

# Policy & Science Advisor UPDATE

## ENVIRONMENTAL RESEARCH

Q2 2023



Photo Credit: Agrivoltaic Solutions LLC

Caitlin Frame, NYSERDA Project Manager



Photo Credit: Caitlin Frame

### Welcome Caitlin Frame as Project Manager

Caitlin Frame has joined the Environmental Research group from the greenhouse gas mitigation section of the New York State Department of Environmental Conservation office of climate change. She has a Ph.D. in chemical oceanography and has authored many peer reviewed publications on the use of stable isotopes to perform source attribution of greenhouse gas emissions from aquatic environments. At NYSERDA Caitlin will be managing projects that examine the interactions among renewable energy siting, land management decisions, and the capacity of landscapes and coastal ecosystems to sequester carbon and emit greenhouse gases. She will also continue managing projects investigating the impacts of acid rain and climate change on ecosystems in the Adirondacks.

September 2023





## Land Based-Renewables

- The **Agricultural Technical Working Group (A-TWG)** had another active quarter, meeting twice as the full group and convening five [specialist committee \(SC\) meetings](#). The April 13th SC meeting is noteworthy as it convened a group of forestry stakeholders to solicit feedback on the Forested Lands Protection section of the [2022 Smart Solar Siting Scorecard](#). This resulted in material feedback for NYSERDA, NYSDEC, and others involved to consider incorporating into the 2023 Smart Solar Siting Scorecard for NYSERDA's Tier 1 annual solicitation. Concurrently, the Scorecard SC continued to meet to deliberate on incremental but important improvements to the balance of the Scorecard. Stay tuned for a final product to be available in the next quarterly update.
- **Agrivoltaic Specialist Committee** meetings explored the applicability and feasibility for agrivoltaics opportunities in New York to potentially serve the dairy industry and sheep industry. At the April meeting, Guest speaker Darren Suarez of Boralex presented novel ways the developer's projects are planning to incorporate agricultural co-utilization such as commercial beekeeping, a dairy co-location pilot project, and an enhanced carbon sequestration pilot project within their Greens Corners Solar project in Jefferson County. AGV SC member Ray Dykeman also presented on his experience as a dairy farmer in New York and with leasing land for a solar project. At the June meeting, guest speakers Lewis Fox and Nick Armentrout of Agrivoltaics Solutions presented on Scaling Prescribed Sheep Grazing as a Dual Use Solar Strategy in New York. It is estimated that nearly 2,000 acres of ground-mounted solar projects are being grazed by sheep in New York this year, and approximately 25,000 acres nationwide. AGV SC member Michael Cucchiara and his colleague Jared McGrath, both of Nexamp, also presented on solar sheep grazing from a developer's experience.
- **Crop Suitability on Solar Sites:** A team from Cornell U. (funded through PON 4270) has submitted for publication their desktop analysis of the impact of solar panel spacing and height, and the availability of direct and diffuse sunlight on where crops and solar arrays can be co-located. The model can be applied to solar sites across the globe; validation with field data was performed for sites in the northeast and southwest U.S. Stay tuned for more details once the paper is published. Meanwhile, they have also been deploying their microclimate sensor packages at solar sites across NY that measure temperature, photosynthetically active radiation (PAR), and soil moisture. Check out press coverage highlighting the lab's work on the mutual benefits of co-locating crops and solar arrays [here](#) and [here](#).
- **Avian Use of Solar Sites:** The DNV GL project (funded through PON 4270), has wrapped up field research on avian habitat use and biodiversity at utility-scale solar facilities in New York over 2021 and 2022. The team conducted field surveys at 15 solar facilities and paired reference sites in cultivated crops,

(Land Based-Renewables, continued...)

hay/pasture fields, shrub, and forest habitats. Field observations include nesting of robins, house finches, eastern phoebes, and eastern bluebirds at solar sites. Statistical comparisons of solar and comparison sites will be presented in the project's forthcoming final report.

- **Solar Grazing Study Underway:** Field work by the American Solar Grazing Association (funded through PON 4270) is underway to measure potential impacts on soil and pasture health of livestock grazing at solar installations. Their study will compare grazed and ungrazed land under and between solar panels using the USDA NRCS's pasture condition scoring criteria and chemical and physical testing of soil and forage by the Dairy One Cooperative lab in New York.



## Ecosystem Response

- **Lignocellulosic Biomass Research:** The State University of New York College of Environmental Science and Forestry (SUNY ESF) completed their research on lignocellulosic biomass as a renewable heat source alternative to coal and petroleum. SUNY ESF examined hot water extracted shrub willow, miscanthus, and wheat straw fuel pellets which had lower ash and higher energy contents. While the carbon monoxide off-gassing of hot water extracted lignocellulosic biomass pellets was consistently higher than lignocellulosic biomass pellets, the emissions remain lower than commercially available pellets. For more information read the final report, "[Lowering Ash Content of Biomass Using Hot-Water Extraction \(HWE\) and Hot-Water Extracted Lignin](#)".
- **Loon Banding Observation:** In July 2023, the Adirondack Center for Loon Conservation hosted their annual loon banding observation nights allowing people to view loon banding and sample collection techniques used by the Adirondack Center for Loon Conservation field crew to monitor the health, exposure to contaminants, and reproductive success of the Adirondack loon population.

Lab student analyzing the mercury samples



NYSERDA supports the Adirondack Center for Loon Conservation's including loon observation, tissue analysis, and mercury analysis of the loon population in the Adirondacks.

- **Fish Mercury Trends Study Underway:** Dr. Charles Driscoll continues to explore fish mercury concentrations in sixteen Adirondack Lakes. Trends in deposition and stream and lake mercury trends for Arbutus Lake will be published in a journal article. Cornell University will build off this work explore of the lake thermal and fish mercury patterns with a final report anticipated in 2024.



## Offshore Wind

- Undersea Glider Deployments:** NYSERDA funded work to collect baseline data in new wind energy lease areas to Stony Brook University, Rutgers University, and Woods Hole Oceanographic Institution. They completed their first deployment of a Slocum G3 glider (an autonomous underwater vehicle) off the coast of Long Island-to conduct surveys for baleen whales and collect oceanographic information. Thirty-day surveys will be conducted quarterly over the next two years to better characterize marine mammal presence in and around the New York Bight offshore wind areas. Data is being published in near-real time on [Robots4Whales](https://robots4whales.org).

Occurrence of Sei Whales (left) and Humpback Whales (right) in the New York Bight

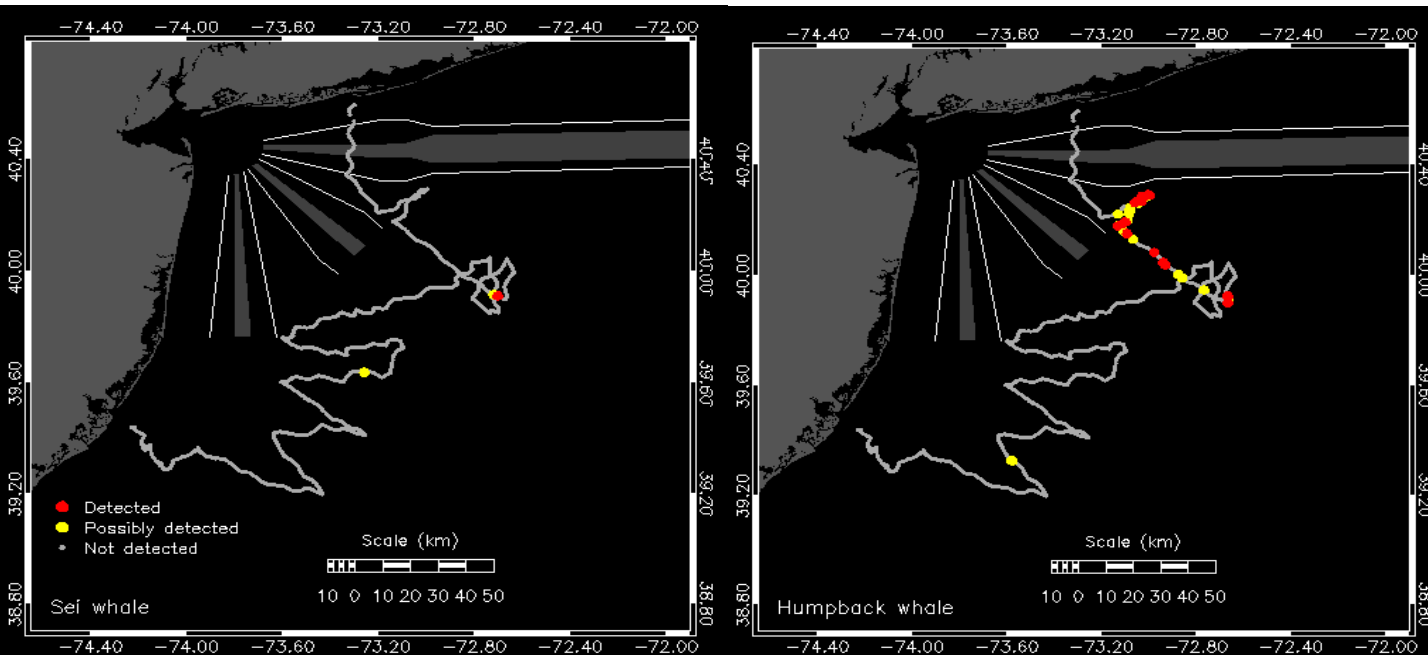


Photo Credits: Rutgers University, Stony Brook University and Woods Hole Oceanographic Institution

- Regional Fisheries Compensation Fund:** NYSERDA continues to support the multi-state effort for the establishment of a fair, equitable, and transparent regional fisheries compensatory mitigation fund. The State caucus recently expanded to include Delaware and North Carolina making it now 11 continuous coastal states from Maine to North Carolina working to advance this effort. A Request for Proposals is expected to be released later this summer for the selection of a fund administrator who will develop, design, and implement the fund. For more details see <https://offshorewindpower.org/fisheries-mitigation-project>
- The Environmental Technical Working Group hosted a public [webinar](#) to present and gather feedback on new guidance, Responsible Practices for Regional Wildlife Monitoring and Research in Relation to Offshore Wind Energy Development. The guidance includes the Atlantic Offshore Wind

(Offshore Wind, continued...)

Environmental Research Recommendations [database](#), as well as considerations for: prioritizing research needs, study design a methodology for regional research, and data standardization and sharing.

International Center of the Capital Region's visit to NYSERDA



- In April, the [International Center of the Capital Region](#) visited NYSERDA with their Ukrainian Climate Change and Renewable Energy Experts as part of the Open World Program. Environmental Research staff provided a brief presentation on NYSERDA's offshore wind program.

Photo Credit: NYSERDA

- On July 27, NYSERDA issued an addendum to New York's third offshore wind [solicitation](#) (ORECRFP22-1). The addendum clarifies that Purchase Commitment Proposals, which are Proposals that have contingent economic benefits associated with Supply Chain Investment Plans (SCIP), can still be eligible for an award if an associated SCIP Facility in the same bid package is not awarded. This clarification ensures that all bid combinations, with and without contingencies, can be considered for award and are treated equitably and in a transparent manner resulting in the most competitive process that provides the most defensible outcome for this solicitation. As part of this addendum, NYSERDA is providing a clarification to all bidders and offering another opportunity for updated pricing to ensure the most competitive award group. Bid prices cannot be adjusted upwards and no other changes to bids will be allowed. Proposers must respond to NYSERDA by Thursday, August 24. In light of this process, NYSERDA currently expects to make award announcements in Q4 of 2023.
- **Offshore Wind Transmission Cables:** In June, the Public Service Commission published an [Order](#) Addressing Public Policy Requirements for Transmission Planning Purposes (Case 22-E-0633) which determined that the requirement to develop at least 9,000 megawatts of offshore wind constituted a Public Policy Requirement driving the need for additional transmission facilities to deliver energy to New York City interconnection points.

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Included in the order are recommendations from the Offshore Wind Cable Corridor Constraints [Assessment](#) and the Cable Working Group as evaluation and ranking criteria for proposers use as guidelines for the development of their submissions to the NYISO.

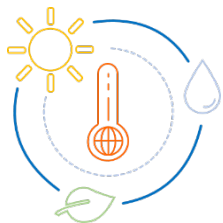
- The **Fisheries Technical Working Group** held a series of virtual open houses on June 1, June 26, and July 17 for members of the commercial and recreational fishing industries. The purpose of these virtual open houses were to synthesize and review previous comments the industry has provided on offshore wind and discuss with industry members how best to apply these and new comments to the Master Plan 2.0 process for the advancement of offshore wind development beyond the 60-meter contour. A final virtual open house will be held on August 15. Further details and meeting summaries can be found at [www.nyftwg.com](http://www.nyftwg.com)
- NYSERDA presented at the [Marine Law Symposium: Can Offshore Wind Development Have a Net Positive Impact on Biodiversity? Regulatory and Scientific Perspectives and Considerations](#) at Roger Williams University School of Law. The Symposium brought together scientific, regulatory, legal, and industry experts from the United States and Europe to discuss the concept of net positive impact (NPI) in the offshore wind development context. NYSERDA participated in a panel entitled, *Regulatory Opportunities: How Can NPI be Advanced in Offshore Wind Projects? An Examination of the Solicitation Process and Other Possible Implementing Mechanisms for NPI.*
- NYSERDA continues to host a monthly offshore wind webinar series, [Learning from the Experts](#). Recent webinars have examined hydrogen power, emergency response planning, and bird monitoring.

## Climate Change

- **Climate Impact Assessment:** Program staff and members of the Climate Impacts Assessment Ecosystems working group spoke at the 2023 Adirondack Research Consortium in Lake Placid in May. The speakers presented preliminary results from the ecosystems assessment that are relevant to the Adirondack region.

Peer review of the technical chapters of the Climate Impacts Assessment (CIA) has begun and will continue into Q3. Review will be staggered, as each chapter is on a slightly different timeline. Progress continues on website development and other outreach products.

- **Extreme Heat Adaptation Plan:** Program staff have continued working with others at NYSERDA, NYS Department of Environmental Conservation, and other agencies on the Extreme Heat Adaptation Plan. Drafting of the recommended actions will begin in Q3. With a target release in early 2024, the plan will include specific actions the State will take to build resilience and adapt to extreme heat, build local capacities, and support local communities in taking action.





## Air Quality and Public Health

- **2023 Summer Air Quality Studies in the NYC-Long Island Region** - During the 2023 ozone season, there will be several NYSERDA-funded activities in the New York City metro region that build upon previous work from the Long Island Sound Tropospheric Ozone Study (LISTOS) launched by the Northeast States for Coordinated Air Use Management (NESCAUM) in 2018. The NYSERDA-funded activities conducted are:
  - Speciated volatile organic compound (VOC) monitoring at Goethals Field on Staten Island conducted by NYS DEC to support a source attribution analysis by Dr. Jay Turner, Washington University at St. Louis;
  - Ambient air monitoring at Heckscher State Park conducted by Dr. James Schwab, University at Albany, to investigate NYC urban pollution plume impacts along Long Island's south shore; and
  - Mobile ozone and aerosol Light Detection and Ranging (LIDAR) measurements by Dr. Fred Moshary, City University of New York, to measure aloft layers of ozone and aerosol pollution in the lower atmosphere being transported into and over the New York City region.

Along with these projects,

- Dr. Jie Zhang of SUNY Albany will be conducting mobile laboratory measurements of the atmospheric chemical evolution in urban outflow plumes and their interplay with coastal meteorology over Long Island, and
- Dr. Fred Moshary and Colleagues at CUNY will be engaged with additional campaigns described below using ground-based and satellite remote sensing of atmospheric dynamics and constituents at multiple scales and dimensions for an integrated approach to air pollution characterization and modeling.

In addition to their own research objectives, the ground-based observations supported by NYSERDA are complementing a suite of large field campaigns in the New York City area being conducted by a number of federal agencies and universities. National Oceanic and Atmospheric Administration (NOAA) will be flying a DC-8 research aircraft equipped with numerous air monitoring instruments over the New York City area in late July through mid-August during its Atmospheric Emissions and Reactions Observed from Megacities to Marine Areas (AEROMMA) campaign. A NOAA Twin Otter research aircraft will be flying at the same time to investigate atmospheric dynamics on urban plume transport

(Air Quality and Public Health, continued...)

and mixing over and along Long Island Sound as part of the Coastal Urban Plume Dynamics Study (CUPiDS). The Tropospheric Emissions: Monitoring of Pollution (TEMPO) satellite instrument was successfully launched on April 7, 2023 and is expected to begin taking space-based geosynchronous observations of air quality over much of North America in late July. In tandem with the start of TEMPO measurements, NASA will be flying its GV research aircraft in the New York City region as part of the Synergistic TEMPO Air Quality Science (STAQS) mission.

The NOAA Air Resources Lab and University of Maryland will fly a Cessna 402 research aircraft to the region to characterize the meteorology and chemistry leading to air pollution events and emissions of greenhouse gases. National Aeronautics and Space Administration (NASA) researchers will be bringing additional ozone LIDARs and launching ozone sondes for making vertical ozone concentration measurements during these campaigns. These and other activities are collectively part of the umbrella acronym [“AGES+”](#) and are being coordinated through NOAA and NASA with local assistance provided by NESCAUM. The significant amount of research activity in the New York City region during the summer of 2023 is a direct outgrowth of the NYSERDA-funded support for LISTOS starting in 2018.

- **Residential Wood Combustion** - On June 29, 2023, The Attorneys General of New York, Alaska, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Oregon, Vermont, and Washington, and the Puget Sound Clean Air Agency notified Administrator Regan of their intent to sue the US Environmental Protection Agency for failing to review and revise the New Source Performance Standards for Residential Wood Heaters under the Clean Air Act. The letter provides EPA with 60-days' notice of the States' intent to file a lawsuit for EPA's failure to perform a mandatory duty under the statute.
- **NYSERDA co-sponsored a webinar with NYSDEC this quarter** - Systematically assessing the associations and disparities between ultra-fine particles and multiple health outcomes, and the modifications by weather factors and greenness coverage by Shao Lin, MD, MPH, PhD; Professor, Dept. of Environmental Health Sciences & Associate Director of Global Health Research, School of Public Health at SUNY Albany and Arshad Arjunan Nair, PhD; Postdoctoral Associate, Atmospheric Sciences Research Center (ASRC) at SUNY Albany.
- There were four publications from the air quality and public health portion of the program. See last page for titles and links to the publications.



# Program Reports and Papers

## Program Reports & Papers posted recently include:

### ***Air Quality and Related Health Research: Particulate Matter (PM), Ozone and Co-Pollutants***

Cong Cao, Drew R. Gentner, Róisín Commane, Ricardo Toledo-Crow, Luke D. Schiferl, and John E. Mak. Environmental Science & Technology: Policy-Related Gains in Urban Air Quality May Be Offset by Increased Emissions in a Warming Climate <https://pubs.acs.org/doi/10.1021/acs.est.2c05904>

Hopke, P. K., Chen, Y., Rich, D. Q., Mooibroek, D., & Sofowote, U. M. (2023). The application of positive matrix factorization with diagnostics to Big Data. *Chemometrics and Intelligent Laboratory Systems*, 240, 104885. <https://doi.org/10.1016/j.chemolab.2023.104885>

Hopke, P. K., Chen, Y., Rich, D. Q., Watson, J. G., & Chow, J. C. (2023). Issues with the organic and elemental carbon fractions in recent U.S. Chemical Speciation Network Data. *Aerosol and Air Quality Research*, 23(6), 230041. <https://doi.org/10.4209/aaqr.230041>

Khare, P., Krechmer, J. E., Machesky, J. E., Hass-Mitchell, T., Cao, C., Wang, J., Majluf, F., Lopez-Hilfiker, F., Malek, S., Wang, W., Seltzer, K., Pye, H. O., Commane, R., McDonald, B. C., Toledo-Crow, R., Mak, J. E., & Gentner, D. R. (2022). Ammonium adduct chemical ionization to investigate anthropogenic oxygenated gas-phase organic compounds in urban air. *Atmospheric Chemistry and Physics*, 22(21), 14377–14399. <https://doi.org/10.5194/acp-22-14377-2022>

Leibensperger, E. M., Konieczny, M., & Weil, M. D. (2023). Uncertainty in the mobile observation of wind. *Atmosphere*, 14(5), 765. <https://doi.org/10.3390/atmos14050765>

### ***Ecosystems***

New York State Energy and Research Development Authority (NYSERDA). 2022. “Lowering Ash Content of Biomass Using Hot-Water Extraction (HWE) and Hot-Water Extracted Lignin,” NYSERDA Report Number 23-17. Prepared by SUNY ESF, Syracuse, NY. [nyserdera.ny.gov/publications](https://www.nyserdera.ny.gov/publications)  
<https://www.nyserdera.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Environmental/23-17-Lowering-Ash-Content-of-Biomass-Using-HWE-and-HWE-Lignin-acc.pdf>

### ***Land-Based Renewables***

Lawrence, G., Fernandez, I., Bailey, S., Beier, C., Contosta, A., Lane, E., Murdoch, P., Nave, L., Quintana, A., Ross, D., & White, A. (2023). Forming regional soil carbon networks to support effective climate change solutions. *Soil Science Society of America Journal*. <http://doi.org/10.1002/saj2.20551>

### ***Offshore Wind***

Goetsch, et al. 2023. Surface and subsurface oceanographic features drive forage fish distributions and aggregations: implications for prey availability to top predators in the US Northeast Shelf ecosystem. *Ecology and Evolution*. 13:7 e10226.  
<https://onlinelibrary.wiley.com/doi/10.1002/ece3.10226>