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Conservation Innovation in America:
Past, Present, and Future

by

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ABSTRACT

Observers throughout the course of U.S. history, including such prominent commentators as Alexis de Tocqueville in his classic volume *Democracy in America*, have dismissed Americans' willingness to appreciate or conserve nature. In fact, American women and men have a long and distinguished record of realizing landmark conservation innovations that are: novel on a worldwide basis; politically significant; measurably effective; transferable to separate organizations, jurisdictions, and nations; and, particularly significant in the field of conservation, enduring. Among the many important conservation innovations that Americans have achieved, only a distinct subset of them has had an enduring impact and so can be considered landmark innovations. Twenty-first century conservationists are challenged to bring forth a new generation of landmark innovations commensurate with the considerable threats to open space and biodiversity that we now face.

This is the twelfth paper in a series dedicated to understanding innovation in the public sector and in the public interest. The Ford Foundation launched the Innovations in American Government Program in 1985 and funded all of its elements through 2000. In 2001, the Foundation established an endowment at Harvard University to continue the Program in perpetuity and to locate it in a new Institute for Government Innovation. Each year, the Program selects the winners of the Innovations Award from approximately 1500 applications and supports research and casewriting based on the applicants. The Innovations in American Government Program also works in partnership with the Council for Excellence in Government.

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In 1831, a young Frenchman named Alexis de Tocqueville made a nine-month visit to America, visiting settlements and rural areas from Alabama to New England. His two-volume work based on that voyage, *Democracy in America*, quickly gained international acclaim and is now considered a classic review of American culture. Tocqueville provided his readers with profound insights regarding, among other topics, the rapid pace of demographic, technological, and economic change in the new nation. He marveled at Americans' ability to "make immense progress in productive industry" and to alter the face of the landscape. "Americans," he reported, "arrived but as yesterday on the territory which they inhabit, and they have already changed the whole order of nature for their own advantage. They have joined the Hudson to the Mississippi and made the Atlantic Ocean communicate with the Gulf of Mexico…. The longest railroads that have been constructed up to the present time are in America."[2] Similarly, Tocqueville described the ardor with which individual Americans pursued material wealth: "A native of the United States clings to the world's goods as if he were certain never to die; and he is so hasty in grasping all within his reach that one would suppose he was constantly afraid of not living long enough to enjoy them. He clutches everything, he holds nothing fast, but soon loosens his grasp to pursue fresh gratifications."[3]

"Americans arrived but as yesterday on the territory which they inhabit, and they have already changed the whole order of nature for their own advantage."

—Alexis de Tocqueville

Tocqueville was mindful of the disruption that such rapid progress could bring to the nation's natural wonders. As explained by Alfred Runte, Tocqueville wrote to a friend in France in 1831: "'Hasten to Niagara if you wish to see this place in its grandeur. If you delay,' he warned, 'your Niagara will have been spoiled for you. Already the forest round about is being cleared . . . . I don't give the Americans ten years to establish a saw or flour mill at the base of the cataract."[4] In time the young Frenchman's fears regarding Niagara proved to be well-founded. By the 1840s, the shores of Niagara were being rapidly filled by commercial ventures. By the 1870s, the scene moved novelist Henry James to remark that the area was "choked in the horribly vulgar shops and booths and catchpenny artifacts which have pushed and elbowed

to within the very spray of the Falls… [to] ply their importunities in shrill competition with its thunder."[5]

The young Frenchman believed that such despoiling of natural beauty was of little concern to Americans. He reports in *Democracy in America* that, "In Europe people talk a great deal of the wilds of America, but the Americans themselves never think about them; they are insensible to the wonders of inanimate nature and they may be said not to perceive the mighty forests that surround them 'til they fall beneath the hatchet. Their eyes are fixed upon another sight: the American people views its own march across these wilds, draining swamps, turning the course of rivers, peopling solitudes, and subduing nature. This magnificent image of themselves does not meet the gaze of the Americans at intervals only; it may be said to haunt every one of them in his least as well as in his most important actions and to be always flitting before his mind."[6]

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Despite his great insight, Tocqueville was apparently blind to the reality that, in the midst of their "march across these wilds," and their striving for technological progress and material wealth, Americans would, paradoxically, demonstrate a persistent capacity to innovate as protectors and stewards of natural wonders, wildlife, and open space.[7] It is the remarkable tradition, current practice, and future of Americans as conservation innovators that is the topic of this essay.

The American conservation tradition extends to the earliest days of the Republic. Indeed, Thomas Jefferson lent his heart, mind, and pocketbook to the protection of a natural wonder as early as 1773. Some three years before becoming the principal author of the *Declaration of Independence*, Jefferson purchased the Natural Bridge of Virginia and the surrounding landscape from King George's government. He served as the proud steward and promoter of the Natural Bridge—a remarkable stone arch near the Blue Ridge Mountains—for the remainder of his life.[8] Jefferson urged painters from Europe and America—including Maria Cosway, who he had fallen in love with while serving as U.S.

Ambassador to France—to come record the site's beauty, making both the site and the painter "known to all ages."[9] Importantly for the history of conservation, Jefferson saw his role in preserving the Natural Bridge, at least in part, as a public service. He wrote to an associate in 1815 that he had "no idea of selling" the place, and that "I view it in some degree as a public trust, and would on no consideration permit the bridge to be injured, defaced, or masked from public view."[10]

In 1832, the same year that Tocqueville concluded his tour of America, George Catlin was making a voyage on the first steamboat to navigate the upper Missouri River basin, a vessel owned by the American Fur Company named *Yellow Stone*. With his paintbrush, Catlin recorded hundreds of remarkable images of American Indians, wildlife, and the western landscape. He became convinced that something dramatic should be done to protect the cultures and wildlife living on the "plain of grass" that extends from Mexico to Lake Winnepeg.

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> It is here, and chiefly here, that the buffaloes dwell; and with, and hovering about them, live and flourish the tribes of Indians, whom God made for the enjoyment of that fair land and its luxuries.
>
> It is a melancholy contemplation for one who has traveled as I have, through these realms, and seen this noble animal in all its pride and glory, to contemplate its so rapidly wasting from the world, drawing the irresistible conclusion … that its species is soon to be extinguished, and with it the peace and happiness (if not the actual existence) of the tribes of Indians who are joint tenants with them, in the occupancy of these vast and idle plains.
>
> And what a splendid contemplation too, when one… imagines them as they *might* in future be seen, (by some great protecting power of government) preserved in their pristine beauty and wildness, in a *magnificent park*, where the world could see for ages to come, the native Indian in his classic attire, galloping his wild horse, with sinewy bow, and shield and lance, amid the fleeting herds of elks and buffaloes. What a beautiful and thrilling specimen for America to preserve and hold up to the view of her refined citizens and the world, in future ages! A *nation's Park*, containing man and beast, in all the wild and freshness of their nature's beauty!

Like Jefferson, Catlin sensed that his idea might be important to future generations. He concluded his passage on the idea of a nation's park writing that: "I would ask no other monument to my memory, nor any other enrolment of my name amongst the famous dead, than the reputation of having been founder of such an institution."[11]

Jefferson and Catlin's conservation-related deeds and words, along with those of conservation pioneers such as George Perkins Marsh, provided a fertile context for a series of *landmark conservation innovations* launched in the later decades of the nineteenth century by Americans working in both the public and private sectors, as well as in philanthropic and academic institutions. Such landmark innovations have proven to be genuinely significant over time, shaping the use of land and waterscapes, our relationship with biodiversity, and the practice of conservation in North America. Furthermore, such innovations have, in several cases, proved to be so exemplary that they have substantially influenced conservation practice around the globe.

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Relevant Criteria

As an analyst considering what is (and is not) a *landmark* conservation innovation, I suggest that there are five relevant criteria. The first four are the ones used for more than fifteen years by the Innovations in American Government program at Harvard's Kennedy School of Government. These criteria are used by program selection judges to guide the selection of a handful of annual Innovations award winners:

- *novelty*, to the degree that the innovation demonstrates a spark of creativity
- *significance*, to the degree that it addresses an issue of public concern
- *effectiveness*, to the degree that it delivers tangible, quantifiable results, and
- *transferability*, to the degree that it can be replicated by other organizations.

Given that the Innovations in American Government program assesses the merit of present-day innovations across a wide range of subject areas from law enforcement to public health, it is difficult for program administrators and selection judges to assess the long-term impact of candidate programs over, say, the course of several decades or human generations. In the field of conservation, however, an assessment of staying power has considerable relevance, given the fact that most conservation programs are intended to protect natural resources—including land and biodiversity—over the course of multiple generations, or even, in the case of many land conservation easements, "in perpetuity." My suggestion is that, at least for the analysis of historic conservation innovations, a fifth criterion be added to the list to help in identifying and learning the lessons offered by the most significant initiatives.[12] The fifth criterion is:

Most conservation programs are intended to protect natural resources—including land and biodiversity—over the course of multiple generations, or even, in the case of many land conservation easements, "in perpetuity."

- *ability to endure*, to the extent that the innovation has demonstrated, or shows strong promise of demonstrating, a lasting impact over the course of several human generations.

Examples from Nineteenth Century America

Among the several remarkable American landmark conservation innovations of the late nineteenth century, standouts include the 1872 creation of the world's first national park at Yellowstone, the 1872 establishment of the first Arbor Day in Nebraska, and the 1891 creation of the world's first regional land trust in Massachusetts. Each of these achievements was launched in the context of dramatic demographic, economic, and technological change, including the rapid proliferation of long distance communication and transportation networks such as the transcontinental extensions to the eastern railroad networks described by Tocqueville.[13] Each innovation ranks highly against the criteria for landmark conservation innovations, as noted in Table 1, below.

Table 1: Landmark Conservation Innovations in 19th Century America

Example ***Criteria***	*World's First National Park (Yellowstone, 1872)*	*First Statewide Arbor Day (Nebraska, 1872)*	*World's First Regional Land Trust (Massachusetts, 1891)*
Novelty	Following 1864 creation of state reserve at Yosemite, private and public sector innovators lobbied President Grant and Congress to create the world's first "national park" in Wyoming and Montana; initial interest was to protect a "scenic wonder"	Invented by J. Sterling Morton, a newspaper publisher, politician, and railroad promoter who hoped to make Nebraska "the orchard of the Union, the Sylvan Queen of the Republic;" first statewide tree planting holiday	Now known as The Trustees of Reservations, it was first proposed by Charles Eliot as an independent organization formed to preserve remaining "bits of scenery which possess uncommon beauty and more than the usual refreshing power"
Significance	Debated at some length by Congress when created in 1872; when the area became accessible by railroad in early 1880s, the park was visited by President Arthur	Hugely popular in Nebraska as early as 1872; became a featured aspect of early American Forestry Association meetings and the forestry movement	Addressed widespread public concern regarding "poisonous" urban life and the lack of places for lower classes to find fresh air and recreational opportunities
Effectiveness	U.S. National Park system expanded steadily throughout the 20th century; today, the U.S. system covers more than 83 million acres in 385 units across the nation	On first Arbor Day more than one million seedlings planted; National Arbor Day Foundation now sponsors Tree City USA programs throughout nation and internationally	The Trustees system now includes tens of thousands of acres across the Commonwealth, from Cape Cod to metropolitan Boston to the Berkshires
Transferability	The National Park idea has spread across the globe; at the turn of the 21st century, more than 3,380 national parks have been created worldwide, covering more than four million square kilometers (998 million acres)[14]	Within decades, Arbor Day celebrated in most states nationwide; tree planting holidays spread internationally throughout the 20th century	Widely copied throughout the U.S. (there are more than 1,200 U.S. land trusts today), in Britain, Australia, and elsewhere; land conservation techniques that The Trustees helped to pioneer are being employed worldwide
Ability to Endure	The national park movement is still dynamic and national parks are immensely popular; in 2001, the U.S. NPS logged nearly 280 million visits – nearly one for every American[15]	Arbor Day still celebrated around the nation and abroad in 2002; volunteer tree planting now significant in climate change education efforts	The Trustees remains vital and growing after more than a century; the global land trust family continues to expand rapidly in the early twenty-first century.[16]

The conservation innovations described in Table 1 have proved to be highly significant not only in their day, but over the course of more than a century. Indeed, the national park idea is an American contribution to world culture that is arguably as significant as jazz. As noted in Table 1, at the turn of the 21st century, there are some 3,300 national parks or their equivalents in nations on every continent of the world, covering 4.001 million square kilometers (equal to about 998 million acres), an area larger than that covered by all of the fifteen member nations of the European Union in 2002, including France, Germany, Italy, the United Kingdom, Ireland, Denmark, Greece, Spain, Portugal, Finland, Sweden, Austria, the Netherlands, Belgium, and Luxembourg.[17]

The national park idea is an American contribution to world culture that is arguably as significant as jazz.

And the national park idea continues to spread. On a visit to Harvard's Kennedy School of Government in February 2000, John Sawhill, then Chief Executive Officer of the Nature Conservancy, was asked what his most rewarding effort had been in the past several years. He replied that it was going to China to help establish national parks in China's Yunnan Province, a spectacular region studded with steep river gorges, awe-inspiring mountains, and remarkably rich biodiversity.[18] Carrying on after Sawhill's untimely death in May 2000, the Nature Conservancy is working in partnership with China's government for the long-term protection of the region, helping to devise a "plan to guide conservation and development in the mountains for the next hundred years."[19]

Not All Innovations Endure

The distinction between an *important* conservation initiative that is novel, significant, measurably effective, and transferable (but which may not be "built to last") and an initiative which proves to be a *landmark conservation innovation*, one with a lasting impact on either land use patterns or conservation practice over the course of generations, is, of course, the *ability to endure*. A tale of two Audubon Societies is relevant and instructive in distinguishing between the two.

By 1886, a young publishing entrepreneur named George Bird Grinnell had proved himself to be a well-regarded and influential member of a prominent group of outdoorsmen living in New York City. He was well on his way to becoming one of the most important conservationists of his day. Born in 1849, Grinnell moved with his family to the Audubon Park area of upper Manhattan in 1857. The son of an affluent investment banker, Grinnell was schooled on the grounds of the old Audubon estate by "Grandma" Lucy Audubon, the widow of the internationally acclaimed bird painter, John James Audubon. As a boy, Grinnell had the opportunity with his schoolmates to rummage through the great painter's artifacts and memorabilia and, in the spring, roam the woods hunting local wild creatures, including the seemingly endlessly abundant passenger pigeons. Later, as an undergraduate at Yale, Grinnell further established his deep interest in the outdoors. By 1874, he had dissolved his father's banking business, determined to learn the business of "bone hunting" with O.C. Marsh, the famous Yale paleontologist.[20]

While out hunting dinosaur fossils, Grinnell was also contributing articles on big game hunting to the struggling periodical *Forest and Stream*. With the help of his father, Grinnell acquired Forest and Stream Publishing Company, and he became the flagship publication's editor in 1880.[21] He quickly built it into one of the most widely read "hook-and-bullet" publications of its day, with a national circulation. Given his passion for natural history, however, Grinnell infused the magazine with a notable "conscience," repeatedly making editorial statements against "game-hogs" and others who exploited wildlife "for sale to restaurants, hotels, and wholesale suppliers of meat."[22]

Active in a great many early conservation efforts, Grinnell was an ardent member of the American Ornithological Union (AOU), formed at New York's American Museum of Natural History in 1883 by professional ornithologists Elliot Coues, J. A. Allen, and William Brewster. Brewster, a gentleman academic affiliated with Harvard's Museum of Comparative Zoology, continues to be remembered today as the man whose name is

associated with the Brewster Award, presented by the AOU to the author of the most important research on birds of the Western Hemisphere published in the last ten years. Grinnell enthusiastically joined an AOU Committee on the Protection of North American Birds which, in 1886, published a bulletin containing a draft of a "Model Law" designed for adoption by states wanting to protect "non-game" birds that were being hunted into extinction. The hunters that the Committee sought to regulate represented a hodgepodge of interests, including market hunters who sold the bodies and feathers of particularly colorful and graceful birds to milliners, who in turn sewed them onto fashionable ladies' hats. The hats were very popular items in stores along New York's Fifth Avenue and in scores of other exclusive retails centers around the nation. In the context of such market conditions, the coastal breeding grounds of target species, such as egrets, herons, and roseate spoonbills, were subject to withering and relentless attacks.

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Inspired in part by the example set by the Selbourne Society, formed in England in the interest of protecting birds, Grinnell came up, in 1886, with a powerful and novel idea for using the mass media of the day—magazines—to promote bird conservation on a national scale. Hoping to arouse public sentiment in support of efforts to protect bird life, he announced the initiative in the February 11, 1886, issue of *Forest and Stream*:

> We propose the formation of an Association for the protection of wild birds and their eggs, which shall be called the Audubon Society. Its membership is to be free to everyone who is willing to lend a helping hand in forwarding the objects for which it is formed. These objects will be to prevent, so far as possible, (1) the killing of any wild birds not used for food; (2) the destruction of nests or eggs of any wild bird; and (3) the wearing of feathers as ornaments or trimming for dress.

Grinnell provided a free membership certificate to those who signed a pledge. The ornate certificate granting membership to "The Audubon Society for the Protection of American Birds,

Founded by Forest and Stream," was decorated with an image of Audubon himself, alongside a reproduction of his painting of cedar waxwings.[23] The initial response to the offer was remarkably enthusiastic. By 1887, the society had been incorporated in New York and claimed a membership of some "39,000 men, women, and children," demonstrating early and measurable effectiveness in generating widespread support. Social pundits, recognizing the significance of the effort to emerging legions of social activists in the Gilded Age, praised the initiative; Charles Dudley Warner, a well-known wag and collaborator of Mark Twain's, wrote in support of the society's goals, "a dead bird does not help the appearance of an ugly woman, and a pretty woman needs no such adornment."[24]

Grinnell, hoping to reach an even wider audience, had Forest and Stream Publishing Company produce the first issue of *The Audubon Magazine* in February 1887, offering it for the price of six cents per copy. The issue included a widely-read essay by New Hampshire poet Celia Thaxter titled "Women's Heartlessness." Thaxter's essay became a classic of its genre, criticizing a well-to-do matron for wearing "a charnel house of beaks and claws and bones and feathers and glass eyes upon her fatuous head."

However, despite a heartening surge of interest in the cause, Grinnell, with his many other business and charitable interests, apparently did not have the time, energy, resources, or personnel to keep the enterprise afloat. In addition to the AOU and *Forest and Stream*, Grinnell had become involved, alongside Theodore Roosevelt and other prominent New Yorkers, in the 1887 formation of the Boone and Crockett Club, a group that promotes "fair-chase" big game hunting while working to mitigate the "disastrous effects both market hunters and settlers had on the wildlife populations."[25]

Meanwhile, the trade of feathers to milliners continued to flourish, and birds continued to be aggressively hunted. Grinnell, apparently unable to establish *Audubon Magazine* on a solid

foundation either as a philanthropic endeavor or as a going business concern, gave up on his Audubon Society effort. He shut down the magazine after the publication of its second issue, dated December 1888. Grinnell wrote, with a measure of sadness, that the market forces in the ladies' hat trade appeared overwhelming: "Fashion decrees feathers: and feathers it is. This condition of affairs must be something of a shock to the leaders of the Audubon Society, who were sanguine enough to believe that the moral idea represented by their movement would be efficacious enough to influence society at large."[26] While historically important, Grinnell's Audubon Society could not endure.

The Audubon idea was not resurrected for nearly a decade. The rebirth of the movement began some eight years after Grinnell's effort was discontinued, when Mrs. Harriett Lawrence Hemenway and her close childhood friend, Miss Minna Hall, were deeply moved by contemporary newspaper accounts of the slaughter of birds to supply the ladies' hat trade.

Prominent members of Boston Brahmin society, Hemenway and Hall had grown up across the street from one another in Brookline's Cottage Farms neighborhood. They were likely quite familiar with the mechanics and exigencies of national social movements, having been raised in the midst of social advocates of historic importance. Hemenway's father, to name one key example, was Amos Adams Lawrence, a leading textile industrialist and a key supporter of the pre-Civil War abolitionist movement centered in Boston. As one of the principal funders of the New England Emigrant Aid Society, which sent free-soilers to Kansas in the 1850s, Lawrence's generosity was recognized by the free-state settlers, who named the town of Lawrence, Kansas, after him. By further providing funds that led to the establishment of the University of Kansas in that town, Amos Lawrence became a key figure in the early history of the state and in the national struggle to end slavery. [27]

Harriett, born in 1858 as the seventh child of Amos and Sarah Appleton Lawrence, married Augustus Hemenway, scion of

one of the wealthiest families in Boston, in 1881. Her widowed mother-in-law, Mary Hemenway, was well-known for her engagement in a wide range of efforts to improve social conditions, promote knowledge, and sponsor the arts. Mary was, for example, a friend and sponsor of Celia Thaxter, the New Hampshire artist and poet who had authored "Woman's Heartlessness" in Grinnell's magazine. Mary Hemenway and Celia Thaxter very likely contributed to Harriett's awareness of issues related to bird protection in the 1880s and 1890s. Both Mary Hemenway and Celia Thaxter passed away in 1894.

From its earliest days, Massachusetts Audubon was determined both to establish itself on a firm financial footing and to replicate itself far and wide.

A little more than a year later, in early 1896, Harriett Lawrence Hemenway and Minna Hall, intent on halting the decimation of native American bird populations, began to organize a series of tea parties in their living rooms to organize a group, the Massachusetts Audubon Society, that would address the situation. Quickly gaining the enthusiasm and formal organizational leadership of powerful men such as Harvard's William Brewster and U.S. Senator from Massachusetts George Hoar, the two women became known as the Society's "Founding Mothers."[28] They went on to be stalwart supporters and advisors of the Society for more than fifty years.

From its earliest days, Massachusetts Audubon was determined both to establish itself on a firm financial footing and to replicate itself far and wide. Its ability to garner sufficient resources was reflected in the organization's first treasurer's report, which noted, as of October 1897, receipts of $3,322.12 and expenses of $1,904.19, leaving a positive balance of $1,317.93.[29] And, as described in a history of the organization written in 1921, "one of the first questions to come before the Board of Directors was 'how to influence other states to start societies,' and from the beginning every effort was made to this end with very gratifying results."[30] By the end of the year 1900, state Audubon societies, the organization of which was typically spearheaded by prominent local women, sprang up across the nation in politically powerful jurisdictions such as New York, New Hampshire, Maine, Rhode Island, Pennsylvania, the District of Columbia, Iowa, Florida,

Texas, and California. Hemenway and Hall's novel and highly creative organizational strategy, pulling highly influential women into the leadership of a conservation movement that was generally dominated by well-to-do outdoors*men*, successfully sparked the growth of a movement that has had a lasting impact on the conservation of nature into the twenty-first century.

Massachusetts Audubon's intention to address truly significant issues and to achieve substantive, measurable results, was reflected in its appointment, at its first meeting, of a legislative agent who was to "represent the Society in regard to proposed legislation concerning the game laws." Such legislative efforts began to bear fruit as early as 1898, when Senator Hoar first introduced legislation in the U.S. Congress to prohibit "the importation, sale or shipment of millinery plumes in the United States." Although Hoar's early attempt ultimately failed, reportedly due to only faint support from the AOU, in 1900 Iowa Congressman John Lacey did successfully introduce federal legislation banning some interstate trade in the feathers. With the support of Audubon societies across the nation, as well as New York-based leadership shown by AOU Treasurer William Dutcher and Frank Chapman of the American Museum of Natural History, the era of truly effective legislation to protect wild birdlife in America had dawned. And with the enthusiasm generated among schoolchildren exposed to Audubon Society educational materials and calendars, families across the country came to see bird protection as a wholesome and worthwhile endeavor, accelerating popular support for legislative initiatives to protect natural resources. Nonetheless, it took nearly two decades of persistent advocacy for the Audubon movement to see a strong Migratory Bird Treaty, which offered truly effective protection on a continental scale to migratory bird populations, signed and ratified by both the United States and Great Britain, acting on behalf of Canada.

With the cooperation of Massachusetts Audubon and other state societies, a National Committee of Audubon Societies was discussed at an AOU conference in Cambridge, Massachusetts in

1900 and formally organized in 1902 under Dutcher's leadership.[31] The Committee, later to become the National Association of Audubon Societies, and then the National Audubon Society, was formed "to bind together and make more effective the work of the various state organizations."[32] By adaptively aligning state organizations on a national level, the Audubon societies set the stage for another critically important conservation innovation.

"The Audubon Society . . . is [an organization] of men and women . . . who have the precious gift of sympathetic imagination, so that they are able to see, and wish to preserve for their children's children, the beauty and wonder of nature."

—Theodore Roosevelt

As early as the turn of the century, with funds raised by New Hampshire resident Abbott Thayer in the name of the AOU, Dutcher had begun setting up a system of wardens to protect wild birdlife along the Atlantic Coast, from Maine to Virginia. The Florida Audubon Society, formed in 1900 with such eminent directors as Theodore Roosevelt (soon to become President of the United States), Florida Governor W.D. Bloxham, and Frank Chapman,[33] was sympathetic to Dutcher's 1901 plan to hire lighthouse keepers in South Florida to serve as wardens in the Florida Keys and the Dry Tortugas. Soon deeply engaged in legislative efforts, the Florida Audubon Society and its directors were by 1903 solidly behind President Roosevelt's move to establish a Federal Bird Reservation, the first unit of its kind in what is now the Federal Wildlife Refuge System, at Pelican Island on Florida's east coast. In signing the order that created the Pelican Island refuge on March 14, 1903, President Roosevelt generously credited his fellow bird enthusiasts:

> The Audubon Society, which has done far more than any other single agency in creating and fostering an enlightened public sentiment for the preservation of our useful and attractive birds, is [an organization] consisting of men and women who in these matters look further ahead than their fellows, and who have the precious gift of sympathetic imagination, so that they are able to see, and wish to preserve for their children's children, the beauty and wonder of nature. [34]

Today, the National Wildlife Refuge System, which various state Audubon Societies and the National Committee of Audubon Societies were instrumental in creating, represents a substantial and enduring national investment in wildlife conservation. As described by the U.S. Fish & Wildlife Service in

a publication celebrating Pelican Island's March 14, 2003 centennial, the system represents the "world's largest and most diverse network of lands dedicated to the protection and management of a vast array of wildlife, [now encompassing] over 94 million acres on 538 refuges and thousands of waterfowl production areas."[35]

As organizations engaged in conservation advocacy, education, and habitat conservation, both Mass Audubon and National Audubon, as they are now respectively known, continue to thrive to this day as independent but closely allied organizations. With some 68,000 member households, Mass Audubon is the largest conservation organization in New England; National Audubon, with more than 600,000 members,[36] is a worldwide leader in the effort to protect our natural heritage at home and internationally. Collectively, their creation serves as an excellent model of a landmark conservation innovation that has proved over more than a century to meet all of the relevant criteria: being novel in conception and organization, significant in approach to issues of national concern, measurably effective in reaching stated objectives, remarkably transferable, and demonstrating an ability to endure over the course of several human generations.

Landmark Conservation Innovations in the Twentieth Century

In the context of dramatic and recurring economic, demographic, and technological shifts in twentieth century America, new generations of conservation innovators emerged to create enduring initiatives that address complex challenges to open space, biodiversity, and the natural environment. While in no way attempting to propose an exhaustive list of landmark conservation initiatives in the last century, several brief examples should serve to illustrate Americans' ongoing passion for finding creative ways to protect the nation's natural resources.

- *Establishment of a Continent-Wide System of National Forest*s. With leadership from

Gifford Pinchot and others associated with Theodore Roosevelt, the United States created a system of national forests across the continent, administered by one agency, the National Forest Service, with the passage of the Weeks Act in 1911; as of September 2001, the National Forest System encompasses approximately 192 million acres located in 44 states, Puerto Rico, and the U.S. Virgin Islands.[37]

- *Creation of the First Soil and Water Conservation Districts*. Facing devastating dust storms in the 1930s, Hugh Hammond Bennett's Soil Conservation Service, within the U.S. Department of Agriculture, pioneered, in pilot Conservation Districts in Wisconsin, public consultation with private landowners to address massive soil erosion and depletion threats; today, there are nearly 3,000 local conservation districts, found in nearly every non-metropolitan county in the continental United States.[38]
- *Passage of the Wilderness Act*. After decades of persistent lobbying from nonprofit groups such as the Wilderness Society, led by Howard Zahniser, Lyndon Johnson signed legislation in 1964 that now ensures wilderness status for some 105 million acres of land in the U.S., about 56% of which is in Alaska; note that much of the land that is listed within the National Wilderness Preservation System is also counted as part of the National Forest, National Park, or National Wildlife Refuge systems.[39]
- *Establishment of the Land and Water Conservation Fund (LWCF)*. Recommended by Laurence Rockefeller as chair of the Outdoor Recreation Resource Review Commission in the 1950s and 1960s, the LWCF has since its creation in 1964 funded,

in part with novel revenue streams coming from offshore oil leases, more than 37,000 state and local land conservation transactions.[40]

- *The Creation of the Environmental Protection Agency and the Enactment of the Endangered Species Act*. Inspired by *Silent Spring*, Rachel Carson's classic, highly original book on the interaction of toxic substances and wildlife, a generation of environmental activists successfully created a new regulatory framework for managing threats to human and natural communities in the 1960s and 1970s.[41]

And the Work Continues, with Urgency

The examples presented above offer strong evidence that, contrary to Tocqueville's assessment in the 1830s, Americans have proven to be far from "insensible to the wonders of … nature." Americans have shown themselves to be international leaders in imagining and realizing remarkable conservation innovations characterized by novelty, significance, measurable effectiveness, transferability, and an ability to endure. Nevertheless, the challenges to sustainable stewardship of land, biodiversity, and other natural resources continue to mount in number and advance in complexity as we move into the first decade of the twenty-first century. A genuine sense of urgency pervades the community of professional and volunteer conservation practitioners.

The challenges to sustainable stewardship of land, biodiversity, and other natural resources continue to mount in number and advance in complexity as we move into the first decade of the twenty-first century.

Rand Wentworth, President of the Land Trust Alliance (LTA), a national umbrella organization for local groups striving to conserve open space, recently offered his thoughts on the state of land conservation. "Since the start of the land trust movement over one hundred years ago," he noted, "local land trusts have protected over 6.2 million acres of land—an area roughly twice the size of Connecticut. This is an extraordinary accomplishment and cause for hope, but it is dwarfed by the two million acres of natural lands that are lost to real estate development each year. The land we save

over the next twenty years will determine the character of the American landscape for all time. Before it is too late, we need to dramatically increase the pace of conservation in America."[42]

Commenting on the related challenges facing biodiversity conservationists worldwide, Edward O. Wilson, University Research Professor Emeritus at Harvard, metaphorically sees the twenty-first century as a tight and perilous passage through which we must successfully move if we are to salvage our own culture and the "biosphere of life that sustains us." He writes: "We have entered the Century of the Environment, in which the immediate future is usefully conceived as a bottleneck. Science and technology, combined with a lack of self-awareness and a Paleolithic obstinacy, brought us to where we are today. Now, science and technology, combined with foresight and moral courage, must see us through the bottleneck and out."[43]

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—E.O. Wilson

The challenges are brought into sharp perspective by the theory of island biogeography, first introduced by Wilson and Robert MacArthur in the 1960s.[44] One aspect of the island biogeography theory is that, all other things being equal, the number of species on an island that can sustain themselves, escaping extinction, is related to the size of the undisturbed or unfragmented wildlife habitat on the island: the larger the unfragmented land area of the island, the greater the diversity of life (or biodiversity) that might be found. If the land area on the island is divided into smaller and smaller pieces, the pieces being separated from one another by incompatible human settlements or natural disturbances, then the expected level of biodiversity declines.

What we have seen in the late twentieth and early twenty-first centuries is that the loss of wilderness and the fragmentation of remaining undeveloped landscapes is accelerating on a worldwide basis. Such developments are enabled by rapidly growing human populations, a steadily expanding global economy, increased levels of resource consumption, and the emergence of new technologies, including the Internet and express delivery

networks, which increase humanity's mobility and nearly instantaneous reach. The situation was eloquently described by Wilson in 2002, in a passage that echoes some of the prescient observations made by Catlin some 170 years earlier.

> A frightening aspect of the area-species principle is that while removal of 90 percent of the habitat area allows about half of the species to hang on, removal of the final 10 percent can wipe out the remaining half in one stroke. In fact, the number of natural habitats reduced to fragments this size or smaller is increasing rapidly all around the world… The rainforests of the West Indies, Brazil's Atlantic Coast, Madagascar, and the Philippines, for example, retain less than 10 percent of their original cover.
>
> Large numbers of species have already been lost forever from the forest hotspots. Many more are endangered. In a nightmare scenario, battalions of loggers armed with bulldozers and chainsaws could wipe these habitats off the face of the Earth in a few months – and with them a large part of the earth's biodiversity. On the flip side, it is heartening in compensating degree to realize that by protecting this tiny fraction of the planet's land area, millions of species can be saved for posterity.[45]

Indeed, it is heartening to recognize that highly motivated conservation practitioners, based in the United States and around the world, are bringing sustained focus to the threats and opportunities of the present era. They are designing and implementing a broad continuum of conservation innovations in the domains of

- conservation science
- conservation education
- advocacy and policy development
- land and natural resource protection, and
- stewardship.

What is impossible to say from our vantage point at the commencement of the twenty-first century is which of these innovative efforts will prove, over the course of the next several decades, to be the peers of the first national park, the oldest state Audubon Society, the first National Wildlife Refuge, or the

Wilderness Act. We don't know which, if any, will be judged by Americans looking back in 2050 or 2500 as landmark conservation innovations, characterized by novelty, significance, measurable effectiveness, transferability, and an ability to endure.

We can, however, make some thoughtful guesses about several necessary aspects of the best initiatives of the new century. In the face of rapid open space loss and landscape fragmentation in the United States and abroad, effective conservation efforts will necessarily have to knit together the management and stewardship styles of a multiplicity of land owners and managers. Stakeholders in the public, private, nonprofit, and research sectors will have to be able to work in concert with one another if they are keep sufficiently large patches and corridors of landscape—so-called "green matrix" regions—available for wildlife, agriculture, forestry, water supply, recreation, tourism, and increasingly fluid human settlements. Furthermore, the proposed solutions will have to be sold not only to land managers and owners working in isolation; the enduring ideas will necessarily have to catch the imagination, hearts, and minds of urban, suburban, exurban, and rural voters and decision-makers coming from a wide range of backgrounds and beliefs. And, given the enormous change we foresee in even the most peaceful of futures, management schemes will need to be continually re-evaluated against both quantitative and qualitative metrics, using the best science available.[46] Promising projects abound, on every continent. The three innovations listed in Table 2, below, simply exemplify the remarkable range of outstanding conservation practice that is emerging in the early twenty-first century.

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The conservation tasks that face us in the early twenty-first century are not beyond the wit of humankind. We have at our fingertips remarkably accurate monitoring and information processing tools that can assist us in realizing the decades-old admonition to "think globally and act locally." We have the ability to indicate precisely where disruptive factors are originating, thereby turning what were once unspecified, "non-point" sources of pollution and invasive species into sources that can be located

Table 2: Promising Conservation Innovations in 21st Century America

Example / Criteria	*Species Analyst project at the University of Kansas Natural History Museum*[47]	*BirdSource, a joint project of the Cornell Ornithology Lab and National Audubon*[48]	*The Pingree Forestry Partnership, led by the New England Forestry Foundation*[49]
Novelty	A leading example of integrative **conservation science**, Species Analyst allows researchers to query scores of institutions worldwide for structured information on natural history collections in a matter of seconds or minutes, replacing traditional methods which required months or years of effort	An outstanding citizen science and **conservation education** initiative, engages school-children, adults, and seniors into a coordinated continental network; visual feedback over the Internet is more immediate and interactive than print	An exemplary **land protection and stewardship** effort, the Pingree project has employed novel techniques in several areas, including project organization, easement structuring, communications strategy, and stewardship monitoring
Significance	Information collected allows the construction of highly accurate computer models that can, for example, forecast the range of various species under a range of climate scenarios. Such models can inform local, regional national, or continental-scale conservation planning efforts	Field-based citizen participation brings diverse human populations together into very large scale networks, generating enthusiasm for "birding with a purpose;" informs stewardship on public, private, and NGO lands	In protecting some 762,000 acres of forestland in Maine, the Pingree project represents the largest conservation easement on private land in American history; represents a major milestone in the spectrum of efforts underway in the Northern Forest
Effectiveness	Early results using Species Analyst to analyze the dynamics of bird, fish, and frog populations are very promising; the tool has also been successfully used to predict the spread of human diseases and their biological carriers (e.g., mosquito-borne West Nile Virus)	As of mid-2002, the BirdSource network engaged more than 50,000 volunteer bird-watchers throughout North America; powerful scientific analysis conducted using data collected by BirdSource network	The Pingree Forest Partnership raised more than $30 million in less than two years, largely from private and nonprofit sources; includes participation from major institutions, including the Nature Conservancy
Transferability	Launched in the mid-1990s, Species Analyst is, in 2002, employed in more than 80 natural history collections in public institutions, museums, and universities in the U.S., Canada, Latin America, Europe, and Africa	BirdSource is being studied and adopted by organizations focused on insects, fishes, water quality, air quality, and other environmental indicators in *urban, suburban, and rural communities*	Various techniques pioneered during the Pingree campaign have been adopted or are being considered for adoption by major conservation organizations working on similarly large parcels in the Northern Forest, as well as in the West
Ability to Endure	A young and growing initiative; ability to endure depends on adoption by additional institutions, researchers, and governments; numerous requests for assistance with implementation by institutions around the world promises continued transfer and utilization	Incorporates older birding traditions, such as National Audubon's Christmas Bird Count, which has been ongoing since the early 1900s; organizers predict that new tools will help perpetuate such practices well into the next century	The Pingree family has carefully managed its vast forest reserves in Maine since the 1840s; with the new easements in place, responsible forestry practices should continue for many generations to come

The genuine challenge is one of focus and resolve.

and attributed with pinpoint precision. And we have children around the planet who are vastly more sensitive to environmental and conservation issues than their parents and grandparents were when they were children. The genuine challenge is one of focus and resolve. If history is any guide, we may well once again rise to the challenge with remarkable skill and energy, conserving a natural heritage that has developed over thousands of millennia for a great many years to come.

ENDNOTES

1 JAMES N. LEVITT is the Director of the Internet and Conservation Project, Taubman Center for State and Local Government, Kennedy School of Government, Harvard University. Levitt's research focuses on the potentially constructive and disruptive impacts of new communications and transportation networks on land use and the practice of conservation, as well as opportunities for landmark conservation innovation in the twenty-first century. He is also a director of several conservation orgnizations, including the Quebec-Labrador Foundation and the Massachusetts Audubon Society. Contact: james_levitt@harvard.edu.

2 Alexis de Tocqueville, *Democracy in America*, vol. II (New York: Vintage Press, 1990), 157.

3 Ibid., 136.

4 Alfred Runte, *National Parks: The American Experience* (Lincoln: U. of Nebraska Press, 1987), 6.

5 Henry James is quoted in William H. Goetzmann and William N. Goetzmann, *The West of the Imagination* (New York: W.W. Norton and Company, 1986), 167.

6 Tocqueville, 74. Tocqueville's observations regarding American attitudes about wilderness are discussed at some length in Roderick Frazier Nash's 1967 classic, *Wilderness & the American Mind* (New Haven: Yale University Press, 2001), 23.

7 This idea that Tocqueville did not foresee American inventiveness in conservation is related to the idea explained by Kathleen Hogan on the *Tocqueville's America* website, hosted by the American Studies Department at the University of Virginia (see www.xroads.virginia/~edu /hyper/detoc/Hudson/toque.html). Hogan explains that Tocqueville "rightly observed the American[s'] obsession with moving quickly across the continent and with making nature responsive to their will. But he was incorrect in suggesting that the natural landscape was not important to Americans. It has always played an enormous role in the American cultural consciousness..."

8 Peter R. Stein and James N. Levitt, "Networks Conservation Philanthropy and Leadership: the Role of Network Entrepreneurs," in James N. Levitt, ed., *Conservation in the Internet Age: Threats and Opportunities* (Washington, D.C.: Island Press, 2002), 288-291.

9 Thomas Jefferson to Maria Cosway, October 12, 1786, in Merrill D. Peterson, ed., *Thomas Jefferson: Writings* (New York: Library of America, 1984), 870.

10 Thomas Jefferson to William Caruthers, March 15, 1815, cited in "Jefferson and the Natural Bridge," available at www.monticello.org/resources/interests/natural_bridge.html.

11 Dwight Pitcaithley, "Philosophical Underpinnings of the National Park Idea," available at www.cr.nps.gov/history/hisnps/NPSThinking/underpinnings.htm, last modified November 6, 2001.

12 A similar suggestion is offered in James N. Levitt, "Conclusion," in Levitt, *Conservation in the Internet Age*, 350.

13 Joni Louise Kinsey, *Thomas Moran and the Surveying of the American West* (Washington, D.C.: Smithsonian Institution Press, 1992), 68 ff. See also, Alfred Runte, *Trains of Discovery* (Boulder, Colo.: Roberts Rinehart Publishers, 1998), 13 ff. Both Kinsey and Runte offer considerable detail regarding the role of the Northern Pacific Railroad in promoting the Yellowstone region with the writings of Nathaniel Langford and the paintings of Thomas Moran, and in lobbying for the creation of the world's first national park at Yellowstone through federal legislation signed by President Grant in 1872.

14 Michael J.B. Greene and James Paine, "State of the World's Protected Areas at the End of the Twentieth Century," IUCN World Commission on Protected Areas Symposium, Albany, Australia, November 1997, available at http://www.unep-wcmc.org/protected_areas/albany.pdf.

15 U.S. National Park Service, "National Park Visitor Use Summary," available at http://www2.nature.nps.gov/stats/summary2001.pdf.

16 The growth of the land trust movement is evidenced at an annual Rally organized by the Land Trust Alliance. For example, the land trust idea has spread to encompass the protection not only of sites with remarkable scenic beauty, but also of forestland (e.g. lands protected by the New England Forestry Foundation), farmland (e.g. lands protected by the American Farmland Trust), tribal lands (e.g. lands protected by the Trust for Public Land), and wilderness that serves as critical habitat for biodiversity (e.g. lands protected by the Nature Conservancy and Conservation International).

17 The fifteen nations of the European Union have a total area of 3,235,460 square kilometers, per the USDA's Economic Research Service (www.ers.usda.gov/briefing/EuropeanUnion/basicinfo.htm); the four million square kilometers of national parks is about 1.2 times the size of the fifteen member nations of the European Union.

18 For information on Sawhill's visit to Yunnan province, see www.nature.org/aboutus/success. Information on John Sawhill's February 28, 2000 talk at the Kennedy School is available at ksgnotes1.harvard.edu/bcsia/bcsia.nsf/photos/Sawhill.

19 For more information on the Nature Conservancy's ongoing work in Yunnan Province, see nature.org/wherewework/asiapacific/china/work /art5098.html.

20 Frank Graham, Jr., *The Audubon Ark: A History of the National Audubon Society* (Austin: The University of Texas Press, 1990), 5.

21 John Alroy, "George Bird Grinnell," Lefalophodon Web site, available at http://www.nceas.ucsb.edu/~alroy/lefa/GBGrinnell.html.

22 Graham, 5.

23 Donna Marion Titus, ed., *By This Wing: Letters by Celia Thaxter to Bradford Torrey about birds at the Isles of Shoals*, 1888 to 1894 (Manchester, N.H.: J. Palmer, 1999), 13.

24 Graham, 12.

25 Hockaday Museum, "George Bird Grinnell" (biographical sketch), from Web site on *The Call of the Mountains: The Artists of Glacier National Park*, exhibited June 27 to October 12, 2002, Hockaday Museum, East Kalispell, Mont., available at www.hockadayartmuseum.org/call_mts_I.htm.

26 Graham, 13.

27 C.S. Griffin, "The University of Kansas and the Years of Frustration, 1854-64," in *Kansas Historical Quarterly* 32:1 (Spring 1966). Available at www.kancoll.org/khq/1966/66_1_griffin.htm.

28 John H. Mitchell, "The Mothers of Conservation," *Sanctuary: The Bulletin of the Massachusetts Audubon Society* (January/February 1996), 1-20. The article is excerpted from the essay "The Founding Mothers," in Christopher Leahy, John Mitchell, and Thomas Conuel, *The Nature of Massachusetts*, (Reading, Mass.: Addison-Wesley, 1996), 3.

29 Winthrop Packard, "The Story of the Audubon Society: Twenty-Five Years of Active and Effective Work for the Preservation of Wild Birdlife," *Monthly Bulletin of the Massachusetts Audubon Society* (December 1921), 5.

30 Packard, 3-9.

31 Graham, 41.

32 Packard, 3.

33 Audubon of Florida, *Audubon Timeline*, available at www.audubonofflorida.org/main/timeline.htm.

34 Theodore Roosevelt, quoted in the *Audubon Timeline*, posted by Audubon of Florida, available at www.audubonofflorida.org/main/timeline.htm.

35 U.S. Fish & Wildlife Service, "America's National Wildlife Refuge System: Celebrating a Century of Conservation," available at refuges.fws.gov/centennial/.

36 National Audubon Society, "About Audubon," available at www.audubon.org/nas/.

37 U.S. National Forest Service, "Land Areas Report as of September 30, 2001," modified February 2002, available at http://www.fs.fed.us/land/staff/lar/LAR01/.

38 National Association of Conservation Districts, "Who Are We," available at http://www.nacdnet.org/about/index.html.

39 National Wilderness Preservation System, "NWPS Information," available at http://www.wilderness.net/nwps/default.cfm.

40 James N. Levitt, "Networks and Nature in the American Experience," in Levitt, *Conservation in the Internet Age*, 36-38.

41 Jack Lewis, "The Birth of EPA," *EPA Journal* (November 1985), available at www.epa.gov/history/topics/epa/15c.htm.

42 Rand Wentworth, "President's Address," Land Trust Alliance Rally 2002, Sunday, October 27, 2002, Austin, Texas, available at www.ltanet.org/objects/view.acs?object_id=3849.

43 Edward O. Wilson, *The Future of Life* (New York: Knopf, 2002), 23.

44 Robert H. MacArthur and Edward O. Wilson, *The Theory of Island Biogeography* (Princeton, N.J.: Princeton University Press, 2001). See also R.H. MacArthur and E.O. Wilson, "An Equilibrium Theory of Island Biogeography," *Evolution* 17 (1963), 383-387, and Paul R. Ehrlich, David S. Dobkin, and Darryl Wheye, "Island Biogeography," available at www.stanfordalumni.org/birdsite/text/essays/Island_biogeography.html.

45 Wilson, The Future of Life, 59-61.

46 James N. Levitt, "Land and Biodiversity Conservation in the 21st Century: A Leadership Dialogue," *Land Lines: Newsletter of the Lincoln Institute for Land Policy* (July 2002), 1.

47 Leonard Krishtalka, A. Townsend Peterson, David A. Vieglais, James H. Beach, and E.O. Wiley, "The Green Internet: A Tool for Conservation Science," in Levitt, *Conservation in the Internet Age*, 143 ff.

48 John W. Fitzpatrick and Frank B. Gill, "BirdSource: Using Birds, Citizen Science, and the Internet as Tools for Global Monitoring," in Levitt, *Conservation in the Internet Age*, 165 ff.

49 Steven A. Sader, Keith Ross, and Frank C. Reed, "Pingree Forest Partnership: Monitoring Easements at the Landscape Level," *Journal of Forestry* 100:3 (April/May 2002), 20-25.

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