What if people stop caring about the environment?

Ominous trends in nature recreation

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Conservation science is replete with analyses of threats to biodiversity. The IUCN even has a formal taxonomy of threats to imperiled species that can be used to tally up global inventories of threats across taxa or geographies (1). Habitat loss and habitat degradation are touted as the greatest threats, with global warming now also recognized as a major problem along with species introductions (2). But Pergams and Zaradic in this issue of PNAS (3) show a trend in human behavior that ultimately may be far more foreboding for the environment than even declining trends of tropical forest cover or increasing trends in greenhouse gas emissions -- they report widespread declines in nature-based recreation (3).

The importance of human behavior and attitudes to our environmental future is not a new idea. It is this connection between human decisions and environmental outcomes that spurred Paul Ehrlich and Donald Kennedy to call in 2005 for a global assessment of human behaviors (4). What is less clear is how human environmental attitudes get shaped, and what causes those

attitudes to change through time. One hypothesis is that the environmental choices humans make depend to a great measure on the connection between humans and nature, and on a broad human appreciation of nature's constraints and workings. While attention to the human connection with nature might seem remote from the more immediate peril of a bulldozer, there is no doubt that investment in and protection of the environment will require human choices, and some changes in human behavior. Just as we track trends in species loss and forest cover as key environmental indicators, we need to pay attention to trends in human behaviors and attitudes as the ultimate drivers of global change.

Pergams and Zaradic (3) have added an important analysis to a growing sentiment that humans are becoming seriously disconnected from nature. In earlier work they reported a steady annual decline in per capita visitation to U.S. National Parks since 1987, and detected a significant relationship between and "videophilia", or the replacement of outdoor activities with endless hours spent playing video games and plugged into the internet (5). The concept of videophilia and reduced outdoor activity captured the media's attention, but also elicited some thoughtful criticism. Particularly important is the question of how good an indicator national park visitation is of broader outdoor recreation trends. By scouring databases, Pergams and Zaradic have now identified sixteen long term time series assessing different forms of nature-based recreation. With these additional indicators, they ask how robust was their initial conclusion based only on US park visitation. The results are striking – all major lines of evidence support a pervasive decline in outdoor nature recreation. Their analyses included trends in park visitation, hunting, and camping in the USA, Japan, and Spain. The finding of declining wilderness experiences and

nature experiences for people around the world is one piece in a broader picture that entails humans increasingly disconnected from nature, and as a result less likely to value nature.

In addition to fewer visits to nature, enhanced urbanization is bringing people to cities in ever-increasing numbers so that now, for the first time in the history of humankind, the majority of humans live in cities. Rapid urbanization is predicted to continue, with an additional 1.75 billion people expected to be added to cities by 2030 (6). City-dwellers depend on nature for clean water, food, and climate regulation, but it is easy to lose sight of that dependence unless concerted efforts are made to educate urban dwellers about the services that ecosystems quietly provide. A promising new approach to conservation entails getting full economic credit for nature's many services, and in some cases charging users of those services a modest fee that is then applied to nature conservation (7). One of the most successful payment for ecosystem service projects is the Quito watershed fund in Ecuador. A major investment in public education emphasizing the connection between intact forests and clean water helped to pave the way for a subsequent tax on water users that is now used to pay for protection of upland forests and watersheds (8). Given the detected declines in recreational nature use, organized and focused education programs modeled after the Quito efforts that make clear the connection between intact ecosystems and nature's services may be an approach that should be widely adopted.

In a related vein, ecologists, evolutionary biologists and environmental educators increasingly lament the absence of outdoor experiences, natural history courses, field courses, and fewer opportunities at field stations. A poor understanding of basic natural history is sure to undermine our ability to solve environmental problems (9). An amusing but unnerving study of British

schoolchildren revealed that kids between ages 4 and 11 were more than twice as good at identifying characters from Pokémon (a popular card game) than common organisms such as a beetle or a rabbit (10). People care about what they know, and people need to know something about nature in order to solve environmental problems. Although the academic literature on sustainability is growing and universities around the world promise sustainability curricula, the decline in field courses and natural history courses may make sustainability an abstract ideal that cannot be reached for lack of knowledge about the basic facts such as what different organisms need to live, and what roles different species play in the natural world.

Pergams and Zaradic's reporting of reduced nature recreation and the many other indicators of a weakening connection between people and nature might seem to run counter to a seemingly healthy environmental movement. Closer scrutiny challenges the notion that environmentalism is thriving, and indeed has spurred some to write essays pronouncing "The Death of Environmentalism"(11). The depth of support for environmental issues is not as strong as some polls indicate. For instance, although nearly 80% of Americans favor "stronger national standards to protect our air, land and water," environment concerns typically come in last place when individuals are asked to rank the environment against other important issues (12). In fact, not only did the environment come in behind economy/jobs, health care, Iraq, social security, and terrorism in 2005 polling, the environment finished behind moral values and taxes as an issue of concern (12).

Warnings about the "Last Child in the Woods" (13), video-addiction, city-bound people, and a younger generation ignorant about nature runs the risk of sounding like nostalgic resistance to

change. There may be new motivations and inspirations for environmental protection arising that are commensurate with our altered world and still manage to promote attitudes that are favorable to conservation. Perhaps virtual nature and the vivid nature shows on television are sufficient. Perhaps stark economic calculations that contrast the cost of water treatment plants to the cost of maintaining healthy watersheds will be sufficient. Unfortunately, both trend analyses and detailed studies of how human attitudes are shaped are skimpy. A recent retrospective analysis of approximately 2000 adults living in urban areas of the USA used structural equation modeling to uncover a strong link between adult environmental attitudes and childhood nature experiences, finding that experiences with nature before the age of 11 emerged as the best predictor of adult environmental behavior (14). The study did not investigate the effects of experiences beyond the age of 11. Other less quantitative analyses have used interviews with conservation activists and leaders to identify significant life experiences, and those studies indicate that "youthful experience of outdoors and relatively pristine environments emerges as a dominant influence in these lives" (15). What is less clear is the extent to which urban nature can provide similar motivations and lead to substantial commitment to environmental issues and biodiversity protection. The San Francisco Bay area, with more than 7 million people and the epicenter of high tech industry is widely regarding as one of the most progressive environmental communities in the world (16). The San Francisco Bay area has protected over one million acres in parks, greenbelt, and so forth compared to 750,000 acres developed (16). Although ardent wilderness aficionadas may shudder to think of this San Francisco urban landscape as conservation strategy, countryside mixed in with cities may well be a model for the foundation of any future conservation movement.

In the end, the fate of biodiversity and ecosystems depends on political choices and individual choices. Although environmental advocates and activists have long recognized the importance of human attitudes and behaviors, scientific studies of the forces that shape human environmental attitudes are remarkably scarce. Jobs, health and safety will always rise to the top of human concerns. Every day humans face stress and uncertainty regarding jobs, health, and security. If people never experience nature and have negligible understanding of the services that nature provides, it is unlikely people will choose a sustainable future. One critical scientific question is what type of experience with nature is needed – is a wilderness experience necessary or will experiences in a backyard garden or urban park suffice? Equally important is the challenge of a educating a wide variety of public constituencies about the connection between intact ecosystems and natures services to people. Successful nature conservation and sustainable ecosystems will require a battle for the hearts and minds of people. Unfortunately, the national and global trends in public attitudes are not clear, nor do we know how to most effectively influence trends in those attitudes. If Pergams and Zaradic are right, then the pervasive decline in nature-recreation may well be the world's greatest environmental threat.

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