

REDUCING BLACK CARBON FROM WOOD BURNING IN FAIRBANKS, ALASKA

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ABSTRACT

Fairbanks, Alaska has been home to air quality concerns for years. Heat sources like wood boilers emit black carbon, a pollutant akin to soot. In Fairbanks's harsh winters, black carbon is trapped close to the earth and creates health problems for residents. Black carbon has a more global effect as well, however, and climate scientists have recently begun to consider reducing black carbon emissions as a viable way to slow the pace of climate change. Fairbanks is uniquely situated to react to this call for action. Reducing black carbon emissions from wood burning in Fairbanks would not only contribute to the greater fight against climate change, but would alleviate significant local air quality and health concerns. This Comment summarizes the issue of black carbon in Fairbanks, and proposes several legal approaches to mitigate its negative environmental and health effects, including public nuisance claims, local regulations, and stricter compliance with federal environmental laws.

INTRODUCTION

When wood or other fuels are burned, fine particles of black carbon diffuse into the air amidst the smoke, causing a host of respiratory problems when people breathe them in. The soot particles that do not make it into human lungs eventually settle like a black patina on the Arctic ice. In recent years, scientists have started to seriously consider the effects of these black carbon particles on climate change. Early on,

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the *New York Times* quoted Dr. James E. Hansen as suggesting that, in order to encourage political movement on the issue, it might make sense to “lock people in a room with a good bit of ozone and black carbon in the air until they come up with some positive ideas.”¹ More than ten years later, black carbon remains an issue ripe for global action; but on the local level, residents of Fairbanks, Alaska, who have essentially *been* trapped in a room with a strong dose of soot, have begun to experiment with some solutions of their own.

Fairbanks is a low-lying basin town in a borough of approximately one hundred thousand people. The town prides itself on its toughness, routinely enduring winters with average lows of -15°F to -25°F and frequent extremes of much lower. For Fairbanks residents, heating buildings during the frigid winter is expensive. Consequently, many people in the city turn to wood burning as an inexpensive and effective—though incredibly dirty—source of heat.

Black carbon, a principal component of soot, is a part of what climate scientists refer to as fine particulate matter (PM_{2.5}): a mixture of tiny particles that are “so small that they can get deep into the lungs and cause serious health problems,” like asthma or heart disease.² One of the major sources of black carbon is wood burning. The temperature during wood burning is too low to completely break down the organic matter, which permits a myriad of byproducts of the incomplete combustion to be released into the atmosphere.³ After hovering temporarily in the atmosphere, the soot ultimately settles as a black film on the Arctic ice. This, in turn, increases the pace at which ice melts, and thus exacerbates the problems of global warming.

Fairbanks in particular has been disproportionately affected by black carbon, and in response has recently attempted to regulate wood burning to improve its air quality. Reducing black carbon emissions from wood burning in Fairbanks is likely to have beneficial effects beyond just improving local air quality. The legal strategies employed by Fairbanks provide some useful guidance on how some emission reductions may be achieved. In particular, public nuisance tort claims, local regulations, and strict adherence to existing federal environmental

1. Andrew C. Revkin, *Debate Rises over a Quick(er) Climate Fix*, N.Y. TIMES (Oct. 3, 2000), <http://www.nytimes.com/2000/10/03/science/debate-rises-over-a-quick-er-climate-fix.html?pagewanted=all&src=pm>.

2. *Particulate Matter – Health*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/pm/health.html> (last updated Mar. 18, 2013).

3. *Black Carbon – Basic Information*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/blackcarbon/basic.html> (last updated Mar. 30, 2012). Though some technical differences exist between them, the terms “soot,” “black carbon,” and “PM_{2.5}” are used interchangeably in this Comment.

laws may be effective strategies for limiting black carbon emissions and improving the health of Fairbanks residents, while ameliorating the impacts of global warming on the Arctic region.

I. THE SOURCES AND EFFECTS OF BLACK CARBON

Black carbon has a particularly profound impact in Arctic regions not only because it is emitted in large quantities from wood burning, but also because of how the black carbon interacts with snow. As more is learned about these impacts, black carbon is likely to play an increasingly large role in climate change discussions because scientists can isolate ways to reduce emissions that have both local and global effects.

A. Sources of Black Carbon

Wood burning is one of the four main categories of black carbon sources and is particularly relevant in cold regions like the Arctic.⁴ In developing countries, where wood stoves are a common and affordable mechanism for cooking and heating in both urban and rural communities, emissions from wood burning have been a huge source of black carbon.⁵ Other anthropogenic activities that produce black carbon include the combustion of fossil fuels such as coal, oil, and gasoline, and the controlled burning of savannahs and forests.⁶ Though fuel combustion creates more black carbon in the Arctic than open fires and wood burning,⁷ black carbon from wood burning is a far easier problem to target and its reduction would have tangible and immediate impacts on the health of local communities and on global warming.

In Alaska generally – but especially in Fairbanks, where natural gas is expensive and heat is essential – wood burning is a particularly noteworthy emitter of black carbon. In addition to the individual residents who take advantage of outdoor wood boilers and stoves, schools and other large institutions also burn wood for heat.⁸ At least

4. EPA *Black Carbon and Global Warming: Hearing Before the H. Comm. on Oversight and Gov't Reform*, 110th Cong. 30 (2007) [hereinafter *Hearing*] (statement of Tami Bond), available at https://house.resource.org/110/gov.house.ogr.20071018_hrs11RFM2154.pdf.

5. *Id.* at 98 (statement of Prof. V. Ramanathan).

6. *Id.* at 71 (statement of Prof. Charles Zender).

7. *Id.*

8. See *Mat-Su Is Latest Alaska School District to Embrace Wood-Burning for Heat*, ANCHORAGE DAILY NEWS (Mar. 26, 2013), <http://www.adn.com/2013/03/26/2840920/mat-su-is-latest-alaska-school.html#wgt=rcntnews> [hereinafter *Mat-Su*] (describing efforts of a school district to install a wood-fired

three school districts in Alaska have installed wood-fired boilers within the last several years.⁹ Newer wood-fired boilers are designed to minimize or eliminate soot output, but can be prohibitively expensive and sometimes require a particular type of wood (such as pellets).¹⁰ Older boilers, on the other hand, may sometimes be retrofitted with particle-catching technology, but such modifications are expensive and cannot be done on log-burning devices.¹¹ As a result, most of the wood burners in Fairbanks contribute significantly to black carbon levels in the area.

B. Black Carbon's Effect on Global Climate Change

According to a recent four-year study, black carbon is now the second largest pollutant contributing to climate change, after carbon dioxide.¹² The 2013 study suggests that black carbon's direct impact on climate is increasingly significant. In 2007, the estimated warming effect of black carbon was sixty percent, more than half as strong as the greenhouse warming effect caused by carbon dioxide.¹³ In recent years, that estimate has increased to eighty percent, indicating black carbon's contribution to the effects of global warming is on the rise.¹⁴

Black carbon consists of dark, microscopic particles that absorb solar radiation and convert it to heat radiation, which causes a warming effect.¹⁵ The soot particles also reduce or darken cloud formations, which

boiler for heating purposes).

9. *Id.*

10. See Fiona Harvey, *Wood Fires Fuel Climate Change - UN*, THE GUARDIAN (Nov. 27, 2011, 6:14 PM), <http://www.guardian.co.uk/environment/2011/nov/27/wood-fires-fuel-climate-change> (noting that some types of wood-fired boilers do not produce black carbon).

11. *Id.*

12. Tami C. Bond, et al., *Bounding the Role of Black Carbon in the Climate System: A Scientific Assessment*, 118 J. GEOPHYSICAL RES. 5380, 5388 (2013).

13. *Hearing*, *supra* note 4, at 49 (statement of Prof. V. Ramanathan).

14. ENVTL. PROT. AGENCY, PUB. NO. EPA-450/R-12-001, REPORT TO CONGRESS ON BLACK CARBON 52 (2012) [hereinafter BLACK CARBON REPORT], available at <http://www.epa.gov/airquality/blackcarbon/2012report/fullreport.pdf>.

15. MATTHEW VESPA, CENTER FOR BIOLOGICAL DIVERSITY, PETITION FOR WATER QUALITY CRITERIA FOR BLACK CARBON ON SEA ICE AND GLACIERS UNDER SECTION 304 OF THE CLEAN WATER ACT, 33 U.S.C. § 1314 3 (2010) [hereinafter CBD PETITION], available at http://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_what_how_why/black_carbon/pdfs/EPA_CWA_Black_Carbon_Petition_2-22-10.pdf (citing Piers Forster et al., *Changes in Atmospheric Constituents and Radiative Forcing*, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP 1 TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 136, 163 (S. Solomon et al. eds., 2007)).

renders clouds less able to reflect sunlight and cool the earth's surface.¹⁶ As black carbon accumulates, these two effects synergistically increase the heat retained in our atmosphere and on the earth's surface.

Black carbon is a short-lived pollutant, remaining in the atmosphere for only a few weeks.¹⁷ In contrast, methane remains for eight to twelve years, while estimates for the atmospheric life span of carbon dioxide range from thirty to over one hundred years.¹⁸ Despite its short atmospheric life span, however, black carbon still has powerful consequences for global warming, because its warming action is swift. At the same time, the relatively short life span of black carbon means any action to reduce it will have almost immediate effects.

C. Black Carbon's Effect on the Arctic

The Arctic region is heavily affected by climate change, warming at a pace about twice as fast as the rest of the world.¹⁹ Black carbon has an identifiable and significant effect on glaciers and other melting ice, and warming from black carbon is largely concentrated in the Arctic (as opposed to CO₂, which warms without discrimination).²⁰ Although long-lived greenhouse gases are the dominant cause of Earth's general recent warming, the presence of short-lived black carbon particles in the Arctic may help explain the faster observed pace of Arctic warming.²¹

The reason black carbon has such an impact in the Arctic is that it creates what is called an "ice-albedo" effect. As soot falls from the atmosphere and settles on the ice, it prevents the bright white snow and ice from reflecting sunlight. Instead, snow covered in black carbon absorbs the sunlight, causing the ice below to warm and melt. Once the ice melts, darker surface areas such as tundra and ocean emerge and

16. Dorothy Koch & James Hansen, *Distant Origins of Arctic Black Carbon: A Goddard Institute for Space Studies ModelE Experiment*, 110 J. GEOPHYSICAL RES. D04204, 2 (2005). See also Revkin, *supra* note 1 ("They tend to make clouds darker, Dr. Hansen says, reducing clouds' tendency to reflect sunlight and make the earth's surface cooler.").

17. *Hearing, supra* note 4, at 13 (statement of Prof. Mark Z. Jacobson).

18. *Id.*; REMY GARDERET & DANIEL W. EMMETT, INNOVO ENERGY SOLUTIONS GROUP, LLC, INTEGRATING BLACK CARBON INTO CLIMATE CHANGE AGREEMENTS: THE NEED, CHALLENGES AND PRACTICAL FIRST STEPS 7 (2009) ("Black carbon stays in the atmosphere for only several days to weeks, whereas CO₂ has an atmospheric lifetime of more than 100 years.").

19. *Hearing, supra* note 4, at 68 (statement of Prof. Charles Zender). See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 59 (2001) ("Climate change in the polar region is expected to be among the greatest of any region on Earth.").

20. *Hearing, supra* note 4, at 68 (statement of Prof. Charles Zender).

21. Koch & Hansen, *supra* note 16, at 1.

absorb even more heat, causing additional warming.²² Even minor amounts of black carbon deposits “are triggering astonishingly large ice-albedo warming.”²³

II. BLACK CARBON IN FAIRBANKS, ALASKA

Fairbanks is particularly susceptible to the impacts of black carbon because its harsh winter weather creates an effect referred to as “inversion.” Temperature inversion is a weather phenomenon in places that have periods with little sunlight. Under normal conditions, air closer to the ground is warmer than air at higher altitudes because the earth absorbs and retains heat from solar radiation. Inversion happens when warm air traps a pocket of cold air below it, closer to the ground.²⁴ The warm air ends up acting as a cap and prevents vertical mixing of the air, trapping pollutants like black carbon closer to the ground.²⁵

Fairbanks is subject to temperature inversion during the winter. It is situated at the bottom of the Tanana Valley and surrounded by mountains.²⁶ There is very little sunlight in the winter, and the surrounding mountains keep Fairbanks insulated from wind. On cold days, temperatures regularly drop to -40° F.²⁷ This cold air sinks to the bottom of the valley and traps the emitted black carbon so that it is unable to disperse.²⁸ Further, the lack of sunlight prevents any warming of the earth, which means there is little heat rising from the ground to break up the inversion.

22. *Hearing*, *supra* note 4, at 68–69 (statement of Prof. Charles Zender).

23. CBD PETITION, *supra* note 15, at 5–6 (citing *Hearing*, *supra* note 4, at 74 (statement of Prof. Charles Zender)).

24. For a simple discussion of inversion, see *What Are Temperature Inversions?*, NAT’L OCEANIC ATMOSPHERIC ADMIN., <http://www.wrh.noaa.gov/slc/climate/TemperatureInversions.php> (last visited Mar. 4, 2014).

25. *Id.*

26. FAIRBANKS NON-ATTAINMENT AREA BOUNDARY COMMENTS, ALASKA DEP’T OF ENVTL. CONSERVATION 24 (2008), available at http://dec.alaska.gov/air/doc/DEC_EPA_Fbks_NA_20oct08.pdf.

27. *How Wood Smoke Is Dirtying Alaska’s Air*, SCIENCE FRIDAY (Feb. 22, 2013), <http://www.sciencefriday.com/segment/02/22/2013/how-wood-smoke-is-dirtying-alaska-s-air.html> (interviewing Prof. Cathy Cahill on radio show).

28. See *id.* (discussing pollution inversion in Fairbanks). See also FAIRBANKS NON-ATTAINMENT AREA BOUNDARY COMMENTS, *supra* note 26, at 14 (“High PM_{2.5} days in Fairbanks are the result of very cold surface temperatures and shallow temperature inversions, calm winds creating stagnant conditions and inhibiting the transport and/or dispersion of pollutants, and local emissions in each community simultaneously producing localized air pollution increases and PM_{2.5} concentrations high enough to exceed the standard in some areas.”).

A. Climate and Health Benefits of Reducing Black Carbon Emissions in Fairbanks

Because black carbon emissions have a particularly strong effect on the Arctic, reductions could have an equally noticeable impact in the region. Though the origin of most black carbon in the Arctic can be traced back to Northern Europe and Asian sources,²⁹ emissions stemming from areas near the Arctic—such as Alaska—are thought to be more impactful, despite their smaller quantities. A 2011 study found that the higher in latitude black carbon emissions originated, the more warming effect they had on a per-ton basis.³⁰ This suggests that emissions from cities like Fairbanks have a meaningful impact on climate change. Consequently, monitoring and reducing black carbon emissions could be an effective way to slow the pace of global warming in the region.

In addition to potentially having a positive influence on climate change trends, reducing black carbon in Fairbanks would have considerable local health benefits. During recent winters, Fairbanks has recorded such low air quality levels as to make it not just one of the most polluted cities in the country, but one of the most polluted cities in the world.³¹ In November 2012, the town of North Pole, also in the Fairbanks North Star Borough (the “Borough”), measured air quality levels twice as bad as those in Beijing, China.³² Due to its poor air quality and high concentration of black carbon, Fairbanks failed to meet the National Ambient Air Quality Standards for PM_{2.5} and is thus considered a nonattainment area for purposes of the federal Clean Air Act.³³

29. See CBD PETITION, *supra* note 15, at 7 (“Black carbon emissions deposited in the Arctic largely originate from Northern Eurasia, North America, and Asia.”); GARDERET & EMMETT, *supra* note 18, at 7 (“[E]missions from Northern Europe result in over 60% of the black carbon that is currently deposited on the Arctic . . .”).

30. See BLACK CARBON REPORT, *supra* note 14, at 54–55 (“This study found that compared to the average emissions of BC from regions between 40°N and 50°N latitude, emissions of BC from between 50°N and 60°N latitude had about three times as much forcing impact in the Arctic on a per-ton basis. In addition, emissions from north of 60°N had seven times as much impact per ton.”).

31. *How Wood Smoke Is Dirtying Alaska’s Air*, *supra* note 27; Suzanna Caldwell, *Fairbanks Air Quality a Dirty Shame Locals Call a Community Health Crisis*, ALASKA DISPATCH (Dec. 20, 2012), <http://www.alaskadispatch.com/article/fairbanks-air-quality-dirty-shame-locals-call-community-health-crisis> (“The levels of pollution are so high, that at certain points this winter, it’s been unofficially considered some of the worst in the country, on par with some of the worst air quality in the world.”).

32. *How Wood Smoke Is Dirtying Alaska’s Air*, *supra* note 27.

33. 2006 24-Hour PM_{2.5} Standards – Region 10 Final Designations, October 2009,

Black carbon presents immediate health risks to the populations whose air it permeates. Health problems linked to fine particulate matter include “aggravated asthma, increased respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease.”³⁴ Fairbanksans have already begun to experience these health effects.³⁵ One school in Chena River experienced such a noticeable health decline in its student body and staff after two local wood boilers began operating that it filed a public nuisance claim against the boiler owners, citing increased levels of “respiratory problems and asthma.”³⁶ Though some efforts have been made to reduce wood burning³⁷—especially now that black carbon has become more prominently linked to health problems—the Borough still faces strong opposition from its residents whenever it attempts to regulate the issue.

B. Local Challenges of Curbing Black Carbon Emissions

For many families in Fairbanks, wood burning provides the only affordable source of heat during the winter. In some houses, wood-fired stoves are the only option available for heating the residence. Others are outfitted with multiple heating systems, but homeowners cannot afford to use them.³⁸ Alaska’s North Slope region is abundant in natural gas and many public officials have suggested that natural gas would be the best solution to the wood-burning problem,³⁹ but, in practice, this form

ENVTL. PROTECTION AGENCY, <http://www.epa.gov/pmdesignations/2006standards/final/region10.htm> (last updated Apr. 19, 2013) [hereinafter *PM_{2.5} Nonattainment Zones*] (identifying Alaskan boroughs (called “counties” by EPA) designated as nonattainment areas for PM_{2.5}). Nonattainment zones based on the 2012 standards of PM_{2.5} are expected to be posted in December 2014. *Area Designations for the 2012 Annual Fine Particle (PM_{2.5}) Standard—Designations Guidance and Data*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/pmdesignations/2012standards/techinfo.htm> (last updated Sept. 18, 2013).

34. Letter from Elin D. Miller, Regional Administrator, Environmental Protection Agency, to Sarah Palin, Governor of Alaska (Aug. 18, 2008), *available at* http://www.dec.alaska.gov/air/doc/18aug08_epa_ltr.pdf.

35. Caldwell, *supra* note 31.

36. Complaint ¶¶ 29, 30, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. Jan. 3, 2013).

37. For an updated list of some local initiatives to reduce black carbon (and other) pollution, as well as other editorials on the air quality in Fairbanks, see CLEAN AIR FAIRBANKS, <http://cleanairfairbanks.wordpress.com> (last visited Apr. 21, 2013).

38. *How Wood Smoke Is Dirtying Alaska’s Air*, *supra* note 27.

39. Caldwell, *supra* note 31.

of energy can be prohibitively expensive for many Fairbanks residents.⁴⁰ Fairbanks currently has no easy way to requisition the necessary fuel, and a natural gas pipeline is, at a minimum, years away.⁴¹ Consequently, fuel prices remain high, with residents often paying as much as \$4.50 per gallon.⁴² Electric heating, though becoming more affordable, can also be prohibitively expensive.⁴³

In addition to those individuals using wood as an inexpensive heat source for their homes, school districts have begun championing the source as an inexpensive way to meet heating needs in the face of budget cuts.⁴⁴ Though the school districts claim these wood boilers are environmentally friendly, only very specific types of wood boilers can truly claim that title. Many members of the public perceive that because wood is a natural source and replaces coal, it must be eco-friendly, but this is not always the case. It remains to be seen whether or not these heaters will be specifically tailored to meet the recommended emission standards for environmentally non-disruptive wood boilers.⁴⁵

Because alternatives to wood burning are so expensive, Fairbanksans have been strongly opposed to any regulation of the practice. The residents of Fairbanks recently introduced a ballot resolution banning any borough action that would have the effect of

40. See Kim Murphy, *Fairbanks Area, Trying to Stay Warm, Chokes on Wood Stove Pollution*, L.A. TIMES (Feb. 16, 2013), <http://articles.latimes.com/2013/feb/16/nation/la-na-fairbanks-air-pollution-20130217> (quoting resident who notes he was “paying twice what [his] mortgage was just to heat [his] home”).

41. *Id.*

42. *Id.*

43. See Jeff Richardson, *Angry Fairbanks Crowd Blasts High Energy Costs*, ANCHORAGE DAILY NEWS (Apr. 26, 2012), <http://www.adn.com/2012/04/26/2440833/angry-fairbanks-crowd-blasts-high.html> (covering electric company’s members’ meeting where over 1,800 members attended to ask for lower electric rates); Jeff Richardson, *Survey: Fairbanks Utilities Cost More than Double the National Average*, FAIRBANKS DAILY NEWS-MINER (July 23, 2012, 11:57 PM), http://www.newsminer.com/survey-fairbanks-utilities-cost-more-than-double-the-national-average/article_410e1c58-1b80-5710-905f-0205dd51de7d.html (noting utility costs for Fairbanks residents in 2011 were more than twice the utility cost to average urban residents); Jeff Richardson, *Study: Heat Pumps Marginally Viable in Fairbanks*, ANCHORAGE DAILY NEWS (July 4, 2011), <http://www.adn.com/2011/07/04/1951481/study-heat-pumps-marginally-viable.html> (acknowledging heat pumps may be a viable heat source in Fairbanks, but face high upfront costs and more expensive electricity than in cities like Juneau and Seward).

44. *Cf. Mat-Su, supra* note 8 (recounting how supporters of plan to install wood-burning boiler in Su Valley Junior/Senior High School “foresee fuel savings for the school”).

45. *Why that ‘Eco-Friendly’ Wood-Burning Stove Could Actually Be Harming the Environment*, DAILY MAIL ONLINE (Nov. 26, 2011, 8:37 AM), <http://www.dailymail.co.uk/news/article-2066520/Why-eco-friendly-wood-burning-stove-actually-harming-environment.html>.

regulating fuel-based heating appliances.⁴⁶ The resolution passed in October of 2012, nullifying existing regulations that sought to monitor wood stove industry standards.⁴⁷ The new law creates a significant obstacle for those residents and officials attempting to reduce black carbon emissions within the community. Ideally, Fairbanks should look to other sources of heat and fuel; practically, however, local pressures may make any such transition extremely difficult.

III. POSSIBLE LEGAL SOLUTIONS TO REDUCE BLACK CARBON EMISSIONS IN FAIRBANKS

There are several potential legal strategies to reduce black carbon emissions in Fairbanks. Some of these, such as local legislation, have failed miserably. Others, like public nuisance tort claims, have met with success in certain communities. Fairbanksans may be able to combat reliance on wood burning from a legal perspective through public nuisance claims, local regulation, and stricter implementation of federal environmental laws.

A. Public Nuisance Claims

In January 2013, the State of Alaska filed a lawsuit in the superior court to enjoin two homeowners in Fairbanks from operating their outdoor wood boilers. The case, *State v. Straughn*,⁴⁸ is the first public nuisance case of its kind in Alaska. Public nuisance claims are one way Fairbanks residents may be able to combat the negative effects of black carbon in their community, and as the seminal case, *Straughn* is instructive as to the opportunities and challenges this course of legal action presents.

The defendants in *Straughn* were husband and wife homeowners who installed and began operating outdoor wood boilers in 2008.⁴⁹ The boilers were on rental properties within a block of each other, and one of the properties is directly across from the Woodriver Elementary

46. FAIRBANKS NORTH STAR BOROUGH, ALASKA, CODE § 8.21.025 (2013), available at <http://www.codepublishing.com/ak/fairbanksnorthstarborough/?FairbanksNSB08/FairbanksNSB0821.html>.

47. Editorial, *Particulate Matters: Wood Stove Initiative Undermines Local Control*, FAIRBANKS DAILY NEWS-MINER (Sept. 5, 2010, 4:00 AM), http://www.newsminer.com/opinion/editorials/particulate-matters-wood-stove-initiative-undermines-local-control/article_7ee4f421-1954-509b-9bfd-dfc36e976e6a.html#ixzz0zR2nc1n2.

48. No. 4FA-13-01205 CI (Alaska Super. Ct. July 22, 2013).

49. Complaint, *supra* note 36, ¶¶ 10, 16.

School.⁵⁰ After receiving nearly two hundred complaints from neighbors, staff, and students regarding the emissions from the boilers, the State of Alaska served a Nuisance Abatement Order on the defendants in March 2011.⁵¹ When the defendants continued operating their boilers, the Department of Environmental Conservation (DEC) filed suit, claiming that emissions generated from the defendants' boilers were "unreasonably interfer[ing] with their neighbors' enjoyment of life and with their enjoyment of their own homes and yards."⁵² Soon thereafter, the presiding judge granted a preliminary injunction to shut down the boilers.⁵³

After several months of proceedings, the parties in *Straughn* reached a settlement agreement and ended the lawsuit before trial.⁵⁴ Ultimately, the defendants agreed to cease operation of the wood boilers or any other solid fuel burning devices. They also agreed to pay the State \$12,000 in damages for penalties and attorneys' fees.⁵⁵ Although the case settled, its progression and the complications that arose illustrate how a public nuisance claim may be pursued in the future.

The DEC pursued several routes in seeking an injunction in *Straughn*. Its claims stemmed from three sources of Alaska law: common law, the Alaska Statutes, and the Alaska Administrative Code.⁵⁶ While the common law establishes a "true" public nuisance tort claim, the statutes and code also exist to prevent the occurrence of public nuisances. Working separately and in tandem, these laws may create convincing authority for a court to rely on in enjoining parties from burning wood with strong emissions.⁵⁷

Common law in Alaska follows the Restatement (Second) of Torts for public nuisance claims.⁵⁸ The Restatement defines a public nuisance

50. *Id.* ¶¶ 19, 22.

51. *Id.* ¶¶ 25-26, 34-35.

52. *Id.* ¶ 32.

53. Order, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. Feb. 4, 2013). The complaint was filed on January 3, 2013, and Judge Robert Downes issued the order enjoining defendants from operating their wood boilers on February 4, 2013.

54. Stipulated Final Judgment and Order at 2, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. July 22, 2013).

55. *Id.*

56. Complaint, *supra* note 36, ¶¶ 4-6.

57. Much of the following explanation of public nuisance claims in Alaska is drawn from the DEC's memo in support of their motion for preliminary injunction. Memorandum in Support of State's Motion for Preliminary Injunction at 10-18, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. Jan. 31, 2013).

58. See *Exxon Valdez v. Alaska Native Class*, 104 F.3d 1196, 1198 (9th Cir. 1997) ("Alaska public nuisance law applies the *Restatement* criteria.").

as “an unreasonable interference with a right common to the general public,”⁵⁹ and refers multiple times to the dissemination of smoke as an example of what might be considered an unreasonable interference with the public right.⁶⁰ It also suggests that unintentional offenders must be negligent or reckless in order for an interference to be deemed “unreasonable.”⁶¹ The comments to the Restatement, however, go on to indicate that where a state has specifically designated certain conduct as a public nuisance, a defendant may be found liable “even though his interference with the public right was purely accidental and unintentional.”⁶²

The Alaska Statutes and Alaska Administrative Code both designate harmful emissions as a public nuisance under Alaska law.⁶³ Section 46.03.810 of the Alaska Statutes (“Air and Land Nuisances”) provides that an individual has created a nuisance if he “allows to be placed or deposited upon any premises owned by the person . . . any . . . matter or thing that would be obnoxious or offensive to the public or that would . . . in any way endanger the health of the community.”⁶⁴ Whether a particular outdoor wood boiler would qualify as “obnoxious or offensive to the public” is a very fact-dependent question. Once it is clear from where the offending smoke originated, and that negative health effects are resulting from that source, a single wood boiler may be deemed obnoxious or offensive. But, in scenarios where multiple members of a community are using multiple wood boilers—and perhaps to a lesser degree or with fewer emissions—it might be difficult to meet this standard.

A regulation in the Alaska Administrative Code (“Air Pollution Prohibited”) may be directly applicable to emissions from wood burning as well. The regulation provides that “[n]o person may permit any emission which is injurious to human health or welfare, animal or plant life, or property, or which would unreasonably interfere with the

59. RESTATEMENT (SECOND) OF TORTS § 821B(1) (1977).

60. *See id.* § 821B cmt. b (“Thus public nuisances consisted of interferences with . . . the public comfort, as in the case of widely disseminated bad odors, dust and smoke . . .”); *id.* § 821B cmt. e (“Thus the spread of smoke, dust or fumes over a considerable area filled with private residences may interfere also with the use of the public streets or affect the health of so many persons as to involve the interests of the public at large.”).

61. *See id.* § 821B cmt. e (noting the application of private nuisance factors to public nuisance tort claims, including intent requirements).

62. *Id.* (carrying strict criminal liability for designated conduct over to the tort cause of action for civil liability).

63. ALASKA STAT. § 46.03.810 (2013) (“Air and Land Nuisances”); ALASKA ADMIN. CODE tit. 18, § 50.110 (2012) (“Air Pollution Prohibited”).

64. ALASKA STAT. § 46.03.810.

enjoyment of life or property.”⁶⁵ As used in the regulation, “emission” refers to a release of air pollutants as defined by the Clean Air Act,⁶⁶ which includes PM_{2.5}.⁶⁷ This regulation may provide the most flexibility for a public nuisance claim concerning wood burning emissions, since it directly prohibits any emission harmful to health, welfare, or property. A strict interpretation of the regulation could mean that the Environmental Protection Agency’s (EPA) consideration of PM_{2.5} as a harmful air pollutant is enough to ban *any* emission of PM_{2.5}, though in practice this seems virtually impossible. It is far more likely that a court would consider only those emissions over an amount considered “injurious to human health or welfare.”⁶⁸ Alternatively, a plaintiff suing under this regulation might pursue a property damage argument. Black carbon is unique in that it is visible to the naked eye, settling as a black film when it ultimately lands on snow and ice. This may have property damage implications, and is one avenue that should be further explored both within the confines of this regulation and in other claims.

One major limitation of any tort-like claim is the causation requirement. A court very well might find that no single emitter is independently harmful to the public or that injuries cannot be traced to a single source of emissions.⁶⁹ If *Straughn* had gone to trial, the plaintiffs may have been successful because the soot’s origin was clearly identifiable. In larger cases or in more sprawling neighborhoods, however, it may be quite difficult to prove whether any particular wood boilers are contributing directly to the identifiably harmful black carbon.

65. ALASKA ADMIN. CODE tit. 18, § 50.110.

66. The Administrative Code’s definition of “emission,” tit. 18, § 50.990(29), refers the reader to a statutory definition, which defines emission as “a release of one or more air pollutants.” ALASKA STAT. § 46.14.990(9). “Air pollutant” is then defined under the Alaska Statutes as those pollutants regulated under the Clean Air Act, 42 U.S.C. § 7602(g) (2012). ALASKA STAT. § 46.14.990(1).

67. See 40 C.F.R. § 50.13 (2013) (setting national ambient air quality standards (“NAAQS”) for PM_{2.5}). See also *PM_{2.5} Nonattainment Zones*, *supra* note 33 (indicating that Fairbanks has not attained the NAAQS for PM_{2.5}).

68. ALASKA ADMIN. CODE tit. 18, § 50.110.

69. In fact, this is quite common in climate change-related public nuisance cases, and has created standing issues in major recent litigation. See, for example, *Native Village of Kivalina v. ExxonMobil Corp.*, 663 F. Supp. 2d 863, 880–81 (N.D. Cal. 2009), where the district court found causation was not clear enough to create standing when a Native village sued gas and oil companies for releasing greenhouse gas emissions that warmed the air, eroded their shoreline, and forced them to move. *Id.* at 880–81, 868–69. The Ninth Circuit did not address standing on appeal, ruling on other grounds. *Native Vill. of Kivalina v. ExxonMobil Corp.*, 696 F.3d 849, 855 (9th Cir. 2012). District Judge Pro wrote separately, however, to indicate his view that Kivalina could not sufficiently trace their injury to the defendants, and thus could not satisfy the Article III standing requirement of causation. *Id.* at 867–68 (Pro, J., concurring).

The pre-trial proceedings in *Straughn* also demonstrate other factors that may come into play in nuisance claims for wood burning. For example, one particular concern is allocation of fault. Fault for pollution from a machine operating normally can be theoretically extended to the offending party, other wood burners, and manufacturers, wholesalers, and retailers. The issue becomes whether these parties can be considered *legally* at fault in a public nuisance claim.

The defendants in *Straughn* argued that if the case proceeded to damages once they had already agreed to dismantle the boilers, then these additional parties would need to be included in the lawsuit, both to share the damages and for separate product liability claims.⁷⁰ While the issue of product liability is beyond the scope of this Comment, there may be some validity to the idea that parties elsewhere in the distribution chain should be held at least partially responsible for damages caused by their product's default operating position. Legally, it may not be possible to hold these companies liable for all or even any civil penalties, and it is very possible the State will opt not to bring any of these parties into the fray.⁷¹ This is an avenue that can be explored further, however, whether in future public nuisance claims or in legislation. For example, wood boilers that display labels indicating the device meets EPA standards may be misleading to consumers. While these standards are helpful in reducing emissions and in most places would mean a certified stove likely would not violate public nuisance laws, the defendants in *Straughn* argued that the standards do not take into account conditions in Fairbanks, which are highly sensitive to black carbon pollution.⁷² This situation is one that should be considered by

70. Memorandum in Support of Motion to Vacate Pre-Trial Dates or, in the Alternative, Stay Proceedings at 2, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. May 20, 2013).

71. See Opposition to Defendants' Motion to Vacate Pre-Trial Dates, or in the Alternative, Stay Proceedings at 9, *State v. Straughn*, No. 4FA-13-01205 CI (Alaska Super. Ct. May 22, 2013) ("The seller and manufacturer of the boilers are not liable to the State under .760(a) because by merely making and selling the boilers, those persons did not create a public nuisance or violate state environmental laws. . . . [T]he State does not contend that using outdoor wood boilers always creates a nuisance (let alone merely selling or making them), only that using *these two* outdoor wood boilers . . . was a public nuisance.").

72. Matt Buxton, *Attorney Says Manufacturer, Retailer Share Blame for Wood Boiler Pollution*, FAIRBANKS DAILY NEWS-MINER (June 26, 2013, 12:07 AM), http://www.newsminer.com/news/local_news/attorney-says-manufactured-retailer-should-share-blame-for-wood-boiler/article_70ff3678-de37-11e2-86e0-0019bb30f31a.html; Matt Buxton, *State Faults Wood Stove Owners for Years of Pollution*, FAIRBANKS DAILY NEWS-MINER (June 27, 2013, 12:11 AM), http://www.newsminer.com/news/local_news/state-faults-wood-stove-owners-for-years-of-pollution/article_39c9c284-df01-11e2-a50d-0019bb30f31a.html.

Alaska's governing bodies when deliberating over regulations to combat black carbon pollution in communities like Fairbanks.

B. Local Regulations

Legislative action by local governing bodies to create regulations that reduce black carbon emissions is an effective but challenging method Fairbanksans can use to protect their air quality. Largely because wood burning is such an affordable and accessible means of heating one's residence, legislative attempts to regulate wood burning have met with strong opposition, despite the increasingly apparent negative health effects caused by the practice. Proposition 3, the ballot measure that passed in October 2012,⁷³ effectively halted all efforts by local governments to reduce black carbon. The Proposition incorporated into the Borough's ordinances a law that provides: "The borough shall not, in any way, regulate, prohibit, curtail, nor issue fines or fees associated with the sale, distribution, or operation of heating appliances or any type of combustible fuel."⁷⁴ The scope of the ordinance appears to go so far as to halt a program implemented by the Borough allowing residents to trade in energy-inefficient stoves for cleaner models.⁷⁵ Similarly, proposed programs intended to incentivize voluntary reductions in wood burning, such as one that would offer \$30 per day to residents in nonattainment zones who switch to cleaner heat sources,⁷⁶ have not been able to pass the Borough Assembly.⁷⁷

It is unclear whether these programs are simply politically-disfavored or if the scope of the ordinance considers voluntary programs encouraging residents to adopt cleaner sources of fuel "regulations," though it is likely a combination of both. Either way, achieving reductions through rulemaking will require a shift in public attitude before it can be effective. While the Borough should continue its attempts to implement emissions-reducing measures at a local level,

73. Citizens Home Heating Initiative, Proposition 3 (Oct. 2, 2012) (codified at FAIRBANKS NORTH STAR BOROUGH, ALASKA, CODE § 8.21.025 (2013)).

74. FAIRBANKS NORTH STAR BOROUGH, ALASKA, CODE § 8.21.025.

75. Yereth Rosen, *Wood Stoves, Extreme Cold Blight Air at Alaska's "North Pole,"* REUTERS (Dec. 1, 2012, 11:10 AM), <http://www.reuters.com/article/2012/12/01/us-usa-alaska-environment-idUSBRE8B00A320121201>.

76. FAIRBANKS NORTH STAR BOROUGH, ALASKA, ORDINANCE 2013-29 (introduced Mar. 14, 2013, defeated Mar. 28, 2013).

77. See Memorandum from Mona Lisa Drexler, MMC, Municipal Borough Clerk, to Luke T. Hopkins, Mayor, Fairbanks North Star Borough (Mar. 29, 2013), available at <http://www.co.fairbanks.ak.us/Meetings/Assembly/2013/2013Mar28RegAct.pdf> (recounting minutes of assembly meeting where proposed ordinance establishing program was defeated).

legislation at the state level regarding heating appliances would likely prove far more effective. The state government could enact programs similar to those prohibited by Proposition 3, which could provide subsidies to non-wood heat suppliers or offer credits to citizens who choose cleaner heat. Similarly, the state government could implement stricter labeling requirements for wood burning devices, alleviating confusion caused by EPA labels that suggest the device meets local regulations.

C. Federal Environmental Compliance

Although black carbon's localized effects make it unique among pollutants associated with climate change, federal action may still be an effective means of regulating local sources. Using existing federal laws such as the Clean Air Act and the Clean Water Act might be one way to force Fairbanks to regulate its black carbon emissions from wood burning. Intuitively, the Clean Air Act is the most appropriate environmental law under which black carbon could be regulated. Fairbanks is already considered in nonattainment for failing to comply with national $PM_{2.5}$ standards,⁷⁸ and monitoring this noncompliance more strictly may be one way to reduce soot emissions. In addition to providing for automatic sanctions triggered by certain events,⁷⁹ the Clean Air Act provides the EPA with the discretionary authority to invoke these sanctions for a number of failures to act on the part of the state.⁸⁰ The available sanctions include loss of highway funding and increased emissions offset requirements.⁸¹ Political pressures make it unlikely that the EPA would apply these, but they could still provide a meaningful incentive for the state to act.

The Center for Biological Diversity recently asked the EPA to regulate black carbon under the Clean Water Act.⁸² The petition is the first of its kind, and claims that the Clean Water Act is the appropriate law under which to regulate because glaciers and melting ice in the Arctic constitute "water" as defined by the Act. In part because Fairbanks is a landlocked city and the current petition seeks mainly to regulate ocean carriers using a significant amount of black carbon-emitting diesel fuel, the Clean Water Act may not be the most effective means of federal regulation. It is possible that a ruling under the Clean

78. *PM_{2.5} Nonattainment Zones*, *supra* note 33.

79. 42 U.S.C. § 7509(a) (2006) (describing automatic sanction triggers).

80. *Id.* (describing discretionary sanctions).

81. § 7509(b) (describing available sanctions).

82. CBD PETITION, *supra* note 15, at 1.

Water Act would eventually require all polluting cities to reduce emissions in a designated way; however, the Center for Biological Diversity petition only requests that the government “[d]evelop national water quality criteria . . . stating that black carbon concentrations on sea ice and glaciers should not deviate measurably from preindustrial levels,” and “[p]ublish information on black carbon . . . to guide states in identifying local sources of black carbon emissions and strategies for reducing those emissions.”⁸³ For now, this is probably not going to be a meaningful approach to decreasing black carbon levels in Fairbanks.

CONCLUSION

Wood burning is a significant and identifiable contributor to climate change, especially in the Arctic. Moreover, it has serious health consequences for the residents of Fairbanks, Alaska. Reducing black carbon emissions, particularly in Fairbanks, is an important first step toward slowing the effects of global warming. While some remedies, such as public nuisance claims, would have fast-acting effects, slower remedies, such as working to repeal local legislation or implementing federal environmental laws, may be equally important steps toward relief from black carbon pollution. In addition to providing immediate health benefits to the Fairbanks area, reducing black carbon may help slow the pace of melting polar ice and buy some time for the federal government to enact stronger laws on climate change.

83. *Id.*