FILED

IN THE SUPREME COURT OF THE STATE OF ALASKA

Supreme Court No. S-14776
Superior Court No. 3AN-11-07474 CI

NELSON KANUK, a minor, by and through his guardian, SHARON KANUK; ADI DAVIS, a minor, by and through her guardian, JULIE DAVIS; KATHERINE DOLMA, a minor, by and through her guardian, BRENDA DOLMA; ANANDA ROSE AHTAHKEE LANKARD, a minor, by and through her guardian, GLEN "DUNE" LANKARD; and AVERY and OWEN MOZEN, minors, by and through their guardian, HOWARD MOZEN,

Petitioners,

v.

STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES,

Respondent.

APPEAL FROM THE SUPERIOR COURT,
THIRD JUDICIAL DISTRICT AT ANCHORAGE,
THE HONORABLE SEN K. TAN, PRESIDING

BRIEF OF *AMICUS CURIAE* ALASKA INTER-TRIBAL COUNCIL IN SUPPORT OF APPELLANTS

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JURISDICTIONAL STATEMENT

Amicus Curiae Alaska Inter-Tribal Council concurs with the jurisdictional statement by the Appellants, Nelson Kanuk, Adi Davis, Katherine Dolma, Ananda Rose Ahtahkee Lankard, Avery and Owen Mozen, by and through their respective guardians (collectively "Our Children").

STATEMENT OF ISSUES PRESENTED

Amicus Curiae Alaska Inter-Tribal Council concurs with the statement of issues presented by Our Children.

STATEMENT OF THE CASE

Amicus Curiae Alaska Inter-Tribal Council concurs with the statement of the case presented by Our Children.

STANDARD OF REVIEW

Amicus Curiae Alaska Inter-Tribal Council concurs with the standard of review presented by Our Children.

INTEREST AND IDENTITY OF *AMICUS CURIAE* ALASKA INTER-TRIBAL COUNCIL

The Alaska Inter-Tribal Council (AITC) is a statewide, tribally governed, non-profit organization that advocates on behalf of tribal governments throughout the state. AITC promotes indigenous self-determination by providing technical assistance to tribal governments, facilitating inter-governmental and inter-agency communication and collaboration, offering public education regarding Alaska Native cultures and

tribal governments, and advocating on behalf of tribal initiatives and self-governance.

AITC is greatly concerned about the impacts of global warming on their members. Living in the Arctic and sub-Arctic regions of Alaska, their members experience daily the effects of global warming, including thinning sea ice, increased coastal erosion, melting permafrost, and changes in plant and animal distributions. Global warming is depleting the subsistence resources of the members of AITC and threatening their health and safety. As a result, the members of AITC has an interest in ensuring that the State of Alaska takes the urgent action needed to reduce carbon dioxide (CO2) emissions to the greatest degree possible.

SUMMARY OF ARGUMENT

This case involves the State of Alaska's duty to reduce CO_2 emissions, the greenhouse gas that is the primary contributor to anthropogenic global warming. Nowhere are the effects of those emissions more severe than in the Arctic. Alaska has been characterized as the "canary in the coalmine" for global warming—polar sea ice is melting, glaciers are receding, and permafrost is melting. At stake is the physical and cultural survival of Alaska's Native people and communities. Reducing the greenhouse gas emissions in Alaska is a critical step in ensuring the survival of Alaska's Native communities. Thus, we join Appellants in urging this Court to overrule the dismissal of this case and to remand it to the trial court.

ARGUMENT

I. INTRODUCTION

> *"We are experiencing things in one lifetime that should take five or six generations. . . . We are making do with less (subsistence food) and trying to make the most of it."* — Ronald Brower Sr. speaking on behalf of the Inuit Circumpolar Conference (ICC).[1]

Alaska's Native people comprise eleven distinct cultures. These cultures are generally organized into five cultural groupings that draw upon cultural similarities or geographic proximity: the Athabascan of the Interior and Eastern Alaska, the Yup'ik and Cup'ik of Western Alaska, the Inupiaq and St. Lawrence Island Yupik of the Northern and Northwestern Arctic, the Aleut and Alutiiq of Southcentral Alaska and the Aleutian Islands, and the Eyak, Tlingit, Haida, and Tsimshian of the Southeastern archipelago.[2] The people of these cultures have occupied the land we know as Alaska for thousands of years.[3] They rely upon, and have a sophisticated knowledge of, their natural environment. This physical and spiritual relationship is sometimes encapsulated by the term "subsistence." Congress

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[1] Margaret Bauman, *Conference Attendees Receive an Account of Arctic Warming, Peninsula Clarion* (Nov. 30, 2005). The ICC is an international organization representing about 145,000 Inuit living in the Arctic regions of Alaska, Canada, Greenland and Chukotka, Russia. *Id.*

[2] *See* Alaska Native Heritage Center website at http://www.alaskanative.net/en/main_nav/education/culture_alaska/ (last visited Nov. 8, 2012).

has defined subsistence as "the customary and traditional uses . . . of wild, renewable resources" for food, clothing, sharing, or other customary uses.[4] It also has recognized the importance of Alaska Native subsistence by exempting subsistence activities from federal environmental statutes.[5]

After surviving in a difficult environment for many millennia, Alaska Native cultures face a daunting challenge as anthropogenic climate change threatens drastic changes to Arctic and sub-Arctic ecosystems and to their very existence.[6] According to the United States Global Change Research Program,[7] the present

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[3] Norman A. Chance, *The Inupiat and Arctic Alaska: An Ethnography of Development*, 17-18 (Harcourt 1990).

[4] Alaska National Interest Lands Conservation Act (ANILCA), 16 U.S.C. § 3113.

[5] *See, e.g.*, Endangered Species Act, 16 U.S.C. §1539(e) (exempting Alaska Natives from take provisions "if such taking is primarily for subsistence purposes"); Marine Mammal Protection Act, 16 U.S.C. § 1371(b) (exempting Alaska Natives from Act's take provisions if take "is for subsistence purposes"); Migratory Bird Treaty Act, 16 U.S.C. § 712(1) (enabling Secretary of Interior to permit Alaska Natives to take migratory birds and collect their eggs for seasonal subsistence use); Alaska National Interest Lands Conservation Act, 16 U.S.C. § 3114 (establishing subsistence preference for fish and wildlife uses on public lands). The term "take" generally means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill the species protected under the various statutes. *See, e.g.*, Marine Mammal Protection Act, 16 U.S.C. § 1361 (13).

[6] ACIA Overview Report, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment* 5 (2004) (hereinafter "ACIA Overview Report") (This report is an overview of the full ACIA Scientific Report published in 2005).

[7] "The U.S. Global Change Research Program (USGCRP) coordinates and integrates federal research on changes in the environment and their implications for society." The organization's vision is to

rate of global heating is occurring as a result of human activities that release heat-trapping greenhouse gases (GHGs) and intensify the Earth's natural greenhouse effect, at an accelerated rate, thereby changing Earth's climate.[8] This abnormal climate change is unequivocally human-induced,[9] is occurring now, and will continue to occur unless drastic measures are taken to curtail it.[10] Climate change is damaging

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produce "[a] nation, globally engaged and guided by science, meeting the challenges of climate and global change." The organization is comprised of "[t]hirteen departments and agencies [that] participate in the USGCRP . . . steered by the Subcommittee on Global Change Research under the Committee on Environment and Natural Resources, overseen by the Executive Office of the President, and facilitated by an Integration and Coordination Office." U.S. Global Change Research Program, *available at* http://www.globalchange.gov/about (last visited Nov. 8, 2012). (last visited Nov. 8, 2012)" U.S. Global Change Research Program, *available at* http://www.globalchange.gov/about (last visited Nov. 8, 2012)." \c 3

[8] U.S. Global Change Research Program, *Global Climate Change Impacts in the United States*, 13 (2009), *available at* http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf [hereinafter Global Climate Change Impacts] ("Human activities have led to large increases in heat-trapping gases over the past century. Global average temperature and sea level have increased, and precipitation patterns have changed.") " Global Climate Change Impacts" \c 3 ; Deutsche Bank Group Climate Change Advisors, *Climate Change: Addressing the Major Skeptic Arguments*, 9 (Sept. 2010), *available at* http://www.dbcca.com/dbcca/EN/_media/DBCCAColumbiaSkepticPaper090710.pdf " Deutsche Bank Group Climate Change Advisors, *Climate Change: Addressing the Major Skeptic Arguments* (Sept. 2010), *available at* http://www.dbcca.com/dbcca/EN/_media/DBCCAColumbiaSkepticPaper090710.pdf" \c 3 ; Intergovernmental Panel on Climate Change (IPCC), IPCC Fourth Assessment Report: Climate Change 2007 (AR4), 1.1 (2007), *available at* http://www.ipcc.ch/publications_and_data/ar4/syr/en/mains1.html#1-1. "IPCC, AR4" \c 3

[9] USGCRP, *Global Climate Change Impacts* at 12 (2009).

both natural and human systems, and if unrestrained, will alter the planet's habitability.[11]

Human beings have significantly altered the chemical composition of the Earth's atmosphere and its climate system.[12] We have changed the atmosphere and Earth's climate system by engaging in activities that produce, or release GHGs in to the atmosphere.[13] Carbon dioxide (CO_2) is the primary GHG, and there is evidence that its emissions are largely responsible for the current warming trend.[14] Although much of the excess carbon dioxide is absorbed by the oceans, plants and forests, the increase of GHG concentrations resulting from historic and present human activities has altered the Earth's ability to

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[10] *Id.* ("Future climate change and its impacts depend on choices made today."); IPCC, AR4 1.1 (2007) ("Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.").

[11] USGCRP, *Global Climate Change Impacts* at 12 (2009) ("Thresholds will be crossed, leading to large changes in climate and ecosystems.").

[12] Naomi Oreskes, *The Scientific Consensus on Climate Change, in Climate Change: What It Means for Us, Our Children, and Our Grandchildren* 65, 93 (Joseph F. C. DiMento & Pamela Doughman eds., MIT Press 2007) ("We have changed the chemistry of our atmosphere, causing sea level to rise, ice to melt, and climate to change. There is no reason to think otherwise."). "Naomi Oreskes, *The Scientific Consensus on Climate Change, in Climate Change: What It Means for Us, Our Children, and Our Grandchildren* (Joseph F. C. DiMento & Pamela Doughman eds., MIT Press 2007)" \c 3

[13] *Id.*

[14] See James E. Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?* 2 Open Atmos. Sci. 217, 217-231 (2008). "*Where Should Humanity Aim?*" \c 3

maintain the delicate balance of energy between that which it receives from the sun and that which it radiates back out into space.[15]

The current CO_2 concentration in our atmosphere is over 390 ppm[16] (compared to the pre-industrial concentration of 280 ppm) and is quickly approaching the dangerous level of 400 ppm.[17] Current atmospheric GHG concentrations are likely the highest they have been in the last 800,000 years.[18] Concentrations of

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[15] John Abatzoglou et al., *A Primer on Global Climate Change and Its Likely Impacts, in Climate Change: What It Means for Us, Our Children, and Our Grandchildren* 11, 15-22 (Joseph F. C. DiMento & Pamela Doughman eds., MIT Press 2007). "Abatzoglou" \c 3

[16] NOAA, Atmospheric CO_2 : Monthly & Annual Mean CO_2 Concentrations (ppm), March 1958 – Present, *available at* http://co2now.org/Current-CO2/CO2-Now/Current-Data-for-Atmospheric-CO2.html (showing an annual mean atmospheric CO_2 concentration of 391.57 for the year 2011). "NOAA, Atmospheric CO_2 : Monthly & Annual Mean CO_2 Concentrations (ppm), March 1958 – Present, *available at* http://co2now.org/Current-CO2/CO2-Now/Current-Data-for-Atmospheric-CO2.html" \c 3

[17] IPCC, AR4 at 37 ("The global atmospheric concentration of CO2 increased from a pre-industrial value of about 280ppm to 379ppm in 2005.") ; National Science and Technology Council, *Scientific Assessment of the Effects of Global Change on the United States* 2 (May 2008) [hereinafter *Scientific Assessment*], *available at* http://www.climatescience.gov/Library/scientific-assessment/Scientific-AssessmentFINAL.pdf ("The globally averaged concentration of carbon dioxide in the atmosphere has increased from about 280 parts per million (ppm) in the 18th century to 383 ppm in 2007.") "Scientific Assessment" \c 3 ; Environmental Protection Agency (EPA), *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* 17 (Dec. 9, 2009) [hereinafter *TS Endangerment Findings*]. "*TS Endangerment Findings*" \c 3

[18] Dieter Lüthi et al., *High-resolution carbon dioxide concentration record 650,000-800,000 years before present*, 453 Nature 379, 379-382 (May 2008) (prior to this publication it was accepted atmospheric CO_2 record extended back 650,000 years, but

other GHGs in the atmosphere have also increased from human activities. Atmospheric concentrations of methane, for example, have increased nearly 150% since the pre-industrial period.[19] Concentrations of nitrous oxide have also increased.[20]

Humans not only continue to add GHGs into the atmosphere at a rate that outpaces their removal through natural processes,[21] but the current and projected CO_2 increase, for example, is about one hundred times faster than has occurred over the past 800,000 years.[22] This increase has to be considered in light of the lifetime of greenhouse gases in the atmosphere. In particular, a substantial portion of every ton of CO_2 emitted by humans persists in the atmosphere for as long as a millennium or more.[23]

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now research indicates that the record can be extended 800,000 years, or two complete glacial cycles). "Lüthi" \c 3

[19] EPA, *TS Endangerment Findings* at 18 ("The global atmospheric concentration of methane has increased from a pre-industrial value of about 715 parts per billion (ppb) to 1732 ppb in the early 1990s, and was 1782 ppb in 2007- a 149% increase from pre-industrial levels.").

[20] *Id.* at 19.

[21] *Id.* at ES-2 ("Atmospheric GHG concentrations have been increasing because anthropogenic emissions have been outpacing the rate at which GHGs are removed from the atmosphere by natural processes over timescales of decades to centuries.").

[22] Dieter Lüthi et al., High-resolution carbon dioxide concentration record 650,000-800,000 years before present 453 Nature 379, 379-382 (May 2008).

[23] James E. Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?* 2 Open Atmos. Sci. 217, 220 (2008) ; See also EPA, *TS Endangerment Findings* at 16 ("Carbon cycle models indicate that for a pulse of CO_2 emissions, given an equilibrium background, 50% of the atmospheric increase will disappear within 30 years, 30% within a few centuries, and the last 20% may remain in the atmosphere for thousands of years.") ; John Abatzoglou et

The current concentrations of GHGs in the atmosphere therefore, are the result of both historic and current emissions.

As discussed below, the effects of this warming can be seen in changes in the climate, weather, plants and animals, and every aspect of the natural environment, and all of these changes impair the ability of the Native people who know this environment to continue their close reliance on it.

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al., *A Primer on Global Climate Change and Its Likely Impacts, in Climate Change: What It Means for Us, Our Children, and Our Grandchildren* 11, 29 (Joseph F. C. DiMento & Pamela Doughman eds., MIT Press 2007) ("Since CO_2 has a lifetime of over one hundred years, these emissions have been collecting for many years in the atmosphere.").

II. GLOBAL WARMING THREATENS THE PHYSICAL AND CULTURAL SURVIVAL OF ALASKA NATIVES

> *"Time is running out for the Arctic. We need far-reaching, long-term global commitments to reduce emissions of greenhouse gases if the Arctic is to be protected and if our human rights, particularly our human rights to subsistence, are to be respected."*
> — Sheila Watt-Cloutier, ICC Chair.[24]

For millennia, Alaska Natives have used their sophisticated knowledge of the sea, ice, land, and animals to thrive in a harsh environment. The living resources of the Arctic and sub-Arctic regions of Alaska not only sustain the economic and nutritional viability of Alaska Native communities, they also provide a basis for social identity, spiritual life, and cultural survival.[25] As these communities have observed, the Arctic and sub-Arctic are becoming an environment at risk, threatening their way of life.[26] The sea ice is less stable, weather patterns are unusual, vegetation cover is changing, and particular animals are no longer found in traditional hunting areas during the expected seasons.[27]

Since the 1970s, Alaska Natives also have noticed and

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[24] *Threat to North's Cultural Survival*, ECO 2 (Dec. 2003).

[25] ACIA Overview Report, *supra* note 6 at 94.

[26] *Id.; see also* Arctic Human Development Report (AHDR), Akureyri: Stefansson Arctic Institute (2004), *available at* http://hdr.undp.org/en/reports/regionalreports/other/arctic_2004_en.pdf (independent research by 8 Arctic Council nation members).

[27] ACIA Overview Report, *supra* note 6 at 94.

reported environmental changes outside the bounds of "normal" variability.[28] They have reported sightings of species like American robins, whose normal range does not include the Arctic.[29] Several communities have observed changes in the health and behavior of caribou, a key subsistence species.[30] In the Pribilof Islands, villagers blame global warming along with industrial contaminants for the decline of 20 species, ranging from kelp to sea lions.[31]

Arctic residents also report changes in the abundance of other key subsistence resources. Climate change also may be reducing salmon populations in Alaska.[32]

> "Salmon and other fish that go up river to spawn make up 60 percent of Alaska Natives' subsistence resources. Recent declines in these fish populations have thus directly affected the dietary and economic well-being of these people."[33]

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[28] Sheila Watt-Cloutier *et al.*, *Responding to Global Climate Change: The Perspective of the Inuit Circumpolar Conference on the Arctic Climate Impact Assessment, 2° Is Too Much! Evidence and Implications of Dangerous Climate Change in the Arctic* 57 (World Wildlife Fund 2005) at 59.

[29] Larry D. Hinzman *et al.*, *Evidence and Implications of Recent Climate Change in Northern Alaska and Other Arctic Regions*, 72 Climatic Change 252, 286 (2005).

[30] *Id.*

[31] Margot Roosevelt, *Vanishing Alaska: Global Warming is Flooding Villages Along the Coast. Should They Surrender and Move?* Time Magazine (Sept. 27, 2004).

[32] Bruce P. Finney, *et al.*, *Impacts of Climatic Change and Fishing on Pacific Salmon Abundance Over the Past 300 Years*, 290 Science 795, 797 (2000).

[33] ACIA Overview Report, *supra* note 6 at 119.

In short, global warming is rearranging their environment:[34]

> The weather seems less stable and predictable. From sources of indigenous knowledge across the Arctic come reports that the weather seems more variable, unfamiliar, and is behaving unexpectedly and outside the norm. Experienced hunters and elders who could predict the weather using traditional techniques are now frequently unable to do so. Storms often occur without warning. Wind direction changes suddenly. In many places it is increasingly cloudy. Storms bringing high winds and lightning occur with increasing frequency in some locations. As noted by several elders, "the weather is harder to know." This presents problems for many activities, from hunting to drying fish, on which Indigenous Peoples depend.[35]

These observations are supported by scientific research. The Arctic Climate Impact Assessment (ACIA) is a joint project between the Arctic Council and the International Arctic Science Committee (IASC) to produce a scientific assessment consolidating the scientific research on Arctic global warming trends, causes, and effects.[36] The *Arctic Climate Impact Assessment* was prepared with the input of nearly 300 scientists, and included the knowledge of elders from Arctic indigenous communities.[37] Among its key findings were that the annual average Arctic temperature has increased at almost twice the rate as that of the rest of the world over the past few

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[34] Alaska Regional Assessment Group, *Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change* 7 (Dec. 1999).

[35] ACIA Overview Report, *supra* note 6 at 96.

[36] ACIA Scientific Report, *Arctic Climate Impact Assessment*, Chapter 1 (2005) (hereinafter "ACIA Scientific Report").

decades.[38] The report stated that increasing global concentrations of CO_2 and other greenhouse gases are projected to contribute to additional Arctic warming of about 4 degrees to 7 degrees Celsius over the next 100 years.[39] Already, average annual temperatures have risen between 2 to 3 degrees Celsius since the mid-1900s and up to 4 degrees Celsius in the winter, which is some of the most rapid and severe climate change being experienced on earth.[40]

A. Global Warming Threatens the Subsistence of Alaska Natives

> *"The practice of coming out here and being on the land and hunting caribou is not only about feeding our families, because it is all we have to survive from. We don't have Safeways and Wal-Marts and stuff like that in our tribes. But it's also about maintaining our culture and our spiritual relationship with these animals that we've had for time immemorial."*
> — Evon Peter, Arctic Village, Alaska[41]

The continuation of the opportunity for subsistence uses by rural residents of Alaska is essential to Native physical economic, traditional, and cultural existence.[42] The situation in Alaska is unique in that, in most cases, no practical

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[37] ACIA Overview Report, *supra* note 6 at 129-38 (listing contributors to the assessment).

[38] ACIA Overview Report, *supra* note 6 at 10.

[39] ACIA Overview Report, *supra* note 6 at 10.

[40] ACIA Scientific Report, *supra* note 36 at 3

[41] Evon Peter, *The People and the Caribou Are One*, *Voices from the Earth* (Spring 2005), *available at* http://www.sric.org/voices/2005/v6n1/caribou.php.

[42] ANILCA § 801(1), 16 U.S.C. § 3111.

alternative means exists to replace the food supplies and other items gathered from the fish and wildlife that supply rural residents dependent on subsistence uses.[43]

> "[Fifty] percent of the food for three-quarters of the Native families in Alaska's small and medium villages is acquired through subsistence uses, and 40 percent of such families spend an average of six to seven months of the year in subsistence activities."[44]

1. Thinning and Receding Sea Ice Reduces Subsistence Resources on Arctic Coasts

> *"It looks like winter out there, but if you've really been around a long time like me, it's not winter. . . . If you travel that ice, it's not the ice that we traveled 40 years ago."*
> — Orville Huntington, vice chairman of the Alaska Native Science Commission.[45]

In the Arctic, sea ice is one of the most important climatic variables.[46] Changes in sea ice have enormous environmental, economic, and societal implications.[47] The Arctic is rapidly losing its permanent ice, and within four years, the Arctic Ocean may have ice-free summers.[48]

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[43] ANILCA § 801(2), 16 U.S.C. § 3111.

[44] *Native Village of Quinhagak v. Lujan*, 35 F.3d 388, 389-90 (9th Cir. 1994) (citing H.R. Rep. No. 1045, 95th Cong., 2d Sess., at 181 (1978)).

[45] Yereth Rosen, *Warming Climate Disrupts Alaska Natives' Lives*, Reuters (April 16, 2004).

[46] *Id.*

[47] *Id.*

[48] John Vidal, *Arctic Expert Predicts Final Collapse of Sea Ice within Four Years*, The Guardian (Sept. 17, 2012), *available at* http://www.guardian.co.uk/environment/2012/sep/17/arctic-collapse-sea-ice.

The Arctic also exerts control over the climate.[49] Much as a spillway in a dam controls the level of a reservoir, the polar regions control the Earth's heat balance.[50] As the Arctic sea ice melts and shrinks, it reflects less sunlight, eventually warming the entire planet's climate.[51] Scientists also are raising alarms about potential melting of the Greenland ice sheet and the Antarctic.[52] If the current pace of melting continues the seas would rise 10 or more meters, flooding areas inhabited by 25 percent of the U.S. population.[53] The Gulf and East Coast states would experience the brunt of the impacts.[54]

In the Arctic, this melting likely will have devastating consequences for polar bears, ice-dependent seals, walrus, and the Alaska Natives for whom these animals are a primary food source.[55] Sea ice supports an important food web of fish,

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[49] Matthew Sturm *et al.*, *Meltdown in the North*, Scientific American 62 (Oct. 2003).

[50] *Id.*

[51] *Id.*

[52] Jonathan M. Gregory *et al.*, *Threatened Loss of the Greenland Ice Sheet*, 428 Nature 616 (2004); *see also* Kelly Slivka, Rare Burst of Melting Seen in Greenland's Ice Sheet, N.Y. Times (July 24, 2012), *available at* http://www.nytimes.com/2012/07/25/science/earth/rare-burst-of-melting-seen-in-greenland-ice-sheet.html (Over 4 days in July 2012, the surface of Greenland's ice melted an unprecedented amount, with the ice melt expanding from 40 percent of the ice sheet to 97 percent.).

[53] U.S. Geological Service, *Sea Level and Climate* (Revised 2011), *available at* http://pubs.usgs.gov/fs/fs2-00/.

[54] *Id.*

[55] ACIA Overview Report, *supra* note 6 at 8.

seabirds, and marine mammals.[56] Phytoplankton blooms at the ice edge feed prolific arctic cod, which in turn feed beluga whales, narwhal whales, and harp seals.[57] Polar bears, walrus, and ringed seals use the ice for transportation and as a "floating platform for resting, feeding, and producing their young."[58]

The Inupiat and Yupik people of Alaska's Arctic regions know and rely on this sea ice environment, traveling on the ice extensively in search of walrus, bowhead whales, and seals.[59]

Caleb Pungowiyi of Nome recounted the importance of stable ice conditions:

> Ice is a supporter of life. It brings the sea animals from the North into our area and in the fall it also becomes an extension of our land. When it freezes along the shore, we go out on the ice to fish, to hunt marine mammals and to travel. . . . When it starts disintegrating and disappearing faster it affects our lives dramatically.[60]

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[56] U.S. Dept. of Interior, *Outer Continental Shelf Oil & Gas Leasing Program: 2002-2007 Final Environmental Impact Statement*, 4-7 (April 2002).

[57] Nat'l Res. Council, Nat'l Academy of Sciences, *Cumulative Environmental Effects of Oil & Gas Activities on Alaska's North Slope*, 92 (National Academies Press 2003).

[58] Margie Ann Gibson & Sallie B. Schullinger, *Answers from the Ice Edge: The Consequences of Climate Change on Life in the Bering and Chukchi Seas* (Greenpeace U.S.A. 1998).

[59] Don Weller, *Effects of Climate Change on Subsistence Communities in Alaska, Assessing the Consequences of Climate Change for Alaska and the Bering Sea Region: Proceedings of a Workshop at the University of Alaska Fairbanks* 66 (Nov. 1999).

[60] ACIA Overview Report, *supra* note 6 at 24.

Many Arctic communities depend on hunting polar bear, walrus, seals, whales, seabirds and other marine animals.[61] Changes in the species' ranges and availability and the decreased ability to travel safely in changing and unpredictable ice conditions are making people feel like strangers in their own land.[62] The thinning and retreating sea ice also makes it dangerous to hunt walruses, seals and whales.[63] For example, in 1998, whalers from the village of Wainwright had to be rescued after the ice floe they were on broke up and drifted out to sea.[64]

The thinning and receding of sea ice also is decimating subsistence resources:

> Gathering food directly from the land and the sea makes the Yupik very careful observers of their surroundings. In recent years, they have noticed that the walrus are thinner, their blubber less nutritious and oil from walrus fat does not burn as bright in their lamps as in times of old. At the same time, they have noticed that there are fewer and weaker seals. The Yupik hunters have had to go farther and farther from shore to reach the ice pack to find the newborn seals that are being fed fish from nearby waters by their parents. Concurrently, scientists have observed that the sea ice over much of the Arctic is thinner and melting back, with the changes encompassing a broader area than that observed by the Yupik earlier.[65]

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[61] ACIA Overview Report, *supra* note 6 at 61.

[62] *Id.*

[63] Jim Motavalli, *Feeling the Heat: Dispatches from the Frontlines of Climate Change*, 108 (Routledge 2004).

[64] *Id.*

[65] Nat'l Assessment Synthesis Team, U.S. Global Change Res. Program, *Climate Change Impacts on the United States: The*

As large-scale warming has reduced the ice platforms upon which seals and walrus rest between searches for fish and mussels, they become weakened and less productive and thus provide less sustenance for local Native communities.[66] Ice-dependent seals, including the ringed seal, ribbon seal, and bearded seal, are particularly vulnerable to reductions in sea ice because they give birth and nurse their pups on the ice.[67] They also forage near the ice edge, which is an extremely productive area and especially sensitive to climate change.[68] As the ice melts, the seal and walrus populations will decline.[69]

3. Melting Permafrost Diminishes Subsistence Resources

Permafrost is subsurface material that remains continuously frozen for at least two consecutive years.[70] The permafrost regions occupy approximately 24 percent of the Northern Hemisphere's terrestrial surface.[71] As the climate

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Potential Consequences of Climate Variability and Change, 366 (2000) (citing D. A. Rothrock *et al.*, *Thinning of the Arctic Sea-Ice Cover*, 26 Geophysical Research Letters 3469 (1999)).

[66] Nancy G. Maynard, *Final Report: Native Peoples-Native Homelands Climate Change Workshop*, 62 (1998) (citations omitted).

[67] ACIA Overview Report, *supra* note 6 at 59.

[68] *Id.*

[69] *Id.*

[70] U.S. Arctic Research Comm'n, *Climate Change, Permafrost, and Impacts on Civil Infrastructure*, 3 (2003), *available at* http://www.arctic.gov/publications/climate_change_permafrost.htm l.

[71] *Id.* at 5.

differentially warms in summer and winter, the permafrost will become warmer, and the active layer (the layer of soil above the permafrost that annually experiences freeze and thaw) will become thicker.[72]

Thickening of the active layer has two immediate effects.[73] First, decomposed plant material frozen in the upper permafrost thaws, exposing the carbon to microbial decomposition, which can release carbon dioxide and methane to the atmosphere.[74] Second, the ice in the upper permafrost is converted to water.[75] When ice-rich permafrost thaws, the ground surface subsides.[76] Typically, this settlement does not occur uniformly over space, but yields a chaotic surface with small hills and wet depressions known as thermokarst terrain.[77] When thermokarst occurs beneath a road, house, pipeline, or airfield, it can

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[72] U.S. Arctic Research Comm'n, *The Arctic Ocean and Climate Change: A Scenario For The U.S. Navy*, 10 (2002), *available at* http://www.arctic.gov/publications/arctic_and_climate.html.

[73] U.S. Arctic Research Comm'n, *Climate Change, Permafrost, and Impacts on Civil Infrastructure, supra* note 78 at 7.

[74] *Id.* at 8. This thickening of the active layer can facilitate further climate change through the release of greenhouse gases. *Id.* at 19. Because considerable quantities of carbon are sequestered in the upper layers of permafrost, a widespread increase in the thickness of the thawed layer could lead to the release of large quantities of CO_2 and CH_4 to the atmosphere. *Id.* (citations omitted). This in turn would create a positive feedback mechanism that could amplify regional and global warming. *Id.*

[75] *Id.*

[76] *Id.*

[77] *Id.*

compromise these facilities' structural integrity and even lead to collapse.[78] If thermokarst occurs in response to regional warming, large areas can subside and, if near the coast, can be inundated by encroaching seas.[79]

Global warming will likely trigger a new episode of widespread thermokarst development, with serious consequences for most of the engineered works constructed in the Arctic during the twentieth century.[80] Already, melting permafrost has created underground voids that collapse into sinkholes in northern areas such as the city of Fairbanks, has toppled spruce, roller-coaster bike trails, rippled pavement.[81] Homes and buildings are sagging into ruin.[82] Elsewhere, entire forests appear to be sinking or drowning as melting permafrost forces water upward.[83] Alaskans have taken to calling the phenomenon "drunken trees."[84]

Other food security and safety problems arise from the land warming, which threatens underground cellars that have provided

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[78] *Id.*

[79] *Id.*

[80] *Id.* at 13-14.

[81] Doug O'Hara, *Permafrost is Warming*, Anchorage Daily News (Aug. 14, 2005).

[82] *Id.*

[83] Timothy Egan, *Alaska, No Longer So Frigid, Starts to Crack, Burn and Sag*, N.Y. Times (June 16, 2002), *available at* http://nome.colorado.edu/HARC_noframes/NYT_061302.html.

[84] *Id.*

food storage for thousands of years.[85] Cellars thaw and flood during the summer in Kivalina, Point Hope, and now even in Barrow, the northernmost community in Alaska.[86] The traditional diet relies upon adequate storage for large quantities of food and warming raises concerns about foodborne illnesses.[87]

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[85] Michael Brubaker et al., Alaska Native Tribal Health Consortium, Center for Climate and Health, *Climate Change Effects on Traditional Food Cellars in Barrow, Alaska*, CCH Bulletin No. 4 (May 7, 2010), *available at* http://www.anthc.org/chs/ces/climate/upload/Climate-Change-Effects-on-Traditional-Ice-Cellars-in-Barrow-Alaska.pdf; Michael Brubaker et al., Alaska Native Tribal Health Consortium, Center for Climate and Health, *Climate Change Effects on Traditional Inupiat Food Cellars*, CCH Bulletin No. 1 (Oct. 19, 2009), *available at* http://www.anthc.org/chs/ces/climate/upload/CCH-Bulletin-No-01-Permafrost-and-Underground-Food-Cellars-Revised-Final.pdf.

[86] *Id.*

[87] *Id.*

3. Warming Threatens the Health of the Caribou, a Key Food Source

> *"Sometimes when they're supposed to show up, they don't show up. Sometimes they show up when they're not supposed to show up. . . . We've got 15 villages in Northeast Alaska and North Yukon Territory, and some in Northwest Territory, where the same people are depending on one caribou herd. We're caribou people . . . and we all depend on that same herd that migrates through our villages."*
> — Sarah James, Arctic Village, Alaska[88]

Native peoples in more than 25 villages — more than 5,000 households — in northwestern Alaska depend on the Western Arctic caribou herd for subsistence.[89] Caribou are also a feature of Alaska Native mythology, spirituality and cultural identity.[90]

Anthropogenic warming, however, is projected to reduce the traditional forage for caribou herds, which in turn could lead to reduction in the size of caribou herds.[91] Caribou depend on the availability of abundant tundra vegetation and good foraging conditions, especially during the calving season.[92] Vegetation changes caused by climate change, along with rising sea levels, are projected to shrink the tundra area to its lowest extent in the past 21,000 years, greatly reducing the breeding area for

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[88] ACIA Overview Report, *supra* note 6 at 73.

[89] U.S. Geological Service, *Status and Trends of the Nation's Biological Resources: Alaska, Volume 2* (1998), *available at* http://www.nwrc.usgs.gov/sandt/Alaska.pdf (hereinafter "USGS report").

[90] ACIA Overview Report, *supra* note 6 at 71.

[91] *Id.*

[92] *Id.* at 70.

many birds and the grazing areas for many land animals.[93]

Freeze-thaw cycles and freezing rain are also projected to increase.[94] Ice crust formation from freeze-thaw events affects most Arctic land animals by encapsulating their food plants in ice, severely limiting forage availability and sometimes killing the plants.[95] This freeze-thaw effect has caused caribou populations to crash dramatically, and these crashes are happening more frequently.[96] As the caribou herds face increasing trouble, the communities that rely on them for subsistence are forced to reduce their harvest to ensure the sustainability of the herds.

B. Global Warming Is Endangering the Health and Safety of Alaska Natives

> *"The storms are getting more frequent, the winds are getting stronger, the water is getting higher and it's noticeable to everyone in town. If we get 12 to 14 foot waves, this place is going to get wiped out in a matter of hours. We're in panic mode because of how much ground we're losing. If our airport gets flooded out, there goes our evacuation by plane."*
> — Robert Iyatunguk, erosion coordinator for Shishmaref [97]

The effects of global warming are also posing health, safety, and security problems for Alaska Native communities. For example, the thinning and receding sea ice is making

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[93] *Id.* at 46.

[94] *Id.* at 70.

[95] *Id.* at 68.

[96] *Id.* at 69.

[97] *Id.* at 80.

subsistence hunts more dangerous. People are forced to travel farther across rough, open seas to reach the ice where the animals are found. These trips are more dangerous and costly.[98] Nor is the ice reliable once it is reached, as pieces often break off and float away in the midst of a hunt. In 2002, more than 100 stranded hunters from the Inupiat community of Shishmaref had to be rescued by air when the ice on which they were hunting drifted far from shore.[99]

Melting permafrost also threatens the security of Arctic communities. Permafrost stabilizes the ground, buttressing shorelines against fierce Arctic storms.[100] As the permafrost warms and thaws, that buffer dissolves, and shorelines erode.[101] This effect is compounded by the retreat of the sea ice, which has a calming influence on the often rough seas.[102]

In Shishmaref, retreating sea ice and thawing permafrost have exposed the village to erosion from Arctic storms, which

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[98] Joseph B. Verrengia, *In Alaska, an Ancestral Island Home Falls Victim to Global Warming,* Associated Press (Sept. 10, 2002).

[99] *Id.*

[100] Orson P. Smith, & George Levasseur, *Impacts of Climate Change on Transportation Infrastructure in Alaska, The Potential Impacts of Climate Change on Transportation, Part II, Regional Case Studies* 6 (U.S. Dep't of Transportation, 2001).

[101] *Id.* at 5-6; *see also TRUST Alaska*, Exhibit 1. Also available online at http://vimeo.com/33921321.

[102] *Id.* at 7; ACIA Overview Report, *supra* note 6 at 80.

are fiercer and more frequent than in the past.[103] In this village, which sits on a narrow barrier island on the Chukchi Sea, several homes have collapsed over a bluff and others teeter on its edge. The village's 600 residents watched as one end of their village has been eaten away, losing as much as 15 meters of land overnight in one storm.[104] In the past 30 years, 100 to 300 feet of coastline has washed away, half of it since 1997.[105]

The absence of sea ice also deprives the residents of their means of traveling to the mainland to hunt moose and caribou, as they normally would do by early November.[106] Nowadays the inlet is open water in autumn.[107]

Shishmaref is not an anomaly. At Point Hope, a bowhead-whaling village that dates from 600 B.C., flooding seawater threatens the airport runway and a seven-mile evacuation road. [108] "During storms, some people begin to panic," town official Rex Rock told *Time Magazine*.[109] Point Hope is also facing disruption

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[103] *Id.*

[104] *Id.*

[105] Roosevelt, *supra* note 31.

[106] ACIA Overview Report, *supra* note 6 at 80.

[107] *Id.*

[108] *Id.*

[109] *Id.*

of safe drinking water from a temperature-driven increase in organic material in an Arctic tundra lake.[110]

An investigation by the General Accounting Office, an investigative arm of Congress, found that 184 out of 213 (86.4 percent) Alaska Native villages experience some level of flooding and erosion.[111] The GAO report stated that:

> Native villages on the coast or along rivers are subject to both annual and episodic flooding and erosion. Various studies and reports indicate that coastal villages in Alaska are becoming more susceptible to flooding and erosion in part because rising temperatures cause protective shore ice to form later in the year, leaving the villages vulnerable to fall storms . . . In addition, villages in low-lying areas along riverbanks or in river deltas are susceptible to flooding and erosion caused by ice jams, snow and glacial melts, rising sea levels, and heavy rainfall.[112]

The cost of relocating these villages is expected to be high.[113] For example, the Army Corp of Engineers estimates that the cost to relocate Kivalina, which has a population of about

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[110] Michael Brubaker et al., Alaska Native Tribal Health Consortium, Center for Climate and Health, *Source Drinking Water Challenges Changes to an Arctic Tundra Lake*, CCH Bulletin No. 2 (Oct. 19, 2009), *available at* http://www.anthc.org/chs/ces/climate/upload/CCH-Bulletin-No-02-Source-Drinking-Water-Challenges-Changes-to-an-Arctic-Tundra-Lake-Revised-Final.pdf.

[111] U.S. General Accounting Office, *Alaska Native Villages: Most Are Affected by Flooding and Erosion, But Few Qualify for Federal Assistance*, 2-3 (December 2003) (hereinafter "GAO report").

[112] *Id.* at 3.

[113] *Id.*

385, could range from $100 million to $400 million.[114] There are 20 other Alaska villages that are candidates for relocation because of severe erosion.[115]

Kivalina and Shishmaref are located on barrier islands that are continuously shrinking due to chronic erosion.[116] The village of Kivalina lies on a barrier island that is both overcrowded and shrinking from chronic erosion.[117] Surrounded by the Chukchi Sea and the Kivalina Lagoon, the village has no further room for expansion.[118] Chronic erosion has further exacerbated overcrowding.[119] Several homes are currently in danger of falling into the lagoon.[120] On the seaside of the island, fall storm surges create annual coastal flooding and beach erosion.[121] Portions of the island have been breached before, and it is believed that the right combination of storm events could flood the entire village at any time.[122]

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[114] *Id* at 4.

[115] Rosen, *supra* note 44.

[116] GAO report, *supra* note 106 at 29.

[117] *Id.*

[118] *Id.* at 29-30.

[119] *Id.* at 30.

[120] *Id.*

[121] *Id.*

[122] *Id.*; *see also* Michael Brubaker et al., Alaska Native Tribal Health Consortium, *Climate Change in Kivalina, Alaska, Strategies for Community Health* (Jan. 2011), *available at* http://www.anthc.org/chs/ces/climate/upload/Climate-Change-in-Kivalina-Alaska-Strategies-for-Community-Health-2.pdf.

Shishmaref residents have voted to leave the community their families have inhabited for the past 4,000 years and move to a site called Tin Creek, 12 miles away.[123] Unfortunately they lack the many millions it would cost.[124] For now, Shishmaref and the three other Alaska Native villages the federal government has found to be in "imminent danger" will remain where they are, exposed to the consequences of global warming.[125]

CONCLUSION

The changes taking place in Alaska as a result of global warming are among the most dramatic on Earth. The dramatic destruction of the Arctic provides an early warning for the rest of the world of the devastation that is likely to occur if governments and the industries that drive them fail to significantly curb their emissions of greenhouse gases. Judicial recognition of the government's Constitutional obligation to protect public trust resources, including the atmosphere, for all people of the State of Alaska, is a critical first step in addressing the devastation of climate change. Reducing the greenhouse gas emissions in Alaska is an essential next step in ensuring the survival of Alaska's Native

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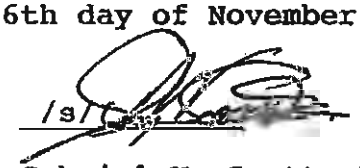
[123] ACIA Overview Report, *supra* note 6 at 80; Roosevelt, *supra* note 31.

[124] Verrengia, *supra* note 94 at 5.

[125] Roosevelt, *supra* note 31; GAO report, *supra* note 106 at 4.

communities. Thus, we urge this Court to overrule the dismissal of the case brought by Alaska youth and to remand it to the trial court.

Respectfully submitted this 16th day of November, 2012.



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