Chapter 1
A Life in Relation to the Broader Stroke of Education

Princess Lucaj, Michael P. Mueller, and Deborah J. Tippins

Beginning a worldwide conversation with this first book in the new series on Environmental Discourses in Science Education is paramount for the encroaching cultural, community and environmental turbulence. This turbulence has been described by the growing needs of populations of people worldwide who depend on fewer agricultural and natural resources and the mounting environmental challenges of climate change. Facing science education in and for turbulent times, Ken Tobin (2014) writes: "The wellbeing of citizens is at stake because of events like these occurring globally, almost every day. Science affords us hearing about and learning from such events, and inevitably knowledge of science and technology are needed to understand what is happening and for others to solve the problems" (p. 293). He goes on to say that science is a "power discourse" that emphasizes disciplinary science within school settings. According to Tobin, "It is important that science educators expand the goals of science education to include science in everyday life and afford opportunities for continuous science learning including the years after compulsory schooling" (p. 298). Indeed many people never go to school and yet possess the traditional knowledge of local places that comes from living in a community that has breathed education for thousands of years. Most people, even formally educated individuals, do not recognize when they are using the science generally learned in the schools and colleges. It is not a knee-jerk reaction to think "huh, I just used science in my life". But for many

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Aboriginal, indigenous, and other peoples worldwide who use traditional knowledge and skills, cultural language and ceremonies, and rely on the place-centered narratives, what might be described as science is a way of life and cannot be separated from the natural world.

Cognizant of the ways the traditional teaching of science separates the cultural world from the natural, Clayton Pierce (2013) writes, "one of modern science's distinguishing features is its epistemological allegiance to matters of the natural world and claims of purity from the sociocultural," and he continues, "the work of modern science, in other words, has been understood since modernity as taking place in objective and knowable universe out there as opposed to the messy human world that is cluttered with things like values, morality, and, above all else, politics" (p. 113). In the larger world of education outside of schools, where people espouse knowledge and skills in relation to robust Earth, modern science and science teaching is less likely to matter after school. This is not to say that people do not use what they learn in school in their everyday lives, it is only to say that the science curriculum in the schools does not nearly encompass the ways that science is lived in communities where people were the original experts in knowledge of their ecosystems. In contrast, if the power discourse of "scientific literacy" is exclusive to the ways that people use modern science in their communities, in the schools, and in sophisticated laboratories – to name a few, then as Pierce (2013) argues, "scientific literacy needs to be radically rethought in an age where the genes of an Ocean Pout (an eel fish) are spliced with those of a Chinook (king) salmon, implanted in Atlantic salmon eggs, and a corporation patents this process *and* the new species of the fish itself, all while leaving the public's only recourse to understanding such a network of exchanges and relations to the mercy of research done by the leading corporate stakeholder in the aquafarming industry" (pp. 113–114). This understanding is particularly relevant in an age where science is needed beyond compulsory schooling and when youth are at their lowest levels of civic engagement and community activism since the Civil Rights era. Youth face many tensions that their parents and teachers did not face, and dissolving the situated tensions between humans and natural habitats is the meaningful purpose of advancing a conversation around ecojustice, citizen science and youth activism.

This chapter features the Alaska Native actress, activist and educator Princess Lucaj's (first author this chapter) mythopoetic narrative of the situated tensions associated with human and nonhuman systems in her Neets'aii Gwich'in community. The way of life she describes and challenges facing her community have far reaching influences globally. Her message is that beyond the challenges associated with situated tensions, *we must make an effort* for the welfare of people and the Earth. Her story provides a metaphor and methodology for exploring science and life in relation to the broader stroke of education painted worldwide. Finally, we will weave Princess' ecojustice work with others in the book. The following section is written by Princess Lucaj.

Gwik'ee Gwiriheendaii Gwizhrii Go'aii

We Must Make an Effort

A luminous full moon appears to follow us as we cruise along La Brea Boulevard in Los Angeles. We are passing the Inglewood oil fields like we have so many times before. Pumpjacks scatter the land and I am hypnotized by their slow up and down rhythm. In my 5-year-old mind, I have determined that the oil wells are large mechanical grasshoppers – they are from a different time. They look like dinosaurs and while I see they are stationary there is something dreadful about them all at once.

It dawns on me I don't know what they are doing, these big metal grasshoppers, so I ask my mother who sits in front of me in the passenger seat. She pauses and looks at the fields with me and then responds with this story:

> Long ago Mother Earth buried these toxins deep inside of her so that they wouldn't harm the beings and all the plants that live on the surface, on the land, like we do.
>
> Those oil wells are pulling it back up.

This short explanation would forever color the way I looked at humanity's relationship to Mother Earth and instilled in me a firm understanding that plants, animals, and people needed to be protected from pollution. I had no idea at that time, in a place far away from my real home, the home of my ancestors in Alaska, how large a role the oil industry and our addiction to fossil fuels would play in my life.

Not long after this, my mother would make the decision to move us kids up to Alaska so we could be raised with our Neets'aii Gwich'in culture. That is a decision that I will be eternally grateful for as it allowed my siblings and I to have a far greater connection to the land, animals, and our people than we would have ever experienced in California.

In Alaska, my life was a belly full of translucent orange King Salmon eggs fresh from the Yukon River. It was picking sweet blueberries in the fall and doing beadwork in the winter, and helping my grandmother tan *vadzaih* (caribou) hide. It was also hiding in my room to stay away from all the drinking, being made fun of in school, and trying to adjust to transitions back and forth between rural and urban Alaska.

As my generation continues to deal with the negative ramifications of the Assimilationist policies of the United States, decolonization and healing is an ongoing process. In Alaska, it is an ever-increasing threat to the subsistence lifestyle and self-determination of our communities. We are forced to ask ourselves what is the true value of money and what of our natural resources will we extract and exploit for short-term gain?

Today I serve my community as the Executive Director of the Gwich'in Steering Committee. We are a non-profit advocacy organization formed at the direction of our Chiefs and Elders in 1988 to protect the birthing and calving grounds of the Porcupine Caribou Herd, which sustains the Gwich'in way of life. The birthing

grounds are located on the Coastal Plain of the Arctic National Wildlife Refuge – the last remaining 5 % of the entire North Slope of Alaska not open to oil and gas development. For over 30 years this area has been under the threat of development. The Gwich'in Nation of Northeastern Alaska and Northwestern Canada has been working to this day for the permanent protection of these lands through a Wilderness designation of the Coastal Plain. While many have seen this movement as solely an environmental issue, at its core, this concern is inseparable from issues of human rights.

Around the world, people ask: Do any group of people have a right to their own means of subsistence? That is namely, basic, local sources of food, and food security. According to the UN International Covenant on Civil and Political Rights these rights are protected. Despite that, we continue to witness the immoral and illegal destruction of land, animals, marine life, air, water and the genocide of Aboriginal and indigenous groups as extreme extractive resource development occurs worldwide.

I grew up situated with these tensions. I observed my mother and other community members speak up for our way of life here in Alaska, in Washington DC, and all around the world. As a mother, my greatest desire is for my children to be able to appreciate and experience the land of our Ancestors – to hike up *Kiiviteiinlii* and camp at *Dachanlee* as they hunt for caribou. I hope they grow up healthy being able to understand that we are all a part of the land and entirely dependent upon it for our survival. Still, it saddens me to know that they will never see the King Salmon run up the Yukon River like salmon once did – never as big, never as abundant. It saddens me that I must travel a great distance away from my family to our nation's capitol to advocate for these seemingly simple human rights. And yet, it is my duty and honor to speak up for the caribou, the land, and all the living beings that do not have a voice.

All of this occurs during a time of severe changes in weather; changes that our Elders warned us about many, many years ago. Here in Alaska, entire coastal communities and villages are eroding away. We are experiencing flooding, changes in vegetation and wildlife migrations. The villages of Newtok, Kipnuk, Kivalina, and Shishmaref are just a few communities that must deal with the painful and incredibly costly reality of relocation. A college freshman from Kipnuk, *Nelson Kanuk*, has even brought suit against the State of Alaska to take more effective action to mitigate the effects of climate change and the court's ruling is pending. Our young people, frustrated by inaction and a largely unjust system are taking bolder measures to question and demand accountability of leaders.

In Alaska much of the economic budget comes from oil revenue. The oil is also the source of a conundrum we find ourselves in, particularly within the Arctic. We ask: As our land and ice erodes, do we continue to contribute to the very root of the problem by supplying the fossil fuels that are so destructive to our planet and atmosphere? Do we squander every square inch of our State till the wells are dry, our waters contaminated, and our wildlife endangered? We have so much to consider.

Across all sectors of education, government, industry, and agriculture, we must work and influence the transformation of these systems. There are solutions. But we must take the time necessary to think about our choices and go out on the land and listen. At our dinner tables, let us speak of where our food comes from that we eat,

the water that we drink, and let us make lively debate and dialogue. Let us wake and find purpose in our words and let us see the challenges before us as an ultimate call to action. We must make an effort.

The crevice between social and ecojustice widens as our thirst for fossil fuels hammers further and deeper the wedge, which may end in our ultimate demise. Ecojustice, for me is the convergence point. It is the eddy in the river where we must face ourselves and each other, unveiled and willing to sacrifice our unsustainable culture of greed for a more conscientious and compassionate economy. We must have hope that this is possible and teach our children that the common good of all humanity is in a thriving, healthy, and vibrant Mother Earth.

Towards the Renewal of the Ecological in Science Education

Princess' story is a metaphor and methodology for engaging people of the Earth in a hearty dialogue encompassed by thought and action for health and ecological wellbeing. We must make an effort, says Princess. Ecojustice is a global phenomenon because there are stories of people wrestling with dilemmas that are similar to the Gwich'in Nation around Alaska and beyond, as Princess highlights. We have an ethical obligation to pay closer attention to these problems because they are intractably human and nonhuman rights issues. Only in an economy based on greed and human authority can we find human rights separated from the Earth. Therefore, Princess calls for a more conscientious and compassionate economy, or 'Earth democracy' as Vandana Shiva has articulated (2005). But what does a conscientious and compassionate economy look like and how will science education play a role in this redefinition of our world? These conversations are beginning to be advanced in science education, despite that the dialogue around ecojustice has ensued for a while now. As we can see from Princess' account, the situated tensions of people such as those who live in communities mitigating the effects of climate change are deeply rooted and characterized by animals and geography. These communities have basic needs and economic interests just like anywhere else. But they are not decontextualized, abstract or void of cultural narrative. Consequently, people of these places often do not see the relevance of traditional science (especially when it does not connect with the lived curriculum of places).

Ecojustice philosophy, citizen science and youth activism are three of the most interesting trends in light of these questions and situated tensions for science education today. Where ecojustice is used to evaluate the holistic connections between cultural and natural systems, environmentalism, sustainability and Earth-friendly marketing trends, citizen science and youth activism are two of the pedagogical ways that ecojustice can be enacted. Understanding the changing environment in the ways that people of the Gwich'in Nation do requires long dwelling narratives and traditional ecological knowledge acquired by monitoring what is happening and why is this happening. Environmental monitoring is one of the fastest growing trends in science education and many chapters in this book describe the nature of

citizen science and problems associated with engaging youth with their teachers in ecological concern.

Princess also mentioned the youth activism beginning to quell from the effects of climate change in ocean-side villages in Alaska. Similar place-based narratives and forms of youth activism are emerging from stories of science education worldwide. Youth activism embodies ways that youth are more fully involved in decisions about things that will affect their communities. Combined with socioecological monitoring, youth have a powerful platform to advocate. When teachers, community members and students come together to evaluate science-related issues involving decisions that must be reached concerning justice and fairness, ecojustice philosophy can provide a lens.

Ecojustice has been used to expand science education for social justice agendas, science education for youth activism, and science education for the freedoms associated with protecting and conserving the prospects of future generations and their children without compromising the subsistence and economic viability of today's evolving communities. The chapters in this book are organized around themes of ecojustice, citizen science and youth activism to provide a deeper definition of what these terms embody for science education and education beyond science. Citizen science and youth activism provide excellent ways where ecojustice becomes a policy and practical part of the science curriculum both in schools and in the larger educational domain of Earth's ecologies. These ecologies are found on the micro and macro levels and not limited to neighborhoods, city parks, farms and so forth. This book comprises evidence-based practice with international service, community-embedded and embodied curriculum, teacher preparation, citizen monitoring and community activism, student-scientist partnerships, socioscientific issues, and new avenues and methodologies for research. We anticipate that this book will be used by teacher educators and teachers to garner new conversations and envision new pathways. Equally, we hope the chapters in this book promote new international collaborations around ecojustice, citizen science and youth activism. Researchers might use this book to envision new teaching, research and service agendas, if not to also imagine how their work cannot be separated from the Earth. These are the ways that a life exists in relation to the broader education. Together we must make an effort.

References

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Princess Lucaj has worked on protecting the Coastal Plain of the Arctic National Wildlife Refuge since she was a teenager. She is the former Executive Director of the Gwich'in Steering Committee, is a graduate of the Elliot School of International Relations at the George Washington University and is currently pursing a masters in education with a focus on ecojustice at the University of Alaska Anchorage. She was raised by strong Gwich'in women and mentored from a young age to speak out on protecting the Gwich'in way of life. Lucaj is also a mother, published poet, writer, and a stage and film actor. Her most recent stage role was that of *Cordelia* in a Gwich'in language version of Shakespeare's *King Lear*. She is the recipient of the Sally A. Kabisch Spirit of the Wilderness Award and works with many groups in Alaska and across the nation who are working on education surrounding climate change, environmental justice, and engaging communities in the grassroots.

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