

Letter to Our Grandchildren from Students of the Natural World
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Dear precious ones,

Although our sons have not yet dreamed of you, you likely will be born in the next decade. The twenty-first century will be yours. Our greatest hope is that you will have a chance to love the Earth's natural beauty as we have. Our connections with life were forged by many small miracles—catching fat bluegill from a small farm pond; walking in the woods with a bottle-raised orphan fawn; hearing the wind whisper hidden riddles from atop a desert mesa; listening to the howl of wolves, a musical counterpoint to the susurrus of aspen leaves; cataloguing the amazing shades of blue, gold, and silver flashed by tide-pool fishes. Our lives have been indelibly enriched by a vibrant planet.

We shared our broad sense of community with our sons, your fathers-to-be. As they grew up, they delighted in the loud swoop of nighthawks outside their tent, interrupting the giggle of shared secrets and dreams. Your fathers learned to read the river's mysteries, divining where cutthroat trout might lurk. They learned to relish the flash of bright scales when the fish were released and to savor the taste when they weren't. These strong, good men learned the importance of floodplains and large wood to river dynamics. They learned how returning salmon feed a forest, and why the majesty of a bald eagle depends on tiny freshwater shrimp. They learned how the irresponsible use of pesticides, chain saws, or plows can denude a river of life. They learned how they are connected to everything. They learned love and responsibility and justice.

As we give you our sons to be your fathers, we have done what we could to bequeath you a healthy world. Because we are scientists, we have tried to understand ecological relationships in desert spring systems, expansive salmon rivers, and small meadow streams. Early on, we found that neither of us was cut out simply to document extinction and record degradation, although we have done both. We have done what we could to defend the community of life inhabiting our piece of the planet.

Much of our early lives were spent in the desert. Deserts hold biological jewels that go largely unnoticed. But when they are closely observed, they sparkle like crystal-clear springs and the tightly interwoven community of species that inhabit them. Desert fishes, almost magically adapted to their harsh environments, are desperately vulnerable to disturbance of their small desert oases. Our society affords some special protection to most desert fishes, and that protection in turn shields the entire communities in which these fishes live. All the same, some of these unique denizens are already extinct, while others survive precariously in habitats invaded by exotic species, overgrazed by livestock, or nearly drained by urban, agricultural, or industrial pursuits.

One place dear to our hearts is Borax Lake, a spring-fed lake in Oregon's high desert country. Separated from other water sources in the basin, the lake perches on an elevated mound of

salts that for millennia have precipitated from its hot-spring sources. There we discovered a fish found only in this lake: the Borax Lake chub. A new species is like an unfilled journal. Every aspect of its life history is a mystery: when they reproduce, what they eat, how long they live. But even before the description of the new species was published, the energy giant Anardarko leased the land surrounding the lake for geothermal energy development. They measured the land's value only in the dollar value of the parts that could be extracted and sold.

We worked hard with others who saw the inherent value of this place. When Borax Lake was acquired for conservation, the public lands around the lake received special designation as an Area of Critical Environmental Concern. The energy companies abandoned their rapacious quest and went in search of areas less encumbered by endangered species concerns. A victory? Yes. But like many such victories, it only holds until the first loss. To this day we can't let this species or its desert ecosystem out of our protective sight. How could anyone who has named a species, who has documented its growth, life, threats, and relationships, not defend it? Like many other scientists, we are unable to sit on the sidelines as unimpassioned observers. Our principles dictate that this place is too valuable to destroy.

Borax Lake has shared its immeasurable values with us. One cold winter day, we climbed the salt mound to the shore of the lake, where we took refuge from the freezing chill. The water was shrouded in a dense cloud of rising steam; we could see no more than ten or twenty feet. Through the warm mist, a flock of tundra swans slowly drifted into our vision like clouds floating across the sky. We have spent countless days sitting in such places, watching for what might touch our souls and rouse our curiosity. There always is more to be amazed by, always more to learn.

For our sons and grandchildren, we have worked so long to protect these values in places across the West. In southern Nevada, Ash Meadows now is a National Wildlife Refuge, where the unique biota of the desert oasis is less vulnerable to human carelessness. In California, winter Chinook salmon still make their way through the San Francisco Bay delta to swim up the Sacramento River, whose flows now are managed, at least in part, to conserve this threatened salmon; they spawn in gravel beds shaded by riparian forests protected for the valley elderberry longhorn beetle. Who would have thought that a rare beetle could help save endangered salmon? The Railroad Valley springfish still swim in their central Nevada warm springs, not knowing that they only narrowly escaped the dangers of missile tracks and oil fields; with the ongoing protection of federal law, this small silver, black, and sapphire fish may continue to swim in the spring throughout your lifetimes. Brought face-to-face with the reality of salmon endangerment along the Pacific coast, the nation reluctantly shifted its attention from arguing about how to divide up the fading fishery to working to ensure that the remaining diversity of salmon stocks survives. The runaway train of Forest Service logging practices was brought to a screeching halt in the Pacific Northwest and switched to a track that has a chance to protect, restore, and maintain the ecological health of rivers and streams. This is a huge step toward realizing that the first and best use of public lands may be maintaining the ecosystem services they provide. Even after all the effort that these victories entailed, we know that every step to save a species can easily be undone through deliberate intent or simple inattention.

Of course, we also must be mindful that saving one place may simply shift the burden to another. Energy giants can move from Oregon's high desert to Wyoming sagebrush country and back again. Only when the demand for more resources subsides can we begin to forge a new relationship with the natural world. We must encourage our neighbors and our society to protect the needs of nature itself, as we protect our own needs and those of future generations.

We are worried that despite our best collective efforts and a lifetime of commitment, your world will not be as rich as ours has been. As scientists, our work has been to investigate how fishes spend their lives. But for years our obligation also has extended to informing public policies and encouraging personal lifestyles that treat the natural world with greater reverence. This is a much harder task, especially as we find ourselves living in a nation of cities inhabited by very busy people with little obvious personal connection to the natural world. From an ecological perspective it seems clear that we all have an obligation to understand the world that sustains us. And, understanding and admiring the natural world, we have an obligation to protect it.

New perils now confront our world. People have spewed greenhouse gases into the atmosphere at so great a rate that the climate is changing faster than many species will be able to adapt. Contaminants have become so pervasive that subtle reproductive anomalies have begun appearing in populations of fish and people. Wildlands are becoming scarce, limiting both the capacity of the Earth to buffer against disturbance and the opportunity for a generation of grandchildren to find, learn about, and grow to understand themselves. Science tells us that people are just as linked to the health of the natural world as salmon, desert pupfish, and beetles are. It is a lesson we all must learn.

We are confident that our sons understand and appreciate their place in the world. We have done what we could to make sure that the land to which you, our grandchildren, will be born still holds secrets and nurtures the capacity to inspire and amaze. As your great-grandfather noted a generation ago, if what is unique about being human is our capacity to know, then every time we destroy an opportunity to know, we destroy part of our own humanity.

The Earth does not care whether people ultimately succeed in finding their place in the world. The planet was just as whole supporting anaerobic bacteria as it is supporting diverse oxygen-based life, and it would continue to hold its place in the universe as a dead rock. But, oh, we care. We care deeply. Our sapient species holds the high ground, and that high perch can be a place for vision or a place for greed. Stresses on our planet grow daily and in ways that are not always easily observed or rectified.

Choices made today will determine whether as you grow, you find your world to be a place of beauty or a place of diminished capacity. Know that you have our heart-deep love and our earnest hope that you will inherit a world still filled with beauty, still vibrant, still able to give you an opportunity to be fully human.