Talking with Children about the Future of Our Planet: A Buddhist Approach

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Abstract

Today we are facing an unprecedented challenge as human beings: the rapid deterioration of the biosphere and geosphere of our planet as a result of human activities, as well as increasing disparities in wealth and wide-spread social unrest. This thesis looks at our problems from the perspective of parents, children, and teachers. Because many adults feel a mixture of despair and hope, they are uncertain how to communicate about the crisis with the children in their lives in a positive way. At the same time children are increasingly isolated from nature. A short pamphlet, created as part of the thesis and based on Buddhist teachings and information from environmental educators and other sources, offers guidance and resources for parents, grandparents, and teachers.

Introduction

We are at an unparalleled turning point in human history. The future of our species and of all other forms of life on this planet is at stake. Without drastic and immediate changes in how we live, eat, travel, heat and cool our homes, reproduce, and treat each other, we are condemning ourselves and all living beings to massively increased suffering and possible extinction. On a planet with finite natural riches we are attached to and embedded in an economic system that requires continuous growth in consumption of those riches. Our exploitation of the earth, particularly our dependence on fossil fuels, has created an extremely dangerous situation, and time is running out (McKibben, 2019).

How are we responding to this moral crisis? Does Buddhism have any answers? How can we explain this situation to our children? Right now it is easy for many of us in the wealthier parts of the world to ignore or be unaware of the urgency of the problems that face us. Many Americans have not been directly affected by wildfires, floods, rising sea levels, or strong hurricanes, and those who have lost their homes may not want to recognize the connection to global warming. The fossil fuel industry is waging a very effective misinformation campaign, and many of our leaders in government and science have failed to respond quickly enough, or at all, to the threats facing us (Nijhuis, 2019).

Some of us care deeply about the earth, but how many of even those who care deeply are willing to voluntarily give up eating meat and other animal products, to stop driving gasoline-powered vehicles, to move into small, energy-efficient homes, and to travel not by airplane, but by other forms of public transportation? At this point those kinds of individual sacrifices would not be enough to prevent catastrophe. Unless all of us are forced by circumstances, external controls, or strong incentives to radically change our lifestyles, to give

up consumerism and return to a much simpler way of life, the future looks very grim (Dunne & Goleman, 2018). Astrophysicist Adam Frank puts it this way:

> [H]umanity and its project of civilization represent a kind of "cosmic teenager." We are likely just one world among many that has grown a civilization to the point where it has gained power over itself and its planet. But like a teenager, we lack the maturity to take full responsibility for our selves and our future (2019, p. 224).

Bill McKibben thinks there is an "outside chance" that we can turn the tide of libertarian hyper-individualism around and slow global warming so that average temperatures will reach a new equilibrium. His hope is based on the rapid development of solar panels, wind turbines, and lithium-ion batteries, and the power of non-violent direct action. "Let's be, for a while, true optimists, and operate on the assumption that human beings are not grossly defective. Let's assume we're capable of acting together to do remarkable things." (2019, p. 202).

It is easy to fall into despair about our continuing destruction of the ecosystems of which we are a part and on which we depend for life. Each coming generation will bear a heavier burden of suffering. Buddhism offers wisdom for living that has stood the test of time. About 2600 years ago in India Shakyamuni Buddha explored the problem of suffering and came up with Four Noble Truths. These and other Buddhist teachings can help us deal with our present situation and explain it to children, the ones who will increasingly suffer the consequences of past human mistakes. This paper attempts to apply Buddhist wisdom to our present crisis, explores the question of how best to talk with the children in our lives, and presents a tool for

encouraging parents, children, and teachers to learn more, talk more, and act on these issues. It is also intended to be helpful for chaplains in comforting those suffering from *solastalgia,* grief at the destruction of the environment.

Because this field of inquiry is very large and rapidly changing, with new scientific research findings constantly becoming available, new solutions being proposed and implemented, and more activism on the part of young people reported almost daily, this paper cannot be totally up to date or inclusive. Please forgive any omissions or errors, which are solely the responsibility of the author.

Methods

Data was collected from parents, grandparents, classroom teachers, and young people of various ages through face-to-face interviews and questionnaires that were distributed in person and returned by mail when completed. The purpose of this initial research was to determine whether family members and teachers are talking with the children in their lives about the ecological crisis and how, and to assess the possible usefulness of an educational tool on the topic. Friends, coworkers, fellow chaplaincy students, and teachers attending a conference at St. John's College all participated in interviews or filled out questionnaires. My samples are not intended to be comprehensive or representative of each group as a whole.

During the same time period I interviewed ten environmental educators. These included staff at local nature centers, directors of non-profit organizations in New Mexico, and two out-of state educators and activists. The purpose of those interviews was to gather ideas that would be helpful to parents and classroom teachers. Other information was obtained from children at Acequia Madre Elementary School in Santa Fe who are part of the Global Warming Express

after-school club there. They allowed me to observe their program and answered questions. Participating in Climate Strike on September 20, 2019, allowed me to talk with other young people and adults, and print and radio reports that included interviews with children supplemented my own research. [Please see Appendix D for questionnaires and interview forms.]

Based on my research and literature review, I created a short pamphlet for parents, kids, and teachers. The same environmental educators who were interviewed critiqued the first version, and so did a few parents. One educator pointed out that by targeting both children and adults in the same pamphlet I was providing information that was not relevant to some of the readers. As a result I narrowed my target audience to adults, primarily parents, and attempted to address children indirectly via the adult readers. Other suggestions were incorporated, and revised versions were sent out for further feedback from those who reviewed the first draft. [Please see Appendix A for pamphlet.]

After the addition of illustrations, the pamphlet was printed and tested with parents, grandparents, and teachers who had not been involved in the previous stages of the project. The evaluating readers were recruited at the public library, city recreation center, local preschools, community organizations, and other settings. Most of them were previously unknown to me, and they were from various educational and cultural backgrounds.

The readers were asked to take a short pre-test, read the pamphlet, and then take a post-test. Pre- and post-tests were comprised of the same ten statements for readers to agree or disagree with on a five-point scale. Five points meant “strongly agree” and one point meant “strongly disagree.” Comparing each person’s scores on the pre- and post-tests gives some indication as to whether their opinions changed or they had learned new information from

reading the pamphlet. The post-test included additional questions about whether the pamphlet was easy to understand and helpful. [Please see Appendix E for pre-test and post-test.]

The pamphlet is available online and I am offering it at fairs and other community events. I would like to distribute it as widely as possible. Taking pre- and post-tests probably encourages or even ensures greater comprehension and retention of the information, so I am continuing to recruit evaluating readers.

Results of Interviews and Surveys

Most of the parents and grandparents interviewed welcomed the idea of receiving more information about the crisis and possible ways they and their children could be part of the solution. It became obvious from talking with children that many of them could also benefit from accurate information about the most effective ways to help the earth. Children are influenced by the attitudes and emotional states, as well as the actions, of the adults in their lives, and the feelings about the crisis expressed by many parents and teachers are fairly negative.

Probably because so many of the classroom teachers who responded to my questionnaire teach in International Baccalaureate schools, the teachers included in my survey seemed more sure of themselves and more confident in their ability to convey information about the ecological crisis than the parents. However, according to what the public school students reported, many of their teachers are not discussing the issue in their classes.

Environmental Educators

Ten environmental educators agreed to be interviewed and shared their experience and knowledge. With the dates of the interviews and their positions at the time they are:

- Layne Kalbfleisch, Ph.D., Education Development Director, Ghost Ranch Presbyterian conference center near Abiquiu, New Mexico; July 25, 2018.
- Christy Wall, Ph.D., Education Director, New Mexico Wildlife Center, Española, New Mexico; August 2, 2018.
- Wendy Johnson, Buddhist meditation teacher and consultant to the Edible Schoolyard Project in Berkeley, California; August 16, 2018.
- Siobhan Niklasson, Education Programs Director, Los Alamos Nature Center, Los Alamos, New Mexico; August 20, 2018.
- Katherine Bruell, Executive Director, Pajarito Environmental Education Center, Los Alamos, New Mexico; August 20, 2018.
- Katie Weeks, Director of Community Education, Audubon New Mexico, Santa Fe, New Mexico; September 4, 2018.
- Rich Schrader, founder and director, River Source, Santa Fe, New Mexico; September 30, 2018.
- Jonathan Hayes, Executive Director, Audubon New Mexico, Santa Fe, New Mexico; January 31, 2019.
- Genie Stevens, Climate Education Director, Rio Grande Chapter of the Sierra Club, and Executive Director, Global Warming Express; March 3, 2019.
- Patte Ranney, naturalist and guide trainer, Outside Brands, an outdoor adventure company, Hilton Head, South Carolina; July 24, 2019.

Most of the environmental educators interviewed see spending time outdoors as very important in helping children to develop a love and concern for the natural world. Several mentioned that becoming familiar with the areas surrounding our homes leads to knowledge of

and caring for those places and for the earth as a whole. Excessive time spent using electronic devices and parental fears that keep children inside houses and vehicles can keep children from connecting with nature.

Quality outdoor education programs and clubs that foster political activism, if available, are wonderful resources. However, simply letting children explore and play outside without active adult supervision is valuable. Such free play promotes problem solving and creativity. Katie Weeks pointed out that time outside is also essential for developing the next generation of conservation leaders. "Studies show that people who grow up with an intimate connection to the outdoors are more likely to care about environmentalism and practice sustainable actions in their personal life."

Wendy Johnson's focus is on food. She believes that growing, cooking, and eating vegetables and fruits are ways to encourage good health and take advantage of children's curiosity. Children love to play in the dirt, and gardening offers a way to promote environmental awareness. Wendy believes that children are naturally alive to plants, and a teacher or parent's enthusiasm can build on the child's curiosity and interest.

Patte Ranney offered two other suggestions: lead by example, and convey factual information in a way that engages the children's emotions. She and Rich Schrader both have kids build three-dimensional models of watersheds using materials readily at hand to demonstrate the water cycle and show how the oceans can become polluted by what we spill on our driveways or dump into our sewers.

Teaching by asking questions (the Socratic Method) stimulates critical thinking. Examples: "What do you see?" "What do you think is happening?" "Where do you think that squirrel is going with the acorn?" "What have you noticed in your home environment that

suggests that the climate may be getting warmer?" "We're seeing more roadrunners here now. Why do you think that is?"

Many of the educators do not use the terms "global warming" or "climate change" because they feel those terms are too politically controversial or frightening. Los Alamos is a community built around scientific laboratories, but it draws school groups from the surrounding area. Even a few years ago mentioning evolution to groups of children visiting the Los Alamos Nature Center prompted some children to reveal that their families accept only a literal interpretation of the Bible. Tactfully using dinosaurs as an example of species becoming extinct, the educators at the center are able to explain what is happening today. Patte Ranny works with all ages and reports that the South Carolina Department of Natural Resources recommends introducing the topic of global warming by asking questions, since participants' answers will reveal their opinions and the educator can then avoid alienating anyone. [For detailed notes on each of these interviews please see Appendix E.]

Parents and Grandparents

The eighteen parents and grandparents whom I interviewed came from a range of education and income levels and from several parts of the United States and Canada. The children in their lives ranged in age from eight months to nineteen years old. All the grandparents were actively involved with their grandchildren, often providing after-school care several days a week. Two interviewees were immigrants whose native language is not English.

Most feel it is important to introduce the topics of climate change and global warming at an early age and, if done in a sensitive and non-frightening manner, as early as kindergarten or pre-school. However more than half of the parents interviewed had not discussed or only indirectly mentioned the environmental crisis to the children in their lives. Although they are

concerned, they hesitate to address the issue because they have conflicted emotions about the situation, do not feel well enough informed, or do not know what they can do to deal with the children's reactions and to help address the crisis. Some feel anxious or guilty, do not want to alarm their children, or they have too many questions themselves about our situation and what they could do personally in response.

All of the families do outdoor activities with their children, including nature walks, gardening, hiking, hunting, mountain-biking, surfing, camping, and skiing. Some have immediate access to streams, forests, or other open space. Other families particularly enjoy watching birds at feeders or in nests near their houses or use binoculars to observe owls. For others, living in a big city seems to limit their options. One family's only outdoor activity involving their teenage sons is rugby, the dad coaching and the boys playing. A father of a four-year-old son, a Greek-speaking immigrant who lives in an apartment, is raising an olive tree on his balcony. The tree's name is Irini, meaning "Peace" in Greek, and his son helps water the tree. Although they live in a large city, the balcony looks out over a wooded area with a creek where the boy likes to climb trees.

Three interviewees had been forced to evacuate their homes more than once due to wildfires in their California neighborhoods. One is a politically conservative physician who does not feel it is his place to talk with his school-age grandchildren about global warming since "there is nothing we can do about it" and he is not their parent. He says he is more likely to discuss birth control with them than the climate crisis. One of the other Californians is a mother of three with a Master's Degree in education. She feels nervous about bringing up the subject with her young children and would like suggestions about how to present the topic to kids.

As to how they personally feel about the future of our planet, parents and grandparents said they were scared, pessimistic, terrified, discouraged, sad, guilty about having brought children into this world, worried, or had a sense of powerlessness. At the same time most were hopeful that "common sense will prevail" and that "people are waking up."

Their feelings about the ecological crisis lead parents to parent differently than they would otherwise. One couple has prioritized putting solar panels on their roof, which they might not have done if they did not have a daughter. Several are more mindful role models of environmental consciousness as consumers and in where they vacation. The father of a very young son stated that he plans to have only one biological child; if he and his wife want more children they will adopt.

Almost all the parents want their children's teachers to discuss global warming and mass extinction in the classroom. They consider it a very important issue: awareness is necessary for survival, and kids should hear about it from adults with various points of view. Several expressed concerns about *how* children learn about the ecological crisis, since their local schools use a heavy-handed, fear-based approach. Many feel that it should be taught in an age-appropriate, gentle manner, helping children appreciate all of nature and understand connection and oneness: "Hurting anything else is hurting yourself," is the lesson one parent wants her children to learn. The mother of a two-year-old daughter stated, "She's just absorbing everything, so we want to guide [what and how she learns about these issues.] That mom also wants to show her daughter that there are ups and down and model how to ride those waves.

M. A., the mother of three teenagers, is one parent who has discussed the climate crisis with her children. Her husband is an economist whose views on the topic differ from hers, and the family has heated discussion at the dinner table. Her children have been aware of the

situation since kindergarten, as it was talked about in their school in Canada. The public school her children attend presents the topic in social skills and science classes, but rarely from a perspective of engagement. This fear-based approach led to her now-fifteen-year-old daughter becoming very stressed – about three years ago she began coming into her mom's room at night in tears, upset about the future of the planet. In response they began to watch Joanna Macy videos at bedtime, read short pieces from her books, and also seek out inspiring people in their community. Macy's outlook emphasizes engagement with hope, and her speeches and writings have been reassuring and calming for this young woman.

M. A. is an indigenous Canadian, and the First Nations perspective of consideration for the seventh generation has changed her views: What if we lived each day with the realization that our actions will affect our great-great-grandchildren? She has led teenagers on retreats in wilderness areas. In her experience kids from richer families are better informed than those from lower socioeconomic brackets. Those in foster homes or living on the streets or in subsistence situations are generally not aware. "If you don't feel cared for how can you care for the environment?"

S.V., a retired college professor with a Ph.D., when asked how his feelings about our current environmental crisis affect his interactions with his teenage granddaughters, said, "It's horrible. We're a tragic species with intellectual abilities to solve problems, but we can't apply them to avoid looming disaster." In his view, everything we do creates demands on our energy system and negatively affects the planet. Even just breathing produces carbon dioxide, and digesting food produces methane, so "the most effective thing to do is jump off a cliff and not have your body found." Cremation burns a tremendous amount of fossil fuel, whereas green

burial or dying where no one will find us, an unrealistic solution for most of us, allows all the useful constituents of our bodies to return to the earth.

Despite his level of education S.V. thinks that climate science is too complicated for laypeople to understand. "We have to trust some source, but what source to trust?" he asked. He also wonders what is effective politically. "How can we all agree? Can we find common ground? The rugged individualism that we idealize here in the United States is so inappropriate. Would we be better off in a totalitarian society?"

When asked how their spiritual beliefs affect their feelings and ideas about the future of our planet, six mentioned that they were raised as Catholics or are still active in the Catholic Church. Only two interviewees, both Catholic, stated that their spirituality has no connection to environmental issues, and despite the fact that four recent popes have spoken out about capitalism and its ecological effects on the planet, one of those said that the priest at her Catholic church never mentions the future of the Earth.

Three interviewees, all fellow chaplaincy students, strongly identify themselves as Buddhists. The comments of the Buddhist parents included, "You can't be a socially engaged Buddhist and not think about [the future of our planet.]" "My interest in climate change is fundamentally guided by my spiritual beliefs -- especially interdependence." "[Buddhism] provides a grounding framework to face reality and gives me resiliency and strength to go forward without falling into apathy or despair when confronted with crisis. It is the foundation of my vision of the future and how to cope."

Young People

Finding children and adolescents to answer questions either in person or on paper was somewhat difficult given time constraints and the inappropriateness of approaching young

children directly without their parents' consent. Eleven young people between the ages of nine and nineteen participated. Two were students at Santa Fe Waldorf High School who were acting as mentors to the Global Warming Express after-school program at Acequia Madre Elementary School in Santa Fe, and two were nine-year-olds who were participants in that program. A university freshman from Japan, a fourteen-year-old freshman Santa Fe Indian School, two thirteen-year-olds, one at a private school in Santa Fe and one from a public school in France, an eleven-year-old from Colorado, and a ten-year-old public school student from Albuquerque were interviewed in person. A high school junior from Colorado sent in a questionnaire.

Five of the eleven respondents reported being scared when they first learned about global warming and six reported feeling sad. Most were also confused, upset, and angry, and some were shocked. What was really helpful in dealing with those feelings was joining a group that is taking action. The most satisfying activities for the students involved in the Global Warming Express (GWE) program were talking with the Mayor of Santa Fe about putting solar panels on all city buildings and speaking at various events, including those during the last session of the New Mexico State Legislature. They succeeded in getting their school cafeteria to eliminate plastic forks, and a previous GWE group convinced the school administrators to install photovoltaic panels at the school. One of the students was excited just to learn more about global warming, and all felt that children should be introduced to the topic somewhere between kindergarten and second grade.

The four U. S. public elementary school students reported that their teachers did not bring up ecology, species extinction, or global warming, and if students brought up the subjects the teachers did not talk very much about them. One student, not involved in the GWE program, was not familiar with the term " ecology" and told me, "If global warming is going to happen we

won't be affected for two hundred years, and I won't be around when everyone dies." However, the Santa Fe Prep student had attended one of the top-rated public elementary schools an Santa Fe where she first heard about global warming in second grade and did school-assigned projects on climate change in fourth, fifth, and sixth grades.

The ten-year-old who attends a public elementary school in Albuquerque had learned about global warming from a YouTube Kids video on his phone at around seven years old and hasn't learned anything about it since. He has not talked with his parents, grandparents, or teachers about it or heard them discuss it. He does recycle and pick up trash and has tried planting a garden with his grandmother. When asked if he wants to know more about climate change or global warming, his answer was a definite "No."

In Japan, according to my informant, the issue was covered in the social studies textbook for ages nine and ten and in junior high school science class. The Waldorf School students reported that they have a whole class about ecology and environmental studies. After working as mentors for GWE they are planning a program for elementary, middle and high school students at Santa Fe Waldorf, involving outdoor games for the youngest and advocacy for the older children.

When J.E., the Colorado high school junior, learned about global warming from her parents at around age eight she felt sad and hurt because she has always felt a connection with nature and animals. Since then she has educated herself through documentaries, YouTube, Google, and scientific reports, but her high school classes have rarely addressed the climate crisis. In fact, the teacher of the environmental science class she took does not believe in climate change, which she finds "absolutely dumfounding. You would think that someone presented with such a vast array of research about what is happening to our planet would believe in it." J.E.

talks with her friends about our planet's future and reports that most of them are aware of "the direness" of the climate crisis. She has made many changes in her lifestyle and convinced her parents to do so as well.

A.K., the thirteen-year-old who attends a public school in France, knew the earth was not doing well, but before age ten he did not care much. He was "quite shocked" when he was ten years old and heard his parents talking about global warming. Then last school year the teacher of his history and geography class brought up the subject when the class was discussing what's causing pollution and how we can cause less. They learned about water problems in Africa and more about the ecological crisis from the same teacher, who emphasized how we can solve problems.

A.K. has not talked about the issue with his friends outside of class, and is not aware of any political action groups in his area. He had heard about the Climate Strike movement, which at the time of our interview was soon to hold a demonstration in Paris, which is about an hour from his house by train, but he did not plan to attend. However, he has made many changes in his lifestyle in response to the crisis. He is eating less meat, using less plastic, buys less than he did before, and uses less electricity in his room. His family has a vegetable garden and grapevine, eats 'bio' (organic) food, and is driving their vehicle less. When I asked him what to say in my pamphlet he said, "It's important to tell parents not to buy more stuff for kids; they should encourage their kids to go outside and move, instead of using their phones or PlayStations, and live in real life, not virtual life."

When I asked other students what they are doing to help the planet, most mentioned recycling and picking up trash. Some are opening the refrigerator less often, not wasting food, trying to put Trump out of office, opening windows at night instead of using the air conditioner,

using reusable products, shopping at consignment stores, eating a vegetarian diet, composting, and donating birthday money to a charity that protects the environment.

Only one student reported being directly affected by climate change. A freshman at Santa Fe Indian School participating in Climate Strike stated that Native Americans are especially affected by climate destabilization because they are farmers and focus on agriculture. She is from Zuni Pueblo, which is in a very dry area and relies on lakes to water the crops. Global warming affects crops, she told me, and other aspects of our ecological crisis could even "poison the soil."

Other young people expressed their views on the Generation Next page of the *Santa Fe New Mexican,* which is by and for teens. The June 21, 2019 page included an article by two students at Santa Fe Prep, "Fighting to Save the World as We Know It," as well as a survey of six students from various schools about what teens can do to help the environment. Suggestions by those surveyed included taking shorter showers, recycling, using metal straws and reusable water bottles, picking up trash, educating others "about the truth," and spreading awareness of the problems and the solutions. The article mentioned several environmental advocacy groups that young people can join and concluded with a high school student urging, "If you want to get involved...look for the group that's finding solutions." (Nathan and Lawrence, 2019).

On September 28, 2019, the local public radio station KUNM featured children's interviews with two climate scientists, University of New Mexico professor Dr. David Gutzler and meteorologist Dr. Dierdra Kahn (KUNM, 2019). Several children of various ages asked questions that ranged from "What are the signs of climate change?" to "Why should we care?" and "Is there any way to stop it?" They also wanted to know about the greenhouse effect, if all

scientists agree that climate change is happening, if it is true that storms are getting bigger and stronger, and what they can do to help.

Classroom Teachers

Fifteen teachers from schools in Canada, Indonesia, Jamaica, Alaska, Florida, Illinois, New Mexico, Ohio, South Carolina, Texas, and Washington. D.C. filled out questionnaires or were interviewed in person. They teach at public, private, and charter schools and work with children from kindergarten through high school. Eleven of the teachers work at International Baccalaureate (IB) schools. These are public and private schools in 109 countries around the world that use a standard curriculum for ages 3 to 19 (www.ibo.org/programmes/). The aim of the IB program is to encourage students to be inquirers and problem-solvers and to think internationally. Ecology and climate change are part of the IB curriculum.

The teachers had so many good ideas and interesting perspectives that it is hard to summarize all their responses to my questions. The subjects they teach include math, physics, biology, Spanish, French, English, chemistry, and literature. As for spiritual beliefs, one is a follower of Amma, the mother figure and guru from India; one is exploring Buddhism because it fits with the biological fact of interdependence; one describes himself as an atheist and another as "faithless," although "I try to believe in Christ as my path, and He taught care, not consumption." Another teacher studies Buddhism, meditates and tries to be mindful all day long, using his breath to bring him back to the present. Others did not list a specific religion, but consider taking care of the planet an essential responsibility and say that their beliefs help them be more optimistic.

All but one of the teachers, a math teacher at a charter high school in Santa Fe, said they are very well informed about the current ecological crisis, and all the teachers talk about it with

their students, regardless of what subject they teach. All agreed that children are ready to learn about taking care of the earth in preschool or kindergarten. Stewardship should be emphasized first, with awareness of changes next and, later on, challenges and solutions. The two private school kindergarten teachers talk with their students about how to be "Earth protectors" and "keep the earth beautiful for our future;" they garden with the children, compost, recycle, talk about saving water, and read picture books about the environment (see Appendix B-1).

High school teachers emphasized the importance of encouraging students to base their opinions on data from reliable sources. One IB French teacher at a large, diverse public high school in Chicago mentioned the United Nations Sustainable Development Goals as essential information for students and their parents. The Sustainable Development Goals are a collection of seventeen global goals set by the United Nations General Assembly in 2015 for the year 2030. The goals include no poverty, zero hunger, clean water, conservation and sustainable use of the oceans, clean and affordable energy, gender equality, and urgent action to combat climate change (United Nations, 2019). The U.N. website is a valuable information source (see Appendix B-3).

When students share information and look at consequences and the pros and cons of an issue, whether in formal debates or informal discussions, they can then form their own views. The teachers feel their role is not to politicize, not to express their own opinions, and not to preach, but to ask questions that plant seeds and stimulate independent thinking, letting the students make up their own minds and chart their own course. The teachers are inspired by the fact that they are making a difference in the lives of children, helping them to be aware and kind, seeing students evolve into their true selves, and stimulating their minds. They hope for a better future for the children under their care. A teacher in a large public school in Chicago said her inspiration is "the desire to open minds and open doors" for her inner city students.

The eighth grade science teacher in a traditional (not IB) public school in Santa Fe has twenty years of teaching experience and uses a problem-solving approach to counteract fear. It is interesting to note that she did not grow up spending much time outdoors – no summer camp, no gardening, no hiking—but she intuitively respected nature and loved animals. In college she connected with the life sciences and changed her major from biology to education because she was concerned about the ecological crisis. Although the topic is not part of the standard eighth grade science curriculum in the Santa Fe Public Schools, she discusses it with her classes, admitting to her students that it may be scary to think about the future of the earth, but life is a series of problems. There are solutions, and we need to act. The more we work on problem solving, the more skillful we'll be. One of her former students is now an environmental engineer.

A majority of the teachers said that their students were interested and concerned about the future of the planet. Curious, alarmed, angry, "interested but not alarmed," apathetic, and sad were other descriptions of students' feelings. It is important that students and parents are aware "that saving the planet is everyone's issue" stated one teacher. We all have personal responsibility and must take action. "Students need to understand that they, too, can make an impact," said another. One teacher is concerned that video games and other screen activities keep many children inside, and as a result, "the natural world has become hypothetical and the virtual, real."

Teachers agreed with parents that the school curriculum should be developmentally appropriate and that the crisis must be framed as a challenge that we can meet by being informed and working together. Personal sacrifice will be necessary, but there are immediate and personal benefits along the way. There should be an emphasis on solutions and problem solving, rather

than on the most terrifying possible scenarios, while answering children's questions truthfully with scientific facts.

Response to the Pamphlet

Thirty-five parents, grandparents, and classroom teachers read and evaluated the pamphlet using a pre- and post-test. Overall, one hundred percent of the evaluating readers found it easy to understand and 89 percent said it was helpful to them as parents. With a maximum score of 50, the average score on the pre-test was 39.1, and the average score on the post-test was 44.6, indicating that the pamphlet had a moderately positive effect in raising awareness and motivating readers to take action. For complete results see Tables 1 and 2.

Literature Review

The Scope of the Problem

The ecological crisis that we are facing has many facets, all related to human activity. The main areas of concern include global warming, climate destabilization, loss of biodiversity, radioactive and chemical pollution, overpopulation, and an unsustainable, unjust economic and social system. There are many interactions among the various forces such that a specific problem usually has multiple causes (Loy, 2018; Dunne & Goleman, 2018; McKibben, 2019).

Our dependence on fossil fuels, wasteful extraction methods, attachment to eating animals, and other factors have led to a buildup of carbon dioxide, methane, nitrous oxide, and other greenhouse gases in the atmosphere, causing acidification of the oceans and global warming. A warmer climate is not only unstable, leading to more severe weather events, but has also led to droughts, desertification, catastrophic wildfires, melting glaciers and polar ice caps with a resultant rise in ocean levels, and more widespread flooding. The Intergovernmental

Panel on Climate Change (IPCC, 2018) estimates that we have until around 2030 to decrease emissions of greenhouse gases to 45% of the 2010 levels in order to limit global warming. We can't stop it, but we can slow it down by making drastic changes in how we live, travel, and eat.

With a warmer climate the public health impacts will include an increase in ticks and mosquitos carrying Lyme disease, malaria, and viruses such as Dengue fever, more heat-related deaths, and more exposure to waterborne and foodborne illnesses. The frequency and severity of allergies such as hay fever, asthma, and other respiratory problems are expected to increase due in part to pollution from wildfires and increased ground-level ozone. Air pollution is increasing, and was the cause of one in every nine deaths globally in 2016 (Mingle, 2019). People affected by extreme weather events can have lasting mental health problems, especially if they lose their livelihoods or have to relocate. Older adults, children, low-income communities, and some communities of color are more likely to suffer negative health consequences of climate change (Fourth National Climate Assessment, 2018).

Species extinction is happening at a faster rate as rapidly warming temperatures disturb the lifecycles of both animals and plants (Kolbert, 2014). Today one species in ten is becoming extinct over a one hundred year period, whereas in the past less than one species in a thousand became extinct (Terry, 2019). Loss of biodiversity is not only caused by global warming but also by habitat loss, damming of rivers, invasive species, hunting and trapping of large mammals, pesticide contamination, and animal disease epidemics such as avian cholera, white nose disease in bats, and bee colony collapse. The loss of pollinators – insects, bats, and birds – is affecting our food supply.

Another consequence of species extinction is occurring with the loss of rainforests. We are losing a major source of plant-derived medicines, as well as eliminating a major carbon sink.

At present at least 19% of the Amazonian rain forest has been lost as ranchers clear the land to raise beef cattle. Scientists estimate that once 20-25% of the forest is destroyed, damage to the water cycle and the resulting reductions in rainfall will mean the forest will start degrading on its own (Kosviner, 2019). Marine fisheries are diminishing as the oceans become more acidic and coral reefs, home to 25% of all marine species, die out (Kolbert, 2014).

The huge increase in human population since World War II, from 2.5 billion to more than 7.5 billion, is causing freshwater shortages, trash buildup, loss of forests and woodlands, overfishing, soil subsidence, and soil erosion. Depleting an aquifer causes the land surface to subside, permanently reducing the water-holding capacity of the aquifer. As women and girls become educated and gain social equality they tend to have fewer children, but there are still many areas of the world in which girls do not have access to education. "Women and girls are responsible for water collection in 80 percent of households without access to water on premises (United Nations, 2019)." Girls cannot attend school if their families depend on them to haul drinking water all day. Without education they are likely to have larger families, especially in sub-Saharan Africa.

Whether we have already exceeded our planet's carrying capacity is a topic of debate. The world's population is projected to grow from 7.7 billion in 2019 to 8.5 billion in 2030, and further to 9.7 billion in 2050 and to 10.9 billion in 2100. The United States is one of nine countries that are projected to be responsible for half of the growth in world population between now and 2050 (United Nations, 2019).

Since World War II the development of nuclear weapons and nuclear power, our use of automobiles, the manufacture of chemicals, plastic, and other synthetic products made from petroleum have also skyrocketed, leading to pollution of our atmosphere, land, rivers, lakes, and

oceans. We have not found a way to safely store nuclear waste, and radioactive contamination of air, soil, and water increases daily. The consumer culture of more affluent nations encourages waste, and there will soon be more trash in the oceans than fish. Acid rain continues to be a problem in some areas, as well as toxic levels of heavy metals due to their increased extraction.

The problems of the biosphere are inextricably linked to our inequitable social and economic systems. Our economy is currently dependent on oil and gas extraction and use, especially in New Mexico. A sustainable society is one in which the basic needs of humans are met without impairing or destroying the natural systems and species that support us. Our society is not sustainable. David Loy, in *Dangerous Years: Climate Change, the Long Emergency, and the Way Forward*, says:

> From a systems perspective, the challenge of sustaining civilization requires calibrating – and recalibrating, in perpetuity -- the energy, water, and material consumption as well as the ecological effects of seven, and soon, perhaps, eleven billion humans given the complex realities of ecology, thermodynamics, the biogeochemical cycles of the Earth, and ethics on a planetary scale." (p. 4).

Obviously changing consumption patterns on a widespread basis is extremely difficult to do, and we have not attempted, let alone succeeded, in doing so.

We in the developed world are exporting our white supremacist, consumerist culture to countries that currently have a smaller per capita carbon footprint. Citizens of those countries want the same status symbols of prosperity – cars, a meat-based diet, and big houses – that many people in richer nations have. In the United States we waste large amounts of food, while immigrants in detention centers, refugees, and victims of drought and climate change go hungry.

In fact, according to the Food and Agriculture Organization of the United Nations, about one-third of the food produced and packaged for human consumption is lost or wasted, while ten percent of people in the world are chronically undernourished, a "disastrous misallocation of need and want" (Segal, 2019 p.10).

> All that excess food, scientists say, contributes to climate change. From 8 percent to10 percent of greenhouse gas emissions are related to food lost during harvest and production or wasted by consumers, a recent report by the Intergovernmental Panel on Climate Control found. Rotting food in landfills emits methane, a gas that is roughly 25 times as harmful as carbon dioxide. And to harvest and transport all that wasted food requires billions of acres of arable land, trillions of gallons of water and vast amounts of fossil fuels. (Segal, 2019, p.10).

Economic policies that benefit large corporations increase and maintain an inequitable distribution of wealth. Racism, sexism, ethnocentrism, nationalism, homophobia, and xenophobia keep us from working together to create a sustainable and just culture. Discrimination on the basis of these prejudices and the ever increasing gap between rich and poor will lead to increasing violence and social disruption as the climate continues to become warmer, warns Gary Holthaus (2008). Many of the victims of discrimination are now housed in

overcrowded refugee camps, detention centers, and prisons, deprived of education, decent health care, and basic rights.

According to Wikipedia, "A species' habitat is those places where it can find food, shelter, protection and mates for reproduction (2019)." Birds, for instance, are dying off in great numbers—there are three billion fewer birds in North America now than there were in 1970 -- due to lack of habitat, food, safe nesting and resting sites along migration routes, and the abundance of domestic and feral cats (Lambert, 2019). Humans have similar habitat needs – adequate food, clean water, shelter, and safe communities in which to raise children. Many humans are suffering from loss of habitat and becoming refugees from war, violent gangs, drought, earthquakes, and hurricanes. Lack of clean water and poor sanitation facilities are a problem for 30 percent and 60 percent of the world population respectively (UN, 2019).

Here in the United States many humans are homeless due to a lack of affordable housing and inadequate facilities for treatment of mental health problems and addiction. Inner city residents often live in a "food desert" where they do not have access to fresh fruits, vegetables and other nutritious foods. Rural residents, on the other hand, are often far away from a hospital. Less than half of rural counties have hospitals that provide obstetric care, and eighty percent of rural counties lack a single psychiatrist (Wen, 2019).

Another facet of our economic system is the huge military industrial complex. We waste large sums of money preparing for and fighting wars and building nuclear weapons, polluting the earth in the process. Rather than eliminating poverty and improving education and health care, our priorities are corporate profits, control of other countries through military might, and increased wealth for the wealthy. As Thich Nhat Hanh states in *Love Letter to the Earth*, "When

we perpetrate violence toward our own and other species, we're being violent toward ourselves at the same time." (Nhat Hanh, 2013, p.28).

Finally, industrial agriculture is a major contributor to our current crisis. The use of chemical fertilizers and pesticides, genetically modified crops, petroleum-powered farm equipment, and the cultivation of grains for ethanol, alcoholic beverages, and animal feed, instead of as food for humans -- are part of the problem. Raising animals in huge factories is not only cruel, but creates a large proportion of the greenhouse gases that humans are responsible for producing, and animal wastes pollute air and water. Regenerative agriculture, which draws excess carbon out of the air, is sometimes described as "an effort to mimic how nature grows food…This ability to capture greenhouse gases is why many experts believe regenerative agriculture ,also known as carbon farming, could play an important role in fighting climate change. " Unfortunately, it is not yet being widely enough practiced (Tucker, 2019, pp. x-xi).

How Did We Get Ourselves into this Mess?

All situations are the result of many intersecting causes and conditions. There is no one underlying source of our problems. However, the better we understand the reasons behind the crisis, the better able we are to address it. There are many theories about how we arrived in our current predicament. Many of them blame human mistakes, greed, and shortsightedness. In Thich Nhat Hanh's words, "When a society is overcome by greed and pride, there is violence and unnecessary devastation." (Nhat Hanh, 2013, p.28). But is it the greed of the many or of the few?

Some say that the problem began with the development of agriculture, when we stopped living lightly on the land as hunters and gatherers and began to depend on domesticated animals and on crops that we planted for food. For 7000 years Earth's climate was stable, allowing

humans to develop civilizations and permitting art and culture to flourish (NASA, 2019). One result of becoming settled in agricultural communities was the development of hierarchical social structures, as not everyone needed to farm—some could be traders, merchants, artisans, priests, and rulers. Yet many indigenous cultures today, even those that are not nomadic, retain their respect for the earth as our mother and treat the animals and plants of the natural world as vital parts of one whole, of which humans are only one component.

Being agriculturalists does not necessitate exploiting the earth. Before the Spanish arrived, peoples in the Amazon basin actually enriched the thin topsoil of the rainforest to the depth of several feet and transplanted fruit-bearing trees so that the area could support a very large population, unlike present day ranchers who clear-cut the jungle (Mann, 2005). Native tribes used controlled fires to manage ecosystems all over North America. This facilitated agriculture by rapidly recycling mineral-rich ash and biomass, increased nut and berry production in wild orchards, created better habitat for game animals, facilitated travel, and decreased the frequency of larger scale, catastrophic fires.

Europeans did not recognize or learn from Native Americans' land management practices. They assumed that the Americas were an untouched wilderness that they could take for themselves. As a result of colonization native populations were devastated and fire exclusion or fire suppression became official U.S. policy. Millions of acres of forest and grasslands have become very vulnerable to, or have already been destroyed by catastrophic wildfires, since natives no longer use fire to manage those lands (Manolescu, 2019).

Another possible cause was the emergence of monotheistic religions, specifically Judaism, Christianity, and Islam, the so-called "desert trinity." These religions established a hierarchical framework for society with Man in charge of the Earth and all its creatures, with a

resulting change in attitude. From being part of and dependent upon the earth and our fellow creatures we began to see them as "resources" to exploit (Holthaus, 2018). These religions are also pronatalist, especially the Catholic Church, the Amish, the Church of Jesus Christ of Latter-day Saints, and the Salafi movement in the Muslim world, encouraging population growth and discouraging the use of birth control, thus contributing to our current situation of gross overpopulation (Wikipedia, 2019).

In the Americas Christianity became the dominant religion, supplanting native worldviews that honored the plants and natural forces upon which the indigenous peoples depended for food. The Maya respected and worshipped their corn god, sun god, and rain god. Up to 85 percent of their diet consisted of corn. Mary Lindsay Elmendorf, an anthropologist who studied an isolated Mayan village in Yucatan in the 1970's, was impressed by the harmony between men and women in the village. The men spent much of their time cultivating corn, and the women spent many hours each day making the fresh corn tortillas they enjoyed with each meal. They did not work for money or material gain; work was considered a human need that provided dignity, creativity, and satisfaction, and the work of men and women was equally valued (Elmendorf, 1985).

Consider how far modern humans have departed from that ideal. We have become more and more divorced from the reality of our dependence on the natural world, and more and more isolated in manmade environments. Children's use of electronic devices and lack of outdoor time has become a concern. In the wealthier parts of the world digital technology is used by 83 percent of young children age 6 months to 6 years on a daily basis (Bell, 2016). Richard Louv's book, *Last Child in the Woods*, brought public attention to this issue (2008). A review of literature by UNICEF shows stronger research is needed on technology's effects on children's

mental and physical health, but did not address the spiritual poverty that is contributing to the ecological crisis (Kardefelt-Winther, 2017).

Adam Frank, an astrophysicist, in a lecture as part of Upaya's Varela Symposium, said "Science has gotten us into the current insanity," but he also says we are not to blame (2018). He takes a long view, from 10,000 light years away. There is a minute chance (one in ten billion trillion) that our situation is unique. According to Frank, it is extremely likely that there have been other civilizations on planets in other solar systems that have faced a similar crisis of sustainability and either destroyed themselves, died off, or avoided collapse by becoming sustainable. Yes, humans have changed the climate, but it is not our fault. The discovery of fossil fuels was a mistake with unanticipated consequences, Frank asserts. As life forms exceed the carrying capacity of a planet, mass extinction and the death of civilization are the normal and inevitable result of intelligent life on a planet.

Max Weber's work, *The Protestant Ethic and the Spirit of Capitalism*, posits that the Reformation led to greater exploitation of workers and the glorification of economic gain (Weber, 1930). By eliminating priests as intermediaries, Protestant churches de-emphasized miracle and mystery and opened the way for materialist explanations of science and the materialist concerns of capitalism. Charles Darwin's theory of evolution through natural selection further challenged the religious beliefs of the time. Capitalists used "survival of the fittest" to justify ruthless forms of economic and political competition and to rationalize exploitation of the weak.

Zen teacher David Loy points out the absurdity of capitalism.

> The extraordinary irony is that we have become so obsessed with exploiting and abusing our actual treasure—a flourishing biosphere with healthy forests and topsoil, lakes and oceans full of marine life, an unpolluted atmosphere—in order to maximize something that in itself has no value whatsoever—namely, digital numbers in bank accounts. (2018, p. 3.)

A

The capitalist system depends on continual growth in the production and consumption of goods, and therefore constant exploitation of the earth. This is a recipe for disaster on a finite planet. Looking at our society from a systems perspective "revealed two glaring and well-documented flaws in Western thinking," Loy (2016, p.4) writes. First, the mechanistic worldview of Newton tended to reduce problems to their component parts, isolating them from their larger context. The second flaw, to which the founders of the American Republic succumbed, was a focus on the short-term, which "tends to redirect our attention from ends to means. Neither flaw appeared to be very important when the pace of change was slower, the stakes were lower, and the sheer mass of civilization was much smaller." (Loy, 2016, page 4). Systems thinking, on the other hand, means seeing the big picture and how all the components of a system influence each other and work together. It also includes anticipating the consequences of changes to a system, the behavior of which may be counterintuitive. The result of a change, due to long lead and lag times, may not be apparent for many years.

An outgrowth of capitalism is consumerism, which theologian Sallie McFague calls the newest religion. "We human beings are so embedded in the culture of consumerism that being asked to consume less makes us almost gasp." (Dunne & Goleman, 2018, p. 139). We are addicted to shopping, and it has been said that our society is addicted to the extraction and use of fossil fuels, which are necessary to produce and transport consumer goods. "So many of us feel empty inside and are searching for something to fill the vacuum. We try to fill the void by taking

pills or intoxicants or by consuming things." (Nhat Hanh, 2013, p.29). Consumerism is also driven by the advertising industry's skillful manipulation of our consciousness, convincing us to buy things we don't need and can't afford.

Joanna Macy and Chris Johnstone explain consumerism this way:

> Seeing ourselves as separate entities, rather than as connected parts of a larger whole, reduces the search for purpose to a preoccupation with how well our self is doing compared with other. As a result, the unhealthy obsession with appearance and status known as affluenza has become major contributor to emotional distress.

They see consumerism as a manifestation of the erosion of extended family and community networks that has accompanied a steadily rising rate of depression in industrialized countries. "As status has become associated with having more, bigger, and supposedly better things, the desire to keep up appearances propels the consumerism that is wrecking our world (Macy and Johnstone, 2012, p. 92)."

Bill McKibben agrees that social isolation and loss of community are part of the problem. He reports that social science researchers have found that Americans have become less happy in the past sixty years (McKibben, 2007). We've become disconnected from other people in our single-family homes in the suburbs where we immerse ourselves in the virtual reality of our many individual screens. The idea that humans are innately self-absorbed and overwhelmingly acquisitive is a relatively recent concept.

International corporations are perhaps the most powerful manifestations of capitalism today. Although modern China is run by the Communist party and its policies severely limit religious expression, it has a larger population than any other country and contributes more

greenhouse gases. However, one third of its contribution to global warming is due to production of goods made in China for U.S. consumption. Large corporations' responsibility for the ecological crisis and their influence on our society's response to the crisis have been devastating. Will the lies propagated by a small number of oil company executives determine the fate of the earth? "The reason we don't have a solution to climate change has less to do with the greed of the great unengineered unwashed than with the greed of the almost unbelievably small percentage of people at the top of the energy heap." (McKibben, 2019, page 202).

In the second half of the twentieth century the idea that government is bad and corporations should be free from rules took hold, and unrestricted global trade became the goal, regardless of its consequences for the average person. According to Bill McKibben's latest book, *Falter*, a small group of billionaires who subscribe to the individualistic, anti-altruism philosophy of Ayn Rand has used their wealth to influence and even take control of government on a state and national level. The Koch brothers and the political networks and institutions they and their fellows set up have been able to block the adoption of solar power and the expansion of mass transit in many states (McKibben, 2019; Rail Passengers Association, 2019). Their selfish agenda to insure continued profits for the fossil fuel industry has brought us to the point where it is now almost too late to stop global warming. They have also locked in new forms of inequality, as the poor suffer most from rising temperatures (McKibben, 2019).

We have known for a long time that trouble loomed ahead. As early as 1896 Swedish scientist Svante Arrhenius calculated that increased carbon dioxide in the atmosphere would boost average surface temperatures in the Arctic (Nijhuis, 2019). However, his research was not confirmed and expanded upon until much later. In 1965 President Lyndon Johnson, speaking to the joint houses of Congress, raised the issue of the increasing level of carbon dioxide in Earth's

atmosphere due to burning fossil fuels, but again the seriousness of the message did not sink in. Beginning in 1979, U.S. Government reports and NASA researcher James Hansen warned of our need to move away from coal and other fossil fuels as energy sources. At that time Exxon and the American Petroleum Institute began their aggressive attack on climate science and climate legislation that has led to climate change denial at all levels of society.

Since then the United States government has continually blocked international agreements and sabotaged negotiations to limit greenhouse gas emissions. Americans have been complacent, and there was not enough political or public support for climate action in the 1980's or 1990's. Now we are facing a dire situation in which our failure to act may mean that earth will soon be uninhabitable (Nijhuis, 2019). However, it is not too late to change course. Public awareness is rising, and with non-violent action we could at least replace the use of fossil fuels with solar and wind energy (McKibben, 2019).

Finally, we return to the idea that it is not science or technology that is the root of these issues but our own spiritual and intellectual poverty – our greed, desires, conceits, and arrogance, our failure to feed the poor, protect the weak, and treat with respect the 'ten thousand things,' as the ancient Chinese called the myriad creatures, large and small, animate and inanimate, that make up our planet. This brings us to Buddhism, a tremendous resource for these times.

How Buddhism Can Help Us Understand and Respond

After considering the extent and roots of our current crisis – a crisis that is political, economic, and biological, as well as social and spiritual in nature – it is helpful to turn to the Buddha's teachings for guidance. As we struggle to deal with our emotional reactions to the sixth great extinction and wonder what we can do in response, ancient wisdom offers ways to

understand and cope. There is much overlap between the worldview of many indigenous peoples and the fundamental Buddhist principle of interdependence. A key idea of Zen Buddhism is that we are one with, and a part of, nature. We can also find guidance in the concept of impermanence, the Four Noble Truths, the precepts, brahmaviharas, and paramitas. The Bodhisattva vows can inspire us to follow an "Ecosattva" path, as described by David Loy (2018). These Dharma Principles overlap in many instances, and separating them out is a bit artificial, so there may be some redundancy in the following section.

Here I will focus on the Buddhist truths that seem to be particularly useful in talking with children about the crisis. These are also the concepts that have been most helpful for me personally and may be helpful for chaplains in talking with adults who are depressed about our situation or are suffering from *solastalgia*. Solastalgia, the distress caused by environmental change when one's immediate environment is radically altered, is becoming more common as the ecological crisis affects more and more people directly (Albrecht, 2007).

Impermanence

Impermanence is one of the facts of life that, along with death, is especially difficult to accept. Everything changes, and not always in the direction we would prefer. Since World War Two our world has been changing faster than ever before with the introduction of new technology, especially in the fields of communication, agriculture, weapons, industrial production (plastics, synthetics, chemicals), and transportation. There have also been sweeping changes in social structures, such as different roles and more rights for women and minorities, a growing gap between rich and poor, and larger numbers of refugees. But for many of us the most disturbing changes are occurring with the destruction of the planet, especially losing the places and animals we have come to know and love.

Suffering, according to the Second Noble Truth, is caused by our attachment to things as they are or from wanting things to be different, the way we would like them to be. Recognizing impermanence, the inevitability of change, is a first step in accepting what is and moving on to what we can do about the changes we do not like. With the ecological crisis and advances in technology changes are happening faster and faster. There are two practices that can help us accept change. The first is being present in each moment, mindfulness, and the second is gratitude.

Mindfulness

Thich Nhat Hanh is one of the chief proponents of mindfulness and being present in the here and now. He defines mindfulness as "nonjudgmental awareness of all that is happening inside us and around us," our breath, our thoughts, and our actions (Nhat Hanh, 2013, p. 34). Whether we are walking, washing the dishes, eating, or brushing our teeth, the practice of mindfulness helps us to enjoy each moment, to connect to our bodies and to the Earth, and to appreciate the beauty around us. "When we're able to listen to ourselves and each other with mindfulness and compassion, we increase our ability to listen to our planet." (Nhat Hanh, 2013, p. 36).

Gratitude

Gratitude is another way to cope with the reality of impermanence. We can feel grateful for what we have now, rather than focusing on what we may lose in the future. Japanese culture, which of course is strongly influenced by Zen Buddhism, places a high value on the poignancy of fleeting beauty. Although plum blossoms may be just as beautiful and last for weeks, the Japanese lavish much more attention on cherry blossoms, which may come and go in a week -- reminders of impermanence. Unless we take time to appreciate and be grateful for the earth, we

may not care enough to want to save it. "When we come from gratitude, we become more present to the wonder of being alive in this amazing living world," says Joanna Macy (Macy & Johnstone, 2012, p. 38.)

The Four Brahnaviharas

The Brahmaviharas are virtues that can be cultivated through meditation. All of them -- loving kindness, compassion, joy, and equanimity -- can help us respond to the ecological crisis. Loving-kindness -- benevolence or goodwill towards all beings -- is a foundation of ecological consciousness. Unless we care, we will not act to protect the biosphere.

Compassion is feeling genuine concern about others' suffering and wanting to do something to relieve it. As Joan Halifax (2018) asserts in *Standing at the Edge*, "I am convinced that compassion supports the survival of *all* species on our planet." (p. 207).

Empathetic joy is the capacity to rejoice in the happiness of others, even if we did not contribute to it. Today there is much to rejoice about in the courage of youth speaking out about global warming, in the successes of environmental organizations in protecting habitats and wildlife, and in the political victories of "Green" candidates. If we can find joy in each moment we can better handle all our emotions and heal our suffering.

Equanimity, the ability to remain calm and even-minded no matter what situations we face, is necessary as we engage in non-violent actions to bring about change. It is the serenity to accept what we cannot change.

Generosity

The paramitas, the six or ten "perfections" of Mahayana Buddhism, include generosity. Giving ourselves -- our time, our money, and our energy -- to turn the tide of ecological disaster is absolutely crucial at this point. Donating as much money as we can afford to organizations

working for environmental justice is only one way to help protect the earth, and it is essential. If we all recognize our responsibility to give unselfishly, we can decrease the magnitude of the inevitable suffering that looms ahead.

Interdependence

Interdependence, or "interbeing" as Thich Nhat Hanh calls it (Nhat Hanh, 2001, page 55), is a Buddhist concept that is shared by traditional cultures around the world, as well as being validated by systems thinking. We are all part of one whole, a biosphere composed of many ecosystems, and we depend on the healthy functioning of each part to live. There is no separation between the natural world and us. We need to free ourselves from the delusion of our each having an individual self and recognize our kinship with plants, insects, other animals, rocks, soil, and trees. Seeing human beings as separate is what has gotten us into trouble, and returning to an earlier worldview could be a necessary part of recovery.

Reverence for Life

Reverence for life is one of the basic precepts of Buddhism, expressed as "I vow not to kill [living beings]," "I vow not to do harm," and "I vow not to take what is not freely given." If everyone took these precepts seriously and became vegans we would drastically reduce methane production, pollution from animal waste, and hunger worldwide. Freeing up the millions of acres used to produce animal fodder and using them to grow healthier sources of protein would feed more people, benefit our health and the health of the earth. We would also eliminate the incalculable suffering of the animals we eat and use as milk producers (Loy, 2018).

For Albert Schweitzer, a doctor, philosopher, and musician who devoted his life to caring for people in Africa, reverence for life was a personal and a cultural goal. He revered all creatures, even the lowliest and most obnoxious, for they all have a will to live. That will to live

is our link to every other animal and plant, he believed. It is the fundamental force that links every creature in the world (Schweitzer, 1953).

The Four Noble Truths

The first of the Four Noble Truths is to recognize suffering as a condition of living. That is easy to do when we read the news and consider how the effects of global warming are already affecting the earth. The second Truth is that suffering has a cause. Attachment, greed, and craving, especially for material goods and wealth, are all partial causes for our current crisis. The third is the good news that there is a way to relieve suffering, and the fourth outlines a way to live that will minimize or transform suffering, the Eightfold Path. How can these simple and profound truths help us respond to the ecological crisis? Letting go of attachments, staying open-minded, and working diligently are all necessary if we are going to address the climate emergency.

Letting go

Not being attached to outcomes is an attitude that can save us from suffering when things do not turn out the way we hope they will. Joanna Macy (2012) calls her approach to the crisis, "Active Hope." It is the practice of taking a clear view of reality, identifying what we hope for, and taking steps to move the situation and ourselves in that direction. It doesn't require optimism, so even if we do not feel hopeful about achieving our goal, we go ahead anyway, following our intention regardless of what results we may or may not achieve (Macy and Johnstone, 2012). It can be hard to let go of our desires, but seeing how they can take over our lives reveals the validity of the Second Noble Truth. We will also have to let go of many of our current habits and ways of living if we are to turn the tide from destruction to reverence.

Not Knowing and Right View

Not Knowing is one of the three basic tenets of the Zen Peacemakers Order, and it is also one fold of the Eightfold Path, right or wholesome view. Thich Nhat Hanh emphasizes the damage that can be done when we jump to conclusions based on our limited perception of a situation or person. If we can be flexible in our thinking, leave our preconceptions and prejudices behind, and accept the limits of our knowledge, it is easier to be present and open to others' insights and experiences and ready to face whatever the future may hold (Nhat Hanh, 2001). Another aspect of right view is the importance of learning as much as we can about a subject or situation from reliable sources, in other words, to know the truth to whatever degree is possible. We need to be open-minded, but also well informed, about issues that concern us.

In regard to the future of the planet, right view may mean taking the long view and thinking in geologic terms. In *Love Letter to the Earth*, Thich Nhat Hanh writes,

> You have an immense capacity to embrace, handle, and transform everything that is cast at you, whether it be great asteroids, refuse and filth, poisonous fumes, or radioactive waste…even if it takes millions of years. You were able to reestablish equilibrium after the devastating collision that created the moon and have endured at least five mass extinctions, reviving yourself every time. You have an extraordinary capacity to renew, transform, and heal yourself—and also us, your children. (2013, pp.111-112).

Right effort, right intention, and right action

Urgent action is needed if we are to stop the destruction of our planet. This will require determined, diligent effort on all our parts. The life of Dekila Chungyalpa is an example of the kind of intention and action that our earth needs. Born into the Buddhist culture of the

Himalayas and educated as a Western scientist in the field of biodiversity conservation, Dekila has devoted her life to protecting the earth and fulfilling her Buddhist commitment to benefit all sentient beings (Chungyalpa, 2019).

About twelve years ago Dekila became very depressed about the future. Her family, who are deeply religious Buddhists, convinced her to go to Bodh Gaya where she heard a talk by His Holiness the Karmapa. He gave a moving plea for vegetarianism and later asked Dekila to help the monks and nuns in the monasteries in his tradition to become educated activists for the earth. With her spiritual beliefs as her source of strength and her years of fieldwork giving her credibility, Dekila demanded that her employer, the World Wildlife Fund, pay her to work with faith leaders, and they complied. In this instance, right intention, right action, and right effort resulted in right outcome.

Meditating outdoors

Buddha did it. So did his sangha in India. Meditating outdoors, however you do it, is a different experience than meditating inside. It can lead to feeling a deeper connection to the rest of the natural world. Buddha and his followers practiced outdoors in groves, caves, forests, and parks. As a child sitting under a rose apple tree Siddhartha experienced for the first time a balanced state of mind and heart. Later he taught outside using metaphors and analogies from nature. Buddhist monasteries and temples of all lineages tend to be in mountains, deserts, and forests, for a good reason.

The writings of Dogen (1200-1253), founder of the Soto sect of Japanese Zen Buddhism, contain many poems (*waka*) that show his awareness of natural beauty and the cycle of the seasons. “Dogen seemed most content after he moved from the political strife occurring in Kyoto to the splendor of the Echizen Mountains, where he experienced a constant state of

communion with the natural environment." (Heine, 2015). In his *Treasury of the True Dharma Eye*, the *Shobo Genzo*, Dogen writes, "I suspect that voices of…insentient beings speaking dharma are resounding even now, still blended with the sounds of the night's stream." (Tanahashi, 2010, p. 87).

Dahl Jamail, author of *The End of Ice: Bearing Witness and Finding Meaning in the Path of Climate Disruption*, talks about how valuable it is for him to spend time in the mountains.

> What I've learned is when you really listen, and I mean go really quiet — put all the mental jargon aside and just get really quiet and really, really humble and really listen to the Earth — then I believe that each one of us is going to get our own personal marching orders of "here's what you're going to do, here's what I need you to do." (2019).

Few possessions, treated with respect

We live in a "throw-away" culture. Much of what we buy is wrapped in plastic, designed for single use, or will soon be obsolete. That is one reason why there are huge amounts of trash in the oceans. Living a life of Zen simplicity means only having things of good quality that you can use for many years. You value them and take good care of them because they are the product of many people's diligent work. Then there is less to throw away. "Nothing starts out as rubbish. Things become rubbish when they are treated as rubbish," asserts Shoukei Matsumoto (2018) in *A Monk's Guide to a Clean House and Mind.* "People who don't respect objects don't respect people." (p.4). In our throw-away world we throw away objects and throw away people, especially those experiencing homelessness, those incarcerated in prisons, jails, detention centers, and refugee camps.

In Japanese Buddhism, especially in Zen temples, cleaning is valued as an important way to cultivate the mind. Having a place for everything and storing each item in its proper place after use are also valued. If we consider whether or not we truly need something before we buy it, our minds and our living spaces will be less cluttered. The consumerism that is the basis of our economic system can lead us to being tied down by worldly possessions or the debts we've accumulated in buying them. Living with less, assuming our basic needs are met, allows us freedom to focus on other issues.

Sangha, the importance of community

Buddhism has three treasures – Buddha (the teacher), Dharma (the teachings), and Sangha (the community of followers). Martin Luther King, Jr. talked about "The Beloved Community," a global vision of loving connection in which all share in the wealth of the earth. He believed that non-violent action could eliminate poverty, hunger, homelessness, bigotry, and injustice (Senauke, 2018). Joanna Macy, who has offered workshops designed to restore a sense of connection with the web of life since the late 1970's, is convinced that the antidote to despair over the mess we're in is by joining together with others who share our concerns.

> We can develop a team spirit with life. When we are guided to find and play our part, we can feel as if we are acting not just alone but as part of a larger team of life that acts with us and through us. (Macy & Johnstone, 2012, p.114).

Profile of an Engaged Buddhist

Using Buddhist teachings and practices, how would an exemplary engaged Buddhist respond to the ecological crisis? What skillful means (*upaya*) are most effective? First of all, joining with others in collective efforts to urge elected leaders to be climate and conservation

champions is essential. Our state and federal government officials must set goals and enforce regulations for decreasing greenhouse gas emissions. Our engaged Buddhist votes in every election and works to elect 'Green" candidates. Perhaps she will also run for elected office herself. She writes letters, participates in non-violent demonstrations, possibly getting arrested as a result, and helps organize an eco-sangha – a network of like-minded activists. As an advocate for smart water policies, community solar legislation, and education about the ecological crisis in public schools, she testifies at the state legislature, speaks up at school board meetings, and attends public hearings on important environment-related issues.

Being well informed about the science of climate change and related reliable and verifiable research, she would know that of all the ways that a family or an individual can help the earth, the four most effective in reducing greenhouse gases are to have one fewer child, to live car-free, to travel in airplanes as little as possible, and to eat a plant-based diet (Wynes and Nicholas, 2017). Personal choices that have a less significant impact on carbon emissions include driving a plug-in vehicle or hybrid car, installing solar panels, buying less, repairing, reusing, and recycling, buying products in bulk or with minimal packaging, avoiding single-use items, upgrading light bulbs, washing clothes in cold water, and hanging them to dry. All these things are worth doing, although individual actions are not enough to 'save' the earth. Planting flowers for bees and other pollinators, using less water, not wasting food, and using as little plastic as possible help the planet in other ways.

As a role model both in the community action sphere and in her personal life, our engaged Buddhist travels by train, bus, or boat on longer trips and rides her bike to work and for errands. Rarely does she 'need' to fly in an airplane since she has designed her life to be simple, uncluttered, and serene. She and her partner enjoy creating delicious vegan meals with fresh

food from their organic garden and orchard and share them with family and friends. When shopping, they look for "Fair Trade" and locally-made products. They might choose to adopt or be foster parents rather than give birth to biological offspring. Their retirement savings are invested in socially responsible funds, and they have taken their money out of big banks that finance pipelines, coal mines, Artic drilling, and other expansion of the fossil fuel industry. Since big banks are making huge profits, charge excessive fees, and have been convicted of predatory lending and other customer abuses, they have switched their credit cards and their checking accounts to a credit union.

Shopping at thrift stores, living 'off the grid,' and planting native trees, grasses, and bushes around their well-insulated passive solar house are other ways in which they minimize their use of fossil fuels and maximize their enjoyment of an earth-friendly lifestyle. They collect rainwater from their roof to water their garden, and all the lights in their home are LEDs (light-emitting diodes). Can we all be models of engaged Buddhism? All it takes is the determination to start taking one step at a time.

Dekila Chungyalpa is an inspiring role model for Buddhists. So are Joanna Macy, Bill McKibben, Terry Root, Pope Francis, and Greta Thunberg, among others. Terry Root is a 65-year-old Stanford University professor emerita who was one of the Nobel Prize-winning authors of the 2007 report of the Intergovernmental Panel on Climate Change. She has studied climate change since 1987 and is now devoting her time to speaking about the urgency of the problem. Her talks are clear and concise with dramatic visual images and very inspirational. During a a recent talk, Root asked the audience members to promise three things: that the next car we buy will be an electric vehicle, that the next appliance we buy will be "Energy Star" certified, and that we will never say, "I believe in climate change." Climate change is a fact, not

a belief system, she emphasized. Root and her husband replaced their lawn at their home with native plants and drive a Nissan "Leaf." Their electric bills dropped dramatically when they installed photovoltaic panels (Root, 2019).

Greta Thunberg, the teenager from Sweden, has gathered the attention of the world by speaking truth to power. She is a role model for young people everywhere, as well as for people with autism spectrum disorders. On January 23, 2019, Thunberg arrived in Switzerland for the World Economic Forum after a 32-hour train journey, in contrast to the many delegates who arrived by up to 1,500 individual private jets flights. She told a forum panel, "Some people, some companies, some decision makers in particular have known exactly what priceless values they have been sacrificing to continue making unimaginable amounts of money. I think many of you here today belong to that group of people." She spoke again in front of some 25,000 people in Berlin on March 29, 2019, where she warned that "the people who have contributed the least to this crisis are the ones who are going to be affected the most." (Wikipedia, 2019).

On September 23, 2019, Thunberg addressed assembled world leaders at the U.N. Climate Action Summit in New York City. She opened her speech to the General Assembly with an impassioned introduction. "You are failing us." Thunberg stated. "But the young people are starting to understand your betrayal. The eyes of all future generations are upon you. And if you choose to fail us, I say: We will never forgive you." (Wikipedia, 2019).

After her appearance at the U.N. Thunberg fielded questions at a Global Climate Strike press conference in Montreal. When asked why she invited indigenous youth to help lead the march, she said: "Indigenous people have for centuries and millenniums protected the local environment and of course we need to because they are often the ones who are … at the front line, so we need to be able to hear their voices." Thunberg was asked if she had a specific

message for the Prime Minister of Canada. “My message to all the politicians is the same – to listen to the science and act on the science,” she said. (Wikipedia, 2019).

Greta is like the little boy who was struck by what should have been obvious to everyone and blurted out, “The emperor has no clothes!” If a sixteen year old girl with Asperger syndrome can set aside her schooling to tackle the most serious problem the human race has ever faced how can we not follow her example and that of other inspiring role models and become truly engaged Buddhists? We need to “walk our talk” and ensure that our lives reveal our values. If our purpose as chaplains is to relieve suffering – if the reason we are here on this planet is to help others—then we cannot remain silent and complacent. We must give up our attachment to the unhealthy lifestyles we are so comfortable living and adopt an earth-friendly way of life. Our Buddhist vows demand no less.

Conclusions

As a result of the interviews, literature review, and other research for this paper, certain conclusions became evident.

1. The biosphere as we know it is in danger due to human activities.
2. We are also facing a humanitarian crisis.
3. We have a limited time, until about 2030, to prevent the worst effects of global warming and the resulting climate destabilization.
4. Many people are not aware of or are ignoring the crisis. Some elected officials are actively making the situation worse.
5. Adults and children who are aware are often suffering from grief, depression, fear, guilt, confusion, anger, and other emotions.

6. Many parents and teachers are not talking with children about the crisis, encouraging problem-solving, or discussing solutions, even though they may want to be responsible and do the right thing.
7. Buddhism offers much wisdom that can help us respond in positive ways to the crisis.
8. There are inspiring role models that we can look to for guidance and encouragement.
9. More people might take action if they knew that they could make a difference and they were not attached to a successful outcome.
10. Dealing with the ecological crisis is *everyone's* responsibility.
11. An educational tool to help parents talk with children about the crisis can be helpful.

Discussion

One of my goals in choosing this topic for my thesis was to feel more positive about the future of the Earth so that I could help children and young people understand climate change and what they can do to minimize it. Through reading inspiring stories of what individuals and non-profit organizations are doing to bring about changes in political systems, communities, and ecosystems, and through learning more about climate science, my attitude has changed. Whereas before working on this paper I felt resigned to the inevitable and rapid destruction of the biosphere, now I am much more hopeful about our ability as humans to undo some of the damage we have done. I am committed to making changes in my own life and to advocating for the Earth.

Another of my goals was to learn more about Buddhist principles, such as impermanence, non-clinging, and non-preferential mind, and to practice them in my daily life. I have found that when one begins to focus on non-attachment, for example, in one area, one's attachments in

other areas become apparent. Recognizing the truth of impermanence as a cause of suffering becomes pervasive throughout one's consciousness.

To be a passionate advocate for all beings on our planet, to be an eco-chaplain, one must be grounded in spirituality. Anger at the shortsightedness and greed of those in the fossil fuel industry, the reluctance to face reality and consequent inaction of political leaders, and the failure of past generations to pay attention can be a spur to action, but it needs to be coupled with deep compassion, forgiveness of other humans past and present, including ourselves, and faith in the basic goodness, the buddha-nature, of all living beings. This is one endeavor in which Christian and Buddhist values coincide.

Four popes, John Paul II, Paul VI, Benedict XVII, and now Francis, have urged all peoples of good will to care for the Earth. Pope Francis in his 2015 Encyclical makes a connection between our abuse of the Earth and our treatment of other humans. "We are not faced with two separate crises, one environmental and the other social, but rather one complex crisis…. Strategies for a solution demand an integrated approach to combating poverty, restoring dignity to the underprivileged, and at the same time protecting nature" (2015). His thinking is in agreement with the United Nations Sustainable Development Goals.

Thich Nhat Hanh believes "A spiritual revolution is needed if we're going to confront the environmental challenges that face us." (2013, page 28). Pope Francis agrees:

> The ecological conversion needed to bring about lasting change is also a community conversion. This conversion calls for a number of attitudes which together foster a spirit of generous care, full of tenderness. First, it entails gratitude, a recognition that the world is God's loving gift, and that we are called quietly to imitate his generosity in self-sacrifice and good works. … It also entails a loving awareness that we are not disconnected from the rest of creatures, but joined in a splendid universal communion. (2015).

"Thay [Thich Nhat Hanh] put great emphasis in his last years of teaching on sharing how our community can contribute to change in the world by bringing back the spiritual dimension, and showing how, together, we can fall back in love with Mother Earth." For their three-month Rains Retreat this year, the monks and nuns in his tradition have taken the themes of "nourishing Bodhicitta (the mind of love), taking care of Mother Earth, and building enduring, sustainable communities; all crucial aspects of bringing about the collective awakening we need." (Plum Village, 2019).

A spirituality that honors the Earth, respects all beings, including all peoples, and sees humans as just one element in the web of life is an essential element of restoring balance to our world and making a future possible for our global family.

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Table 1

Responses to Pamphlet: number of responses for each option on pre-test and post-test.

1=strongly disagree 2=disagree 3=unsure 4= agree 5=strongly agree

		1	2	3	4	5
1. I plan to spend time exploring the outdoors with my children in the next week.	Pre:					
	Post:					
2. I am concerned about the future of our planet.	Pre:					
	Post:					
3. I know where to look for accurate information about climate change and global warming.	Pre:					
	Post:					
4. I am likely to bring up these subjects with my children.	Pre:					
	Post:					
5. I feel hopeful about the future of our planet.	Pre:					
	Post:					
6. It is important to contact elected officials about environmental issues.	Pre:					
	Post:					
7. I plan to do all I can to minimize climate change and global warming.	Pre:					
	Post:					
8. I know what changes I could make that would be most effective in slowing down global warming.	Pre:					
	Post:					
9. I am active in (or plan to join) an organization that is working to protect the earth.	Pre:					
	Post:					
10. Meditating outdoors can help us appreciate nature and our place in it.	Pre:					
	Post:					

Table 2

Responses to Pamphlet: number of responses for each option on questions of readability and helpfulness.

1=strongly disagree 2=disagree 3=unsure 4= agree 5=strongly agree

	1	2	3	4	5
11. The pamphlet I just read was easy to understand.	0	0	0	8	27
12. The pamphlet I just read was helpful to me as a parent/grandparent/teacher.	0	0	4	5	26

Appendix A: Pamphlet -- Hello, Fellow Earthlings! [illustrations not shown]

If you are parent, grandparent, teacher, or otherwise have children in your life, perhaps you have wondered what is the best way to help kids understand what is happening to our planet. Learning about the changes that are happening to the earth can be scary for kids, depressing for teenagers, and worrisome for adults. Climate change is only one of many ways in which we humans have negatively affected life on earth, but there are many ways in which we can help the Earth and our fellow Earthlings.

Talking with Kids about the Ecological Crisis

Children understand and absorb information from an early age. Every child is different, but there are general guidelines for introducing these difficult topics in age-appropriate stages.

- Learning about the world as it is through direct observation begins at birth. Toddlers often find worms and baby birds fascinating and love to play in the dirt.
- Recognizing changes that occur with the cycle of the seasons, tides, and phases of the moon begins around age 2 or 3. Preschoolers can plant seeds and watch them grow or look at old family photos to increase their awareness of the inevitability of change.
- Forming good habits, such as picking up trash, composting, recycling, turning out lights, conserving water, not wasting food, and eating vegetables and fruits, can also begin very early.
- Basic science—the water and carbon cycles, photosynthesis, the food chain, ocean currents, and soil formation—can be understood beginning around age five. Build on what they are learning in the classroom and from books with outdoor activities to see these processes in action.
- Introduction of the ecological crisis with emphasis on solutions and direct action can start around age 6 to 8. Parents may need to help and encourage students to find organizations to join or projects to do.

To Know Her Is To Love Her

Spending time outside, whether in active exploration or sitting quietly helps us appreciate our place in the universe. We are all part of nature, one family that includes everything alive and everything that we walk on, breathe, and eat. To help kids develop a strong connection with nature:

- Allow and encourage kids to play outside with minimal supervision and no structured activities. Building hideouts and making up games fosters imagination, social skills, and creativity. Send them outside with a magnifying glass, camera, or binoculars and see what they find.
- Know the neighborhood. We are more likely to protect the areas around our homes. What trees and plants grow there? Are there shortcuts to school, stores, or friends' homes? Is our neighborhood being affected by environmental problems? What can we do about them?
- Meditate outdoors with your child. Pick a spot and sit quietly for 5-10 minutes. What do you see, hear, smell, and feel? Return at different times of day and in different seasons and notice any changes. Or just focus on breathing. Ask the Earth how you can help and listen for answers.
- Plant an organic garden. Even growing flowers and vegetables in pots on the porch offers the chance to learn about where our food comes from and can help bees and other pollinators.
- Plant native trees, plants, or wildflower seeds in your yard or in a park or burned area. Plants take up carbon dioxide, provide oxygen and shade, and provide shelter and food for animals.
- Take a sketchbook on a walk or hike. Stop often and write a short poem or draw what you see.
- Find joy in the beauty of this moment and express gratitude for everything that makes our lives possible. This is a time to notice and be thankful for the incredible beauty of our planet.

Be informed!

The most accurate and up-to-date information is available from scientists at NASA (National Aeronautics and Space Administration: climate.nasa.gov), the U.N. (United Nations: un.org/en/climatechange/), NOAA (National Oceanic and Atmospheric Administration: www.noaa.gov), and the IPCC (Intergovernmental Panel on Climate Change: www.ipcc.ch). At climate.nasa.gov and climatekids.nasa.gov you'll find answers to questions such as:

- What is climate change?
- How do we know the climate is changing?
- Why is the earth getting warmer?
- What is happening in the ocean?

Recently humans have released too much carbon dioxide into the atmosphere. We call carbon dioxide a greenhouse gas because it acts like a greenhouse or blanket, trapping extra warmth and raising average air and sea surface temperatures over the entire planet. This is disrupting weather patterns everywhere.

Be inspired!

Greta Thunberg, age 16, skipped school to protest outside the Swedish parliament and started a worldwide movement of young people. Read and hear her speech to the UN at climatestrike.org. Her mom gave up her career as an opera singer in response to Greta's concern for the Earth because singing required frequent airplane trips, and the whole family became vegans.

Marina Weber and Joanna Whysner started the Global Warming Express, an after-school political action club, when they were in fourth grade (theglobalwarmingexpress.org). When Marina first learned about global warming she was very upset. Her mom asked her, "What do you want to do about it?" A book and then the club were Marina's answers.

When they were 6 and 9 years old, sisters Katherine and Isabelle Adams became concerned about girls in other countries missing school because they had to spend all day hauling water. By selling origami ornaments with their parents' help they have raised $1.5 million to bring clean water and awareness of the world water crisis to people everywhere (paperforwater.org).

Hannah Laga-Abram, who helped other high school students organize Santa Fe, NM's youth Climate Strike, was quoted in the *Santa Fe Reporter* of April 10-16, 2019:

> Go outside and remind yourself of how beautiful and wild and magical and crazy this universe is, and then start asking people questions and bringing up the uncomfortable conversation…. Once you start talking to people and forming networks, you will start feeling the support that is out there. And then together, we can move towards action.

Speak out! Take action!

What are the most effective actions we can take to protect our earth? First of all, we must join together to pressure our governments to act. Individual actions are important, but the problem is so complex and pervasive that collective action and global cooperation are absolutely necessary. We can:

1) Contact elected officials (the mayor, school board, governor, Congress) telling them what we love and what we don't want to lose as a result of changes that they have the power to prevent. If you are a young person be sure to include your age. For help writing see 2). Urge them to take action to

- replace fossil fuels with solar and wind
- promote regenerative agriculture and resilient soil by restricting chemical use
- preserve forests and open space
- increase public transportation options
- protect endangered species
- require climate science education in schools at all grade levels

2) Join and support organizations that are working to bring about change (rootsandshoots.org), protect wild places (nature.org), animals (WWF.org and audubon.org), and forests (arborday.org), influence policy-makers and government leaders (EDF.org), promote public transportation (railpassengers.org) and a cleaner, healthier world (greenamerica.org). Roots and Shoots was founded by Jane Goodall and is focused on helping even very young children be creative Earth-helpers.

There are many ways that a family or an individual can help the earth. Some of the most important are:

1) **Eat more plant-based meals.** Get started at https://kickstart.pcrm.org.
2) **Ride a bike or walk** or take public transit when possible. Save money to buy an electric car.
3) **Minimize your use of air travel**. Buy carbon offsets when you do fly at cooleffect.org.
4) **Consider adoption if you want a larger family**.

Also worthwhile: buy less, get an energy audit of your house, replace windows and insulate walls and roofs if necessary, install solar panels for hot water and electricity, collect rainwater, invest responsibly, ditch your bank for a credit union, buy Energy Star appliances, wash clothes in cold water, hang them to dry, use LED lighting, eat organic, don't waste food, avoid buying single-use and excessively packaged items, compost, mend, reuse, and recycle (www.iopscience.iop.org/article/ and greenamerica.org).

In Summary

We can't stop climate change and global warming, but if we act now it may be possible to slow them down and lessen the suffering of all the creatures on this planet. We can:

1) Appreciate the present moment and the beauty around us by spending time outdoors.
2) Educate ourselves about what's happening to the planet.
3) Work for systemic change through organized groups and non-violent action.
4) Do what we can do individually for the earth.
5) Not be attached to things turning out the way we would like.
6) Become comfortable with not knowing exactly what will happen.

Books for children and young people -- Check them out at the library and read with your child.

Molly Bang, *My Light*, 2004, Blue Sky Press, New York. Describes how we transform sunlight into electricity. All Molly Bang books have clear explanations and beautiful color illustrations. Age 5 and up.

Molly Bang and Penny Chisholm, *Living Sunlight - How Plants Bring the Earth to Life*, 2009, Blue Sky Press, New York. Tells how plants catch sunlight and use it to make food. Age 5 and up.

Molly Bang and Penny Chisholm, *Ocean Sunlight – How Tiny Plants Feed the Seas*, 2012, Blue Sky Press, New York. Introduces the sun's life-sustaining role in ocean ecosystems. Age 5 and up.

Molly Bang and Penny Chisholm, *Buried Sunlight - How Fossil Fuels Have Changed the Earth*, 2014, Blue Sky Press, New York. Explains how fossil fuels are sunlight trapped beneath Earth's surface and how their being burned changes our planet's carbon balance. Age 6 and up.

Molly Bang and Penny Chisholm, *Rivers of Sunlight – How the Sun Moves Water around the Earth*, 2017, Blue Sky Press, New York. Tells how water cycles through our bodies and through the Earth and shows how Earth's water balance is changing. Age 5 and up.

Oliver Jeffers, *Here We Are: Notes for Living on Planet Earth*, 2017, Philomel Books, New York. Explains our place in the universe with whimsical paintings and gentle suggestions. Ages 4-8.
Alice McLerran and Barbara Cooney, *Roxaboxen*. A true story of the joy of outdoor play. Age 3 and up.
April Pulley Sayre, *Thank You Earth: A Love Letter to Our Planet*, 2018, Greenwillow Books, New York. Colorful photographs with ideas for action. Ages 1-5.

Marina Weber and Joanna Whysner, *The Global Warming Express*, 2017, Terra Nova Books, Santa Fe. Two girls take a magical trip to save animals endangered by fossil fuels and climate change. Ages 8-13.

Magazines for kids: *Ranger Rick* and *Ranger Rick, Jr*. from the National Wildlife Federation, nwf.org.

Website for parents written by psychologists on raising children to thrive in a climate-changed world:
https://www.psychology.org.au/for-the-public/Psychology-topics/Climate-change-psychology/Talking-with-children-about-the-environment

Books for adults:

William deBuys, *A Great Aridness: Climate Change and the Future of the American Southwest*, 2011.

Adam Frank, *Light of the Stars: Alien Worlds and the Fate of the Earth*, 2018. The big picture!

Pope Francis, *Encyclical on Climate Change and Inequality: Care for Our Common Home*, 2015.
Or read it online at cathlicclimateconvenant.org.

Dahr Jamail, *The End of Ice: Bearing Witness and Finding Meaning in the Path of Climate Disruption*, 2019.

Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants*, 2014. See Discussion_And_Question_Guide_Braiding_Sweetgrass.pdf

Elizabeth Kolbert, *The Sixth Extinction: An Unnatural History*, 2014.

For more information and the complete report this pamphlet is based on, please contact Mary Ray Cate at info@sunlit-art.com. Please feel free to copy and distribute this information.

Appendix B: Notes from interviews with environmental educators

Christy Wall has a Ph.D. in atmospheric science and was a Fellow supported by a National Science Foundation grant in 2006-2007. She has taught children in Salt Lake City and was the education director at the New Mexico Wildlife Center in Española, New Mexico, before beginning her current job as the sixth grade science and math teacher at McCurdy, a charter school, also in Española. As head of the River Classroom program at the Wildlife Center she worked with fourth through eleventh graders from two northern New Mexico school districts, including children in Chama and Tierra Amarilla. Her students have been her main inspiration. By helping kids to care about the natural world, "I can see that I make a difference," she says.

New Mexico Wildlife Center partners with local schools to offer an intensive, integrated education program that directly addresses the Next Generation Science Standards. These standards set expectations for what students in grades K-12 should know and be able to do. According to the Next Generation Science website (https://www.nextgenscience.org/), the standards were developed by states to improve science education for all students and give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science.

The River Classroom is a hands-on, experiential, inquiry-based program that takes students into local riparian habitats. It integrates biology, chemistry and geology concepts with real world scientific data collection and habitat monitoring. Students spend half a day every other week for the entire school year exploring their local rivers. Christy believes that the best way to motivate children to care about nature, wildlife, and the environment is to get them outside as often as possible to show them how science applies to their home communities. The River Classroom program allowed her as a scientist to develop relationships with the children over time.

Activities in the program include getting the children in waders to collect water bugs, benthic macro-invertebrates, to be specific. These little river dwellers are an indicator of water quality and are fascinating to watch. The children also collect data using modern equipment and submit it to the state water quality board. To improve their observational skills the children use graphic organizers to record what they feel, see, hear, smell, taste and touch. As part of each session Christy recommends allowing a block of time, 30-60 minutes, for unstructured play along the riverbank.

The goal of this program is to develop action-oriented curricula that contribute to community education goals and involve students in science. By connecting local students with their environment, New Mexico Wildlife Center is improving science learning and increasing awareness of the importance of local rivers. The state of New Mexico is in the process of adopting the Next Generation Science Standards, which include teaching middle school students about weather patterns and high school students about the changing planet. Hopefully more and more school systems will use the type of curriculum developed by the Wildlife Center.

As for talking about global warming with kids, "It's so hard," Christy says. She casually mentions climate change a lot in the course of being outdoors with children. For example when they spot a roadrunner she comments that there are more and more roadrunners in the area as it becomes warmer. They used to be rare here, but now are moving north. On spring trips students note how much snow is on the ground, compared with previous years. In northern New Mexico many of the children's grandparents are still intimately connected to the earth -- grazing animals, cutting firewood in the forests, taking care of *acequias*. So their families may be aware of global warming through direct experience.

Christy has found that specific lessons on climate change across the globe are less effective than focusing on local issues such as wildfires and water shortages, although she does address the wider picture with high school students. She has had the older students, some of whom have participated in the River Classroom for up to five school years, study different ecosystems, their common animals and plants, the elevation and rainfall of each, and how climate change is affecting them. When discussing the problems generated by climate change, she always includes what the students can do to alleviate the problems.

Although she personally finds global warming and its consequences concerning, Christy tries to be positive in her approach to kids. She does not want her students or her young daughter to feel worried or hopeless about our current situation. She seems to be successful in this, and her students have surprised her with all that they retain from her lessons. At the beginning of one school year a student told how during the summer she had found herself with her family in an aspen grove. Her parents and siblings were amazed at everything she had learned about aspens the previous spring – their common root system, their need for winter water, how their bark contains chlorophyll. It is stories like these that show Christy Wall how her efforts to connect children with nature are affecting whole families. That gives her hope for the future of our planet.

Layne Kalbfleisch, Ph.D., is a member of the Ojibwe nation and maintains a private practice as an educational psychologist. Previously she did research as a cognitive neuroscientist on autism spectrum disorders and taught middle school. However her main job at the time of our interview was as the education development director at Ghost Ranch, a Presbyterian conference center near Abiquiu, New Mexico. Ghost Ranch offers year-round seminars open to everyone on

a variety of topics selected and created by Layne, including programs for children and young people of all ages. One recent summer the theme for ages 3-12 was "Patterns," and the program included outdoor adventure, expressive arts, taking care of the land and each other, paleontology, exploring the cultural gifts of northern New Mexico, music and games. The high school program's theme was "Seeing Differently" and included photography and stone carving. Hundreds of children participate in these programs while their parents or grandparents are singing in a gospel choir, learning to weave, hiking, or writing poetry.

There are two museums at the Ranch, paleontology and archeology. These were the setting for an overnight STEM camp for 60 kids sponsored by the National Science Foundation, St. Philip Presbyterian Foundation (Houston, TX) and an anonymous donor. It was so interesting that the parents and younger siblings joined in. There are plans are for another intergenerational program on geology and plant medicine, involving botanical drawing. The social justice seminar, "Signs of the Times," held yearly at Ghost Ranch, considered water issues last year and included a section specifically on climate change. Ghost Ranch is committed to caring for the earth and enriching the lives of those who visit through spirituality, creativity, discovery, and hospitality.

Layne says just being in the physically beautiful setting of Ghost Ranch motivates children to care about nature and the environment. It is also important to recognize and acknowledge obstacles to expressing curiosity. If teens think they are "too cool" to participate in some activity they will not be able to take advantage of the opportunity to learn. Layne chose photography and riparian habitat restoration as youth program content for this reason. The teens eagerly took cameras with them to explore the Ranch and exhibited some outstanding photos in the end-of-session art shows. Another activity Layne's research team created was "sound

hunting." Teams of four kids wearing headphones and connected via a four-way splitter roam the ranch recording sounds – natural or man-made. Then they learn how to create rap music from their recordings.

In addition to natural beauty Ghost Ranch is fortunate to contain the Hayden dinosaur quarry, a site where kids can hunt for Triassic period bones and make casts of the dinosaur uncovered at Ghost Ranch, the coelophysis. STEM campers were accompanied into the quarry by its discoverer, John Hayden. Parents and older children can participate together in an archeology dig on the Ranch, helping to excavate a rock shelter dating to the period of hunters and gatherers. Being involved in real outdoor scientific discovery can open a child's awareness of their options in life and increase their appreciation of our planet and its history.

Although the movie, "Dinosaurs Alive," which was filmed at Ghost Ranch is shown as part of some programs, Layne believes that people learn best informally, because they are relaxed, curious, and open when given the chance to choose a setting that is authentic and supportive of questions and tasks that build new skills. She does not talk with children specifically about climate change. She does frequently ask, "What can you do between your two hands?" when related issues come up. As a psychologist who understands child development she says that children as young as two years old can begin to notice differences and observe changes. The appropriate time for talking with children about global warming depends on their level of cognitive development.

Layne is concerned, but not discouraged, about our current environmental situation. She is very aware of the stress of living in the high desert with its drought, fire danger, and extreme heat. Three years ago Ghost Ranch was devastated by a huge flash flood that destroyed several buildings and the aqueduct system that provided irrigation water to the pastures. The Ranch is

still repairing some of the damage. What encourages Layne Kalbfleisch is the incremental positive changes she observes and the inspiration she receives from living and working in such a beautiful place.

Buddhist meditation teacher Wendy Johnson, who frequently lectures at Upaya Zen Center in Santa Fe, is the author of *Gardening at the Dragon's Gate*. She is a firm believer in the power of food to interest children in natural history and the health of our planet. She has been a consultant to the Edible Schoolyard Project in Berkeley, California, since its beginning. Over the past twenty-two years she has worked with hundreds of children, from age four through teens, both at Green Gulch Farm Zen Center in Marin County and in the Berkeley public schools. "Always link anything you're talking about with the taste of food," she urges.

The Edible Schoolyard Project is headquartered in Berkeley and has trained teachers, school administrators, food service staff, nutritionists, community leaders, and parents from schools in 42 states and in countries all over the world. It is designed to transform children's relationship with food by providing a rich, integrated educational experience, introducing them to organic gardening, cooking, and healthy eating as part of their day at school. Teachers must have a clear understanding of science in order to answer children's questions, and the Edible Schoolyard Project offers the training they need to feel comfortable with the curriculum.

A joyful, vigorous spirit, Wendy believes that children are naturally alive to plants, and a teacher or parent's enthusiasm can build on the child's curiosity and interest. "It's in them, whatever you do." Wendy's playfulness and enthusiasm are charismatic. She can be silly as well as serious, and engages children's attention in numerous ways. Imitating the high voice of a small child in a humorous and endearing manner, she recounts some of her typical conversations with kids.

Child: What's that in your hair?
Wendy: There's nothing in my hair.
C: Yes, there is!
W: No. Where?
C: There (pointing)!
W: (Pretending to discover what looks like the coiled green top of a fiddlehead fern, sticking up like an antenna clipped to her hair) Oh, this? This is how I communicate with the plants.

"Be curious, open, and simple," says Wendy. Get to know the kids and listen before offering a program. One of her presentations is about poison hemlock and how to recognize it. After describing its unique characteristics, she shows the children a table with hemlock, carrots, yarrow, and other plants in the same family and asks them to identify commonalities and pick out the hemlock. She uses bee and bat finger puppets and connects plants and foods with stories, such as the Japanese legend about the Peach Boy or local lore. Tasting sessions where the kids close their eyes and describe what they are eating are also popular.

As far as talking with children about climate change, Wendy says kids will bring it up. Don't talk down to them. They are never too young to discuss serious issues and to share sad *and* happy stories. "Who says children are fragile? They are hungry for true stories." Ask them what they see happening in their area. Wendy herself is a passionate activist, even though she says she has no hope. "I'm full of joy, even though I know the facts. I have so much life force and so much skin in the game." She comes from gratitude and empathy in addressing the ecological crisis. "Is there some way I can meet this?" she asks herself.

Wendy agrees with non-violent peace activist Father John Dear that it's too late to worry about our individual carbon footprints and whether everyone has changed their light bulbs. Peace and the health of the planet are inextricably linked. As adults we have to stride into the

heart of the problem with non-violent direct action. Children should not be made to feel that it is up to them to save the earth. We need to take peacemaking work seriously. It is the call of our times.

Wendy's inspirations are Buddhist scriptures and scientific studies and journals. She loves learning more science. It is rare to find someone as energetic and grounded as Wendy. She illustrates Buddhist teachings with facts about nature. Interdependence is demonstrated by the fact that it takes 33-36 leaves on an apple tree to create one apple. The compost pile teaches us about the cycles of life and death. In fact, the principles of ecology -- matter cycles, energy flows, life exists in a web -- could be called basic Buddhist truths. The universe is messy, dynamic, and transient, but with commitment, compassion and a sense of humor, as embodied in Wendy Johnson, we can live with joy and inspire love of the earth in our children.

Siobhan Niklasson is the mother of two children, ages 9 and 11, and is the Education Programs Director for the Los Alamos Nature Center, a modern museum surrounded by gardens and play areas. Perched on the brim of one of the many canyons that divide the mesa on which the city is built into finger-like projections, it is run by PEEC, the Pajarito Environmental Education Center. The organization emphasizes hands-on activities and recognizes that young children learn through play. It offers hundreds of programs each year, including one for preschoolers and toddlers called "Nature Playtimes," and hosts visits from many school groups, as well as local families and the general public. Students from Española, the pueblos, and Los Alamos come on yearly field trips, and PEEC staff visit them in their classrooms. The children get to know Siobhan, and their curiosity and enthusiasm inspire her. "When they learn something new, they are like little light bulbs!" she says.

As Richard Louv points out in his bestselling book, *Last Child in the Woods*, there is no substitute for personal experience in nature. Siobhan agrees. The Nature Center emphasizes child-directed outdoor play, whether at the center or on a trail near the children's school. The most popular activity area for children who come with a school group to the center is the fort-building area, a wooded ravine where logs and sticks are waiting to be assembled into whatever the children's imagination suggests. Interacting with their peers to build a hideout or playhouse fosters problem-solving, social skills, teamwork, and risk-management, as well as being good physical exercise. Adults stay in the background after going over only a few basic rules: be safe, responsible, and respectful.

Siobhan talks with kids about global warming and climate change, but usually not until they are in middle school. Due to the wild fires that have destroyed parts of Los Alamos in recent years, local residents of all ages are very aware of fire and water issues. But unless children have made a personal connection with the natural environment near their homes, telling them about rain forest destruction in South America and other doomsday stories can induce "ecophobia," according to *Last Child in the Woods*, associating nature "with fear and apocalypse, not joy and wonder." If children and young people feel that they alone are responsible for saving the earth the task can seem so daunting as to discourage them from even trying.

Siobhan's story illustrates in part this scenario. In high school and college she focused on science, earning a B.S. at Stanford University and an M.S. in geophysics at University of California at Santa Barbara. However, thinking about species extinction, the loss of biodiversity, and other global environmental problems was stressful, so it took her awhile to consider a career in her current field. She thinks of herself as an optimistic person and feels that by educating

students about how we are affected by and affect living systems, a new generation will make the right choices.

Siobhan's colleague and boss, Katie Bruell, spent all her summers from age nine to age fifteen at Farm and Wilderness summer camps in Vermont, running around barefoot outdoors, backpacking, gardening, and swimming in a pond. Farm and Wilderness is one of the few camps where children are outside most the time, not separated from the real world. As a result, "I'm very comfortable in nature," Katie says. As executive director of PEEC, Katie feels that it is more important than ever to get kids outside. If they spend all their time with their screens they won't have a connection to or feel at home in nature. And this is the key to motivating children to care about wildlife, the earth, and ecology, she believes.

Is your child reluctant to play outside? Katie recommends *Roxaboxen*, a book by Caldecott Medal-winning illustrator Barbara Cooney and author Alice McLerran. It captures the joy of playing outdoors. Pinecones, rocks, bugs, and dirt are fascinating to very young children, and adults can encourage imaginative play by taking older kids on walks and asking questions such as, "If you were a squirrel, where would you hide your nuts and seeds?" Spending time in nature has benefits for stressed parents, as well as for kids, Katie says. "The natural beauty around Los Alamos is breathtaking." She enjoys hiking on the many trails in the area and just being outside without her cellphone in natural areas**.** "It's hard to find that kind of peace elsewhere in your life."

Rich Schrader is an energetic, fast-talking, and super-productive protector and restorer of watersheds. Rivers are his passion, and he started River Source in 1997 to put his values into practice. Through community-based environmental education, collaboration with non-profit organizations, science and policy actions, River Source has had a big impact on the rivers and

streams of northern New Mexico. Rich has designed riparian habitat restoration projects all over New Mexico, including the one that recreated a more natural Santa Fe River where it runs through the city of Santa Fe. He is helping cities, counties, and private ranches to adapt to global warming and works directly with about three thousand children a year. He also does teacher training and consulting.

An example of his work is a Santa Fe Watershed Association program that Rich will conduct for forty-five fifth-grade classes during the 2018-2019 school year. Each class will meet with him three times: first in their classrooms, then on a field trip into the watershed to see the reservoirs and the prescribed-burn areas, and afterwards again at school. Rich gives the students pre- and post-tests to assess what they already know and to measure what they learn. They will find out not only where their drinking water comes from but also learn about the role of fire in keeping a forest healthy.

Rich has a lot of fun, interactive ways to get kids to feel connected to nature. He wants them to develop a sense of place, a sense of caring for a home, for a habitat. By mapping a hundred-foot-square area as if they were firefighters doing fire management the children increase their observational skills. They may also create a model of a watershed by piling up their backpacks, covering them with a waterproof tarp, and then spraying the tarp with water to see how the water flows. Rich likes hands-on activities because they engage multiple intelligences. He asks questions that the children have to think about in order to pique their curiosity.

Rich does talk with children about global warming, but usually not until they are in fifth grade, and he never leads off with anything depressing. Just presenting them with scientific facts is not enough. “Numbers will not get them to care.” He talks about coal mining and how the

regulations have changed under the current federal administration, but also organizes high school students to do actual physical conservation work.

Personally Rich is optimistic about the future of our planet, but he also feels a sense of urgency and the need to be hyper-organized to accomplish as much as he can as quickly as he can. He wants to be a role model for the next generation. As to what inspires him to do what he does, Rich wanted to work with people of different cultures, to work outdoors, and to feel good about his work. "It's possible to do well by doing good," he says, and as a social entrepreneur he has been able to support his family. He loves his work and sees it as "right livelihood." His light-hearted and well-organized approach seems to be working well.

Katie Weeks is the Director of Community Education for Audubon New Mexico and has led the popular summer day camps at the Randall Davey Audubon Center in Santa Fe. The center also hosts third- and fourth-grade children who come on field trips and trains teachers to present an Audubon curriculum at elementary schools in other parts of the state. In total, Audubon New Mexico reaches about 3000 children a year.

John J. Audubon was a naturalist and an artist who is famous for his paintings of birds. Randall Davey, also a painter, left his home and studio in the Santa Fe River canyon to the Audubon Society. Programs for kids at the center and in schools integrate developmentally appropriate art projects and nature studies, as well as engineering and play. Katie points out the connection between artists and scientists – both gather data and depict it, although in different ways.

One Audubon-trained teacher at Tesuque Pueblo School had her class do a research project about birds that involved writing a report and drawing color illustrations. Children are eager to read about animals they have seen in real life. At Ohkay Owingeh Pueblo students drew

pictures of important bosque plants and animals, then interviewed their elders about what the river and their bosque mean to them. This led to the creation of a pamphlet showing the children's pictures with the Tewa names of each plant and animal.

Games and hands-on activities encourage children to experiment and build. By making bee houses from toilet paper tubes and paper straws the kids learn that most native bees here are solitary and do not live in hives. There is always time for fort building during summer camp and always lots of questions. Inquiry-based learning is a way to get kids to notice their surroundings and think about why the animals and plants they observe look and act the way they do.

Bird-watching can be a meditative activity. Katie finds that sometimes it is the only way to get children to sit quietly. She believes that direct experience outside in natural settings helps children understand that they are a part of nature. Children enjoy learning "cool" facts about bugs and birds and find them fascinating. A snail, for instance, is both male and female, has most of the major organs that we have, and can learn through operant conditioning. Most children have seen videos of deer or woodpeckers, but to see live animals up close is very meaningful for them. A doe wandered across the lawn of the center during our interview, while a flock of wild turkeys gathered under a large tree hung with bird feeders.

Global warming is a politically charged topic, and Katie doesn't always talk about it, depending on the age of the children and the setting. When she does discuss it she uses coded language, talking about how the earth is changing and that we need to be good stewards. "How can we protect the animals and plants?" she asks the children, and then lets them come up with their own ideas. One five-year-old boy told her, "I am not going to build a house in the middle of the forest." Where would he build it? "I would put it in the street 'cause there are no trees there."

At the end of every Audubon program there is time to think about what each child can do, depending on the theme of the program, whether it is water issues or birds. Getting the children to talk in small groups helps kids feel comfortable and promotes problem-solving skills. By that time they will know the vocabulary and background information to be able to talk about what they have observed.

Katie grew up in Hawaii and has always felt connected to the natural world. She is an educator because she likes interacting with people and wants to share her love of nature. Hearing depressing news about the ecological crisis makes Katie feel anxious, but it also motivates her to get creative and teach more effectively. As a playful person who loves nature and likes working with kids, she loves being a teacher, learning new things she can share with her students.

Genie Stevens did not train to become an environmental educator, but found herself running an after-school educational program for children due to her young daughter's concern for the earth. She is now the Climate Education Director for the Rio Grande Chapter of the Sierra Club as well. Genie's daughter Marina Weber was six years old when she learned about global warming and became angry that animals were suffering. "So what are you going to do about it?" challenged her mother. "I'm going to write to the President," Marina answered. Marina wrote several letters to then President Obama, but eventually learned that the replies she received were form letters. The President wasn't getting the message. With her artistic friend Joanna Whysner as illustrator she began writing a book. When the two girls were in middle school *The Global Warming Express* was published and has won numerous awards.

Meanwhile, in 2013, the Global Warming Express Club was started at an elementary school in Santa Fe. Since then it has involved about one thousand children ages 8-12 years old

and currently is offered in fifteen schools in New Mexico. Meeting weekly for an hour and a half after school, the program is run by and for kids. They set their own big and little goals, and with the help of an adult mentor, learn about climate change and become politically active.

The mentor for each club is a trained volunteer who starts by teaching the basic science related to climate change using props, such covering a globe with a blanket to demonstrate the effect of greenhouse gases. "What do you do if you're too hot when you're in bed trying to sleep?" "You kick off the covers." " Can the earth kick off this blanket?" Rather than looking at photos of starving polar bears the group reads colorful picture books such as the Sunlight Series by Molly Bang, which are a great resource in explaining climate science. Active games, such as Oil Spill Tag and Musical Rocks, are another learning tool.

In Genie's experience children are usually angry, not scared, when they learn about global warming. She emphasizes solutions through advocacy and empowerment and encourages them to use critical thinking to make group decisions about what to do. The program gives them skills -- how to write a letter, how to give a speech -- and engages the children in artistic expression and at times drama to make their voices heard. Children in the program have successfully petitioned their school principals, mayors, and city councils to install solar panels, remove machines selling bottled water, and compost food waste. They have participated in demonstrations at the state capitol and spoken to large groups of adults about their mission to protect the earth.

Genie says that all 8-10-year olds care about nature and identify with animals. She approaches each child with an open mind—what is this child's or this group's experience? She believes that third, fourth, and fifth grades are a magic age for learning. "Children who feel safe absorb information like sponges. They want to make a difference and can; grownups want to

hear children speak and will listen." By age twelve and thirteen hormones hit and teens become more preoccupied with social groups, so Genie feels that elementary school is the time to get children informed and concerned. Yet Greta Thunberg, the Swedish teenager, has inspired people all over the world to take action, and Genie sees her as a wonderful role model for youth.

Genie's personal feelings about our current environmental crisis are mixed. Buddhism is one of her foundations. "The world is in us, so how can I change and thus change the world? It's not 'out there.' I must be committed to the next generation and catalyze their sense of agency." She sees kids as little bodhisattvas with the right support. Her core belief is that transformation is always possible and love is basic. "I don't sit still with one solution -- there are unlimited options. There's nothing that enough talking can't solve."

Jonathan Hayes is the executive director of Audubon New Mexico. He became interested in biology in high school and was fascinated by biodiversity and the complexity of the living world. He came to believe that the world's biggest problem is loss of biodiversity, leading him to choose a career in this field. I interviewed him with his coworker Katie Weeks several months after my initial interview with Katie. First we came up with a list of threats to wildlife and to life in general on Earth. The number one threat, in Jon's opinion, is habitat loss. Many of these threats are interrelated and are listed in the next section, "The Scope of the Problem."

We then discussed the claim that regenerative agriculture can reverse climate change. Soil can sequester carbon from the atmosphere; in fact our soil and oceans are earth's two main carbon sinks. No-till agriculture, conservation ranching, organic farming, and other techniques to preserve roots, microorganisms, and other valuable components of soil allow more carbon to be taken up by earth. But Jon and Katie doubt that any one change can be a total solution to our ecological crisis.

What is a realistic view of the future? The United Nations' Intergovernmental Panel on Climate Change has predicted that between 2030 and 2052 the earth's temperature will rise by 1.5 to 2 degrees Centigrade if global warming continues at the current rate, and there will be disastrous consequences. Unless we make significant progress before 2030 many changes will be irreversible. But many people are not aware of the changes that are already occurring as a result of global warming. Until the impact is impossible to ignore the public may remain unaware and not care enough to act. Katie used the analogy of a huge cruise ship. Some passengers may see danger ahead and shout loudly, but it takes time to turn a large ship. Systems evolve slowly, and political changes and new regulations require time unless there are bold leaders at the helm. Individual actions are not enough now. We must have systemic change.

Jon and Katie pointed out that there is cause for optimism. President Bush set aside a large marine preserve in the northwestern Hawaiian Islands. Wind and other renewable energy sources are becoming a market force. They have faith that humans are resilient and innovative and will adapt to climate change.

I asked Jon and Katie, "What connection do you see between our present crisis, its solution, and spirituality?" Jon mentioned Max Weber's work, *The Protestant Ethic and the Spirit of Capitalism*, which showed how the Reformation led to greater exploitation of workers and glorification of economic gain. But today the biggest polluters and destroyers of the environment are the Chinese, Communists with no religion. Jon sees spirituality that promotes mindfulness and oneness with nature as part of the solution to our ecological crisis, while organized religion is destructive.

Katie talked about how we teach morals and ethics. Previously it was through religion. We want to create a conservation ethic in our culture, but we don't talk about spirituality. In

Hawaii where she grew up, an environmental ethic is part of the native religion. How to harvest trees, which fish to catch, and other sustainable practices were enforced as part of their cultural identity. Native cultures self-regulate. When working with students she tries to instill awe, gratitude, wonder, understanding, and respect for the natural world. What does it mean to be a part of nature? It's hard to appreciate nature if you have not been exposed to it. Some of the fourth-graders who come to the Audubon Center have never been in a forest before. They are afraid -- of bears, of bugs, of being in a foreign environment. It can be over-stimulating for them.

My final question in the interview was "What keeps you from giving up in despair?" Jon says he unconsciously tries to balance harsh realism about the challenges we face with hope and optimism. Katie sees herself as a problem solver as well as a doomsday preparer. For her, teaching kids is a long-term investment, and she has faith in her work. Jon and Katie both focus on achievable goals, what they can do to conserve habitat today. They see incremental changes for the good, and that keeps them working as stewards of the earth.

It was sheer good luck that when I reached the top of the Chimney Rock mesa at Ghost Ranch Patte Ranney was sitting zazen under my favorite tree. When she finished her meditation she caught up with me on the trail back down to Ghost Ranch, and we introduced ourselves. Patte is a naturalist with Outside Brands, an outdoor adventure company on Hilton Head Island, South Carolina. She trains guides in an area she has come to love through living most of her adult life there. Her job also involves leading corporate groups interested in the environment on kayak trips through the salt marshes around the island. She also teaches up to seven hundred seventh graders each year. Every seventh grader in Beaufort County gets a low- or no-cost field

trip to learn about the tides, the marshes, and other aspects of nature through visiting the marina and exploring in a kayak.

Patte thinks that children as young as five years old can begin learning about climate change and global warming and can start to conserve energy and resources, but she would not talk about the urgency of dealing with the crisis until they are in the upper elementary grades. 'Lead by example' is her motto: pick up trash, recycle, enjoy walking outside, observe bugs, and directly experience the tides. She demonstrates how everything in a watershed flows into the ocean by using chocolate chips as trash, chocolate sprinkles as fertilizer, soy sauce as motor oil, and a spray bottle as rain.

With adults who are paying for a kayak trip she is cautious, as climate change is a divisive topic. She asks questions and lets the participants reveal their opinions through their answers. "To the best of my knowledge, we know the temperature is rising, sea levels are rising. What have you noticed in your home environment?" In South Carolina violent storms have caused flooding at the time of the full moon, and animals that used to live mainly in Florida, such as manatees, sea turtles, and seals, are now more common along the northern part of the South Carolina coast.

Patte is inspired by the wonder of the natural world. "As soon as you think you know something, nature surprises you," she says. She works almost exclusively outdoors, and every day there is something new, a new beginning. Her spiritual beliefs are the source of her work, and her role models are John Muir, Walt Whitman, Henry David Thoreau, and Jacques Cousteau. "The earth and everything in and on it is as alive as I am," she believes. "We are one and the same. I just look and move differently. Everything in the universe is in me; everything in me is part of the universe."

Appendix C. Suggested Resources for Children and Adults

1) **Books for Children**

Recommended by the Sierra Club:
Ages 3–7

The Digger and the Flower **($18, Balzer + Bray) by Joseph Kuefler.** This simple story about a backhoe that tries to protect a flower from urban sprawl offers parents a jumping-off point for talking to little children about the ways in which plants keep our planet's soil and air healthy. It also sends a subtle message about how we can help repair the damage that now contributes to climate change by planting some flower seeds of our own.

Ages 4–8

The Brilliant Deep **($18, Chronicle Books) by Kate Messner, illustrated by Matthew Forsythe.** If your kid's an ocean-lover, it's likely she already knows that the world's coral reefs are dying due to ocean warming and acidification. This book offers a much-needed hopeful message about the restoration work being carried out by the Coral Restoration Foundation. It shows children that while climate change is grim, we do have the power to repair some of the destruction it's already wrought.

Ages 5–6

Great Polar Bear **($18, Seagrass) by Carolyn Lesser.** Illustrated with exquisite cut-paper collages, Lesser's lyrical look at how polar bears struggle to survive the seasons allows young readers to develop an emotional connection to this vulnerable species. This makes the back matter—which explains in detail how climate change is leading to rapid polar bear decline—all the more poignant.

Ages 6–10

Icebergs & Glaciers **($18, Harper) by Seymour Simon.** Understanding shrinking icebergs and glaciers is critical to understanding cause and effect: Temperatures warm, causing ice to melt, causing oceans to rise, causing cities and towns to flood. Climate-change-specific facts are embedded within Simon's broader exploration of frozen regions—for example, the rate at which Iceland's ice sheets are shrinking and how increasingly thirsty countries contemplate using icebergs as sources of fresh water. Accompanying photos offer glimpses of a beautiful but disappearing world.

A Place For… **($17 each, Peachtree) by Melissa Stewart, illustrated by Higgins Bond.** Focused on bats, butterflies, frogs, fish, birds, and turtles, this series doesn't expressly mention climate change. But in explaining the link between human behavior and the health of wild animals, it makes a clear case for protecting those ecosystems that are disappearing due to rising temperatures.

Ages 7+

Look at the Weather ***($20, Owlkids)*** **by Britta Teckentrup.** To better understand climate change, it helps to understand rain, snow, and storms—and their roles in the intense varieties of weather that are becoming increasingly common as Earth warms. This tome strikes that rare note between fact—say, how water turns to ice in the atmosphere—and art, offering poetic musings on sun showers and ocean fog. Its text is set atop evocative landscape paintings.

The Wolves of Currumpaw **($24, Flying Eye) by William Grill.** A remarkable illustrated biography of wolf hunter Ernest Thompson Seton, this book concludes with Seton's dramatic change of heart about wild animals and the environment. Readers learn that Seton eventually went on to co-found the Boy Scouts of America, and that in 2013, the organization mandated that its Eagle members earn sustainability badges—a critical nod to human contributions to climate change.

Ages 8–12

The End of the Wild **($17, Little Brown) by Nicole Helget.** Fracking advocates argue that natural gas burns cleaner than coal, while detractors point out that it leaks methane, intensifying climate change. This novel centers around a girl living in a depressed rural area where residents fall under the sway of a jobs-promising fracking company. It deftly explores the collateral damage of hydraulic fracturing: water pollution, the destruction of ecosystems, and the ways in which differing opinions can also fracture relationships.

The Global Warming Express **($15, Terra Nova) by Marina Weber, illustrated by Joanna Whysner.** Sometimes, a message is better received when it's delivered by peers. This fanciful tale about a group of animals alarmed by climate change and determined to fight it was written and illustrated by the nine-year-old founders of the Global Warming Express nonprofit. Their message to young readers: If *they* can do it, so can you.

Ages 9–13

Rising Seas **($20, Firefly) by Keltie Thomas.** This primer on climate change is loaded with information about why our oceans are rising, what it has to do with soaring global temperatures, and the ways in which certain places—from Miami to Kiribati to Antarctica—are literally drowning. Pumping out straightforward facts, this book doesn't offer any cheerful prognoses. Most tweens, however, already know that swift, strong climate action is required of them—and this book's back matter suggests 10 ways to make a difference.

Ages 10+

When the Sky Breaks **($23, Smithsonian) by Simon Winchester.** Winchester recounts monster storms such as Hurricane Sandy and Cyclone Tracy, explaining to older kids how they're part of shifting global weather patterns rather than isolated freak occurrences. This book also delves into how human behavior worsens storms and the myriad unpleasant effects we can expect to experience as the decades march ever-hotly on. This is a serious book for the seriously science-minded, providing answers to pressing questions about climate change and serving as a call to action.

Ages 12+

Legacy **($18 pre-order, Putnam) by Jessica Blank.** In the 1990s, before climate change had become a household term, young activists in Washington State began occupying old-growth forests to protect them from logging companies. This novel uses those events as the setting for the personal drama unfolding in the life of its protagonist. Teen readers will connect those early environmental efforts to the present—and will be moved by the book's gentle but poignant plea for the spiritual necessity of wild places.

And here are all the books listed in the "Fellow Earthlings!" pamphlet plus a few more:

The "Sunlight Series" by Molly Bang – clear text and beautiful color illustrations for age 5+:

Molly Bang, *My Light*, 2004, Blue Sky Press, New York. Describes how we transform sunlight into electricity.

Molly Bang and Penny Chisholm, *Living Sunlight - How Plants Bring the Earth to Life*, 2009, Blue Sky Press, New York. Tells how plants catch sunlight and use it to make food.

Molly Bang and Penny Chisholm, *Ocean Sunlight – How Tiny Plants Feed the Seas*, 2012, Blue Sky Press, New York. Introduces the sun's life-sustaining role in ocean ecosystems.

Molly Bang and Penny Chisholm, *Buried Sunlight - How Fossil Fuels Have Changed the Earth*, 2014, Blue Sky Press, New York. Explains how fossil fuels are sunlight trapped beneath Earth's surface – now being burned and changing our planet's carbon balance.

Molly Bang and Penny Chisholm, *Rivers of Sunlight – How the Sun Moves Water around the Earth*, 2017, Blue Sky Press, New York. Tells how water cycles through our bodies and through the Earth and shows how Earth's water balance is changing.

Joanna Cole, *The Magic School Bus and the Climate Challenge*, 2010. Why not turn to Ms. Frizzle, so kids can understand the crisis - and how they can help solve it!

Laurie David, *The Down-to-Earth Guide to Global Warming*, 2007. A kid-friendly and engaging book that will get kids get interested in the environment.

Oliver Jeffers, *Here We Are: Notes for Living on Planet Earth*, 2017, Philomel Books, New York. Explains our place in the universe with whimsical paintings and gentle suggestions.

Thich Nhat Hanh, *The Hermit and the Well*, 2003, Plum Blossom Books, Berkeley. Based on a true story by the Vietnamese Zen master.

Gary Larson, *There's a Hair in My Dirt*, 1998, HarperCollins, New York. Humor with a message.
Alice McLerran and Barbara Cooney, *Roxaboxen*, A true story about children's joy in creative outdoor play.
Anne M. Picard, *Peace and Pancakes*, 2006, Beaver's Pond Press, Edina, MN. Non-violent communication for children.
Margret and H.A. Rey, *Curious George Plants a Tree,* 3rd edition, 2010, HMH Books for Young Readers. The little monkey sets a good example.

April Pulley Sayre, *Thank You Earth: A Love Letter to Our Planet*, 2018, Greenwillow Books, New York. Colorful photographs with ideas for action.

Theodor Seuss Geisel, a.k.a. Dr. Seuss, *The Lorax,* 1971, Penguin Random House, New York. The ecology crisis and our responsibility to care for earth's beauty in colorful pictures and rhyming verse.

2) **Books for Adults**

William deBuys, *A Great Aridness: Climate Change and the Future of the American Southwest*, 2011. What we can expect in New Mexico.

Joseph Cornell, *Sharing Nature with Children (Twentieth Anniversary edition),* 2018, and Joseph *Cornell and Richard Louv, Sharing Nature: Nature Awareness Activities for All Ages, 2015.* Engaging nature games that invite curiosity and play.

Jared Diamond, *Collapse*, 2005. A comparison of several societies that have preserved their natural environments with others that have exploited their ecosystems to the point of collapse.

Adam Frank, *Light of the Stars: Alien Worlds and the Fate of the Earth*, 2018, W.W. Norton & Company, New York. The big picture and the long view.

Pope Francis, *Encyclical on Climate Change and Inequality: Care for Our Common Home*, 2015, Melville House Books, New York. The Biblical basis for caring about the earth and a moving plea to take care of the less fortunate.

Gary Fuller, *The Invisible Killer: The Rising Global Threat of Air Pollution – and How We Can Fight Back*, 2019. See questions & answers-with-gary-fuller.

Thich Nhat Hanh, *Love Letter to the Earth*, 2013, Parallax Press, Berkeley. Zen wisdom for facing today's crisis.

Paul Hawkens, editor*, Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming.* 2017. Penguin Books, New York. A *New York Times* best-seller.

Dahr Jamail, *The End Of Ice: Bearing Witness and Finding Meaning in the Path of Climate Disruption*. A journalist's journey.

Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants*, 2014, Milkweed Editions, Minneapolis. Beautifully written true stories from a Native American biology professor and herbalist.

Elizabeth Kolbert, *The Sixth Extinction: An Unnatural History*, 2014, Henry Holt & Company, New York. A glimpse into how scientists learn about the geologic past.

Macy, Joanna & Johnstone (2012). *Active Hope: How to Face the Mess We're in without Going Crazy*. Novato: New World Library.

Matsumoto, Shoukei (2018). *A Monk's Guide to a Clean House and Mind*. New York: Penguin Books. A short, calming, and pertinent guide to Zen living with amusing illustrations.

McKibben, Bill (2019). *Falter: Has the Human Game Begun to Play Itself Out?* New York: Henry Holt & Company. Honest, but hopeful.

3) Websites (Also see the websites mentioned in the pamphlet.)

"Next Generation Science Standards" for schools: https://www.nextgenscience.org

Educational resources from Cornell University: https://climatechange.cornell.edu/youth/

Ideas for teachers from NASA at: https://climatekids.nasa.gov

An Australian handbook for parents on raising children to thrive in a climate-changed world: https://www.psychology.org.au/for-the-public/Psychology-topics/Climate-change-psychology/Talking-with-children-about-the-environment

Appendix D. Questionnaires

1) **Questionnaire for Teachers**

Today's date:

Name:

School:

Role:

Number and ages of children you are or have been teaching or responsible for:

General description of curriculum or setting:

Where do you get most of your information about world and local events? Do you consider yourself well informed about our current ecological crisis?

Do your students ever spontaneously bring up the topic of climate change and global warming? Do you talk with your students about climate change and global warming?If yes, how? If no, why not?

At what age do you think it is appropriate to introduce those topics?

How do your students feel about animals, trees, and the future of our planet? Bored, interested, sad, depressed, scared, angry, concerned, energized?

Are there any books, films, or other instructional materials that you would recommend to parents and other teachers?

How do your personal feelings about our current environmental crisis affect your work with

children? Are you optimistic, pessimistic, hopeful, discouraged?

What inspires you as a teacher?

How do your spiritual beliefs affect your feelings and ideas about the future of our planet?

What do you think parents need to know or would find helpful when talking with their children about the future of our planet?

Are there other questions you think I should ask? Other people I should talk with?

Thank you very much for helping me with my research project on kids and climate change. It is part of the final paper I am writing as a student in the Upaya Zen Center Chaplaincy Program.

Mary Ray Cate, sunlitart@hotmail.com, (505) 989-1630 1677 Cerro Gordo Road, Santa Fe, NM 87501-6148

2) **Questionnaire for Parents and Grandparents**

Today's date:

Name:

Role:

Gender and ages of children:

Where do you get most of your information about world and local events?

Place or setting where most of your interactions occur:

How often do you explore nature or observe wildlife with your children or grandchildren?

What specific activities do they enjoy that might increase their ecological consciousness?

Have you talked with your children about climate change and global warming? If yes, how?

At what age do you think it is appropriate to introduce those topics?

Would you want your (grand) child's teacher to discuss global warming and mass extinction with your child's class? Why or why not?

Are there any books, films, or other instructional materials that you would recommend to other parents and teachers?

Are you optimistic, pessimistic, hopeful, or discouraged about the future of our planet?

How do your personal feelings about our current environmental crisis affect your parenting?

How do your spiritual beliefs affect your feelings and ideas about the future of our planet?

What inspires you as a parent or grandparent?

Would you like more information about the ecological crisis and how to explain, discuss, and respond to it with your children?

Are there other questions you think I should ask? Other people I should talk with?

[All the parents and grandparents were interviewed in person, therefore I did not include my contact information on this form.]

3) **Questionnaire for Young People**

Today's date:

Name:

School:

How old are you now?

How old were you when you first heard about global warming?

How did you hear about it?

How did you feel when you first learned about it? Sad, mad, scared, confused?

Have you learned more about the climate crisis since then? In school? Online? Through social media?

If yes, have your feelings changed and how?

Do you talk with your parents about global warming?

Do you talk with friends or classmates about the climate crisis?

Does the subject come up in any of your classes?

Is ecology, species extinction, or global warming part of the curriculum at your school?

Who knows more about it, you or your parents?

Where do you get most of your information about what's going on in the world?

What do you think parents should know about talking with their children about the climate crisis?
At what age do you think it is appropriate for kids to know about the problems our planet is facing?

Are you doing anything to help the earth? If yes, what are you doing?

Thank you very much for helping me with my project.
Mary Ray Cate, sunlitart@hotmail.com

4) **Questionnaire for Environmental Educators**

Today's date:

Name:

Organization:

Role:

Number and ages of children you are or have been teaching or responsible for:

General description of curriculum or setting:

How do you motivate children to care about nature, wildlife, and the health of our planet?

What specific activities have you found useful in increasing ecological consciousness?

Do you talk with children about climate change and global warming? If yes, how?

At what age do you think it is appropriate to introduce those topics?

Are there any books, films, or other instructional materials that you would recommend to other parents and teachers?

How do your personal feelings about our current environmental crisis affect your work with children? Are you optimistic, pessimistic, hopeful, discouraged?

What inspires you as a teacher or parent?

Are there other questions you think I should ask? Other people I should talk with?

[All the environmental educators were interviewed in person, therefore I did not include my contact information on this form.]

Appendix E: **Pre-test**

Please agree or disagree with the following statements by circling the number.
1=strongly disagree 2=disagree 3=unsure 4= agree 5=strongly agree

1. I plan to spend time exploring the outdoors with my children in the next week.	1	2	3	4	5
2. I am concerned about the future of our planet.	1	2	3	4	5
3. I know where to look for accurate information about climate change and global warming.	1	2	3	4	5
4. I am likely to bring up these subjects with my children	1	2	3	4	5
5. I feel hopeful about the future of our planet.	1	2	3	4	5
6. It is important to contact elected officials about environmental issues.	1	2	3	4	5
7. I plan to do all I can to minimize climate change and global warming.	1	2	3	4	5
8. I know what changes I could make that would be most effective in slowing down global warming.	1	2	3	4	5
9. I am active in (or plan to join) an organization that is					

working to protect the earth. 1 2 3 4 5

10. Meditating outdoors can help us appreciate nature and our place in it. 1 2 3 4 5

11. What are the ages of your children/grandchildren/students?

12. Have you talked about climate change or global warming with them?

Post-Test

Please agree or disagree with the following statements by circling the number.
1=strongly disagree 2=disagree 3=unsure 4= agree 5=strongly agree

1. I am concerned about the future of our planet. 1 2 3 4 5

2. I know where to look for accurate information about climate change and global warming. 1 2 3 4 5

3. I am likely to bring up these subjects with my children. 1 2 3 4 5

4. I plan to do all I can to minimize climate change and global warming. 1 2 3 4 5

5. I feel hopeful about the future of our planet. 1 2 3 4 5

6. I plan to spend time exploring the outdoors with my children in the next week. 1 2 3 4 5

7. It is important to contact elected officials about environmental issues. 1 2 3 4 5

8. I know what changes I could make that would be most effective in slowing down global warming. 1 2 3 4 5

9. I am active in (or plan to join) an organization that is working to protect the earth. 1 2 3 4 5

10. Meditating outdoors can help us appreciate nature and our place in it.	1	2	3	4	5
11. The pamphlet I just read was easy to understand.	1	2	3	4	5
12. The pamphlet I just read was helpful to me as a parent/grandparent/teacher.	1	2	3	4	5

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I could not have written this thesis and the pamphlet for parents and teachers without the help and cooperation of all those who agreed to be interviewed, filled out questionnaires, wrote comments on the pamphlet, and evaluated the final draft. I am especially grateful for the editorial assistance of Katie Weeks of Audubon New Mexico, Patte Raney of Outside Brands in Hilton Head, South Carolina, Rich Schrader of River Source, Genie Stevens of Global Warming Express and the Sierra Club, Katie Bruell at the Pajarito Environment Education Center, and Siobhan Niklasson of the Los Alamos Nature Center. I would also like to thank my fellow chaplaincy students in Cohort 11 for their support. Knowing we are all in this together has made the daunting process of writing a thesis a lot easier.

Underlying everything, of course, is the basic commonsense message of Sid (the Buddha). We are here on this planet as integral parts of the universe to help all our fellow beings in whatever way we can. To all those who have passed down and kept alive the Buddha's teachings, a deep bow. May all beings be safe, be strong, be happy, and live with ease.