

Invited Features

COMMENTARY

Biodiversity and national parks: What's relevance got to do with it?

By Glenn Plumb, Edward O. Wilson, Sally Plumb, and Paula J. Ehrlich

RECENTLY, THE DIRECTOR OF the National Park Service (NPS) asked the National Park System Advisory Board Science Committee to answer three questions: What should be the goals of resource management in the National Park Service? What policies for resource management are necessary to achieve these goals? What actions are required to implement these policies? Broad in scope and implication, these questions and their answers are intended to help chart the course of NPS resource stewardship. This dialogue generated a call “to steward NPS resources for continuous change that is not yet fully understood, in order to preserve ecological integrity and cultural and historical authenticity, provide visitors with transformative experiences, and form the core of a national conservation land- and seascape” (National Park System Advisory Board 2012). Within this context, the next century for the National Park Service will be influenced by a combination of system-level drivers and stressors such as advancement of climate and land use change, responses to such changes, and how stakeholders perceive the agency's relevance. This essay considers not the relevance of biodiversity, but rather the relevance of the National Park Service as seen through the lens of participants in national park biodiversity discovery and conservation experiences. Simply put, without relevance, the National Park Service will have a difficult time championing meaningful biodiversity conservation.

Discovery matters

What connects national parks, biodiversity, and relevance? The public perception of the centenary National Park Service is increasingly focused on the nation's biodiversity, though this vocabulary is not yet universally practiced. Technically, biodiversity is the diversity of life across the ecosystem, species, and genetic levels. Personally, only the most inattentive of park visitors do not find themselves taking a short breath in wonder and delight when first encountering a park's diversity of life: majestic trees, expansive prairie, tender wildflowers, teeming wild fish, charismatic wild predators and prey, a hatch of the salmon fly, marine mammals, migratory birds and butterflies on their long journeys, cold-blooded amphibians and reptiles, coral reefs, and the colorful extremophiles of acidic hot springs. The diversity of life lives on in its full exuberance, we intend and hope.

We believe that old and young alike who experience biodiversity fully at the level of species in a national park are more likely to believe in the importance of conserving life in general, and to actively become a current- or next-generation steward. The power of biodiversity discovery in such moments is becoming central to the perceived transcendence of national parks. One needs only see the light of discovery in a child's eyes at a park bioblitz to become a believer in the value of living nature. Such transformative experiences

of discovery can be tightly coupled with the diversity of life that has been entrusted to the National Park Service. Think about it. *The diversity of life that has been entrusted.* Think about it again. Think about the great archetypal stories of journeys of discovery and of being entrusted with the diversity of life. Biodiversity is not an asset or a currency simply to be carefully packaged for passage through a purported Anthropocene. For the National Park Service and its visitors and stakeholders, biodiversity discovery and conservation are the journey. Exhilarating.

Words matter

Let's take a step back from the edge of the profound, draw a short breath, and think about our current state of affairs. Just as of old, we continue to record and pass along our rules, accomplishments, aspirations, and paths through written narrative. In the past three decades, the scientific and nonscientific narrative about our growing understanding and anxiety about the ecological consequences of the accelerating loss of biodiversity, especially at the species level, has exploded globally. From this emerging understanding of the ecological centrality of biodiversity in the human condition, this discussion has expanded to include the aesthetic, ethical, sociological, and economic consequences of the loss of diversity of life. Distinctly, Nobel Peace Prize-winner Eric Chivian and colleague Aaron Bernstein (2008) undertook the first

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in-depth synthesis of the fundamental and profound relationships between biodiversity and human health. Though we face many challenges to improving the human condition, conservation of the diversity of life remains within our collective capacity. Conceivable.

Words are important. Certain words speak volumes when used, and are poignant by their absence. Relevance can indeed become biased by a deft turn of phrase. Notwithstanding the rapidly growing global interest in biodiversity, a quiet reading of NPS Management Policies (2006) reveals that “biodiversity” or “diversity” is not to be found in the table of contents or glossary, and is mentioned obliquely only four times amidst this 170-page tome. Intriguing.

Despite this lack of specific biodiversity guidance, the business of biodiversity conservation takes place day to day in national parks through a wide array of resource protection and management, including restoration of native species and ecosystems, control of invasive species, integrated pest management, and inventory and monitoring. The National Park Service is actively engaged in the business of protecting a wide range of habitats, such as prairie, tundra, ocean, mountains, forest, desert, rivers, islands, reefs, mangroves, and coastal wetlands; conserving ecological processes such as predation, competition, and disturbance; preserving large-scale marvels such as migration and

dispersal; and providing for genetically diverse *wild life* populations.

Who cares matters

In addition to this foundational work of protection, the National Park Service advances biodiversity conservation by raising awareness through effective engagement of our citizens. As global threats increase, national parks are becoming critical reserves of biodiversity. Yet current societal trends include the disconnection of youth from nature and low park visitation by minority groups and underrepresented communities. If something is not seen as relevant, it is not considered important.

We suggest that public education and involvement in biodiversity discovery at our national parks are vital to conserving our national biodiversity for the future. Biodiversity discovery in national parks, for example via a public bioblitz, has proven to generate transformative visitor experiences that both educate and inspire through direct public involvement in the discovery of living organisms in the parks, of which it is estimated that 80–90% remain unknown. Because biodiversity discovery activities often require only excited minds and willing hands, they appeal to children and nonscientists as much as they do to experts in the subject matter. The NPS Call to Action item 7, “Next Generation Stewards,” envisions a new generation of citizen scientists and future stewards of

our parks through societal involvement in fun and educational biodiversity discovery activities and has challenged park staffs to conduct such activities in at least 100 parks from 2011 to 2016. Parks can thereby develop new, engaging relationships with diverse audiences, especially children, in the discovery of life in our parks. In the past 16 years, biodiversity discovery activities in parks have identified approximately 21,500 species new to park species lists, and have provided hands-on science experiences for more than 39,000 people of diverse ages, races, and backgrounds (NPS 2014). The scientific gains from biodiversity discovery are incalculable, species specialists will tell you. Public involvement and education can also be catalytic, yielding an exponential increase in awareness of and motivation for stewardship of biodiversity. Imagine the number 39,000 with a few more zeroes.

Consider, for example, the middle school student from Connecticut who attended the 2013 NPS–National Geographic Society BioBlitz at Jean Lafitte National Historical Park and Preserve in Louisiana (see sidebar on page 17). He became so inspired by the experience that he subsequently coordinated a bioblitz that engaged his entire school. As stated by one of his teachers, “City kids who live in some of the most crime-ridden and drug-ridden housing projects in the Northeast, and who need to appear ‘tough’ so they can survive, are now talking biodiversity.”

Participation in biodiversity discovery can be life-changing in unexpected ways. Contemplate, for instance, students from inner-city Los Angeles who were bused to the 2008 NPS–National Geographic Society BioBlitz at Santa Monica Mountains National Recreation Area. Before a single species had been identified, a bigger discovery was made: these children were *seeing the ocean* for the first time. Extrapolate this handful of children to the millions of people who have not yet experienced a national park and who have little understanding of the importance

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of biodiversity in their lives, health, and well-being. They need to experience the ocean to appreciate the fish; they need untamed spaces to attach importance to wild life.

Partners matter

The overarching enterprise of biodiversity conservation is beyond the scope of any single entity. Preservation of biodiversity and our natural heritage needs to take place not only in our national parks but also in our citizens' hearts and minds. We believe that the NPS mission to pass on park resources unimpaired for the enjoyment of future generations, along with the array of implications from the loss of biological diversity, requires the Park Service to undertake leadership and teamwork at spatial scales larger than parks, and in step with partners who may share in this mission. Capturing the public's mind and soul means engaging people wherever they are, whether it be in national parks, vital private natural areas, or their own backyards. Parks are embedded in larger regional and continental landscapes (National Park System Advisory Board 2012), and thus we propose that partnerships with organizations that are working to protect and restore at-risk species and ecosystem biodiversity on private lands are vital to the National Park Service mission. Nonprofits such as the E. O. Wilson Biodiversity Foundation (www.eowilsonfoundation.org), Encyclopedia of Life (www.eol.org), and Discover Life in America (www.dlia.org) are building much-needed capacity for biodiversity discovery and conservation; they can act as conveners, anchoring a driving focus on the importance of biodiversity field research and education, and the use of our parks as classrooms for learning, involvement, and caring. By working together to build a broad and authentic grassroots community

of people who have a deep and personal experience of nature—who explore and participate in the *science* of biodiversity and the *practice* of global biodiversity conservation—we can encourage a public citizenry who understands how the complex and intricate web of biodiversity supports the fabric of our lives and who, through that knowledge, begins to seed this understanding into our cultural DNA and the way we engage with the living world.

Purpose matters

How to serve both humanity and the rest of life is the great challenge of the modern era. That is the reality of the natural world we are trying to save in national parks and other reserves. These final sanctuaries are our transcendent heritage and we will be wise to hold on to them. We can enjoy surviving fragments of nature in various ways and measures. Let us all first take constant pleasure from the surprise, mystery, awe, wholeness, and redemption they offer. Deeper still, let us hold on to a sense of the eternal, which is latent in wildlands. These special places provide hope for the immortality of life as a whole, freed of human cares and intervention (Wilson 2014).

In the not too distant future, we will look back and recognize that sometime near the transition to the 21st century, biodiversity became one of the defining characteristics of the American experience. For the National Park Service mission, for national park relevance, and perhaps for the insights herein, it is imperative for the National Park Service, without hesitation, to undertake leadership and commit to the enduring journey of *biodiversity discovery and conservation* with our stakeholders and partners, along with all the accompanying aspirations and consequences.

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