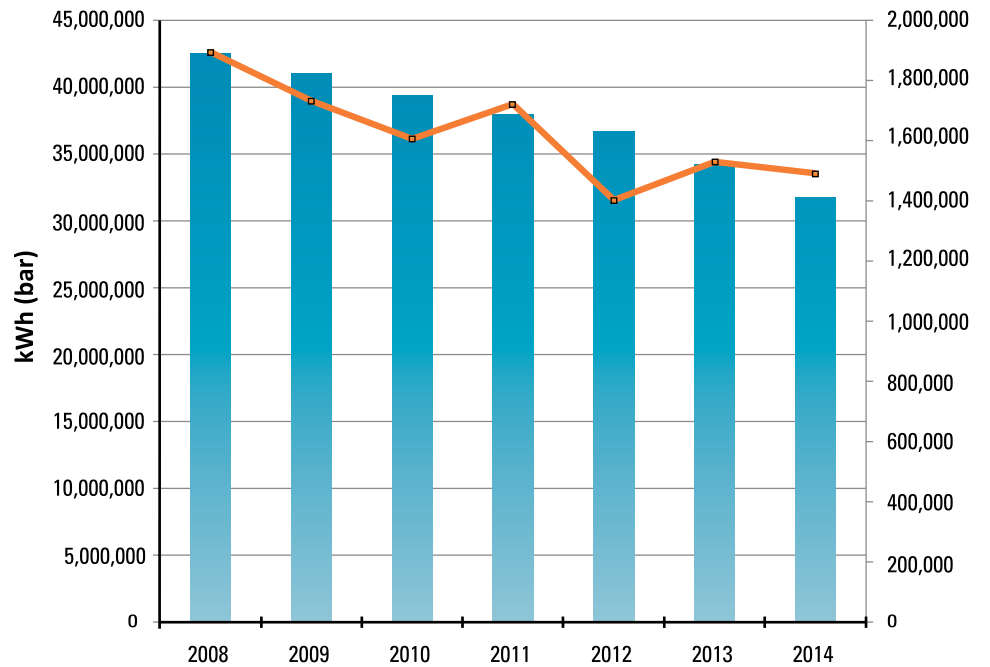
Although we continue to reduce our electrical consumption, our natural gas consumption has risen. This is likely due to longer, colder temperatures in the winter. We have also increased the use of No.2 fuel oil used in generators and boilers. NIEHS receives a reduced rate for power during the entire year, in exchange for curtailing natural gas use and switching to No.2 fuel oil when demand for natural gas is high. Our fuel oil consumption for 2013 was 92,500 gallons, and for 2014 was 183,700 gallons. Emergency generators consumed 50 percent more fuel in 2014, with 3,721 gallons, while in 2013 they consumed 2,221 gallons (data not shown).



## Energy Consumption Trend 2010-2014



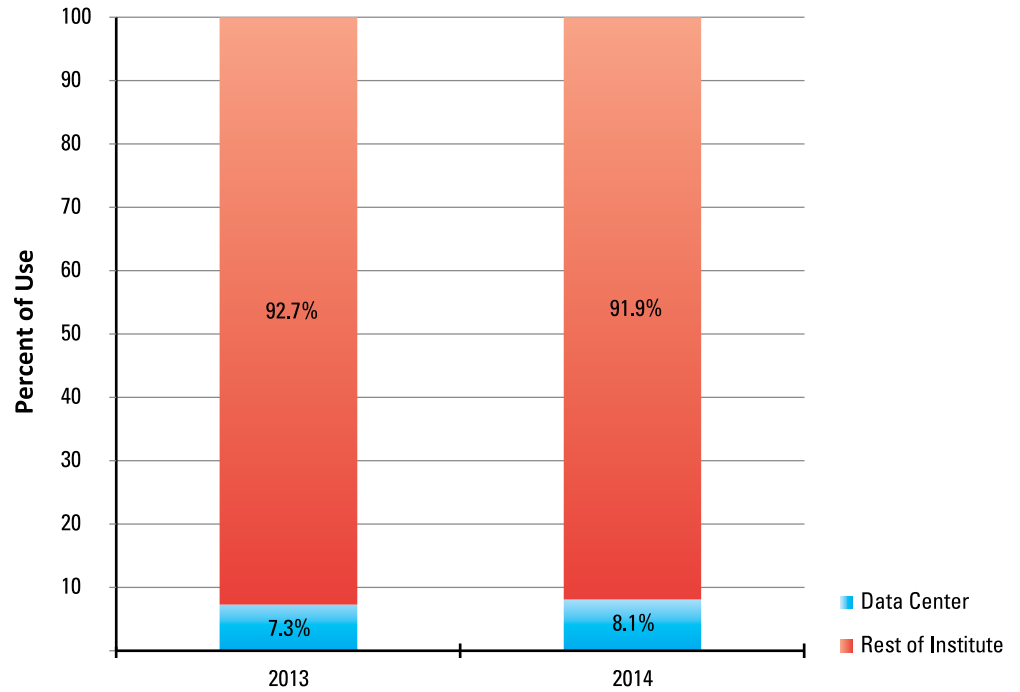
## Electricity and Natural Gas Trend



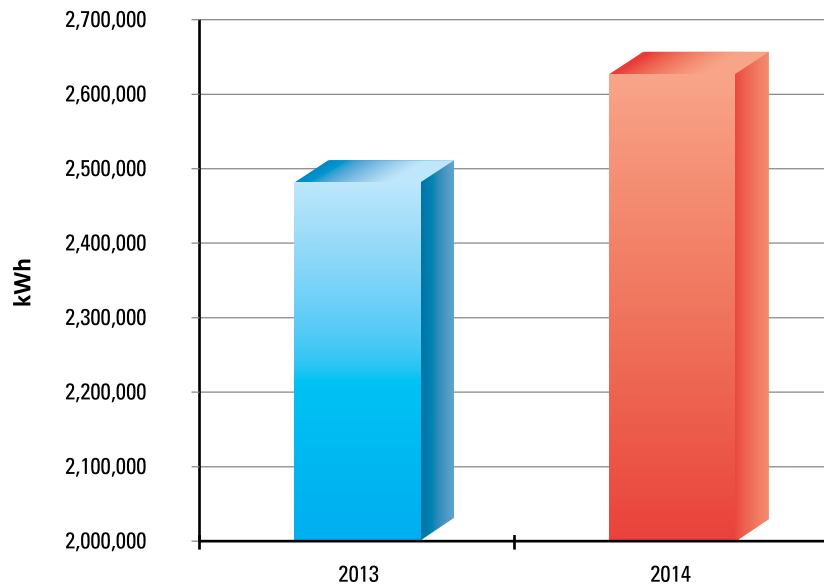


Our data center has increased energy consumption over the last few years, while the institute as a whole has reduced consumption. As we consider the role of the data center in research, we recognize the drive toward technological advances in research and science will require a more managed approach to the data center to maintain or improve efficiency. We will continue to seek and implement the use of renewable sources, additional metering to better manage usage, and other sustainability measures to support that effort. The data center total consumption for 2013 was 2,481,325 kWh and in 2014 it was 2,627,022 kWh.

### Data Center vs. Whole Institute



### Data Center Energy Consumption

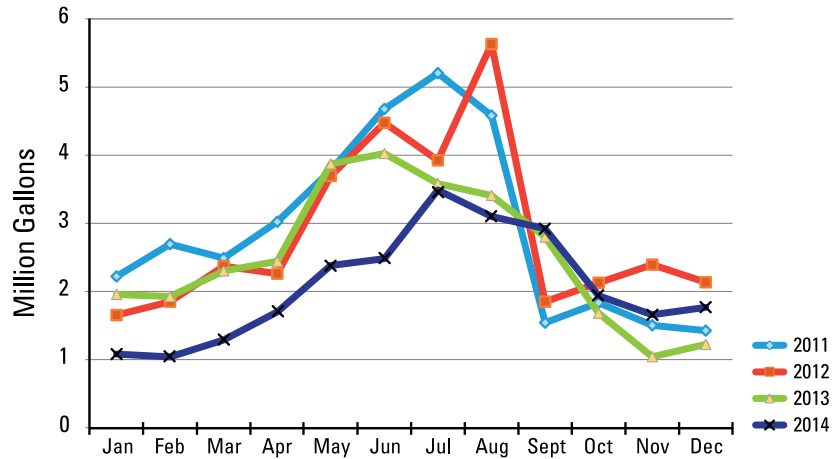




# Water

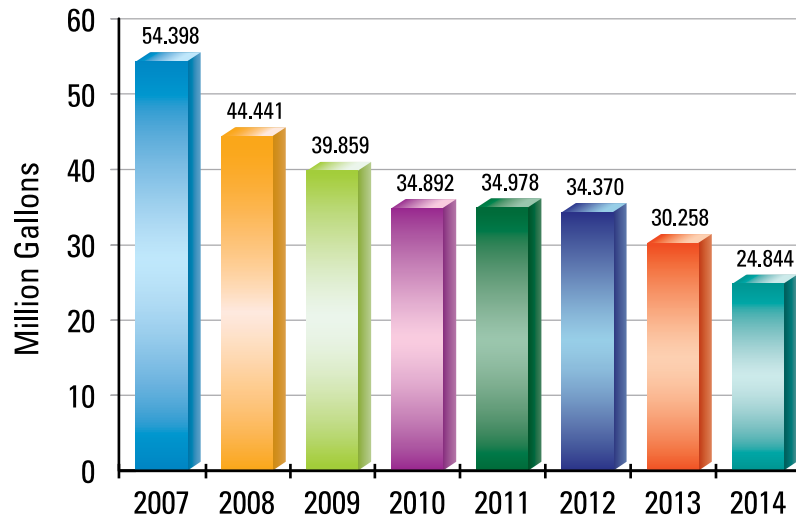
NIEHS has been a bold leader in water reduction strategies and successes since a drought in 2007. We continuously work to reduce our peak consumption during the summer months. A new reverse osmosis system has been in place, but not in use on a continuous basis during some major renovations. When fully operational, it has the potential to reduce peak consumption during the summer.

## Monthly Water Consumption Trend 2011-2014



Annual trends continue to drop as well. In 2014, there was a 54 percent reduction from our 2007 baseline, and a 27.7 percent reduction from 2012.

## Annual Water Consumption Trend





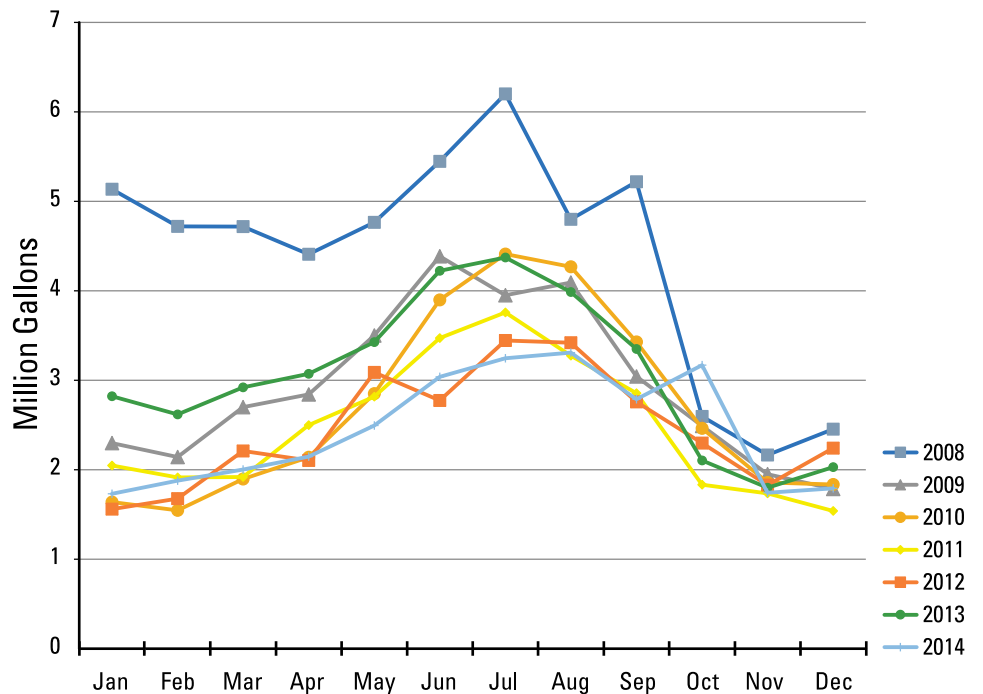
# Emissions

## Emissions – Water

Wastewater trends continue to remain fairly constant. With the help of a reverse osmosis system, we hope to see a continued reduction, especially in the summer months. Water consumption has reduced dramatically since 2007, and wastewater has typically trended the same.

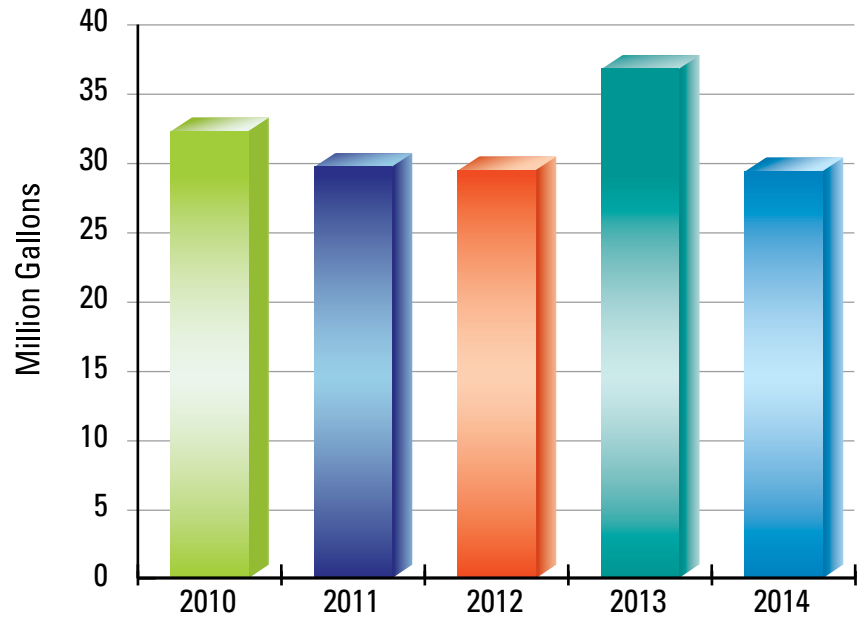
There was an increase in usage in 2013 due to the replacement of two chillers for one more efficient chiller, the purge of our reverse osmosis system during that process, and a piping replacement project. We promptly returned to more typical usage in 2014 and expect 2015 to follow suit.

### Monthly Wastewater Emissions Trend





## Wastewater Emissions Trend

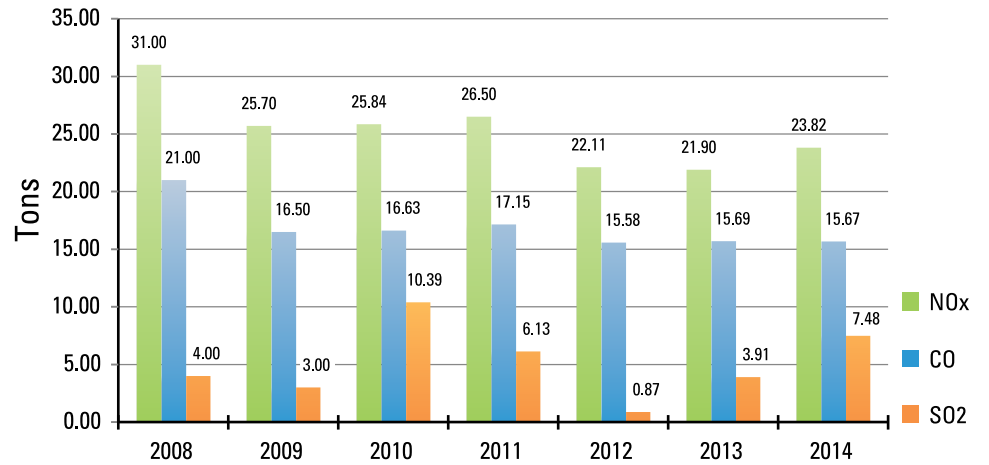


## Emissions – Air

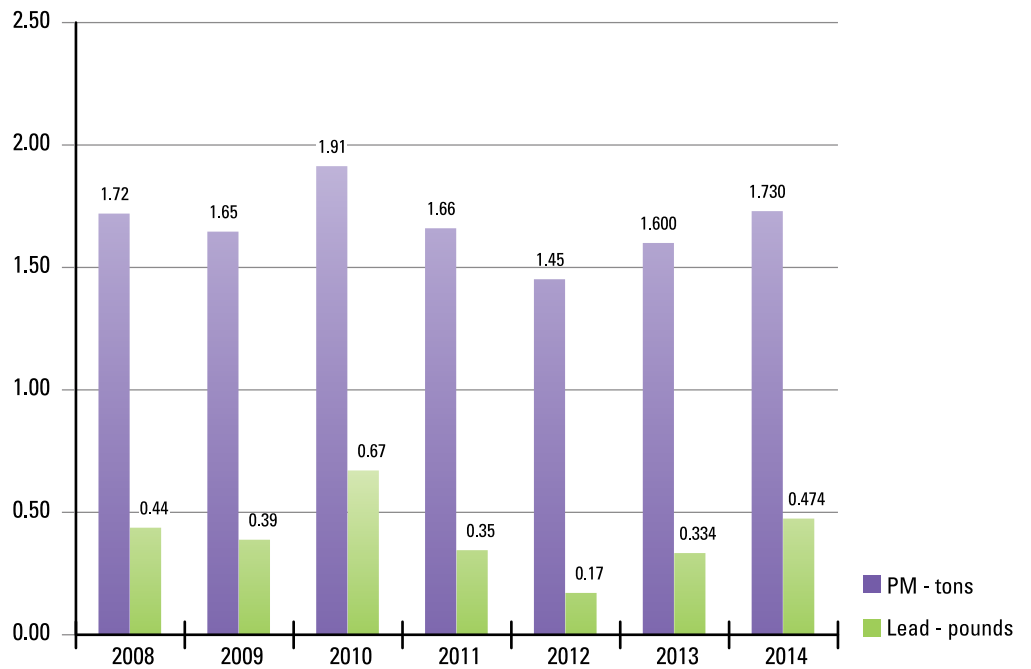
NIEHS is conscious of emissions associated with our operations. As much as we focus on greenhouse gas emissions, we recognize these elements have an impact on human health. We incinerate our pathological waste on-site to avoid costs and greenhouse gas emissions associated with transport of these materials to an off-site commercial incinerator. NIEHS avoids these increased permitting requirements by recycling a large portion of our other waste and shipping non-recyclable waste to a local landfill. The State of North Carolina and the U.S. Environmental Protection Agency have approved our incinerator operation and exempted us from Title V requirements. Emissions have remained steady over the course of the years, with some changes during extreme weather. Nitrous oxides and carbon oxides are down overall, while sulfur oxides are up. These data demonstrate the increase in use of No. 2 fuel oil when our institute is under curtailment by our local utility provider. NIEHS receives a reduced rate for power during the entire year, in exchange for curtailing use when demand is high. Lead and particulate matter increases follow that same reasoning showing changes based on the type of fuel consumed.



## NIEHS/EPA NO<sub>x</sub>, SO<sub>2</sub>, CO Emissions



## Lead and PM Emissions Trend





# Transportation

## Fleet Management

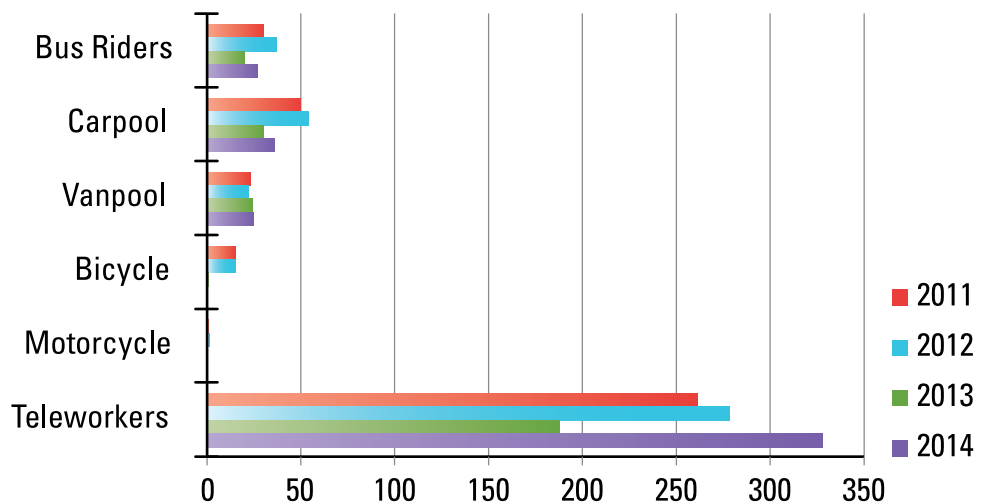
NIEHS has reduced the total number of vehicles by two in the last two years. This reduction streamlines our processes, while offering ample opportunity to use federal vehicles to conduct business. There is a total of 35 vehicles currently in the fleet. The average mpg is 7.8 mpg, with 14 vehicles getting greater than 10 mpg, and 16 vehicles getting less than 10 mpg. We continue to meet the federal requirement for 75 percent of the government flex fuel fleet vehicles to use E85 fuel.

NIEHS Fleet Vehicles	Number
Fuel efficiency less than 10 mpg	16
Fuel efficiency 11-19 mpg	11
Fuel efficiency over 20 mpg	3
Flex fuel vehicles	24
Hybrids	2

## Alternative Transportation

Our ridership and telework efforts continue to grow. Employees find many choices for alternative transportation, with the support of management. Telework is by far the most popular, but ridership for bus, van, and carpools continues to increase. With so many options, it is a win-win for employees and the environment. One employee also rides a velomobile, which fits under the bicycle category.

## Alternative Transportation Trends







## Waste and Recycling

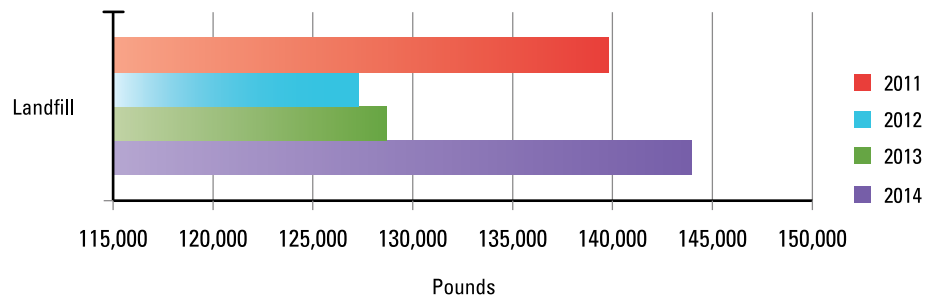
In an effort to reduce overall chemical load at our facility, and better manage biological materials, we took up the charge to not only record and report where all biological materials were located, but also took the opportunity to help labs clean out old unused or unwanted items. This will not only make our labs safer, but also reduce our overall footprint.

The calculations for landfill, and construction and demolition (C&D) materials, were adjusted to more accurately reflect how C&D waste is handled. With an uptick in landfill waste, we make every effort to reuse and recycle where possible.

We saw little change overall since 2012 for recycling, as a whole. We take these numbers to imply a reduction in use and not a reduction in recycling, which is a positive move for our institute. For example, a reduction in animal bedding compost is the direct result of a new cage system put in place for housed animals during 2014. With cage changes reduced by half, the amount of bedding used and then composted is cut dramatically.

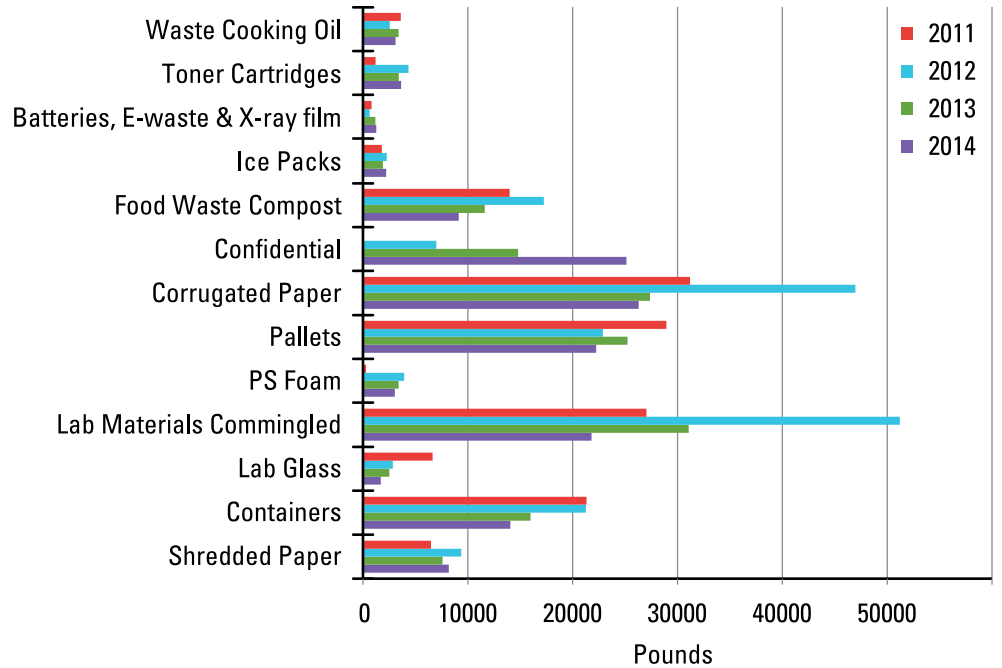


### Waste to Landfill

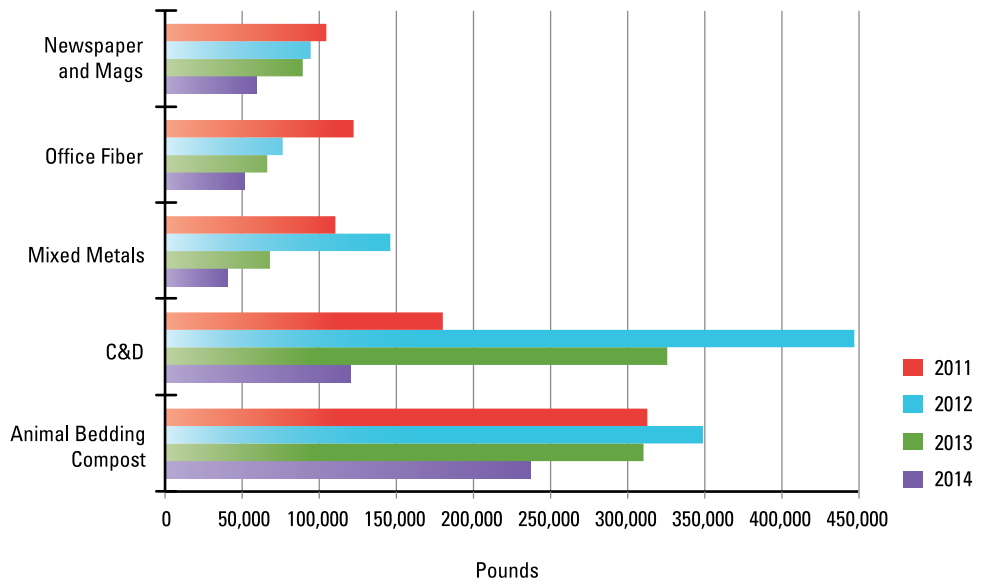




## Recycling Summary (Small Volume Materials)



## Recycling Summary (Large Volume Materials)



## Purchasing

Our acquisitions group continues to support and implement green purchasing standards along federal guidelines. We have worked with the General Services Administration (GSA) to help create a green procurement [compilation](#) that will provide information and support for federal contract personnel and program managers purchasing services and products for federal operations. This site will help guide employees to make greener choices for all acquisitions.



## Looking Ahead

NIEHS recognizes that natural resources are limited, and that the demand for resources will continue to increase due to economic and population expansion. Understanding the environmental aspects and resource demands of our operations is a key part of setting goals and objectives that support our sustainability strategy.

In 2014, we revised our strategy to include several areas that focus on improving the efficiency of operations, utilizing innovative technology, and expanding biodiversity and wildlife habitat. These changes included the following.

- Developed an organizational printer policy that sets goals to reduce paper and printing use, to conserve resources and lower energy consumption. Efforts would include reducing the overall number of individual desktop printers and encourage the use of shared printers, while also expanding the use of 100 percent recycled content paper, and encouraging paperless processes
- Support a project to upgrade campus illumination to LED lighting to improve visibility and reduce energy use. The project would involve removing current incandescent, fluorescent, and metal-vapor lamps and fixtures being used on campus and replacing them with appropriate LED lighting. The benefits from the newer lighting technology include the potential to significantly reduce energy use, lower maintenance and replacement costs, and substantially improve visibility. The results are a safer, more efficient and reliable mode of lighting for the campus.
- Promote initiatives that protect and expand habitat for native wildlife, such as increased housing for bluebirds, purple martins, and the brown-headed nuthatches, as well as new dwellings for bats, whose population has declined in recent years. As we continue to learn more about the importance of pollinators, the potential to expand the habitat for mason bees, by adding mason bee boxes, will be explored.
- Evaluate campus Ash tree population for invasive Emerald Ash Borer (EAB) activity, take measures to protect the Ash from the invasive insect, and seek to eliminate or reduce effects of potential infestation, where possible. Ecologists have seen an expansion of this destructive beetle to the edges of our region and anticipate the eventual presence of the EAB in the Research Triangle area of North Carolina. There will be a need to develop a plan of action to monitor and detect the presence of infestation, as well as efforts to protect and preserve the presence of the Ash tree on the NIEHS campus.
- Opportunities to include renewables into our energy portfolio are limited but create a desirable approach to reducing our carbon footprint. We are looking to place a photovoltaic array along the roof of the offices of the central utility plant to reduce greenhouse gas emissions and energy costs.