
IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

No. 23-3624
CENTER FOR BIOLOGICAL DIVERSITY, et al.
Plaintiffs-Appellants,

v.

BUREAU OF LAND MANAGEMENT, et al.
Defendants-Appellees,

CONOCOPHILLIPS ALASKA, INC, et al.,
Intervenor-Defendants-Appellees,

and

No. 23-3627
SOVEREIGN IÑUPIAT FOR A LIVING ARTIC, et al.,
Plaintiffs-Appellants,

v.

BUREAU OF LAND MANAGEMENT, et al.,
Defendants-Appellees,

CONOCOPHILLIPS ALASKA, INC, et al.,
Intervenor-Defendants-Appellees.

Appeals from the United States District Court for the District of Alaska
Nos. 3:23-cv-61 & 3:23-cv-58 (Hon. Sharon L. Gleason)

**AMICUS CURIAE BRIEF OF OUR CHILDREN'S TRUST
IN SUPPORT OF APPELLANTS**

FILED WITH CONSENT OF ALL PARTIES PURSUANT TO
FEDERAL RULE OF APPELLATE PROCEDURE 29(a)

ANDREW L. WELLE
Our Children's Trust
1216 Lincoln St
Eugene, OR 97401
Tel: (574) 315-5565
E: andrew@ourchildrenstrust.org

*Counsel for Amicus Curiae Our
Children's Trust*

STATEMENT REGARDING CONSENT OF THE PARTIES

Counsel for Our Children’s Trust contacted counsel of record for all parties to seek their consent for the filing of this amicus curiae brief. All parties consent to the filing of this amicus curiae brief.

CORPORATE DISCLOSURE STATEMENT

Pursuant to Fed. R. App. P. 29(a)(4)(A) and Fed. R. App. P. 26.1 amicus curiae Our Children’s Trust certifies that it has no parent corporation and that no publicly held corporation owns more than 10% of the amicus curiae.

STATEMENT OF AUTHORSHIP

Pursuant to Fed. R. App. P. 29(a)(4)(E), amicus certifies that its counsel authored this amicus curiae brief in its entirety. No person—other than the amicus curiae and its counsel—contributed money that was intended to fund the preparation or submission of this brief.

TABLE OF CONTENTS

STATEMENT REGARDING CONSENT OF THE PARTIESi

CORPORATE DISCLOSURE STATEMENT.....i

STATEMENT OF AUTHORSHIP.....i

TABLE OF CONTENTS ii

TABLE OF AUTHORITIES iii

INTRODUCTION..... 1

IDENTITY AND INTEREST OF *AMICUS CURIAE*..... 1

SUMMARY OF ARGUMENT3

ARGUMENT4

 I. Children Are Particularly at Risk from the Harms of Fossil Fuel Pollution and Climate Change.....4

 A. Children are Uniquely Vulnerable to and Disproportionately Harmed by Impaired Air Quality6

 B. Children are Uniquely Vulnerable to and Disproportionately Harmed by Increasing Temperatures.....10

 C. Children are Uniquely Vulnerable to and Disproportionately Harmed by Increasing Extreme Weather Events.....12

 D. The Continuing Existence and Cultures of Many Alaska Native Youth’s Villages are Threatened by Climate Change16

 E. Climate Change Threatens the Species Youth in Alaska Rely on for Subsistence and Food Security18

 F. Children Are Uniquely Vulnerable to and Disproportionately Harmed by the Mental Health Impacts of the Climate Change Crisis21

 II. The Best Available Climate Science Demonstrates that Every Additional Ton of CO₂ Emissions Causes Escalating Climate Harms to Children22

CONCLUSION30

TABLE OF AUTHORITIES

Cases

<i>Genesis B. v. EPA</i> , No. 2:23-cv-10345-MWF (C.D. Cal.).....	2
<i>Held v. Montana</i> , No. CDV-2020-307 (Mont. First Jud. Dist. Ct. Lewis & Clark Cnty.).....	2
<i>Juliana v. United States</i> , No. 6:15-cv-01517-AA (D. Or.)	2
<i>Kanuk v. Alaska</i> , No. 3AN-11-07474 CI (Alaska Third Jud. Dist. at Anchorage) ...	3
<i>Layla H. v. Virginia</i> , No. 1639-22-2 (Va. Ct. App.)	3
<i>Natalie R. v. Utah</i> , No. 20230022-SC (Utah Sup. Ct.)	2
<i>Navahine F. v. Hawai‘i Dep’t of Transp.</i> , No. 1CCV-22-0000631 (JMT) (Haw. First Cir. Env’t Ct.).....	2
<i>Sagoonick v. Alaska</i> , No. 3AN-17-09910 CI (Alaska Third Jud. Dist. at Anchorage)	3

Other Authorities

Aaron Morrison, <i>A Severe Drought has Returned to Alaska for the First Time Since 2019</i> , Alaska’s News Source (Jun. 16, 2022).....	15
Alfredo Rivera et al., <i>Preliminary US Greenhouse Gas Emissions Estimates for 2021</i> , Rhodium Group (Jan. 10, 2022).....	28
American Public Health Association, <i>Making the Connection: Climate Changes Children’s Health</i> (May 2016)	13
Ana C. Franco et al., <i>Impact of Warming and Deoxygenation on the Habitat Distribution of Pacific Halibut in the Northeast Pacific</i> , 31 Fisheries Oceanography 601 (2022).....	20
Andrea Rodgers et al., <i>The Injustice of 1.5°C–2°C: The Need for a Scientifically Based Standard of Fundamental Rights Protection in Constitutional Climate Change Cases</i> , 40 Va. Env’t L. J. 102 (2022).....	25
Ann V. Sanson et al., <i>Responding to the Impacts of the Climate Crisis on Children and Youth</i> , 13 Child Dev. Persps. 201 (2019).	22
Ayurella Horn-Muller, <i>Alaskan Tribal Communities Confront Food Insecurity After Storm</i> , Axios (Sept. 23, 2022)	16
Bareket Falk & Raffy Dotan, <i>Children’s Thermoregulation During Exercise in the Heat: A Revisit</i> , 33 Applied Physiology, Nutrition, & Metabolism 420 (2008).10	

BLM, <i>Willow Master Development Project: Supplemental Environmental Impact Statement: Record of Decision</i> (Mar. 2023).....	28, 29
Carl J. Markon et al., <i>Ch. 26: Alaska, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II, U.S. Global Change Research Program</i> 1185 (2018).....	12, 17
CDC, <i>Asthma: Most Recent National Asthma Data</i>	9
Christine T. Loftus et al., <i>Exposure to Ambient Air Pollution and Early Childhood Behavior: A Longitudinal Cohort Study</i> , 183 <i>Env't Rsch.</i> 10975 (2020).....	7
Christopher G. Nolte et al., <i>Ch. 13: Air Quality, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II, U.S. Global Change Research Program</i> 512 (2018).....	6
Coral Salvador et al., <i>Public Health Implications of Drought in a Climate Change Context: A Critical Review</i> , 44 <i>Ann. Rev. Pub. Health</i> 213 (2023).....	13, 14
Courtney W. Magnus & Therese L. Canares, <i>Heat-Related Illness in Children in an Era of Extreme Temperatures</i> , 40 <i>Pediatrics Rev.</i> 97 (2019).	10
Daniel Helldén et al., <i>Climate Change and Child Health: A Scoping Review and an Expanded Conceptual Framework</i> , 5 <i>Lancet Planetary Health</i> e164 (2021).....	14
David I. Armstrong McKay et al., <i>Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points</i> , 377 <i>Science</i> eabn7950 (2022).	25
Denali Commission, <i>Final Environmental Impact Statement: Mertarvik Infrastructure Development Nelson Island, Alaska</i> (Mar. 2018)	17
Dominique Singer, <i>Pediatric Hypothermia: An Ambiguous Issue</i> , 18 <i>Int'l J. Env't Rsch. & Pub. Health</i> 11484 (2021).	16
Dr. Pieter Tans & Dr. Ralph Keeling, <i>Trends in Atmospheric Carbon Dioxide: Data</i> , NOAA Global Monitoring Lab	24
Ella Nilsen, <i>The Willow Project has been Approved. Here's What to Know About the Controversial Oil-Drilling Venture</i> , CNN (Mar. 14, 2023).....	28
Expert Report of Lise Van Susteren, <i>Juliana v. United States</i> , No. 6:15-cv-01517-AA (D. Or. June 28, 2018)	22
<i>Food Security and Climate Change in Alaska</i> , Climate Hubs U.S. Dept. of Agriculture.....	18
Frederica Perera & Kari Nadeau, <i>Climate Change, Fossil-Fuel Pollution, and Children's Health</i> , 386 <i>New Eng. J. Med.</i> 2303 (2022)	7, 10, 13
GAO, <i>Alaska Native Issues: Federal Agencies Could Enhance Support for Native</i>	

<i>Village Efforts to Address Environmental Threats</i> (May 2022).....	17
GAO, <i>Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion</i> (June 2009).....	17
Giuliana Ferrante & Stefania La Grutta, <i>The Burden of Pediatric Asthma</i> , 6 <i>Frontiers in Pediatrics</i> 1 (2018).....	9
Haris Majeed & Jonathan Lee, <i>The Impact of Climate Change on Youth Depression and Mental Health</i> , 1 <i>Lancet Planetary Health</i> e94 (2017).	21
Hoesung Lee et al., <i>Synthesis Report of the IPCC Sixth Assessment Report (AR6): Longer Report</i> , Intergovernmental Panel on Climate Change (2023).....	27
Hyunkuk Cho, <i>The Effects of Summer Heat on Academic Achievement: A Cohort Analysis</i> , 83 <i>J. Env't Econ. & Mgmt.</i> 185 (2017)	11
Ian Shine, <i>Is 2023 Going to be the Hottest Year on Record?</i> , <i>World Economic Forum</i> (July 20, 2023)	11
IPCC, <i>Ch. 5: Sustainable Development, Poverty Eradication and Reducing Inequalities</i> , in <i>Special Report: Global Warming of 1.5°C</i> (2018).....	26
IPCC, <i>Summary for Policymakers</i> , in <i>Climate Change 2021: The Physical Science Basis</i> (2021).....	24
IPCC, <i>Summary for Policymakers</i> , in <i>Climate Change 2022: Impacts, Adaptation and Vulnerability</i> (2022).	25
IPCC, <i>Summary for Policymakers</i> , in <i>Climate Change 2023: Synthesis Report</i> (2023)	21, 23, 24, 27
Jacob R. Pratt et al., <i>A National Burden Assessment of Estimated Pediatric Asthma Emergency Department Visits that may be Attributed to Elevated Ozone Levels Associated with the Presence of Smoke</i> , 191 <i>Env't Monitoring & Assessment</i> 269 (2019)	9
James Hansen et al., <i>Assessing “Dangerous Climate Change”: Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature</i> , 8 <i>PLOS ONE</i> e81648 (2013).....	25
James Hansen et al., <i>Ice Melt, Sea Level Rise and Superstorms: Evidence from Paleoclimate Data, Climate Modeling, and Modern Observations that 2°C Global Warming Could be Dangerous</i> , 16 <i>Atmos. Chem. & Phys.</i> 3761 (2016)	25, 26
James Hansen et al., <i>Young People’s Burden: Requirement of Negative CO₂ Emissions</i> , 8 <i>Earth Sys. Dynamics</i> 577 (2017)	25, 26

Janet L. Gamble & John Balbus, <i>Ch. 9 Populations of Concern, in The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment</i> 248 (2016)	11
Jisung Park, <i>Hot Temperature, High Stakes Exams, and Avoidance Behavior: Evidence from New York City Public Schools</i> , NBER (2017)	11
Johan Rockström et al., <i>Safe and Just Earth System Boundaries</i> , 619 <i>Nature</i> 102 (2023)	25
John E. Walsh et al., <i>Extreme Weather and Climate Events in Northern Areas: A Review</i> , 209 <i>Earth-Science Revs.</i> 103324 (2020).....	15
Joshua Graff Zivin & Jeffrey Shrader, <i>Temperature Extremes, Health, and Human Capital</i> , 26 <i>Future Children</i> 31 (2016).....	11
Julie Depenbrock, <i>This is What’s at Risk from Climate Change in Alaska</i> , NPR (Dec. 22, 2022)	18
Karen C. Seto et al., <i>Carbon Lock-In: Types, Causes, and Policy Implications</i> , 41 <i>Annu. Rev. Env’t & Res.</i> 425 (2016).	29
Karina von Schuckmann et al., <i>Heat Stored in the Earth System 1960-2020: Where Does the Energy Go?</i> 15 <i>Earth Sys. Science Data</i> 1675 (2023)	23
Karina von Schuckmann et al., <i>Heat Stored in the Earth System: Where Does the Energy Go?</i> 12 <i>Earth Sys. Science Data</i> 2013 (2020)	23, 25
Karn Vohra et al., <i>Global Mortality from Outdoor Fine Particle Pollution Generated by Fossil Fuel Combustion: Results from GEOS-Chem</i> , 195 <i>Env’t Rsch.</i> 110754 (2021)	6
Katya Wassillie, <i>On Thin Ice: Subsistence Walrus Hunting and the Adaptation to a Changing Climate in Alaska</i> , <i>Cultural Survival</i> (Sept. 8, 2015)	20
Lauren A. Sill & David Koster, <i>Subsistence Harvests of Pacific Halibut in Alaska, 2020</i> , Alaska Dep’t of Fish and Game (Jan. 2022)	19
Leslie A. Jones et al., <i>Watershed-scale Climate Influences Productivity of Chinook Salmon Populations Across Southcentral Alaska</i> , 26 <i>Glob. Change Biology</i> 4919 (2020)	19
Lisa Friedman, <i>Many Young Voters Bitter Over Biden’s Support of Willow Oil Drilling</i> , <i>N.Y. Times</i> (Apr. 24, 2023)	22
M. Roxana Sierra-Hernández et al., <i>Increased Fire Activity in Alaska Since the 1980s: Evidence from an Ice Core-Derived Black Carbon Record</i> , 127 <i>J. Geophysical Rsch.</i> e2021JC035668 (2022)	8

Margaret Sugg et al., <i>A Scoping Review of Drought Impacts on Health and Society in North America</i> , 162 <i>Climatic Change</i> 1177 (2020).	14, 15
Mark Jacobson, <i>Low-cost Solutions to Global Warming, Air Pollution, and Energy Insecurity for 145 Countries</i> , 15 <i>Energy & Env't Sci.</i> 3343 (2022).	27, 30
Mark Jacobson, <i>More Hopeful Calculations for the Energy Transition</i> , <i>Issues Sci. & Tech.</i> (Feb. 18, 2022)	30
Mark Lynas et al., <i>Greater than 99% Consensus on Human Caused Climate Change in the Peer-Reviewed Scientific Literature</i> , 16 <i>Env't Rsch. Letters</i> 114005 (2021)	23
Mark Z. Jacobson et al., <i>100% Clean and Renewable Wind, Water, and Sunlight (WWS) All-Sector Energy Roadmaps for the 50 United States</i> , 8 <i>Energy Env't Sci.</i> 2093 (2015)	27
Mark Z. Jacobson et al., <i>Zero Air Pollution and Zero Carbon from all Energy at Low Cost and Without Blackouts in Variable Weather Throughout the U.S. with 100% Wind-Water-Solar and Storage</i> , 184 <i>Renewable Energy</i> 430 (2022).	27, 30
Mason Inman, <i>Carbon is Forever</i> , 1 <i>Nature Climate Change</i> 156 (2008).	23
Matthew W. Jones et al., <i>Global and Regional Trends and Drivers of Fire Under Climate Change</i> , 60 <i>Revs. Geophysics</i> e2020RG000726 (2022)	8, 9
Micah B. Hahn et al., <i>Association of Temperature Thresholds with Heat Illness– and Cardiorespiratory-Related Emergency Visits during Summer Months in Alaska</i> , 131 <i>Env't Health Persps.</i> 057009 (2023)	12
Mika Rantanen et al., <i>The Arctic has Warmed Nearly Four Times Faster than the Globe Since 1979</i> , 3 <i>Commc'ns Earth & Env't</i> 168	12
National Weather Service, <i>Weather Related Fatality and Injury Statistics</i>	10
NOAA, <i>Broken Record: Atmospheric Carbon Dioxide Levels Jump Again</i> (June 5, 2023).....	24
NOAA, <i>Secretary of Commerce Approves Disaster Declarations in AK and WA</i> (Dec. 16, 2022).....	19
NOAA, <i>Wildfire Climate Connection</i>	15
Oliver Milman, <i>Alaska Indigenous People See Culture Slipping Away as Sea Ice Vanishes</i> , <i>The Guardian</i> (Dec. 19, 2016).....	18
Price-Waterhouse-Coopers LLP et al., <i>100% Renewable Electricity: A Roadmap to 2050 for Europe and North Africa</i> (2010).....	27
Public Comment Letter from Our Children's Trust to BLM, Re: Notice of	

Preparation of a Supplemental Environmental Impact Statement for the Willow Master Development Plan (Mar. 8, 2022).....	4
R.A. Bryant et al., <i>Separation from Parents During Childhood Trauma Predicts Adult Attachment Security and Post-Traumatic Stress Disorder</i> , 47 Psych. Med. 2028 (2017).	21
Rebecca Pass Philipsborn & Kevin Chan, <i>Climate Change and Global Child Health</i> , 141 Pediatrics e20173774 (2018).....	5
Rick Thoman, <i>In Changing Climate, Alaska Faces Risk of Extreme Precipitation</i> , Alaska Beacon (Dec. 15, 2022)	15
Sabrina Shankman, <i>The Climate Change Health Risks Facing a Child Born Today: A Tale of Two Futures</i> , Inside Climate News (Nov. 14, 2019).....	6
Sahana Mathiarasan & Anke Hüls, <i>Impact of Environmental Injustice on Children’s Health—Interaction between Air Pollution and Socioeconomic Status</i> , 18 Int’l J. Env’t Rsch. & Pub. Health 795 (2021).....	6
Samantha Ahdoot, Susan E. Pacheco & Council on Environmental Health, <i>Global Climate Change and Children’s Health</i> , 136 Pediatrics e1468 (2015);.....	5
Sarah Yoder, <i>Assessment of the Potential Health Impacts of Climate Change in Alaska</i> , State of Alaska Epidemiology (Jan. 8, 2018).....	18, 19
Seung Hyun Lucia Woo et al., <i>Air Pollution from Wildfires and Human Health Vulnerability in Alaska Communities Under Climate Change</i> , 15 Env’t Rsch. Letters 094019 (2020).	9
Stephanie M. Holm et al., <i>Health Effects of Wildfire Smoke in Children and Public Health Tools: A Narrative Review</i> , J. Expo. Sci. & Env’t Epidemiology 31 (2020).	9
Stephen Vida et al., <i>Relationship Between Ambient Temperature and Humidity and Visits to Mental Health Emergency Departments in Québec</i> , 63 Psychiatric Servs. 1150 (2012)	21
Taylor Telford, <i>Western Alaska Confronts Damage After Historic Storm</i> , Wash. Post (Sept. 18, 2022)	16
Tero Mustonen & Brie Van Dam, <i>Climate Change and Unalakleet: A Deep Analysis</i> , 13 Sustainability 9971 (2021).....	19
The White House, <i>FACT SHEET: President Biden Announces New Initiatives at COP27 to Strengthen U.S. Leadership in Tackling Climate Change</i> (Nov. 11, 2022).....	29
The White House, <i>Remarks by President Biden on Climate</i> (June 19, 2023).....	29

U.S. Energy Info. Admin., <i>EIA Expects U.S. Fossil Fuel Production to Reach New Highs in 2023</i> (Jan. 21, 2022)	28
U.S. EPA, <i>Climate Change and Children’s Health and Well-Being in the United States</i> (Apr. 2023).....	5, 6, 22
U.S. EPA, <i>Power Plants and Neighboring Communities</i>	6, 7
U.S. Global Change Research Program, <i>Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II</i> (2018).....	25
UNICEF, <i>Number of Displaced Children Reaches New High of 43.3 Million</i> (June 13, 2023).....	13
USDA, <i>Alaska and a Changing Climate</i>	12
Wim Thiery et al., <i>Intergenerational Inequities in Exposure to Climate Extremes</i> , 374 <i>Science</i> 158 (2021)	5, 21
World Economic Forum, <i>Children Are Dying from Air Pollution. Here’s How We Can Protect Them</i> (Nov. 19, 2021)	8
World Health Organization, <i>Heat and Health</i> (June 1, 2018).....	10
World Health Organization, <i>Quantitative Risk Assessment of the Effects of Climate Change on Selected Causes of Death, 2030s and 2050s</i> (Simon Hales et al. eds., 2014).....	14, 15
World Meteorological Organization, <i>State of the Global Climate 2022</i> , WMO-No. 1316 (2023)	11
Xavier Basagaña et al., <i>Heat Waves and Cause-specific Mortality at all Ages</i> , 22 <i>Epidemiology</i> 765 (2011).....	10
Yoko Akachi et al., <i>Global Climate Change and Child Health</i> , UNICEF (2009)..	14
Zhiwei Xu et al., <i>The Impact of Heat Waves on Children’s Health: A Systematic Review</i> , 58 <i>Int’l J. Biometeorology</i> 239 (2013)	11

INTRODUCTION

Our Children’s Trust (“OCT”) submits this *amicus curiae* brief in support of Plaintiffs.¹ Plaintiffs challenge the Bureau of Land Management’s (“BLM”) approval of the Willow Master Development Plan (“Willow Project”), a massive oil-drilling venture on Alaska’s north slope. Among other claims, Plaintiffs argue BLM did not sufficiently evaluate the Willow Project’s climate effects. OCT seeks to assist the Court in its analysis of this case by illuminating the broader context in which the Willow Project would operate, including: (1) the unique vulnerabilities and disproportionate harms to youth in Alaska and worldwide from the federal government’s continuing contributions to the climate crisis through the approval of fossil fuel projects like the Willow Project, and; (2) the best available climate science, which demonstrates that continuing fossil fuel emissions resulting from the approval of such projects critically harm and endanger the lives, health, and safety of youth. The best available science further demonstrates that new fossil fuel projects, like the Willow Project, are unnecessary because clean, renewable energy is readily available to economically fulfill all energy needs without causing destruction to the climate system and the health and safety of children.

IDENTITY AND INTEREST OF *AMICUS CURIAE*

¹ OCT files this brief concurrently in each of the above-captioned cases. The term “Plaintiffs” in this brief generally refers to the plaintiffs-appellants in both cases.

Our Children’s Trust is a non-profit public interest law firm that provides strategic, campaign-based legal services to youth from diverse backgrounds to secure their legal rights to a safe climate. OCT works to protect the Earth’s climate system for present and future generations by representing young people in legal efforts at federal, state, and global levels to secure their binding and enforceable fundamental rights to a healthy atmosphere and stable climate, based on the best available science.

OCT currently represents youth in active constitutional climate litigation pending in the United States District Courts for the District of Oregon² and the Central District of California;³ and in the state courts of Montana,⁴ Hawai‘i,⁵ Utah,⁶ and Virginia,⁷ each of which challenges government policies and systemic practices that cause and contribute to the climate crisis, endangering the health and safety of children in violation of their constitutional rights. OCT has also represented Alaska youth, including Alaska Native youth, in the pursuit of climate

² *Juliana v. United States*, No. 6:15-cv-01517-AA (D. Or.).

³ *Genesis B. v. EPA*, No. 2:23-cv-10345-MWF (C.D. Cal.).

⁴ *Held v. Montana*, No. CDV-2020-307 (Mont. First Jud. Dist. Ct. Lewis & Clark Cnty.).

⁵ *Navahine F. v. Hawai‘i Dep’t of Transp.*, No. 1CCV-22-0000631 (JMT) (Haw. First Cir. Env’t Ct.).

⁶ *Natalie R. v. Utah*, No. 20230022-SC (Utah Sup. Ct.).

⁷ *Layla H. v. Virginia*, No. 1639-22-2 (Va. Ct. App.).

justice.⁸ All of OCT's advocacy efforts on behalf of youth are based on the best available climate science and supported by Nobel laureate scientists and medical experts, including the world's top climate scientists. Given OCT's mission, experience, and leading advocacy to secure climate justice for youth, OCT has a unique perspective, expertise, and a significant interest in informing the court on the best available climate science and the disproportionate harms to youth from the federal government's ongoing contributions to the climate crisis through fossil fuel projects like the Willow Project.

SUMMARY OF ARGUMENT

This Court's decision in this appeal has important implications for the Earth's climate system, the health and safety of children, and the habitability of the world they will inherit. The best available climate science demonstrates that, because of the use of fossil fuels, atmospheric concentrations of greenhouse gases ("GHGs") have already risen well beyond safe levels, resulting in climate changes that are disproportionately harming the health and safety of our nation's youth, including in Alaska. The federal government's approval of new fossil fuel infrastructure, like the Willow Project, locks in continuing GHG pollution for decades, exacerbating the climate crisis and the resulting harms to children. As Our

⁸ *Sagoonick v. Alaska*, No. 3AN-17-09910 CI (Alaska Third Jud. Dist. at Anchorage); *Kanuk v. Alaska*, No. 3AN-11-07474 CI (Alaska Third Jud. Dist. at Anchorage).

Children’s Trust explained in their public comment on the Willow Project, every additional ton of emissions matters and causes more danger, more temperature rise, and more harm to youth, making it harder to return to a safe, stable climate system.⁹ With children already suffering disproportionate harms from climate change with life-long implications for their health and safety, urgent emissions reductions are required to prevent further worsening existential harms to our nation’s youth. Additional GHG emissions from fossil fuel projects like the Willow Project only cause further harm and endangerment to youth. Moreover, such projects are entirely unnecessary. Clean, renewable energy is readily available to economically fulfill all energy needs without causing destruction to the climate system and the health and safety of children.

ARGUMENT

I. Children Are Particularly at Risk from the Harms of Fossil Fuel Pollution and Climate Change

Children are uniquely vulnerable to and disproportionately harmed by the dangerous effects of fossil fuel emissions and the climate changes resulting from fossil fuel projects like the Willow Project. Children’s still-developing bodies; unique behavioral patterns; higher intake of air, food, and water per unit of body

⁹ Public Comment Letter from Our Children’s Trust to BLM, Re: Notice of Preparation of a Supplemental Environmental Impact Statement for the Willow Master Development Plan (Mar. 8, 2022), <https://rb.gy/ot9ub>.

weight; dependence on caregivers; political powerlessness; and inheritance of the worst of the increasing harms of climate change all contribute to making them more susceptible to these harms compared to adults.¹⁰ The harmful effects of fossil fuel pollution and ensuing climate disruption to children start before they are born and result in lifelong hardships.

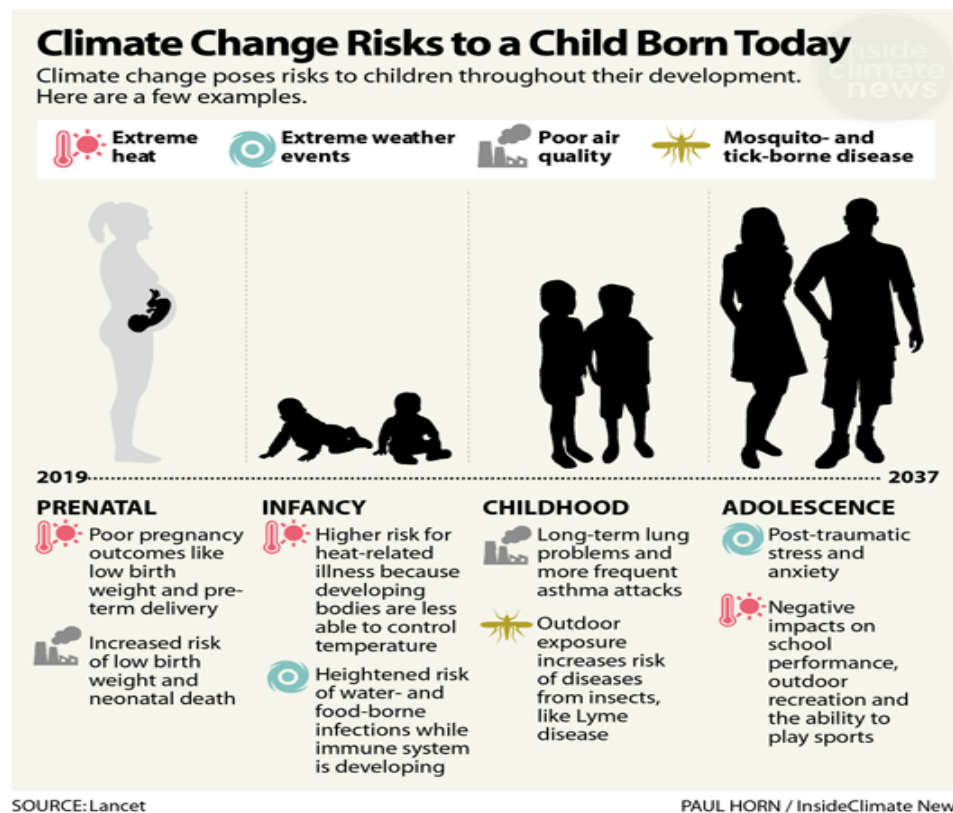


Figure 1: Harmful and disproportionate effects of climate disruption on children

¹⁰ See Samantha Ahdoot, Susan E. Pacheco & Council on Environmental Health, *Global Climate Change and Children's Health*, 136 *Pediatrics* e1468 (2015); Rebecca Pass Philipsborn & Kevin Chan, *Climate Change and Global Child Health*, 141 *Pediatrics* e20173774 (2018); Wim Thiery et al., *Intergenerational Inequities in Exposure to Climate Extremes*, 374 *Science* 158 (2021); U.S. EPA, *Climate Change and Children's Health and Well-Being in the United States* (Apr. 2023).

throughout their development.¹¹

A. Children are Uniquely Vulnerable to and Disproportionately Harmed by Impaired Air Quality

Dangerous air quality caused directly by the development and combustion of fossil fuels¹² and by increasing wildfires resulting from climate change¹³ causes significant and disproportionate harm to children's health.¹⁴ The link between dangerous air quality and harms to children's physical health is well established for a wide range of health conditions, including cardiovascular and respiratory diseases, central nervous system disorders, metabolic conditions, reproductive dysfunction, organ damage, cancer, and other serious health effects.¹⁵ Exposure to polluted air also causes profound harms to the cognitive development of youth and

¹¹ Sabrina Shankman, *The Climate Change Health Risks Facing a Child Born Today: A Tale of Two Futures*, Inside Climate News (Nov. 14, 2019), <https://insideclimatenews.org/news/14112019/health-children-infants-climate-change-impact-pollution-heat-lancet-countdown-study/>.

¹² U.S. EPA, *Power Plants and Neighboring Communities*, <https://www.epa.gov/power-sector/power-plants-and-neighboring-communities>.

¹³ Christopher G. Nolte et al., *Ch. 13: Air Quality*, in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, U.S. Global Change Research Program 512, 519 (2018), <https://nca2018.globalchange.gov/chapter/air-quality>

¹⁴ Sahana Mathiarasan & Anke Hüls, *Impact of Environmental Injustice on Children's Health—Interaction between Air Pollution and Socioeconomic Status*, 18 Int'l J. Env't Rsch. & Pub. Health 795, 796 (2021); U.S. EPA, *supra* note 10, at 35-45; Karn Vohra et al., *Global Mortality from Outdoor Fine Particle Pollution Generated by Fossil Fuel Combustion: Results from GEOS-Chem*, 195 Env't Rsch. 110754 (2021) (air pollution generated by fossil fuel consumption caused 876 child deaths in North America in 2018).

¹⁵ U.S. EPA, *supra* note 12.

children.¹⁶

The physiological features of youth make them disproportionately vulnerable to the harms of dangerous air quality because they breathe more air per unit of body weight than adults, and because their organs, such as the lungs and brain, are still developing.¹⁷ Children's bodies also take more time to process and excrete toxic materials such as those present in wildfire smoke and fossil fuel pollution.¹⁸ The risk of adverse health effects from dangerous air quality increases with exposure and are greater for individuals exposed throughout their lifetimes beginning in their youth, than for individuals exposed during adulthood.¹⁹

The medical harms of hazardous air quality to youth and children begin during fetal development. Exposure to dangerous air quality during fetal development triggers miscarriages, stillbirths, and premature births; and significantly increases the incidence of birth defects, low birth weight, infant medical conditions, and infant deaths.²⁰ Exposure to air pollution during fetal development is associated with both immediate and lifelong injuries to health.

¹⁶ See Christine T. Loftus et al., *Exposure to Ambient Air Pollution and Early Childhood Behavior: A Longitudinal Cohort Study*, 183 *Env't Rsch.* 10975 (2020).

¹⁷ Frederica Perera & Kari Nadeau, *Climate Change, Fossil-Fuel Pollution, and Children's Health*, 386 *New Eng. J. Med.* 2303, 2304 (2022).

¹⁸ See U.S. EPA, *Why Wildfire Smoke is a Health Concern*, <https://www.epa.gov/wildfire-smoke-course/why-wildfire-smoke-health-concern>.

¹⁹ U.S. EPA, *supra* note 12.

²⁰ U.S. EPA, *supra* note 12.

(Figure 2).

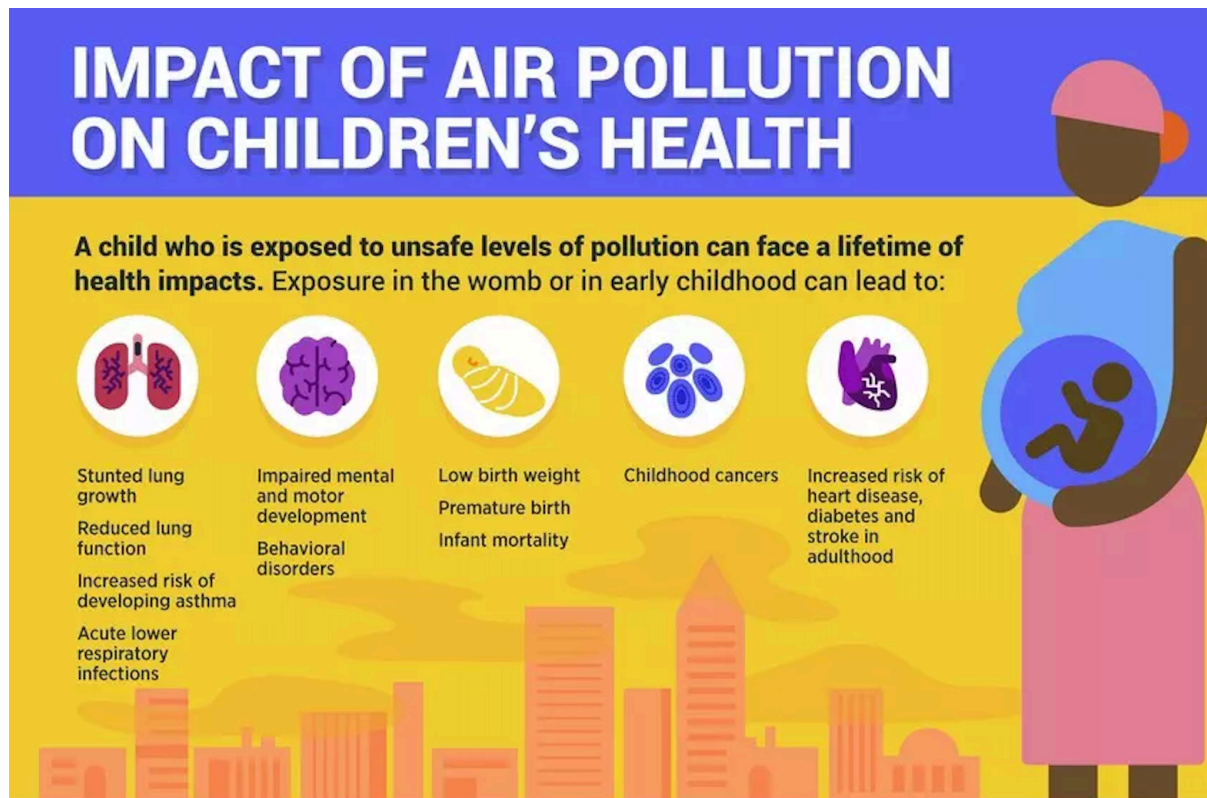


Figure 2: Harms to children's health from air pollution begin with early exposure and last a lifetime.²¹

Climate change is increasing the frequency and severity of wildfires in the U.S., including in Alaska, exposing children to increasing levels of hazardous wildfire smoke.²² Over 7 million children are exposed to wildfire in the United

²¹ World Economic Forum, *Children Are Dying from Air Pollution. Here's How We Can Protect Them* (Nov. 19, 2021), <https://www.weforum.org/agenda/2021/11/how-we-can-protect-children-dying-from-air-pollution/>.

²² Matthew W. Jones et al., *Global and Regional Trends and Drivers of Fire Under Climate Change*, 60 *Revs. Geophysics* e2020RG000726 (2022); M. Roxana Sierra-Hernández et al., *Increased Fire Activity in Alaska Since the 1980s: Evidence from an Ice Core-Derived Black Carbon Record*, 127 *J. Geophysical Resch.* e2021JC035668 (2022).

States annually, and this number is increasing as climate change worsens with continuing GHG emissions.²³ It is estimated that exposure to wildfire smoke already accounts for over 2,400 annual visits to the emergency room by children with asthma,²⁴ which is the leading chronic disease in children,²⁵ affecting 4.7 million U.S. children under age 18.²⁶ In Alaska, exposure to particulate matter from wildfire smoke already “presents a substantial public health burden in the present day.”²⁷ The length of Alaska’s fire weather season has already increased by approximately 69 percent and could increase by 174 percent by 2100 if GHG emissions continue unabated.²⁸ The harms to children’s health and safety from exposure to climate-induced wildfires will only increase if the federal government continues to systemically cause and contribute to the climate crisis by authorizing projects like the Willow Project.

²³ Stephanie M. Holm et al., *Health Effects of Wildfire Smoke in Children and Public Health Tools: A Narrative Review*, J. Expo. Sci. & Env’t Epidemiology 31 (2020).

²⁴ Jacob R. Pratt et al., *A National Burden Assessment of Estimated Pediatric Asthma Emergency Department Visits that may be Attributed to Elevated Ozone Levels Associated with the Presence of Smoke*, 191 Env’t Monitoring & Assessment 269 (2019).

²⁵ Giuliana Ferrante & Stefania La Grutta, *The Burden of Pediatric Asthma*, 6 Frontiers in Pediatrics 1 (2018).

²⁶ CDC, *Asthma: Most Recent National Asthma Data*, https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm.

²⁷ Seung Hyun Lucia Woo et al., *Air Pollution from Wildfires and Human Health Vulnerability in Alaska Communities Under Climate Change*, 15 Env’t Rsch. Letters 094019 (2020).

²⁸ Jones et al., *supra* note 22, at 14, 44.

B. Children are Uniquely Vulnerable to and Disproportionately Harmed by Increasing Temperatures

Youth are also uniquely vulnerable to the rising temperatures and increasingly frequent and deadly heat waves resulting from climate change. Heat is the leading weather-related killer in the United States,²⁹ and children are at elevated risk of heat-related illness and death compared to adults due to their greater surface area to body mass ratio, lower rate of sweating, and slower rate of acclimatization.³⁰ Heat-related illness and injury is increasing as temperatures rise due to fossil fuel-induced climate change, and children compose almost half of the population impacted by heat-related illness.³¹ Even small increases in extreme heat leads to increased illness and deaths.³² The very youngest are at a particularly elevated risk of heat-related death: within the first seven days of life, infant mortality increases 25% on extremely hot days.³³ Among student athletes, death from heat-related illness is rising,³⁴ and over 9,000 high school athletes are treated

²⁹ National Weather Service, *Weather Related Fatality and Injury Statistics*, <https://www.weather.gov/hazstat/>.

³⁰ Bareket Falk & Raffy Dotan, *Children's Thermoregulation During Exercise in the Heat: A Revisit*, 33 *Applied Physiology, Nutrition, & Metabolism* 420, 425 (2008).

³¹ Courtney W. Magnus & Therese L. Canares, *Heat-Related Illness in Children in an Era of Extreme Temperatures*, 40 *Pediatrics Rev.* 97, 97 (2019).

³² World Health Organization, *Heat and Health* (June 1, 2018), <https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health>.

³³ Xavier Basagaña et al., *Heat Waves and Cause-specific Mortality at all Ages*, 22 *Epidemiology* 765 (2011).

³⁴ Perera & Nadeau, *supra* note 17, at 2307.

for heat-related illnesses each year.³⁵ Between 2000 and 2013, deaths from heat stroke doubled among U.S. high school and college football players.³⁶ Extreme heat also places young children at higher risk of kidney and respiratory disease as well as fever and electrolyte imbalance.³⁷ Heat and increasing temperatures make it more difficult for children to learn, perform well on tests, and even to attend school.³⁸

Because of fossil-fuel-induced climate change, the last 8 years have been the hottest, globally, in recorded human history,³⁹ and experts predict that 2023 will be the hottest year in human history.⁴⁰ Youth in Alaska are experiencing rapidly warming temperatures. Alaska has warmed *twice* as fast as the global average since the mid-20th century, the arctic has warmed nearly four times the global average

³⁵ Janet L. Gamble & John Balbus, *Ch. 9 Populations of Concern, in The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* 248, 255 (2016), <https://health2016.globalchange.gov/populations-concern>.

³⁶ *Id.*

³⁷ Zhiwei Xu et al., *The Impact of Heat Waves on Children's Health: A Systematic Review*, 58 Int'l J. Biometeorology 239, 244 (2013).

³⁸ See Joshua Graff Zivin & Jeffrey Shrader, *Temperature Extremes, Health, and Human Capital*, 26 Future Children 31, 40 (2016); Jisung Park, *Hot Temperature, High Stakes Exams, and Avoidance Behavior: Evidence from New York City Public Schools*, NBER (2017); Hyunkuk Cho, *The Effects of Summer Heat on Academic Achievement: A Cohort Analysis*, 83 J. Env't Econ. & Mgmt. 185, 192 (2017).

³⁹ World Meteorological Organization, *State of the Global Climate 2022*, WMO-No. 1316 (2023).

⁴⁰ Ian Shine, *Is 2023 Going to be the Hottest Year on Record?*, World Economic Forum (July 20, 2023), <https://www.weforum.org/agenda/2023/07/climate-2023-hottest-year-on-record/>.

since 1979, and this trend is expected to accelerate.⁴¹ Increasingly temperatures in Alaska are directly associated with higher emergency department visits for a variety of health issues,⁴² and the harms to youth of rising temperatures and increasingly frequent and severe heatwaves are projected to increase in Alaska and throughout the nation with additional emissions from the approval of projects like the Willow Project. With continuing development and combustion of fossil fuels, Alaska's annual average surface air temperature is projected to increase by a devastating 14.4°F by the end of the century.⁴³ Additional fossil fuel infrastructure like the Willow Project would directly lead to more GHG emissions and increasing temperatures and heatwaves, worsening the harms children are already enduring.

C. Children are Uniquely Vulnerable to and Disproportionately Harmed by Increasing Extreme Weather Events

Children are also vulnerable to the increasing flooding, storms, and other extreme weather events that are occurring as a result of fossil fuel-induced climate

⁴¹ Carl J. Markon et al., *Ch. 26: Alaska, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, U.S. Global Change Research Program 1185, 1190, 1192 (2018), <https://nca2018.globalchange.gov/chapter/alaska>; *see also* Mika Rantanen et al., *The Arctic has Warmed Nearly Four Times Faster than the Globe Since 1979*, 3 *Comm'ns Earth & Env't* 168.

⁴² *See* Micah B. Hahn et al., *Association of Temperature Thresholds with Heat Illness— and Cardiorespiratory-Related Emergency Visits during Summer Months in Alaska*, 131 *Env't Health Persps.* 057009 (2023).

⁴³ USDA, *Alaska and a Changing Climate*, <https://www.climatehubs.usda.gov/hubs/northwest/topic/alaska-and-changing-climate>.

change.⁴⁴ Children's developing immune systems make them particularly vulnerable to water-related and gastrointestinal illness when extreme weather events impact sanitation and sewer systems.⁴⁵ Children suffer disproportionately from such events, with 88% of the global disease burden of climate change falling on children under 5 years old.⁴⁶ Extreme weather events also injure, kill, and displace children and their families, and damage and destroy their homes and schools. Globally, approximately 12 million children were displaced due to extreme weather events in 2022.⁴⁷ These extreme weather events disproportionately impact children and lead to increased hospitalization and mortality due to cardiovascular, respiratory, mental health, and renal diseases.⁴⁸

Flooding events are increasing due to climate change, putting children at increased risk of drowning and experiencing direct harms from physical and

⁴⁴ Perera & Nadeau, *supra* note 17, at 2305.

⁴⁵ American Public Health Association, *Making the Connection: Climate Changes Children's Health* (May 2016), https://www.apha.org/-/media/Files/PDF/topics/climate/Childrens_Health.ashx.

⁴⁶ *Id.*

⁴⁷ UNICEF, *Number of Displaced Children Reaches New High of 43.3 Million* (June 13, 2023), <https://www.unicef.org/press-releases/number-displaced-children-reaches-new-high-433-million>.

⁴⁸ Coral Salvador et al., *Public Health Implications of Drought in a Climate Change Context: A Critical Review*, 44 *Ann. Rev. Pub. Health* 213, 214, 219 (2023).

mental trauma.⁴⁹ Additionally, childhood mortality and morbidity from severe storms and flooding is increased because of the risk of infectious diseases and nutritional deficiencies.⁵⁰ The World Health Organization (“WHO”) estimates that there will be 48,000 additional deaths due to diarrheal diseases among children under age 15 in 2030 when compared to a future without climate change.⁵¹

At the other extreme, climate change and rising temperatures also increase drought severity.⁵² Droughts have wide-ranging effects on multiple sectors, impacting ecosystems, agriculture, water security, and food security.⁵³ In general, children are most vulnerable to the health impacts of droughts, experiencing respiratory illness, diarrheal illnesses, and malnutrition.⁵⁴ Droughts lead to water insecurity for families in impacted areas, and contribute to worsened respiratory health, mental health, undernutrition, and infectious diseases among children.⁵⁵ The

⁴⁹ Yoko Akachi et al., *Global Climate Change and Child Health 4*, UNICEF (2009), <https://www.unicef-irc.org/publications/560-global-climate-change-and-child-health-a-review-of-pathways-impacts-and-measures.html>.

⁵⁰ Daniel Helldén et al., *Climate Change and Child Health: A Scoping Review and an Expanded Conceptual Framework*, 5 *Lancet Planetary Health* e164, e166-67 (2021).

⁵¹ World Health Organization, *Quantitative Risk Assessment of the Effects of Climate Change on Selected Causes of Death, 2030s and 2050s 7* (Simon Hales et al. eds., 2014).

⁵² Salvador et al., *supra* note 48, at 216.

⁵³ *Id.* at 214.

⁵⁴ Margaret Sugg et al., *A Scoping Review of Drought Impacts on Health and Society in North America*, 162 *Climatic Change* 1177, 1187 (2020).

⁵⁵ Helldén et al., *supra* note 50, at e167.

WHO predicts an additional 131,000 deaths in children under 5 due to climate-related undernutrition in 2030.⁵⁶ Drought and climate change also contribute to increased wildfire in the United States.⁵⁷ Drought-related stressors often lead to mental health issues, including depression and anxiety, and children experience higher levels of stress during drought than adults.⁵⁸

Storms, flooding, extreme wind, droughts, and abnormal precipitation have battered Alaska over the past decade. Climate models project that these extreme weather events will only become more frequent with continuing GHG emissions from the approval of fossil fuel infrastructure like the Willow Project.⁵⁹ Together, they have already caused significant environmental degradation, substantial economic losses, and enormous human suffering. In 2022, for example, Typhoon Merbok devastated Western Alaska with unprecedented force, impacting well over

⁵⁶ World Health Organization, *supra* note 51, at 89.

⁵⁷ NOAA, *Wildfire Climate Connection*, <https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection>.

⁵⁸ Sugg et al., *supra* note 54, at 1183.

⁵⁹ John E. Walsh et al., *Extreme Weather and Climate Events in Northern Areas: A Review*, 209 *Earth-Science Revs.* 103324, 4-10 (2020); Rick Thoman, *In Changing Climate, Alaska Faces Risk of Extreme Precipitation*, Alaska Beacon (Dec. 15, 2022), <https://alaskabeacon.com/2022/12/15/in-changing-climate-alaska-risks-extreme-precipitation/>; Aaron Morrison, *A Severe Drought has Returned to Alaska for the First Time Since 2019*, Alaska's News Source (Jun. 16, 2022), <https://www.alaskasnewssource.com/2022/06/16/severe-drought-has-returned-alaska-first-time-since-2019/>.

1,000 miles of coastline.⁶⁰

Climate disasters in Alaska are uniquely difficult to respond to. The remote nature of the state makes repairs costly, especially when the few roads that run to affected communities get washed away entirely.⁶¹ Extreme weather events affect youth in remote communities in particular, as they wipe out power grids, disrupting power to the freezers the youth and their families use to store food for the entire winter.⁶² In Alaska's remote areas, damage to roads or runways can interfere with food and medicine deliveries, which affects still-developing children. Additionally, damage to heating infrastructure from extreme weather events disproportionately affects young children, who are more susceptible to hypothermia.⁶³

D. The Continuing Existence and Cultures of Many Alaska Native Youth's Villages are Threatened by Climate Change

Continuing fossil fuel emissions resulting from the government's approval of projects like the Willow Project are causing loss of sea ice, flooding, thawing

⁶⁰ Taylor Telford, *Western Alaska Confronts Damage After Historic Storm*, Wash. Post (Sept. 18, 2022), <https://www.washingtonpost.com/business/2022/09/18/alaska-storm-typhoon-merbok/>.

⁶¹ *Id.*

⁶² Ayurella Horn-Muller, *Alaskan Tribal Communities Confront Food Insecurity After Storm*, Axios (Sept. 23, 2022), <https://www.axios.com/2022/09/23/alaskan-tribal-communities-storm>.

⁶³ Dominique Singer, *Pediatric Hypothermia: An Ambiguous Issue*, 18 Int'l J. Env't Rsch. & Pub. Health 11484, 6 (2021).

permafrost, and coastal erosion in Alaska that threaten to wipe the very existence of many Alaska Native youth's villages off the map.⁶⁴ The United States Government Accountability Office's assessment of threatened Alaska Native villages increased from 31 ("facing imminent threats") in 2009⁶⁵ to 70 villages ("facing significant environmental threats") in 2022.⁶⁶ Consequently, many of these villages will need to relocate or face devastating disbandment.⁶⁷ The costs of relocation are enormous,⁶⁸ increasing the risk of youth losing their communities and cultures.⁶⁹

The long-term psychological, cultural, and spiritual damage children can suffer as a result of displacement is particularly severe for Alaska Native children, whose families and communities have often lived in their native homelands since time immemorial, and who have deeply rooted cultural and spiritual traditions tied

⁶⁴ GAO, *Alaska Native Issues: Federal Agencies Could Enhance Support for Native Village Efforts to Address Environmental Threats* (May 2022), <https://www.gao.gov/products/gao-22-104241>; Markon et al., *supra* note 41, at 1190, 1192.

⁶⁵ GAO, *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion* 14 (June 2009), <https://www.gao.gov/products/gao-09-551>.

⁶⁶ GAO, *supra* note 64, at 18.

⁶⁷ GAO, *supra* note 65, at 17-18.

⁶⁸ See, e.g., Denali Commission, *Final Environmental Impact Statement: Mertarvik Infrastructure Development Nelson Island, Alaska* 28 (Mar. 2018).

⁶⁹ See GAO, *supra* note 65, at 20-27.

to the land they inhabit.⁷⁰

E. Climate Change Threatens the Species Youth in Alaska Rely on for Subsistence and Food Security

Climate change is also harming species Alaska's youth fish and hunt for subsistence, threatening their food security, economy, cultures, and community.⁷¹ Most rural households in Alaska rely on subsistence food sources,⁷² and declining harvests from the impacts of climate change threaten the health and well-being of Alaskan children. "Many Alaska communities have already reported various changes to subsistence harvest, such as salmon die-offs related to warmer ocean waters, shifting caribou migration, decline and range change in sea mammals, and increased variability in berry harvest."⁷³ With heavy reliance on these subsistence resources, changes to these food sources resulting from continuing GHG emissions

⁷⁰ See Julie Depenbrock, *This is What's at Risk from Climate Change in Alaska*, NPR (Dec. 22, 2022), <https://www.npr.org/2022/12/22/1144942195/climate-change-is-transforming-the-arctic-and-alaska-natives-are-on-the-frontlin>; Oliver Milman, *Alaska Indigenous People See Culture Slipping Away as Sea Ice Vanishes*, The Guardian (Dec. 19, 2016), <https://www.theguardian.com/environment/2016/dec/19/alaska-sea-ice-vanishing-climate-change-indigenous-people>.

⁷¹ *Food Security and Climate Change in Alaska*, Climate Hubs U.S. Dept. of Agriculture, <https://www.climatehubs.usda.gov/hubs/northwest/topic/food-security-and-climate-change-alaska#:~:text=Unlike%20most%20other%20states%2C%20food,harvester%20access%20to%20food%20sources>.

⁷² *Id.*

⁷³ Sarah Yoder, *Assessment of the Potential Health Impacts of Climate Change in Alaska*, State of Alaska Epidemiology 24 (Jan. 8, 2018), <http://www.epi.alaska.gov/bulletins/docs/rr201801.pdf>.

threatens the food security and health of Alaska's children.⁷⁴

Salmon are a prime example of how climate change is diminishing the populations of fish species Alaska's children rely on for subsistence, with increasing mortality rates from warming streams, increased high-flow events, and variability in stream flow.⁷⁵ The federal government declared fishery disasters for the 2021 Alaska Kuskokwim River Salmon, 2021 Norton Sound Chum and Coho Salmon, 2021 Chignik Salmon, and 2020 Copper River/Prince William Sound Coho and Pink Salmon.⁷⁶ Climate change is projected to continue harming salmon populations,⁷⁷ increasingly threatening the food security of Alaska's children and future generations.

Climate change has also impacted halibut harvest, on which many Alaskan families rely.⁷⁸ In 2020, 49% of Subsistence Halibut Registration Certificate

⁷⁴ *Id.* at 24-25.

⁷⁵ Leslie A. Jones et al., *Watershed-scale Climate Influences Productivity of Chinook Salmon Populations Across Southcentral Alaska*, 26 *Glob. Change Biology* 4919, 4920, 4926-28, 4931 (2020).

⁷⁶ NOAA, *Secretary of Commerce Approves Disaster Declarations in AK and WA* (Dec. 16, 2022), <https://www.noaa.gov/news-release/secretary-of-commerce-approves-disaster-declarations-in-ak-and-wa>.

⁷⁷ Tero Mustonen & Brie Van Dam, *Climate Change and Unalakleet: A Deep Analysis*, 13 *Sustainability* 9971, 19 (2021), <https://www.mdpi.com/2071-1050/13/17/9971>.

⁷⁸ Lauren A. Sill & David Koster, *Subsistence Harvests of Pacific Halibut in Alaska, 2020*, Alaska Dep't of Fish and Game vii (Jan. 2022), <https://www.adfg.alaska.gov/techpap/TP485.pdf>.

holders indicated that they were not able to meet their needs for halibut.⁷⁹ Pacific halibut habitat is projected to decrease by about 50% by 2100 because of climate change.⁸⁰

Climate change also threatens many of the species of mammals on which Alaska Native youth rely for subsistence. The communities of Gambel, Savoonga, Diomede, and Wales have had to declare harvest disasters and request aid due to food shortages relating to failed walrus hunts;⁸¹ and the State of Alaska also declared a disaster on St. Lawrence Island.⁸² Similarly, seal populations on which Alaska Native youth rely are declining as a result of loss of sea ice and other effects of climate change.⁸³ Continuing GHG emissions pursuant to the federal government's perpetuation of the climate crisis through the approval of projects like the Willow Project will only increase the threats to the species youth in Alaska rely on for their sustenance and food security, and other harms to the health and safety of youth in Alaska and throughout the nation and world.

⁷⁹ *Id.*

⁸⁰ Ana C. Franco et al., *Impact of Warming and Deoxygenation on the Habitat Distribution of Pacific Halibut in the Northeast Pacific*, 31 *Fisheries Oceanography* 601, 608, 610 (2022), <https://onlinelibrary.wiley.com/doi/epdf/10.1111/fog.12610>.

⁸¹ Katya Wassillie, *On Thin Ice: Subsistence Walrus Hunting and the Adaptation to a Changing Climate in Alaska*, *Cultural Survival* (Sept. 8, 2015), <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/thin-ice-subsistence-walrus-hunting-and-adaptation>.

⁸² *Id.*

⁸³ *Id.*

F. Children Are Uniquely Vulnerable to and Disproportionately Harmed by the Mental Health Impacts of the Climate Change Crisis

Climate change additionally has severe and lasting effects on children's mental health. The psychological health effects to children related to climate change include elevated levels of anxiety, depression, post-traumatic stress disorder, increased incidences of suicide, substance abuse, social disruptions like increased violence, and a distressing sense of loss.⁸⁴ Studies show links between higher temperatures and rates of mental health concerns,⁸⁵ and between fluctuations in climate and the onset and severity of depression.⁸⁶ Children are also disproportionately vulnerable to the physical and psychological harms of the climate crisis because, as they grow older, they will experience increasingly numerous, frequent, and severe injuries in comparison with present generations of adults.⁸⁷

The U.S. Environmental Protection Agency and mental health experts have

⁸⁴ See R.A. Bryant et al., *Separation from Parents During Childhood Trauma Predicts Adult Attachment Security and Post-Traumatic Stress Disorder*, 47 *Psych. Med.* 2028 (2017).

⁸⁵ Stephen Vida et al., *Relationship Between Ambient Temperature and Humidity and Visits to Mental Health Emergency Departments in Québec*, 63 *Psychiatric Servs.* 1150, 1152 (2012).

⁸⁶ Haris Majeed & Jonathan Lee, *The Impact of Climate Change on Youth Depression and Mental Health*, 1 *Lancet Planetary Health* e94, e95 (2017).

⁸⁷ Thiery et al., *supra* note 10, at 158; IPCC, *Summary for Policymakers, in Climate Change 2023: Synthesis Report 7* (2023).

identified “climate anxiety” among children as a chronic stressor with adverse effects on children’s lives.⁸⁸ Children that understand the likelihood of experiencing climate change effects throughout their lives are more predisposed to experiencing climate anxiety and feelings of hopelessness and trauma.⁸⁹

Government betrayal, by contributing to the climate crisis through approval of projects like the Willow Project is also linked to children’s climate anxiety.⁹⁰

Children’s inability to participate in the political process leaves them politically powerless to change government policy regarding the systemic approval of damaging fossil fuel infrastructure like the Willow Project and the resulting harms to their health and safety. This causes significant feelings of disempowerment and hopelessness in youth.⁹¹

II. The Best Available Climate Science Demonstrates that Every Additional Ton of CO₂ Emissions Causes Escalating Climate Harms to Children

There is an overwhelming scientific consensus that human-caused climate change has been and is occurring throughout Alaska, our nation, and the entire

⁸⁸ U.S. EPA, *supra* note 10, at Appendix A, 2.

⁸⁹ *Id.*

⁹⁰ Expert Report of Lise Van Susteren at 15-18, *Juliana v. United States*, No. 6:15-cv-01517-AA (D. Or. June 28, 2018), ECF No. 271-1; *see also* Lisa Friedman, *Many Young Voters Bitter Over Biden’s Support of Willow Oil Drilling*, N.Y. Times (Apr. 24, 2023), <https://www.nytimes.com/2023/04/24/climate/willow-biden-climate-voters.html> (“young people felt betrayed by the Willow decision”).

⁹¹ Ann V. Sanson et al., *Responding to the Impacts of the Climate Crisis on Children and Youth*, 13 Child Dev. Persps. 201, 203 (2019).

world today.⁹² The present rate of warming is the direct result of anthropogenic GHG emissions, primarily CO₂, from the combustion of fossil fuels.⁹³ The release and accumulation of GHGs into the atmosphere is causing more solar energy to be retained in Earth's atmosphere than radiates out into space, disrupting Earth's energy balance.⁹⁴ The energy imbalance concept is the “*most critical*” metric for determining “the prospects for continued global warming and climate change.”⁹⁵ Earth's energy imbalance is driven by elevated atmospheric concentrations of greenhouse gases—mainly CO₂ measured in ppm—that are produced by human activities, particularly fossil fuel combustion. CO₂ released into the atmosphere can remain there for up to 1,000 years continuing to affect Earth's energy imbalance and causing additional warming long after it is emitted.⁹⁶ Emissions generated today will affect the climate for generations to come.

Atmospheric concentrations of CO₂ have been increasing, and continue to increase, as a direct result of development and combustion of fossil fuels, causing

⁹² See generally Mark Lynas et al., *Greater than 99% Consensus on Human Caused Climate Change in the Peer-Reviewed Scientific Literature*, 16 *Env't Rsch. Letters* 114005 (2021).

⁹³ IPCC, *supra* note 87, at 7.

⁹⁴ See generally *id.*; Karina von Schuckmann et al., *Heat Stored in the Earth System: Where Does the Energy Go?* 12 *Earth Sys. Science Data* 2013 (2020); Karina von Schuckmann et al., *Heat Stored in the Earth System 1960-2020: Where Does the Energy Go?* 15 *Earth Sys. Science Data* 1675 (2023).

⁹⁵ von Schuckmann et al., (2020), *supra* note 94, at 2014 (emphasis added).

⁹⁶ Mason Inman, *Carbon is Forever*, 1 *Nature Climate Change* 156, 157 (2008).

Earth's energy imbalance and resulting climate change.⁹⁷ Current atmospheric CO₂ concentrations are higher than levels have been in millions of years.⁹⁸ Atmospheric CO₂ concentration reached 419 ppm in 2022 and will be greater than 420 ppm in 2023, crossing the halfway point towards doubling atmospheric CO₂ from its pre-industrial concentration.⁹⁹ The status quo is already dangerous to youth, and additional emissions from new fossil fuel infrastructure will only worsen the concentration of CO₂ in the atmosphere, bringing further harm to children.

The scientific consensus is that to reduce Earth's energy imbalance and restore the stability of Earth's climate system at an equilibrium that will preserve the ability of natural systems to sustain human life and health, atmospheric CO₂ must be reduced to a maximum concentration of 350 ppm.¹⁰⁰ Importantly, the

⁹⁷ IPCC, *supra* note 87, at 4.

⁹⁸ IPCC, *Summary for Policymakers*, in *Climate Change 2021: The Physical Science Basis* 8 (2021).

⁹⁹ Dr. Pieter Tans & Dr. Ralph Keeling, *Trends in Atmospheric Carbon Dioxide: Data*, NOAA Global Monitoring Lab., <https://gml.noaa.gov/ccgg/trends/data.html>; see the NOAA data available at the following website: https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt; see also, NOAA, *Broken Record: Atmospheric Carbon Dioxide Levels Jump Again* (June 5, 2023), <https://www.noaa.gov/news-release/broken-record-atmospheric-carbon-dioxide-levels-jump-again>.

¹⁰⁰ James Hansen et al., *Assessing "Dangerous Climate Change": Required*

concept of Earth’s energy imbalance, and the corresponding standard of 350 ppm, reflects the gravity and urgency of the current climate crisis more accurately than do the temperature targets of the Paris Climate Accord of limiting warming to 1.5°C to 2.0°C, which are not based on best available science and are not safe for humanity or children. The Paris temperature targets were reached through negotiations and by political consensus rather than through scientific analysis.¹⁰¹ Current increased average temperatures of 1°C and greater (now at ~1.2°C) are already dangerous according to the IPCC.¹⁰² A temperature target of 1.5°C is catastrophic for our children and posterity,¹⁰³ and should not be used to guide

Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature, 8 PLOS ONE e81648, 5 (2013) [hereinafter *Assessing “Dangerous Climate Change”*]; James Hansen et al., *Young People’s Burden: Requirement of Negative CO₂ Emissions*, 8 Earth Sys. Dynamics 577, 578 (2017) [hereinafter *Young People’s Burden*]; von Schuckmann et al. (2020), *supra* note 94, at 2029; Johan Rockström et al., *Safe and Just Earth System Boundaries*, 619 Nature 102, 104 (2023).

¹⁰¹ Andrea Rodgers et al., *The Injustice of 1.5°C–2°C: The Need for a Scientifically Based Standard of Fundamental Rights Protection in Constitutional Climate Change Cases*, 40 Va. Env’t L. J. 102 (2022).

¹⁰² IPCC, *Summary for Policymakers*, in *Climate Change 2022: Impacts, Adaptation and Vulnerability* 11, 17 (2022).

¹⁰³ See *Assessing “Dangerous Climate Change”*, *supra* note 100, at 2, James Hansen et al., *Ice Melt, Sea Level Rise and Superstorms: Evidence from Paleoclimate Data, Climate Modeling, and Modern Observations that 2°C Global Warming Could be Dangerous*, 16 Atmos. Chem. & Phys. 3761, 3800 (2016) [hereinafter *Ice Melt, Sea Level Rise and Superstorms*]; U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* 82-83 (2018); see generally David I. Armstrong McKay et al., *Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points*, 377 Science eabn7950 (2022).

decisions that must be based on best available science. The IPCC has stated that allowing a temperature rise of 1.5°C “is not considered ‘safe’ for most nations, communities, ecosystems and sectors and poses significant risks to natural and human systems as compared to the current warming of 1°C (*high confidence*).”¹⁰⁴

In order to restore Earth’s energy imbalance as necessary to avert catastrophic climate change, preserve conditions that are safe for human life, and avoid triggering tipping points after which runaway climate change becomes irreversible, atmospheric CO₂ concentrations must be reduced to no more than 350 ppm as rapidly as possible. To achieve this limit, at minimum, fossil fuel emissions must be eliminated as quickly as possible and existing excess atmospheric CO₂ must draw down to prevent the worsening of the unprecedented climate disasters the world has experienced in the last few decades.¹⁰⁵ Scientific evidence emphatically establishes that the necessary way to achieve the 350 ppm limit, thereby “restor[ing] planetary energy balance[,]” is by rapidly phasing out fossil fuel pollution and drawing down atmospheric CO₂.¹⁰⁶ It is economically and technically feasible to achieve these objectives without compromising energy

¹⁰⁴ IPCC, *Ch. 5: Sustainable Development, Poverty Eradication and Reducing Inequalities*, in *Special Report: Global Warming of 1.5°C*, at 447 (2018), <https://www.ipcc.ch/sr15/chapter/chapter-5/>.

¹⁰⁵ See, e.g., *Young People’s Burden*, *supra* note 100, at 595.

¹⁰⁶ See e.g., *Ice Melt, Sea Level Rise and Superstorms*, *supra* note 103, at 3801.

reliability,¹⁰⁷ and no new fossil fuel infrastructure is needed to meet energy demands.¹⁰⁸

With atmospheric levels of GHGs already well past safe levels, every ton of CO₂ emissions worsens Earth’s energy imbalance, the ensuing climate crisis, and the resulting harms to youth.¹⁰⁹ The most recent IPCC report underscores the urgency of the situation: “[c]limate change is a threat to human well-being and planetary health (*very high confidence*). There is a rapidly closing window of opportunity to secure a livable and sustainable future for all (*very high confidence*). . . . The choices and actions implemented in this decade will have impacts now and for thousands of years (*high confidence*).”¹¹⁰ These impacts will fall most severely on today’s youth, who will have to live with the consequences of the government’s

¹⁰⁷ See, e.g., Mark Z. Jacobson et al., *100% Clean and Renewable Wind, Water, and Sunlight (WWS) All-Sector Energy Roadmaps for the 50 United States*, 8 *Energy Env’t Sci.* 2093, 2104 (2015); Mark Z. Jacobson et al., *Zero Air Pollution and Zero Carbon from all Energy at Low Cost and Without Blackouts in Variable Weather Throughout the U.S. with 100% Wind-Water-Solar and Storage*, 184 *Renewable Energy* 430, 440 (2022).

¹⁰⁸ Jacobson et al., *Zero Air Pollution and Zero Carbon*, *supra* note 107, at 440; Price-Waterhouse-Coopers LLP et al., *100% Renewable Electricity: A Roadmap to 2050 for Europe and North Africa* (2010), <https://www.pwc.co.uk/assets/pdf/100-percent-renewable-electricity.pdf>; Mark Jacobson, *Low-cost Solutions to Global Warming, Air Pollution, and Energy Insecurity for 145 Countries*, 15 *Energy & Env’t Sci.* 3343 (2022).

¹⁰⁹ Hoesung Lee et al., *Synthesis Report of the IPCC Sixth Assessment Report (AR6): Longer Report*, Intergovernmental Panel on Climate Change 24, 48 (2023); IPCC, *supra* note 87, at 7.

¹¹⁰ IPCC, *supra* note 87, at 24.

continuing contributions to the climate crisis through approval of projects like the Willow Project.

Despite the dire urgency of the climate crisis, U.S. GHG emissions and fossil fuel production are moving in the wrong direction. U.S. economy-wide GHG emissions increased an estimated 6.2% in 2021,¹¹¹ while U.S. fossil fuel production is expected to reach a new record high in 2023.¹¹² The Willow Project represents another significant step towards irreversible climate disaster. BLM's own analysis estimates that the Project could yield more than 600 million barrels of oil over the next 30 years.¹¹³ The fossil fuels extracted pursuant to the federal government's approval of the Willow Project would lead to an estimated 260 million metric tons of CO₂ emitted, or around 9 million metric tons of CO₂ per year. That is equivalent to the emissions of adding two million gasoline-powered cars to the roads for 30 years.¹¹⁴ It is impossible to square the approval of this project with the federal

¹¹¹ Alfredo Rivera et al., *Preliminary US Greenhouse Gas Emissions Estimates for 2021*, Rhodium Group (Jan. 10, 2022), <https://rhg.com/research/preliminary-us-emissions-2021/>.

¹¹² U.S. Energy Info. Admin., *EIA Expects U.S. Fossil Fuel Production to Reach New Highs in 2023* (Jan. 21, 2022), <https://www.eia.gov/todayinenergy/detail.php?id=50978>.

¹¹³ BLM, *Willow Master Development Project: Supplemental Environmental Impact Statement: Record of Decision* 12 (Mar. 2023).

¹¹⁴ See Ella Nilsen, *The Willow Project has been Approved. Here's What to Know About the Controversial Oil-Drilling Venture*, CNN (Mar. 14, 2023), <https://www.cnn.com/2023/03/14/politics/willow-project-oil-alaska-explained-climate/index.html>.

government’s statements that climate change represents “*the* existential threat to humanity.”¹¹⁵ The Biden administration has announced its desire to “empower youth across the world to be leaders on resilience and clean energy,”¹¹⁶ yet the government’s approval of the Willow Project serves only to disempower and harm the health and safety of children.

Approving additional fossil fuel infrastructure, like the Willow Project, locks in continuing GHG emissions for decades, which will result in further harm to youth.¹¹⁷ Large investments in long-lasting fossil fuel infrastructure create barriers to the utilization of new and cleaner renewable energy technologies even when they are more cost-effective, because of the resistance to “strand” fossil fuel assets.¹¹⁸ The Willow Project is estimated to have a 30-year lifetime,¹¹⁹ locking in continuing emissions well beyond the time when the United States must eliminate its fossil fuel emissions in order to avoid run-away climate change. With

¹¹⁵ The White House, *Remarks by President Biden on Climate* (June 19, 2023), <https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/06/19/remarks-by-president-biden-on-climate-resilience-palo-alto-ca/> (emphasis in original).

¹¹⁶ The White House, *FACT SHEET: President Biden Announces New Initiatives at COP27 to Strengthen U.S. Leadership in Tackling Climate Change* (Nov. 11, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/11/fact-sheet-president-biden-announces-new-initiatives-at-cop27-to-strengthen-u-s-leadership-in-tackling-climate-change/>.

¹¹⁷ Karen C. Seto et al., *Carbon Lock-In: Types, Causes, and Policy Implications*, 41 *Annu. Rev. Env’t & Res.* 425, 427 (2016).

¹¹⁸ *Id.* at 428.

¹¹⁹ *See* BLM, *supra* note 113, at 58.

atmospheric levels of GHGs already past safe levels, and the resulting impacts of climate change already substantially harming the health and safety of children in Alaska and throughout our nation, adding any new fossil fuel infrastructure further condemns children to a future of escalating climate disaster.

Further, new fossil fuel projects and infrastructure, like the Willow Project, are entirely unnecessary. Economically and technologically feasible clean, renewable energy is readily available to fulfill all energy needs without compromising energy reliability and without causing destruction to the climate system and the health and safety of children.¹²⁰

CONCLUSION

Any new fossil fuel infrastructure propels the youth of Alaska, our nation, and world into further climate chaos. More than any generation of adults alive today, children will disproportionately bear the consequences of the federal governments' continuing systemic contributions to the climate crisis through the approval of projects like the Willow Project. Children throughout Alaska, our nation, and the world, are already suffering grievous injuries from the climate crisis. Best available science requires urgent emissions reductions to restore the

¹²⁰ Jacobson et al., *Zero Air Pollution and Zero Carbon*, *supra* note 107, at 440; Jacobson, *Low-cost Solutions for 145 Countries*, *supra* note 108, at 3347; *see also* Mark Jacobson, *More Hopeful Calculations for the Energy Transition*, *Issues Sci. & Tech.* (Feb. 18, 2022), <https://issues.org/renewables-minerals-energy-transition-jacobson-forum/>.

earth's energy balance. Allowing projects like the Willow Project to move forward continues our nation on a path in the opposite direction, harming children, and our ability to bequeath a habitable world to our posterity.

Dated: January 5, 2024

/s/ Andrew L. Welle
ANDREW L. WELLE
Our Children's Trust
1216 Lincoln St
Eugene, OR 97401
Tel: (574) 315-5565
E: andrew@ourchildrenstrust.org

*Counsel for Amicus Curiae
Our Children's Trust*

**UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT**

Form 8. Certificate of Compliance for Briefs

Instructions for this form: <http://www.ca9.uscourts.gov/forms/form08instructions.pdf>

9th Cir. Case Number(s)

I am the attorney or self-represented party.

This brief contains **words, including** **words**

manually counted in any visual images, and excluding the items exempted by FRAP 32(f). The brief's type size and typeface comply with FRAP 32(a)(5) and (6).

I certify that this brief (*select only one*):

- complies with the word limit of Cir. R. 32-1.
- is a **cross-appeal** brief and complies with the word limit of Cir. R. 28.1-1.
- is an **amicus** brief and complies with the word limit of FRAP 29(a)(5), Cir. R. 29-2(c)(2), or Cir. R. 29-2(c)(3).
- is for a **death penalty** case and complies with the word limit of Cir. R. 32-4.
- complies with the longer length limit permitted by Cir. R. 32-2(b) because (*select only one*):
- it is a joint brief submitted by separately represented parties.
- a party or parties are filing a single brief in response to multiple briefs.
- a party or parties are filing a single brief in response to a longer joint brief.
- complies with the length limit designated by court order dated
- is accompanied by a motion to file a longer brief pursuant to Cir. R. 32-2(a).

Signature **Date**

(use "s/[typed name]" to sign electronically-filed documents)

Feedback or questions about this form? Email us at forms@ca9.uscourts.gov