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THE CONFLICTED MISSION OF THE UNITED STATES BUREAU OF BIOLOGICAL SURVEY, 1885 – 1940: WILDLIFE, UNCERTAINTY AND AMBIVALENCE

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THE CONFLICTED MISSION OF THE UNITED STATES BUREAU OF BIOLOGICAL SURVEY, 1885 – 1940: WILDLIFE, UNCERTAINTY AND AMBIVALENCE

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF HISTORY

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ABSTRACT

The United States Bureau of Biological Survey, initially founded as the Division of Economic Ornithology and Mammalogy within the Department of Agriculture in 1885, began with a focus on scientific research. Its principle responsibilities were mapping the North American continent's geographical distribution of flora and fauna and determining which animal species were beneficial or injurious to agriculture. Soon, however, the Survey took on new assignments. By the first decade of the twentieth century, the federal bureau was controlling predators and rodents, protecting wildlife on big game reservations and avian refuges, and enforcing wildlife legislation. These added responsibilities resulted in a conflicted mission for the Survey: Since the bureau had to both kill (through predator and rodent control) and protect wildlife, it could not build unequivocal, long-lasting alliances with groups of constituents that would support the Survey. Stockmen supported predator and rodent control yet were critical of wildlife protection. Sport hunters welcomed the avian refuges but often opposed the enforcement of hunting regulations. Scientists and conservationists endorsed wildlife protection but disapproved of predator and rodent control. Furthermore, states, other federal agencies, and residents living near the refuges and reservations often had their own ideas about wildlife and the acceptable use of land designated for wildlife protection, sometimes welcoming the Survey, sometimes opposing it, and sometimes demonstrating a combination of support and resistance. Thus, the Survey's relationships with states, other bureaus, local

citizens, and different groups of constituents were ambivalent and uncertain. The uncertainty was further exacerbated by the lack of basic knowledge of wildlife, a reflection of the incipient fields of wildlife science and game management. Working within the restraints of a conflicted mission, divided authority between state and federal government over the management of wildlife, a wavering base of support, and limited scientific understanding of wildlife, the Survey faced its responsibilities with a high degree of uncertainty and was pulled in multiple directions.

INTRODUCTION

On May 4, 2011, Department of the Interior Secretary Ken Salazar announced that the 1,200 gray wolves of Montana and Idaho would be taken off the endangered species list. The wolves' loss of protected status was the latest incident of an ongoing dispute: on the verge of extinction, the wolf was reintroduced in parts of the Rocky Mountains in the mid-1990s, much to the dismay of ranchers (worried about threats to livestock) and hunters (concerned over attacks on deer and elk). Controversy ensued. In 2008, the wolf was taken off of the endangered species list (a place it occupied since 1974) and later placed back on the list in the same year. This latest episode in the row promises to be even more contentious. The de-listing of the wolf in 2011 was accomplished by an act of Congress, not by the more customary process of scientific review, a precedent with potential future ramifications for other species on the list. Even before the latest salvo, two hundred and twenty-five scientists had sent a letter of protest to Salazar. They argued that the current estimated population of the gray wolf (1,645 in the northern Rocky Mountains) is too small to prevent a reduction of the species' gene pool. Future debate will be centered on the criterion for a "recovered" species and who has responsibility for the management of the wolf: Will it be the federal government (under the Endangered Species Act) or the states (for species not on the endangered list)?[1]

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[1] David A. Gabel, "Wolves Taken off the US Endangered Species List," *Environmental News Network*, 14 April 2011, available at: http:www.enn.com/wildlife article/42584 [accessed 27 May 2011]; Laura Zuckerman, "Wolves to Lose Federal Protection Today," *Environmental News Network,* 5 May 2011, available at: http:www.enn.com/top_stories/article/42658 [accessed 23

The wolf's journey to its current status is tied to two federal agencies, the Fish and Wildlife Service, the current manager of much of the nation's wildlife, and the Bureau of Biological Survey, an organization that merged in 1941 with the Bureau of Fisheries to become the Fish and Wildlife Service. While the Fish and Wildlife Service has helped to bring the wolf back from the precipice of extinction, the Bureau of Biological Survey, for a substantial portion of its history, engaged in predator control. The wolf, already in decline from nineteenth-century state-sponsored bounties and private efforts to reduce the threat to livestock, became a target of the Survey's predator control programs.[2] Killing predators such as wolves and (mostly) coyotes, however, was not the only responsibility of the Survey. Somewhat paradoxically, federal legislation authorized the bureau to protect wildlife, albeit species other than predators. This dissertation examines the implications of the Bureau of Biological Survey's paradoxical assignment.

This dual relationship to wildlife—killing and protecting—was not part of the Bureau of Biological Survey's original mission. Founded in 1885 as the Division of Economic Ornithology and Mammalogy, the federal agency was part of the Department of Agriculture. Its focus was generally research: determining which species, primarily birds, were beneficial or injurious to agriculture and mapping

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May 2011]; and John Platt, "Wolves Dropped from U.S. Endangered List—Again," *Scientific American Online*, 8 May 2009, available at: http://www.scientificamerican.com/blog/post.cfm?id=wolves-dropped-from-endangered-spec-2009-05-08 [accessed 23 May 2011].

[2] For a discussion of the wolf in the nineteenth century, see Michael J. Robinson, *Predatory Bureaucracy: The Extermination of Wolves and the Transformation of the West* (Boulder: University Press of Colorado, 2005), chapters 1-3.

the geographical distribution of the North American continent's flora and fauna. By the first decade of the twentieth century, however, the Survey's responsibilities, in addition to research, consisted of predator and rodent control, the enforcement of federal wildlife protective legislation, and the management of big game reservations and bird refuges.

Despite these important roles, scholars have paid limited attention to the Survey, at least in comparison to the Reclamation Service, Forest Service, and National Park Service, federal agencies that emerged within the first two decades of the twentieth century that managed land and natural resources. The only work with a singular emphasis on the Survey is Jenks Cameron's 1929 study, part of a series by The Institute for Government Research's Service Monographs of the United States Government. While useful for providing a general overview, Cameron's volume is dated and lacks a historical interpretation. Keir Sterling and David Lendt have written biographies of Survey chiefs C. Hart Merriam and Jay Norwood Darling, respectfully, but these cover a limited chronological scope.[3]

Although no one has written a monograph on the Survey, several scholars have analyzed the federal bureau in studies with a larger focus, usually on wildlife. The Survey's predator control program has received much attention. Donald Worster, Rick McIntyre, Michael J. Robinson, and Bruce Hampton have argued that the Survey needlessly destroyed wolves and coyotes and developed a

[3] Jenks Cameron, *The Bureau of Biological Survey: Its History, Activities, and Organization* (1929; reprint, New York: Arno Press, 1974); Keir B Sterling: *Last of the Naturalists: The Career of C Hart Merriam* (New York: Arno Press, 1977); and David L. Lendt, *Ding: The Life of Jay Norwood Darling* (Ames: The Iowa State University Press, 1984).

strong alliance with members of the western livestock industry—allies who pressured Congress to fund the bureau's predator control program.[4] Thomas R. Dunlap and Lisa Mighetto have examined the Survey in the context of changing ideas about predators in American society, from reviled nuisances to important members of ecological communities.[5] Other scholars have analyzed some of the refuges managed by the Survey. These protected areas were hybrid landscapes, as the Survey impounded water and created dams, ponds, islands, and feeding areas in an effort to "produce" more birds and arrest a precipitous decline in avian populations that became acute by the 1930s.[6] Other scholars have suggested that

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[4] Donald Worster, *Nature's Economy: A History of Ecological Ideas*, 2nd ed. (New York: Cambridge University Press, 1994); Rick McIntyre, ed., *War against the Wolf: America's Campaign to Exterminate the Wolf* (Stillwater, Minnesota: Voyageur Press, 1995); Bruce Hampton, *The Great American Wolf* (New York: Henry Holt, 1997); and Robinson, *Predatory Bureaucracy*.

[5] Thomas R. Dunlap, *Saving America's Wildlife* (Princeton: Princeton University Press, 1988); and Lisa Mighetto, *Wild Animals and American Environmental Ethics* (Tucson: The University of Arizona Press, 1991).

[6] For studies of refuges managed by the Survey, see: Robert M. Wilson, *Seeking Refuge: Landscapes on the Pacific Flyway* (Seattle: University of Washington Press, 2010); Jared Orsi, "From Horicon to Hamburgers and Back Again: Ecology, Ideology, and Wildfowl Management, 1917-1935," *Environmental History Review* 18 (winter 1994); Nancy Langston, *Where Land and Water Meet: A Western Landscape Transformed* (Seattle: University of Washington Press, 2003); Douglas Harvey, "Learning the Hard Way: Early Water Control Projects at Cheyenne Bottoms Wildlife Area," *Kansas History: A Journal of the Central Plains* 32 (Autumn 2009); Douglas Harvey, "Creating a 'Sea of Galilee': The Rescue of Cheyenne Bottoms Wildlife Area, 1927-1930," *Kansas History: A Journal of the Central Plains* 24 (March 2001); John L. Zimmerman, *Cheyenne Bottoms: Wetland in Jeopardy* (Lawrence: University Press of Kansas, 1990); Fredric L. Quivik, "Engineering Nature: The Souris River and the Problem of Migratory Waterfowl," *History and Technology* 25 (December 2009); Robin Bruce, "A Brief History of Turnbull National Wildlife Refuge," *The Pacific Northwest Forum* 4 (1991); and Amy L. McKinney, "Medicine Lake: National Wildlife Refuge," *Montana: The Magazine of Western History* 54 (spring 2004). Many of these studies follow the insights of other scholars who have studied national parks. The parks built roads, suppressed fires, controlled insects and predators, manufactured trails, created scenic vistas, installed toilets, stocked fish, and featured charismatic species of wildlife. These studies suggest that "nature" in the national parks was not completely "natural." Furthermore, William Cronon and Neil Evernden, in separate works, have examined the ways in which the idea of nature was constructed by humans. See: Alston Chase, *Playing God in Yellowstone: The Destruction of America's First National Park* (Boston: Atlantic Monthly Press, 1986); Richard Sellars West, *Preserving Nature in the National Parks: A History* (New Haven: Yale University Press, 1997); William Cronon, "The Trouble with Wilderness, or, Getting Back to the Wrong

the Survey's tepid efforts to enact stricter hunting regulations may have played a role in the dwindling number of birds.[7]

Collectively, these historical studies suggest a two-faced Survey. On the one hand, the Survey was powerful with strong backing from livestock interests. On the other hand, the Survey was too weak to take a more aggressive approach to protecting birds. An assessment of the Survey, however, is more complicated than a simple strong/weak dichotomy. Since the federal bureau studied, protected, and killed wildlife, there was no single Bureau of Biological Survey. Each of the Survey's diverse responsibilities required the formation of relationships with an equally diverse set of organizations and individuals, including farmers, ranchers, conservation organizations, other federal bureaus and agencies, scientists, local residents not affiliated with any organization, hunters and sporting associations, state wildlife and game associations, and politicians from all levels of the political spectrum. The strength or weakness of these relationships can wax or wane over time, depending on the issue, local circumstances, and the political and intellectual climate.

Nature," in William Cronon, ed., *Uncommon Ground: Toward Reinventing Nature* (New York: Norton, 1995); and Neil Evernden, *The Social Creation of Nature* (Baltimore: The Johns Hopkins University Press, 1992).

[7] Stephen Fox, *The American Conservation Movement: John Muir and His Legacy* (Madison: The University of Wisconsin Press, 1985), 156-182; Frank E. Smith, *The Politics of Conservation* (New York: Pantheon Books, 1966), 165-166; and Donald C. Swain, *Federal Conservation Policy, 1921-1933* (Berkeley: University of California Press, 1963), 44. For a more sympathetic treatment of the Survey's role in enforcing hunting regulations, see: James B. Trefethen, *An American Crusade for Wildlife* (New York: Winchester Press, 1975), 180-181. Trefethen's work is basically a restatement of his earlier work, *Crusade for Wildlife: Highlights in Conservation Progress* (Harrisburg, Pennsylvania: The Stackpole Company, 1961); and Dian Olson Belanger, *Managing American Wildlife: A History of the International Association of Fish and Wildlife Agencies* (Amherst, Massachusetts: University of Massachusetts Press, 1988).

This dissertation explores the difficulties that stem from the Survey's varied—and sometime incompatible—responsibilities. It argues that the federal government gave the Survey a conflicted mission: since the Survey had to both kill and protect wildlife, it was impossible for the federal bureau to develop a base of unequivocal, long-lasting alliances that could be relied on for support. The Survey's mission was further hindered by the dearth of information on wildlife management, and many of the bureau members began having doubts about their assumptions about nature, wildlife, and scientific methods of investigation. The Survey's uncertain alliances, combined with its uncertain intellectual underpinnings, pulled the bureau in multiple directions and compromised its ability to achieve its goals, conflicted and incompatible as the goals sometimes were.

The Survey's expanded list of responsibilities—protecting, killing, and managing wildlife—were integral to conservation during the Progressive Era, a time when the wasteful use of natural resources, including wildlife, came under increased scrutiny. Despite the nation's past history of the over-exploitation of natural resources, conservation leaders believed these resources could be used on a more sustainable basis, provided that decisions were made by scientific experts rather than politicians who might place the interests of their states over the interests of the nation. Although decisions based on disinterested, objective science is a laudable goal, much of the needed science was in a rudimentary stage of development, and it was impossible to divorce politics from the governmental

decision-making process: the success of a conservation project often depended on winning the support of local populations or constituencies that stood to benefit from the project.

For the Survey, establishing favorable relations with area residents was crucial, because it often encountered local resistance when creating refuges or enforcing wildlife legislation. The resistance was not always successful in thwarting the Survey's plans, but it often created obstacles and put limitations on what could be accomplished. Locals resisted for several reasons: if the federal government withdrew land from the public domain, cattlemen and farmers objected that the land should be used for economic development. Others argued that withdrawn land would no longer be a potential source of local taxes (if a homesteader purchased the land); the same argument was applied to acquiring private holdings for a refuge (the land would not be subject to local taxes). More generally, opposition to land withdrawals was related to the resentment of western citizens who believed the public domain belonged to the individual states, not the federal government. Despite this opposition, locals often looked to benefit from the Survey's work. They looked to the Survey to protect wildlife and thus enhance nature-based tourism, especially hunting. The employment of local hunting guides, purchase of equipment, and lodging revenue could be lucrative additions to rural economies. In short, locals might support or resist the presence of the Survey, thus creating an ambivalent relationship between the federal bureau and local populations.

The Survey also had ambivalent relations with others who could potentially be supporters or detractors. As the Survey expanded beyond its early research focus, its various new roles pulled the organization in different directions. Predator control, the enforcement of wildlife legislation, and the management of wildlife refuges created relationships with different sources of potential conflict or support: stockmen, hunters, and a combination of scientists and preservationists. Each one of these groups supported some aspect of the Survey's roles but opposed others. For example, stockmen benefited from the Survey's predator control programs and also acquired water and hay from some of the refuges managed by the Survey. However, they often opposed the maintenance of animal sanctuaries, especially when land was withdrawn from the public domain to create the protected areas. Hunters generally supported the Survey's work with animal refuges, especially sanctuaries for migratory waterfowl. Even though hunting was prohibited on most of the refuges, sportsmen hoped that the number of birds would increase and leave the protected areas. Nonetheless, they often opposed specific hunting regulations, such as the length of time for a closed hunting season or limits on the number of birds that could be killed ("bag limits"). Scientists and nature preservationists supported the creation of the wildlife refuges and the enforcement of wildlife legislation, but, by the mid-1920s, many of them were outspoken critics of the Survey's predator control programs.

Because of the multiple directions the Survey had to navigate, it was difficult to build long-lasting alliances with these groups, yet the Survey needed them for

various reasons. Stockmen appealed to their representatives in Washington to keep predator control funded, and the Survey sometimes desired grazing on the refuges because it helped to reduce the threat of fire. The Survey relied on hunters to assist in data collection for its bird banding work that attempted to chart migratory patterns and changes in avian populations. The Survey often used arguments from scientists to illustrate the necessity of wildlife refuges and hunting regulations. Thus, the Survey needed these groups—the same groups that might welcome or oppose the Survey's work. Since the support or opposition could be there one day and gone the next, uncertainty characterized the Survey's relationship with stockmen, hunters, and scientists.

The Survey's work was also marked by a growing intellectual uncertainty. Members of the Survey had confidence in its earliest work of determining food habits of various species and mapping the distribution of flora and fauna of North America. Arcane disputes over taxonomic classification and speciation arose periodically, but these controversies are normal in taxonomy, as the field swings back and forth between "lumping" (minimizing the differences between taxonomic characteristics and thus naming fewer unique species) and "splitting" (emphasizing minute differences and thus naming more unique species).[8] However, as the Survey began managing nature (protecting wildlife and killing predators) rather than just studying it, the early confidence gave way to increasing doubt; managing nature involved greater complexity and more indeterminate

[8] Robert E. Kohler, *Naturalists, Collectors, and Biodiversity, 1850-1950* (Princeton: Princeton University Press, 2006), 230.

variables, and it became increasingly more problematic to make generalizations about nature and wildlife. Thus, the Survey's early understanding of nature—determinate and certain—gave way to a more indeterminate and uncertain understanding.

Without a firm intellectual edifice, many of the Survey's decisions about wildlife management involved speculation and rough approximations. Similarly, Survey members often gave educated guesses when attempting to ascertain local sentiment. The Survey's perpetually shifting base of potential support and the necessity of considering the concerns of local populations influenced the Survey, sometimes hindering the bureau's work, sometimes supporting it and benefiting from it. The need for local support was especially important for the Survey, because its responsibilities, outside of predator and rodent control, did not promise significant economic gains, unlike the Forest Service (grazing fees and timber production) the Reclamation Service (irrigation projects), and the National Park Service (tourism revenue). The lack of significant economic potential compounded the difficulties of building supporting alliances as the Survey embarked upon on the relatively uncharted territory of wildlife management.

Chapter one provides an overview of the Survey's wildlife management history and situates it within the larger context of conservation from the Progressive Era to the New Deal. It argues that a conceptual framework used by some historians to describe Progressive Era conservation—preservationist vs. wise use—does not apply to the Survey. Because the federal government

assigned the Survey the double mission of both protecting and killing wildlife, the federal bureau, at times, embodied both of those approaches to conservation as it continually reinvented itself in response to its new responsibilities.

Chapter two looks at the growing dissatisfaction with the Survey's science, as the bureau expanded its responsibilities beyond the study of the relationship between birds and agriculture and the mapping of the continent's flora and fauna. The new responsibilities of predator control and wildlife management presented challenges that made scientists realize that nature was more variable and indeterminate than previously thought. Although Survey scientists had increasing doubts about understanding nature, when the bureau presented itself to the public, it touted its expertise. Chapter three examines the public face of the Survey and the ways in which the bureau attempted to win support. The Survey's earliest public relations efforts promoted the bureau's ability to aid farmers, but by the 1930s, with the Survey entangled in more controversial issues, it took more authoritative steps to minimize bad publicity.

It was essential for the Survey to maintain a positive public image, because, once it began managing wildlife refuges, gaining the support of local populations could facilitate the success of the refuges, the subject of chapters four and five. Chapter four examines the Survey's management of the National Elk Refuge in Jackson Hole, Wyoming, an example of the competing claims that often circumscribed the Survey's wildlife conservation efforts. In Jackson, the Survey had to consider the needs of cattlemen, local citizens, state game authorities, the

Forest Service, and the National Park Service, before it could provide more habitat for the elk by enlarging the refuge.

Chapter five focuses on the Survey's management of bird refuges, an endeavor that was often confounded by local populations. Similar to the citizens in Jackson, Wyoming, locals near the bird refuges often resisted the Survey or sought to benefit from the federal bureau's efforts to maintain the refuges. The citizens were not passive subjects, acquiescing to federal authority, and they realized that the Survey needed to address their concerns. On numerous occasions, the Survey realized it needed to build local support to advance its goals. Compounding the difficulty for the Survey was the diversity of refuges. They varied in size, ecology, and location, and each presented a different set of political and local circumstances; there was no "blueprint" for managing a wildlife refuge.

The conclusion places the Survey's history in the larger contexts of federalism and America's ambivalent notions of wildlife. Under federalism, government bureaus share authority and need to consider the concerns of local populations when implementing policy. The Survey's efforts to implement and enforce policy were met unevenly by area residents, as they often had their own understanding of acceptable or unacceptable roles for wildlife. Working within the restraints of federalism, limited scientific understanding, a conflicted mission, locals' different views of the desirability of wildlife, and a wavering base of support, the Survey

faced its responsibilities with a high degree of uncertainty and was pulled in multiple directions.

THE UNITED STATES BUREAU OF BIOLOGICAL SURVEY AND WILDLIFE CONSERVATION: A BRIEF HISTORY, 1885 – 1940

As the United States underwent rapid economic and industrial development in the last quarter of the nineteenth century, Americans began to take notice of the depletion of natural resources and the decline of wildlife. A growing concern over natural resources became manifest by the early twentieth century, most notably exemplified by a growing conservation movement. Conservationists such as the Forest Service's Gifford Pinchot advocated the use of natural resources, albeit as long as it was done in an efficient and sustainable manner. In contrast to the conservationists, preservationists, led by naturalist, popular author, and founder of the Sierra Club (1892) John Muir, were more skeptical of the use of natural resources and argued that wilderness areas should be maintained in a pristine condition. The conservation/preservation division, often used by historians to analyze the Progressive Era's responses to concerns about nature and natural resources, has been criticized recently by Robert W. Righter and Curt Meine as overly-simplistic.[1] Furthermore, applying this division to the Survey is

[1] Robert W. Righter has criticized the ways in which historians have used the conflict between Pinchot and Muir, especially in reference to the damming of the scenic Hetch Hetchy area in California, as an example of a battle of ideas about wilderness vs. civilization. Historians using this wilderness/civilization framework tend to portray the Pinchot/Muir dispute as a morality play, with Muir the enlightened guardian of nature and Pinchot the benighted destroyer of nature. See: Robert W. Righter, *The Battle over Hetch Hetchy: America's Most Controversial Dam and the Birth of Modern Environmentalism* (New York: Oxford University Press, 2005), especially the Introduction and chapter nine, "The Legacies of Hetch Hetchy." Kurt Meine suggests that the conservation/preservation framework has blinded historians to other ways of conceptualizing the issues, arguing that "there is a tendency to extrapolate uncritically the dualism between wilderness preservation and utilitarian conservation, as if nothing had changed since Muir and Pinchot parted company." Kurt Meine, "Conservation and the Progressive Movement," in Ben A. Minteer and Robert E. Manning, eds., *Reconstructing Conservation: Finding Common Ground* (Washington: Island Press, 2003), 174. Two works that employ a sharp conservation/preservation distinction

problematic, as the bureau was sometimes conservationist, sometimes preservationist, and sometimes a combination of both. Similar to the conflicted mission of killing and protecting wildlife, the dual roles of conservation/preservation pulled the Survey in multiple directions, causing the bureau to reinvent itself several times as it adjusted to changing circumstances from Progressive Era conservation to New Deal conservation.[2]

The emergence of the Survey was tied to the growth of government bureaus after the Civil War. Richard White observes that in the West, the state grew and took on modern forms. The United States Army was primarily a western army, since its most important role in the nineteenth century (with the exception of the Civil War) was subduing Indians in the West. Bureaucracies such as the Post Office and the Custom Service existed in the East, but the bureaus that had significant roles in the West—the General Land Office, the United States Geological Survey, and the Bureau of Indian Affairs—expanded the size and scope of federal government. In the West, the enlarged federal government was

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are: Roderick Nash, *Wilderness and the American Mind* (New Haven: Yale University Press, 2001); and Stephen Fox, *The American Conservation Movement: John Muir and His Legacy* (Madison: The University of Wisconsin Press, 1981).

[2] While Progressive Era conservation and New Deal conservation are typical parameters of many conservation histories, some scholars point out that there was significant conservation activity "between the Roosevelts." See: Kendrick A. Clements, *Engineering the Good Life: Hoover, Conservation, and Consumerism* (Lawrence: University Press of Kansas, 2000); Carl E. Krog, "'Organizing the Production of Leisure': Herbert Hoover and the Conservation Movement in the 1920s," *The Wisconsin Magazine of History* 67 (spring 1984): 199-218, Paul Sutter, *Driven Wild* (Seattle: University of Washington Press, 2002); and, by the same author, "Terra Incognita: The Neglected History of Interwar Environmental Thought and Politics," *Reviews in American History* 29 (June 2001): 289-297.

principally concerned with the collection of data on land, natural resources, wildlife, and animal diseases.[3]

The government focused much of its early scientific research on agriculture. In 1862, Congress passed legislation that established the Department of Agriculture and the Morrill Land Grant Colleges, many of which eventually became centers for agricultural research. Furthermore, as future American scientists received a European education, and as more American universities based their graduate programs on European educational models emphasizing specialization, many in the scientific community looked to American universities for the future of agricultural research.[4] The focus of much of this education and government research was on applied science, often with economic consequences. For example, in 1884, the Bureau of Animal Industry was formed to investigate animal diseases after European nations began limiting American exports of meat infected with pleuropneumonia, trichinosis, and hog cholera. The bureau's successful eradication of pleuropneumonia by 1890 was a testament to the federal

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[3] Richard White, *"It's Your Misfortune and None of My Own": A New History of the American West* (Norman: University of Oklahoma Press, 1991), 55-57; and Donald J. Pisani, *To Reclaim a Divided West: Water, Law, and Public Policy, 1848-1902* (Albuquerque: University of New Mexico Press, 1992), 6-9. Richard Franklin Bensel notes that the federal government facilitated the development of the industrial East, primarily through protective tariffs, maintenance of the gold standard, and relatively unregulated markets. See: *The Political Economy of American Industrialization, 1877-1900* (New York: Cambridge University Press, 2000).

[4] A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities to 1940* (New York: Harper & Row, 1957), 151-159; and Robert V. Bruce, *The Launching of American Science, 1846-1876* (Ithaca, New York: Cornell University Press, 1987), 334-335. See also: Margaret W. Rossiter, "The Organization of the Agricultural Sciences," in Alexandra Oleson and John Voss, *The Organization of Knowledge in Modern America, 1860-1920* (Baltimore: Johns Hopkins University Press, 1979), 211-248. For the European influence on American education, and for European-American intellectual exchanges in general, see: Daniel T. Rodgers, *Atlantic Crossings: Social Politics in a Progressive Age* (Cambridge: The Belknap Press of Harvard University Press, 1998).

commitment to applied science, an approach that was affirmed by the Allison Commission, a bipartisan congressional committee (1884-1886) that investigated government scientists in the Geological Survey, the Coast Survey, and the Weather Service. These scientists had to demonstrate that their work had practical applications.[5]

This federal commitment to applied science set the context for C. Hart Merriam, a young medical doctor with a passion for natural history, when he appealed to Congress for assistance in completing a project he began with the American Ornithological Union, an organization he help found in 1883.[6] He spearheaded an effort within the Union to collect and collate data from a network of 1,200 voluntary observers on bird migration patterns, food habits, and economic importance. Soon, however, he realized that the volume of information was overwhelming. Thus, Merriam, suggesting that farmers could benefit from this ornithological knowledge, appealed to the federal government for support. As a result, Congress, partly motivated by the Division of Entomology's inadequate response to an outbreak of locusts in the Plains in the 1870s,

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[5] Dupree, *Science in the Federal Government*, 161-167; and Donald Worster, *A River Running West: The Life of John Wesley Powell* (New York: Oxford University Press, 2001), 424-433. For the Bureau of Animal Industry and the development of veterinary medicine in the United States, see: Vivian Wiser, Larry Mark, and H. Graham Purchase, *100 Years of Animal Health* (Beltsville, Maryland: Associates of The National Agricultural Library, 1987).

[6] "Natural History" defies an easy definition, but historian of science Mark V. Barrow Jr. describes it as a practice "characterized by the collection, description, naming, and classification of organisms based largely on their external characteristics." One did not need to have a degree or specialized field of research to be a natural historian. Barrow argues that, in reference to ornithology, the distinction between professional and amateur was quite blurry well into the first quarter of the twentieth century. Mark V. Barrow Jr., *A Passion for Birds: American Ornithology after Audubon* (Princeton: Princeton University Press, 1998), 185.

appropriated 5,000 dollars in 1885 for the creation of a new organization within the Department of Agriculture's Division of Entomology.[7]

This new organization, initially titled the Division of Economic Ornithology and Mammalogy (renamed as the Division of Biological Survey in 1896 and as the Bureau of Biological Survey in 1905), was under the leadership of Merriam from 1885-1910. Within a few years, the Division acquired more personnel for wildlife, most notably, Vernon Bailey. Although possessing only a cursory college education, Bailey rose to the position of Chief Naturalist and went on to author twelve books and numerous articles on mammalogy and natural history. He also married Merriam's sister Florence, an ornithologist and author of popular works of natural history. Within a few years, wildlife specialist Theodore Palmer, predator expert Albert Fisher, and Edward Nelson, future chief of the Survey, joined the Division.[8]

With his small but dedicated staff, Merriam sought to use science to benefit farmers, but he also realized that he needed farmers to further that science. For example, the Division attempted to ascertain which animals, especially birds, might be detrimental to agriculture (by destroying crops) or might be helpful (by eating insects and rodents). Accordingly, in 1886, Merriam mailed questionnaires

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[7] Keir B Sterling, "Builders of the US Biological Survey, 1885-1930," *Journal of Forest History* 33 (October 1989): 180-181; and Oliver H. Orr, Jr., *Saving American Birds: T. Gilbert Pearson and the Founding of the Audubon Movement* (Gainesville, Florida: University Press of Florida, 1992), 22-30. For Merriam, see: Keir B Sterling: *Last of the Naturalists: The Career of C. Hart Merriam* (New York: Arno Press, 1977).

[8] Sterling, "Builders of the US Biological Survey, 1885-1930," 182-186. For brief biographical sketches of early Survey members, see: Keir B. Sterling, "Naturalists of the Southwest at the Turn of the Century," *Environmental Review* 3 (Autumn 1978): 20-33. For a study of how Bailey,

to farmers asking them to identify beneficial or injurious birds and lost revenue due to the birds' "depredations."[9]

The crucial element in the use of local knowledge was the reliability of the respondents—"trustworthy witnesses," according to Merriam.[10] The accuracy of local observers, however, was increasingly questioned by some Survey members by the 1930s. More generally, the use of "trustworthy" non-scientists was becoming obsolete in twentieth-century science. According to historian of science Robert E. Kohler, as science required more education and professionalization, scientific "institutional affiliation gradually replaced personal character as the guarantee of authentic facts."[11]

Realizing that even "trustworthy" farmers were prone to error, Merriam began using "food habits" research to determine which bird species were injurious or beneficial. The food habits method seemed straightforward: acquire a dead animal, dissect its stomach, and determine which crops, insects, or rodents it ate.

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lacking educational credentials, was "socialized" into science, see: Robert Kohler, "From Farm and Family to Career Naturalist: The Apprenticeship of Vernon Bailey," *Isis* 99 (2008): 28-56.

[9] The questionnaires can be found in Department of Agriculture, *Report of the Ornithologist and Mammalogist, 1886* (Washington: Government Printing Office, 1887), 230-234. Questionnaires asked about other topics besides the utility of birds, and answers sometimes corrected misapprehensions. For example, Merriam was corrected by one of his respondents about the manner in which crows eat and eject poison ivy seeds. See Department of Agriculture, *Report of the Ornithologist and Mammalogist, 1890* (Washington: Government Printing Office, 1891), 282-283.

[10] See Department of Agriculture, *Report of the Ornithologist and Mammalogist, 1888* (Washington: Government Printing Office, 1889), 501. In the nineteenth century, the boundary between professional and non-professional scientist was more porous than in the twentieth century, especially for the life sciences. It was not uncommon for professionals to acquire information from non-professionals. Janet Browne's two volume biography of Charles Darwin notes many instances in which Darwin utilized information from a variety of non-professional sources, such as bird watchers and animal and plant breeders. See: Janet Browne, *Charles Darwin: Voyaging* (Princeton, New Jersey: Princeton University Press, 1995); and *The Power of Place: Charles Darwin: The Origin and After—The Years of Fame* (New York: Knopf, 2002).

If an animal consumed more insects than crops, then it was a "good" species. Thus, food habits research created a simple dichotomy of "good" and "bad" species based on their diets, a dichotomy that could also be used to justify killing the "bad" species. However, the Survey also used food habits research to challenge the conventional wisdom on "bad" species, pointing out that the crow, hawk, skunk, and weasel did more good than harm.[12] Food habits research was so crucial to the Survey's work that Merriam even solicited animal stomachs from members of the public, asking them to mail the contents to Washington in order to "aid in the solution of economic questions of very great importance."[13]

Figure 1: No tenderfoots allowed: The Survey's early expeditions. Undated photograph: Library of Congress, Prints and Photographs Online Catalog.

The Division found other ways to address "economic questions of very great importance." In addition to providing literature that documented the benefits of the "good" species, the Division began issuing bulletins about how to eradicate or

[11] Robert E. Kohler, *Naturalists, Collectors, and Biodiversity, 1850-1950* (Princeton: Princeton University Press, 2006), 136.
[12] Department of Agriculture. *Report of the Ornithologist and Mammalogist, 1887* (Washington: Government Printing Office, 1888), 226-229.
[13] Department of Agriculture. *Report of the Ornithologist and Mammalogist, 1890* (Washington: Government Printing Office, 1891), 285.

control "bad" species such as gophers and squirrels.[14] Furthermore, the Division began assisting western settlers in exterminating prairie dogs in 1902. The prairie dog was accused of various misdeeds: destroying crops, competing with cattle for grass, and interfering with irrigation systems. The Division provided the settlers with poison, instructions, and live demonstrations. Though not opposed to destroying prairie dogs in principle, Merriam had some misgivings because too little was understood of the animal and its habitat.[15]

Besides the qualms Division members had about killing prairie dogs, they would rather do what they had a passion for: studying birds and mammals and mapping their environments. This intellectual curiosity led to the Survey's most noteworthy contribution to science, the *North American Fauna* series, a sixty-three volume set spanning the years 1889-1963. The multi-volume work documented the continent's flora and fauna, often done in the challenging environments of the American West (SEE PHOTOS), and provided both practical and theoretical information. The authors focused on the environments inhabited by animals as well as their physical characteristics, breeding habits, migrations, geographical range, population size, and potential profits for ranchers and farmers. Survey scientists especially valued the collection of animal specimens. A

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[14] Department of Agriculture, *Report of the Ornithologist and Mammalogist, 1886* (Washington: Government Printing Office, 1887), 236-238.

[15] Department of Agriculture, *Report of the Chief of the Division of Biological Survey, 1902* (Washington: Government Printing Office, 1903), 210. Susan Jones points out the prairie dog, unlike other animals such as the wolf that had a long history of evoking fear and hostility from humans, was considered an adorable social animal that lived in "prairie dog towns." By the late nineteenth century, however, as settlement proceeded throughout the West, the prairie dog fell into disfavor. See: Susan Jones, "Becoming a Pest: Prairie Dog Ecology and the Human Economy in the Euroamerica West," *Environmental History* 4 (October 1999): 536-542.

wide sampling of specimens, taken from different locations, allowed scientists to distinguish between species and subspecies and between subspecies and varieties. The desideratum for these scientists was the specimen of a new species unknown to science.[16] Over time, scientists identified and named numerous new species and sub-species.[17]

The writers of these works used a variety of sources. Most of their findings were based on their own expeditions into the natural world, a generalist method of studying nature around the turn of the twentieth century that was seemingly losing ground to more specialized laboratory-based techniques, a change lamented by Merriam.[18] In addition to fieldwork, the scientists often drew upon the great

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[16] Great care was required in acquiring the specimens. They had to be trapped, labeled, handled, and shipped according to procedures pioneered by Merriam. Detailed field notes, written right after the finding of a new specimen, were required. For Merriam's influence on field methods, see the first chapter in Sterling, *Last of the Naturalists*.

[17] Robert Kohler notes that, within the first few years of its field investigations, Division members found seventy-one new vertebrate species. This number, however, needs to be assessed in the scientific context of lumping and splitting. Merriam, an extreme splitter, was often criticized for making fine distinctions and naming new species. In addition to taxonomists, Theodore Roosevelt criticized Merriam for his splitting. Some of the new species that Merriam coined eventually were revised into the subspecies or variety categories. See Robert E. Kohler, *Naturalists, Collectors, and Biodiversity,* 4-8; and Sterling, *Last of the Naturalists*, 168-173. For Merriam's thoughts on splitting and lumping, see C. Hart Merriam, "Suggestions for a New Method of Discriminating between Species and Subspecies," *Science*, n.s., 5 (14 May 1897): 753-758; and by the same author, "Criteria for the Recognition of Species and Genera," *Journal of Mammalogy* 1 (November 1919): 6-9.

[18] C. Hart Merriam, "Roosevelt, the Naturalist," *Science,* n.s., 75 (12 February 1932): 181-183. Merriam's constant approbation of natural history and skepticism of laboratory methods is one reason Keir B. Sterling has titled his biography of Merriam, *Last of the Naturalists.* However, "last of the naturalists" might be a misleading characterization of Merriam. As an atheist, Merriam did not share the theological implications of early nineteenth-century natural history—nature's orderliness is reflective of a wise creator. Furthermore, "the last naturalist" assumes an end to natural history, a contention challenged by historian of science Paul Lawrence Faber. According to Faber, natural history is still flourishing, and he finds the embodiment of that tradition in the work of Sociobiology founder and biodiversity advocate E.O. Wilson. He also points out that, in the late nineteenth century, natural history received support from government, universities, private individuals and organizations, museums, zoos, and botanical gardens. See: Paul Lawrence Faber, *Finding Order in Nature: The Naturalist Tradition from Linnaeus to E.O. Wilson* (Baltimore: The Johns Hopkins University Press, 2000). See also: Philip J. Pauly,

naturalists of the nineteenth century; some writers went back even further and mined the early Spanish accounts. Occasionally, the Division scientists utilized oral testimony from ranchers, farmers, trappers, and Indians, an approach most clearly illustrated in the works of Vernon Bailey.

Darwinism and Merriam's concept of the life zones provided the theoretical support for the *North American Fauna* series. The writers often discussed struggle and competition between species and each species' means of defense. They also explained animals' physical features in terms of adaptation to the environment. For example, in *North American Fauna 29: The Rabbits of North America*, E.W. Nelson noted how changes in rabbits' pelage were related to changes in the environments they inhabited. Division scientists also framed their taxonomic findings with reference to evolutionary theory. They noted how slight physical differences in closely related specimens illustrated how a subspecies evolves into a separate species. As more specimens were analyzed, scientists revised many taxonomic classifications.[19]

The other theoretical basis of the *North American Fauna* series—Merriam's concept of the life zones—was put forth by Merriam in 1890 in the third *North American Fauna* and in several articles in scientific journals. Merriam believed that, in North America, there were seven different "life zones," each with its own distinct flora and fauna and physical characteristics. He argued that temperature

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Biologists and the Promise of American Life (Princeton: Princeton University Press, 2000), 44-70. For the relation between natural history and theology, see: Alan Olding, *Modern Biology and Natural Theology* (New York: Routledge, 1991).

places limits on the distribution of species; this is why species are "checked in their efforts to overrun the earth."[20] Once certain environmental conditions such as temperature, moisture, and atmospheric pressure are measured, then laws can be formulated that describe an orderly and predictable natural world, a quantitative approach to studying the environment developed earlier in the nineteenth century by the German geographer Alexander von Humboldt.[21]

The geographical determinism implied in the life zones concept was more than a reflection of an orderly nature: knowledge of the life zones allowed one to predict the type of crops that will thrive in a particular zone. Merriam used this

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[19] For a discussion of the importance of taxonomy for evolutionary theory and contributions made by mammalogists, including Survey scientists, see: Elmer C. Birney and Jerry R. Choate, *Seventy-Five Years of Mammalogy 1919-1994* (Provo, Utah: American Society of Mammalogists, 1994).

[20] C. Hart Merriam, "Laws of Temperature Control of the Geographic Distribution of Terrestrial Animals and Plants," *National Geographic Magazine* 6 (1894): 229, and C. Hart Merriam, *Results of a Biological Survey of the San Francisco Mountain Range and Desert of the Little Colorado Arizona, North American Fauna 3* (Washington, Government Printing Office, 1890). For a collection of Merriam's important writings on life zones and other topics, see: Clinton Hart Merriam, *Selected Works of Clinton Hart Merriam*, ed. Keir B. Sterling (New York: Arno Press, 1974).

[21] Merriam resisted challenges to his deterministic and orderly view of the natural world. For example, in 1906, he penned an article arguing against Hugo de Vries' theory that mutations cause the origin of new species, a theory disagreeable to Merriam, since mutations suggested a chance element operative in nature. See: C. Hart Merriam, "Is Mutation a Factor in the Evolution of the Higher Vertebrates?" *Science,* n.s., 23 (16 February 1906): 242-257. When Vernon Bailey was doing field work, Merriam encouraged him to pay special attention to altitude, since it is correlated with temperature and thus provided evidence for his life zone theory. On one occasion, Merriam told Bailey, "Of course you have found out that altitude has more to do with limiting the distribution of species than any other single cause." When Bailey presented evidence or made suggestions that conflicted with the life zones theory, Merriam corrected Bailey or dismissed the evidence as anomalous. He told Bailey "you overdid yourself" by suggesting slightly different contours for one of the life zones. He dismissed this evidence that ran contrary to his theory as just a "faint tinge" that has "been detected here and there…" See the following correspondence: C. Hart Merriam to Vernon Bailey, 2 July 1904, Box 2, Folder 7. Vernon Bailey Papers, 1828-1958, Collection Number 00554, American Heritage Center, University of Wyoming (hereafter, Bailey Papers, Wyoming); Merriam to Bailey, 12 February 1889, Box 1, Folder 5, Bailey Papers, Wyoming; Merriam to Bailey, 26 December 1890, Box 1, Folder 7, Bailey Papers, Wyoming; Merriam to Bailey, 16 February 1895, Box 1, Folder 13, Bailey Papers, Wyoming. For Humboldt's influence in the United States, see: Aaron Sachs, *The Humboldt Current: Nineteenth–Century Exploration and the Roots of American Environmentalism* (New York: Viking, Press, 2006).

connection between pure and applied science when he was repeatedly under fire to demonstrate practical benefits for farmers. For example, testifying at congressional hearings in 1907, Merriam took the opportunity to validate the life zones concept and show its applicability to agriculture. He constructed a map, based on knowledge of the life zones' climatic conditions, to illustrate the ranges of certain crops, especially cereals; the map was constructed without empirical knowledge of the locations of cereals. Then, he consulted a cereal specialist, a "Professor Plumb, who knew nothing of my work," and asked Plumb to draw up a map of cereal distribution. Plumb "was the most surprised man in the United States" to find concordance between his map and Merriam's.[22]

Despite Merriam's efforts, some congressional representatives failed to see how the Division's work would produce economic benefits. The Chairman of the Committee on Agriculture, James W. Wadsworth, remarked that the "commercial value of the Biological Survey is not so tangible, not so direct as some of the other bureaus…." By the 1900s, the Division could point to examples that had "commercial value" that were "not so direct." The Division began research that could benefit farmers: it studied the distribution of cereals; the use of bacterial diseases as a means for killing rodents; pests such as the boll weevil—the bane of southern cotton production— and the cinch bug, coddling moth, and gopher; and the distribution of seeds by birds. It provided farmers with practical advice, either through direct correspondence, assistance with rodent control, or with periodical

[22] House Committee on Agriculture, *Hearings on H.R. 18537*, 59th Cong., 1st sess. (1906), 400.

publications. The Division published maps of the continent's flora and fauna, and members published their technical findings in the *North American Fauna* series, the Department of Agriculture's annual yearbook, and scientific periodicals. At a more popular level, the Division set up displays at expositions and fairs and provided educational material for schools in an effort to take advantage of the growing popularity of the nature study movement. It also began work in studying wildlife, enforcing wildlife legislation, and compiling state wildlife laws and legal cases. All of these added responsibilities, however, were difficult to quantify in terms of direct benefits. Moreover, the additional work of the Division did not compel Congress to increase appropriations commensurate with the increased workload, thus resulting in low salaries that encouraged some members to leave the Division for jobs in museums, educational institutions, and other government agencies. Though appropriations did increase—from $10,000 in 1887 to $52,000 in 1907—the added finances did not reflect the growing responsibilities of the Division or its new status—The Bureau of Biological Survey in 1905.[23]

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[23] House Committee on Appropriations: *Hearings before the Subcommittee of House Committee on Appropriations, Agricultural Department Appropriations Bill*, 57th Cong., 1st sess. (1902), 289. Jenks Cameron provides a table of appropriations for the Survey from 1886 to 1928. See: *The Bureau of Biological Survey: Its History, Activities, and Organizations* (Baltimore: The Johns Hopkins Press, 1929), 314. Nature Study in public education was popular around the turn of the twentieth century. It was used to promote respect for nature and introduce students to basic scientific principles. Controversy developed over some of the educational materials used for nature study. Critics charged that the materials were too anthropomorphic and unrealistic. The controversy resulted in the infamous "Nature Faker" debate. See Ralph H. Lutts, *The Nature Fakers: Wildlife, Science, and Sentiment* (Charlottesville: University Press of Virginia, 1990). For examples of writings of the Nature Fakers and their critics, see Ralph H. Lutts, ed., *The Wild Animal Story* (Philadelphia: Temple University Press, 1998). For a more contemporary manifestation of the issues raised in the nature-faker debate, see: Matt Cartmill, "The Bambi Syndrome," *Natural History* 102 (June 1993); Ralph Lutts, "The Trouble with Bambi: Walt Disney's Bambi and the American Vision of Nature," *Forest and Conservation History* (October 1992); and Waller Hasting, "Bambi and the Hunting Ethos," *Journal of Popular Film &*

The new status of the bureau also could not prevent an attempt to eliminate the agency all together. In 1907, Wadsworth proposed eliminating the Survey and assigning its responsibilities to other federal agencies. He argued that much of the Survey's work was duplicated by other government organizations. The Survey responded in several ways. Merriam testified before Congress about the practical benefits to farmers that were generated by the Survey's work. Secretary of Agriculture James Wilson's report to Congress demonstrated that the Survey was not duplicating the work of other government bureaus. A collection of statements supporting the Survey was presented by T. Gilbert Pearson of the National Association of Audubon Societies, an organization of bird enthusiasts that developed a close relationship with the Survey. Pearson provided testimonials from the League of American Sportsmen, the National Association of State Game and Fish Wardens and Commissioners, and the International Conference of Cotton Manufacturers, support that reflected the Survey's growing importance in protecting wildlife and in studying agricultural pests, especially the boll weevil. Finally, future Survey Chief H.W. Henshaw wrote a popular article for *National Geographic Magazine*, suggesting a reinvention of the Survey, from research and pure science to applied science. While Merriam often pointed to potential benefits from the Survey's research, the gains were "not so direct." Henshaw, on the other hand, was more explicit about the desirability of applied science, stating that "the pursuit of science for its own sake" is "commendable," but it is "not the

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Television 24 (summer 1996). For an extensive look at the nature study movement, see: Kevin C. Armitage, *The Nature Study Movement: The Forgotten Popularizer of America's Conservation*

spirit that animates our government in its support of scientific research. In its aims and ambitions this is a practical age."[24]

This "practical age" was also the "progressive" period, a term used by historians to describe responses, beginning in the 1890s, to problems associated with modernization, industrialization, urbanization, growing business concentration, political corruption, the utilization of natural resources, and the expansion of the nation.[25] Declining agricultural prices, low industrial wages, and a depression beginning in 1894 created economic hardship for most Americans. Furthermore, these sweeping changes threatened long-standing American ideals: As large corporations grew in size, it became more problematic to be a self-employed entrepreneur, a desirable aspiration for many Americans.[26] The alleged closing of the frontier, most notably expressed by historian Frederick Jackson

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Ethic (Lawrence: University Press of Kansas, 2009).

[24] H.W. Henshaw, "The Policemen of the Air, An Account of the Biological Survey of the Department of Agriculture," *National Geographic Magazine* 19 (February 1908): 79-118. For an overview of the congressional controversy, see: Cameron, *The Bureau of Biological Survey*, 37-42. Several journals defended the Survey during the congressional appropriations controversy. For example, see the following articles in *Forest and Stream:* "The Farmer Threatened," 68 (2 February 1907): 167; "Boone and Crockett Club Meeting," 68 (9 February 1907): 218; and "The Biological Survey's Work," 70 (29 February 1908): 327. See also: "The Agricultural Appropriation Bill," *Science*, n.s., 24 (13 July 1906): 58-59; "The Work of the Biological Survey," *Auk* 25 (April 1908): 246-247; and "Appropriations for the Department of Agriculture," *Science*, n.s., 28 (14 August 1908): 202-205.

[25] Historians have debated the usefulness of using the label "progressive" to describe a "movement" that lacked unity and coherence and included so many divergent tendencies that the term is seemingly meaningless. In this dissertation, "progressive" describes a broad set of responses to problems that were manifest at the end of the nineteenth century. For contrasting views about the use of the progressive label, see: Peter G. Filene, "An Obituary for the 'Progressive Movement,'" *American Quarterly* 33 (spring 1970): 20-34; and Daniel T. Rodgers, "In Search of Progressivism," *Reviews in American History* 10 December 1982): 113-132. For an argument that the Progressive Movement was not very progressive, see Howard Zinn, *A People's History of the United States* new ed. (New York: Harper Collins, 2003). For an overview, see: Arthur Stanley Link and Richard McCormick, *Progressivism* (Arlington Heights, Illinois: Harlan Davidson, 1983).

Turner in 1893, was unsettling to Americans who wanted to homestead on inexpensive land.[27] The growing dissatisfaction with the perceived loss of opportunities gave rise to a populist movement, a brief challenge to the two-party political system.[28]

The conservation movement emerged within this turbulent context around the turn of the twentieth century. The movement was reflective of two larger trends. First, by the late nineteenth century, there was a significant rethinking of the relation between humans and nature and natural resources: people began to question the notion that there was an infinite abundance of natural resources, as earlier generations believed. Concern over depleted forests, an overgrazed range, and vanishing species fueled the incipient conservation movement. Second, since

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[26] Jeffrey Louis Decker explores the transformations of the ideal of the self-made man in: *Made in America: Self-Styled Success from Horatio Alger to Oprah Winfrey* (Minneapolis: University of Minnesota Press, 1997.

[27] Although Turner has been criticized for ignoring Indians, race, gender, and sources of conflict on the frontier, his essay resonated with many Americans because of the importance he attributed to land as a source of American identity. As Donald J. Pisani notes, well before Turner gave his paper at the American Historical Association in 1893, "most Americans recognized that what made the United States different from Europe was its great size and abundance of fertile land. Free or cheap land helped the nation escape feudalism, a landed aristocracy, and the twin despotisms of monarchy and an established church." See: *Water, Land, & Law in the West: The Limits of Public Policy, 1850-1920* (Lawrence: University Press of Kansas, 1996), 51. See also, for symbolic and cultural meanings of land in the American West, Henry Nash Smith, *Virgin Land: The American West as Symbol and Myth* (Cambridge, Massachusetts: Harvard University Press, 1950). For challenges to the glorification of the image of the frontier, see Nancy K. Anderson and William H. Truettner, eds., *The West as America: Reinterpreting Images of the Frontier, 1820-1920* (Washington: Smithsonian Institution Press, 1991). On a more tangible level, Turner has been criticized for overstating the "closing" of the frontier: more homestead entries were filed after Turner delivered his essay, especially from 1908-1922, than before the alleged closing of the frontier. See: Richard N.L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy* (New Haven: Yale University Press, 1999), 87. For an overview of public land laws that facilitated homesteading, see: Paul W. Gates, "An Overview of American Land Policy," *Agricultural History* 50 (January 1976): 213-229.

[28] Lawrence Goodwyn, *The Populist Moment: A Short History of the Agrarian Revolt in America* (New York: Oxford University Press, 1978). Changes affecting farmers in this time period are discussed in Robert Wiebe, *The Search for Order, 1877-1920* (New York: Hill and Wang, 1967);

conservationists saw themselves as skilled professionals with specialized expertise, the movement was part of a larger trend of professionalization. The formation of professional associations that mandated educational or other requirements before entrance to the profession, coupled with state licensing boards, promised to bring competency to the professions and public service.[29]

For conservationists, government bureaus staffed by scientists and technical experts were keys to enlightened policy. Samuel Hays, historian of one of the early and influential works of conservation history, argues that "conservation, above all, was a scientific movement," and "its essence was rational planning to promote efficient development and use of all natural resources." However, as Donald J. Pisani argues, the "science" behind early conservationists, Pinchot in particular, left much to be desired. For the Survey, the lack of scientific expertise was especially noticeable in the management of wildlife, a discipline still developing around the turn of the century. Nonetheless, wildlife conservationists often utilized scientific discourse to distinguish themselves from "sentimentalists," a label with pejorative connotations that implied an unrealistic understanding of nature. Despite the limited science, conservationists argued that scientific experts, not legislators in Washington, should formulate natural resource policy, because, according to Hays, "pressure group action, logrolling in

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and Michael Kazin, *The Populist Persuasion: An American History* (New York: Basic Books, 1995).

[29] Two early works in environmental history examine the intellectual underpinnings of the rethinking of nature: Hans Hurth, *Nature and the American: Three Centuries of Changing Attitudes* (Berkeley: University of California Press, 1957); and Nash, *Wilderness and the American Mind*. For a brief overview of the development of professionalization, see the editor's

Congress, or partisan debate could not guarantee rational and scientific decisions."[30]

These "rational and scientific decisions" had economic consequences, since natural resources were to be utilized, albeit wisely. For Gifford Pinchot of the Forest Service (established in 1905), forests played an essential role in conservation: as reservoirs of natural resources and as locations for grazing, they had an obvious economic importance. Furthermore, he also believed forests regulated other natural resources, a regulatory role with economic ramifications. He saw the importance of "the forest and its relation to streams and inland navigation; to water power, and flood control, to the soil and its erosion; to coal and oil and other minerals; to fish and game; and many another possible uses or waste of natural resources...." [31] The Reclamation Service (established in 1902 and designated as a bureau in 1907) also offered potential economic benefits. It used revenue from the sale of public lands to fund western irrigation projects. The economic implications of reclamation, however, were not limited to the West.

Introduction in: Nathan O. Hatch, *The Professions in American History* (Notre Dame, Indiana: University of Notre Dame Press, 1988).

[30] Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Cambridge: Harvard University Press, 1959), 2-3. Among other questionable scientific judgments made by Pinchot, he overestimated the ability of forests to regulate the flow of waters in streams and to prevent flooding, despite evidence to the contrary. See: Donald J. Pisani, "The Many Faces of Conservation: Natural Resources and the American State, 1900-1940," in Morton Keller and R. Shep Melnick, eds., *Taking Stock: American Government in the Twentieth Century* (New York: Cambridge University Press, 1999), 136-137; and Donald J. Pisani, "Forests and Reclamation, 1891-1911," *Forest and Conservation History* 37 (April 1993): 75-76.

[31] Gifford Pinchot, *Breaking New Ground* (New York: Harcourt, Brace, 1947), 322-23.

Ideally, with irrigation, workers from the overpopulated East would migrate westward to farm and purchase manufactured goods from the East.[32]

Conservation thus attracted a diverse set of constituencies: farmers, cattlemen, sheepmen, irrigation advocates, lumbermen, mining companies, and manufactures seeking to sell their goods to these resource users. These constituencies—and the government agencies that represented their interests—often differed over the use of natural resources and were thus in conflict with one another. According to Pisani, because historians have tended to focus on the conflict between proponents and opponents of conservation rather than conflicts between various conservation organizations and bureaus, they have "treated conservation as a far more coherent movement than it really was."[33]

Conflict can also exist within a government agency. For the Biological Survey, conflict arose, not because one part of the Survey was at odds with another part. Rather, conflict developed because, as the Survey's responsibilities expanded, its various new roles pulled the organization in different directions. Until 1900, the Survey was primarily doing research—either to aid farmers or to map the distribution of flora and fauna. However, by the 1900s, the Survey was managing nature more so than studying it. Although the Survey still conducted research, new responsibilities included predator and rodent control, the

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[32] Donald J. Pisani, *Water, Land, & Law in the West*, 182. For an analysis of the Reclamation Bureau with a more extended chronological focus, see: Donald J. Pisani, "Federal Reclamation in the Twentieth Century: A Centennial Retrospective," in vol. 2, *Reclamation: Managing Water in the West: The Bureau of Reclamation: History Essays from the Centennial Symposium* (Denver, Colorado: U.S. Department of the Interior, Bureau of Reclamation), 611-635.

[33] Donald J. Pisani, "The Many Faces of Conservation,"126; and Donald J. Pisani, "Forests and Reclamation, 1891-1911," 76.

enforcement of wildlife legislation, and the maintenance, sometimes with the assistance of the National Audubon Society, of refuges for threatened animal species. These three added functions of the Survey created relationships with sources of potential conflict or support: stockmen, hunters, and a combination of scientists and preservationist-minded conservationists. Each one of these groups supported some aspect of the Survey's roles but opposed others. For example, stockmen benefited from the Survey's predator control programs, but they often opposed the maintenance of animal sanctuaries, especially if land had to be withdrawn from the public domain to create the protected areas. Hunters generally supported the Survey's work with animal refuges, especially sanctuaries for migratory waterfowl. However, they often opposed specific hunting regulations, such as the length of time for a closed hunting season or the bag limits on the number of waterfowl that could be hunted. Scientists supported the creation of the wildlife refuges and the enforcement of wildlife legislation, but, by the mid-1920s, many of them were critical of the Survey's predator control programs. Because of the multiple directions the Survey had to navigate, it was difficult to find consistent sources of support, thus creating ambivalent relations with stockmen, sportsmen, and scientists.

For the Survey, establishing favorable relations with the stockmen was crucial, but it required a process of reinvention. To demonstrate economic benefits of its work, the Survey attempted to de-emphasize its pure science—taxonomy and mapping flora and fauna—and stress its practical science. Predator

control provided the opportunity. In the early 1900s, the Survey's killing of wildlife concentrated on pesky rodents such as gophers and prairie dogs. However, by killing animals—wolves, coyotes, and cougars—that stockmen claimed were killing their valuable assets, the Survey built an alliance, albeit strained at times, with a powerful constituency with growing influence over management of the public domain.

The stockmen's authority increased after Pinchot attempted to win their support for a proposal that authorized the Forest Service to control grazing on the public domain with a fee-based permit system. Seeking to build support for the Forest Service, Pinchot wanted to assure the stockmen that the forest reserves on the public domain would still be open for grazing, despite legislation passed in 1891 that allowed a president to withdraw land from the public domain, and despite the General Land Office's strict regulation of grazing. Furthermore, stockmen were solicitous of executive authority. Acting on the belief that forests protect watersheds and irrigation sites, Presidents Grover Cleveland and Benjamin Harrison used the 1891 Forest Reserves Act to withdraw millions of acres from the public domain, thus prompting western settlers to fear that the federal government was gratuitously imposing its authority over the West. To win over the stockmen, Pinchot worked to move authority over the forests from the General Land Office (in the Department of the Interior) to the Forest Service (in the Department of Agriculture). He also gave a new name to the forest reserves, calling them "national forests," because "reserves" implied that the land could not

be used for commercial purposes.[34] Finally, his permit system for grazing, based on estimates of the number of animals that could be supported on the range, gave significant input to the stockmen: they helped to determine the number of allowable animals that could be grazed, and regulations had to be agreeable to local grazing associations.[35]

Pinchot's effort to gain the support of the stockmen was indicative of the political clout of the livestock industry, and the stockmen's support of the permit system was reflective of resource users' tendency to oppose federal regulation in principle yet find something of possible benefit in those regulations.[36] The

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[34] Donald J. Pisani, "Forests and Conservation 1865-1900," *The Journal of American History* 72 (September 1985): 340-359; Andrews, *Managing the Environment, Managing Ourselves,* 104-106; and Char Miller, *Gifford Pinchot and the Making of Modern Environmentalism* (Washington: Island Press, 2001), 196-197. George Perkins Marsh, a philologist, diplomat, and lawyer, was an early advocate of forest protection. His 1864 *Man and Nature* (Seattle: University of Washington Press, 2003) is usually discussed in histories of conservation. For an extended treatment, see David Lowenthal, *George Perkins Marsh: Prophet of Conservation* (Seattle: University of Washington Press, 2000). Marsh's ideas did not occur in a vacuum, and some other nineteenth century thinkers also questioned the human/nature relationship. For these early thinkers, see Roderick Nash, *Wilderness and the American Mind*, chapters 3-7; and Douglas H. Strong, *Dreamers and Defenders: American Conservationists* (Lincoln: University of Nebraska Press, 1988), chapters 2-3. For more specific aspects of conservation practices, before conservation became a "movement," see Richard W. Judd, *Common Lands, Common People: The Origins of Conservation in Northern New England* (Cambridge, Massachusetts, 1997); and Steven Stoll, *Larding the Earth: Soil and Society in Nineteenth-Century America* (New York: Hill and Wang, 2002).

[35] Pinchot's actions generated controversy. His permit system tended to favor the more established stockmen. Furthermore, Congress was outraged when Pinchot attempted to have a forestry fund that was independent of congressional oversight and unsuccessfully lobbied to have other government agencies, as well as management of the national parks, transferred to the Department of Agriculture. See: Sterling: *Last of the Naturalists*, 255-256; and Andrews, *Managing the Environment, Managing Ourselves*, 145.

[36] Business acceptance or rejection of government regulations, especially during the Progressive Era, has been a long-standing contentious topic among historians. See, for example, the following two works from Gabriel Kolko: *The Triumph of Conservatism: A Reinterpretation of American History, 1900-1916* (New York: The Free Press, 1963) and *Railroads and Regulations, 1877-1916* (New York: Norton, 1965). See also: Thomas K. McGraw, ed., *Regulation in Perspective: Historical Essays* (Cambridge, Massachusetts: Harvard University Press, 1981). In reference to the stockmen, they also had mixed feelings about federal regulation. While some benefited from the permit system, some rejected it. The issue of federal control over the public domain was especially contentious in Colorado, where Fred Light, in 1906, ignored federal regulations by

Survey, by touting the virtues of its predator control expertise, was able to demonstrate that it was in accord with Progressive Era conservation. The Survey was not only able to highlight its specialized, professional skill—a desired characteristic of the era's conservation agencies—but it was also able to demonstrate that its work produced economic benefits, an assertion that was easier for the Forest Service (guardians of valuable natural resources) and the Reclamation Service (irrigation promoters) to make. As part of the Survey's conflicted mission, predator control embodied the wise use ethos of Progressive Era conservation, even though livestock, the resource to be used wisely (and protected from predators), was a domesticated "natural" resource.

A change in leadership in the Survey facilitated the tendency toward work such as predator control that was demonstrably practical. Chief Merriam disdained Washington politics. In 1910, when the widow of railroad magnate E.H. Harriman offered Merriam a lifetime endowment to pursue any research topic of his choosing, he left the Survey and spent most of his time studying Indians in California. His successor, Henry W. Henshaw, with less interest in pure science, was more fitted for the Washington political climate than Merriam.

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placing 500 cattle on the Holy Cross Forest Reserve to graze. He took his case to the Supreme Court, losing in 1911. See: Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976), 88; and Richard White, *"It's Your Misfortune and None My Own,"* 406-409. For an in-depth look at the Colorado controversy, see: Michael McCarthy, *Hour of Trial: The Conservation Conflict in Colorado and the West, 1891-1907* (Norman: University of Oklahoma Press, 1977). More generally, the West has had contrary reactions to the possibility of having the federal government turn the public domain over to the states to administer them, perhaps best exemplified in responses to Herbert Hoover's proposal to allow states to control the public domain, albeit without subsurface rights. See: Kendrick A. Clements, *Engineering the Good Life*, 157. See also: Debra Donahue, *The Western Range Revisited: Removing Livestock from Public Lands to Conserve Native Biodiversity* (Norman: University of Oklahoma Press, 1999), 28-36.

An issue of growing importance, predator and rodent control, gave Henshaw and the Survey the means to survive in the Washington environment.[37]

The demand for predator and rodent control grew in the nineteenth century, as settlement in the West altered animal habitats and brought humans and animals in closer proximity to each other. Complaints of the "depredations" of predators, especially wolves and coyotes, on livestock, increased. Furthermore, rodent infestation of forage crops and tree orchids was another growing concern.[38] Western ranchers requested their states to address these problems, and states, in response, offered bounties for killing predators. The ranchers argued that they were the largest property owners and thus paid the most property tax. Predators,

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[37] Wilfred H. Osgood, "Biographical Memoir of Clinton Hart Merriam," paper presented at the National Academy of Sciences, Autumn Meeting, 1944, 22-23, available at: http://www.nap.edu/html/biomems/cmerriam.pdf. [accessed 1 July 2010]. The Harriman endowment was the result of a friendship between the Harrimans and Merriam that developed after the railroad magnate financed a major expedition to Alaska in 1899. Merriam, along with 24 other scientists, photographers, and artists, explored the region's wildlife and natural resources. Mrs. Harriman, along with Theodore Roosevelt, who knew Merriam personally, urged Merriam to use the endowment to compile a major study of the continent's mammals, but he used the funds to pursue his lifelong interest in Indians, with the only exception a study of grizzly and brown bears. For a study of the expedition's findings, see: William H. Goetzmann and Kay Sloan, *Looking far North: The Harriman Expedition to Alaska 1899* (New York: Viking Press, 1982). For essays written by members of the expedition, see: George Bird Grinnell, *Alaska 1899: Essays from the Harriman Expedition* (Seattle: University of Washington Press, 1995). By drawing attention to Alaskan wildlife and the territory's inadequate game protection laws, the Harriman Expedition provided some of the impetus for the Survey's wildlife work in Alaska. In 1902, the Survey drafted and began enforcing laws in an effort to curb market and trophy hunting, as the territory's rare wildlife was valued for the status it conferred upon successful hunters. Although the Survey did extensive work in Alaska, there is only limited scholarly work on the bureau's role in the territory. Sherwood Morgan, in *Big Game in Alaska: A History of Wildlife and People* (New Haven: Yale University Press, 1981), examines controversy over bear protection. For a discussion of the Survey's role in formulating game protection laws, see: Ken Ross, *Pioneering Conservation in Alaska* (Boulder: University Press of Colorado, 2006), chapter ten. Frank Dufresne, a Survey biologist who spent many years in Alaska, wrote a personal memoir of his experience: *My Way Was North: An Alaskan Autobiography* (New York: Holt, Rinehart, and Winston, 1966). Another useful work, although focused on the National Park Service and wolf protection, is: Timothy Rawson, *Changing Tracks: Predators and Politics in Mt. McKinley National Park* (Fairbanks: University of Alaska Press 2001).

[38] Cameron, *The Bureau of Biological Survey*, 43.

wolves in particular, threatened that tax base by killing livestock. Therefore, it was in the best interest of all state residents to pay for bounties, an argument made stronger by inflating the numbers of livestock losses to predators.[39]

The savings to the livestock industry, although based on questionable assumptions, allowed the Survey to point to more direct economic benefits for stockmen than the indirect benefits to farmers. The Survey could also point to its growing expertise. Since the bounty system was open to fraud—it was not easy to distinguish a wolf from some breeds of dogs—the Survey argued that its knowledge of mammalogy allowed it to differentiate predators from closely related non-predators. Accordingly, Chief Naturalist Vernon Bailey, as he become one of the Survey's experts in predator and rodent control, authored *Key to Animals on Which Wolf and Coyote Bounties Are Paid,* a 1909 work that demonstrated methods of fraud detection and argued against an ineffective bounty system. He also authored instructional literature on killing wolves, another testament to the Survey's aptitude.[40] Furthermore, the Survey could distinguish itself from non-professional predator and rodent control by arguing that it developed competency in using poison, an important selling point since careless use of poison could kill other animals besides the intended predators; this

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[39] Bruce Hampton argues that, in all likelihood, the numbers were overestimated. Ranchers in Montana who pleaded to reinstate a discounted bounty law claimed much higher rates of livestock loss than other, nearby ranchers who did not want the bounty law continued. Bruce Hampton, *The Great American Wolf*, 118-119; and Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1923* (Washington: Government Printing Office, 1924), 422.

[40] Vernon Bailey, *Key to Animals on which Wolf and Coyote Bounties Are Paid* (Washington: Government Printing Office, 1909), and, *Wolves in Relation to Stock, Game, and the National Forest Reserve* (Washington: U.S. Department of Agriculture, 1907).

specialized skill was facilitated by a congressional appropriation of $25,000 in 1909 for experiments in killing pests.[41]

Although the Survey was developing its expertise for predator control, it did not receive a separate congressional appropriation for predator work until 1915. Before 1915, the Survey's predator work was usually done in conjunction with the Forest Service. Federal efforts were sometimes partly financed by state and local government, individuals, and livestock organizations.[42] The stockmen, however, believed that the federal government should bear more responsibility for predator control. They offered two arguments. First, the federal government, as guardians of the national forests, needed to patrol the land for predators so that the animals did not encroach on private land or land leased from the government. Second, if the costs of predator control had to be borne by the livestock industry exclusively, the price of meat would rise.[43]

In addition to the arguments of the livestock industry, two subsequent developments facilitated the Survey's predator control programs. In 1916, an outbreak of rabies, primarily from coyotes, hit southeastern Oregon, northern California, southern Idaho, and northern Nevada. Congress responded with an appropriation of $75,000 to the Survey to tackle the problem. When the United States entered World War I the following year, increasing the food supply became

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[41] Michael J. Robinson, *Predatory Bureaucracy: The Extermination of Wolves and the Transformation of the West* (Boulder: University Press of Colorado, 2005), 66.
[42] Ibid., 49-66; Steen, *The U.S. Forest Service,* 28; Department of Agriculture, *Report of the Acting Chief of the Bureau of Biological Survey, 1906* (Washington: Government Printing Office, 1907), 401.
[43] Excerpts of the hearings that highlight the key arguments can be found in Rich McIntrye, *War against the Wolf* (Stillwater, Minnesota: Voyageur Press, 1995), 160-174.

a national goal. As a result, Congress allocated $250,000 to the Survey to curb livestock losses from predators and to prevent rodents from destroying crops. By 1917, the Survey employed up to 300 hunters and trappers and killed 30,512 predators, chiefly coyotes, a destruction of wildlife that generated little criticism, even from wildlife advocates.[44]

Controversy, however, emerged by the mid-1920s. In the Kaibab National Forest, located on the North Rim of the Grand Canyon, Arizona, the deer population increased rapidly and overtaxed the vegetation. As a result, the environment could no longer sustain the large number of deer and many perished. The cause of the problem seemed obvious. Near the beginning of the century, concerns over declining game resulted in federal efforts to protect and increase the deer population. In the Kaibab, in 1906, hunting of deer was terminated, the number of allowable cattle and sheep that graze on the range was reduced, and the Biological Survey was called upon to reduce the number of predators that preyed upon deer. These policies appeared to be successful as the deer population grew.

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[44] Jenks Cameron, *The Bureau of Biological Survey,* 46-48; Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1918* (Washington: Government Printing Office, 1919), 257-259; "Uncle Sam Mighty Hunter as Nimrod," *The New York Times*, 15 April 1917; E.C. MacMechen, "Wild Game as a War Weapon," *Scientific American* 118 (26 January 1918): 88-89; and Walter P. Taylor, "The Vertebrate Zoologist and National Efficiency," *Science, n.s.* 46 (10 August 1917): 123-127. The importance of World War I to the western economy is discussed in: Gerald D. Nash, *The Federal Landscape: An Economic History of the Twentieth-Century West* (Tucson: The University of Arizona Press, 1999), 13-19. Lisa Mighetto discusses the gradual acceptance of predators, a process that began slowly in the 1930s, largely by scientists who were concerned with the functioning of ecological systems. See chapter five in *Wild Animals and American Environmental Ethics* (Tucson: University of Arizona Press, 1991). For an analysis of the transformation of the attitude of one scientist, Sigurd F. Olson, from outspoken critic to unequivocal defender of the wolf, see: David Backes, *A Wilderness Within: The Life of Sigurd F. Olson* (Minneapolis: University of Minnesota Press, 1997), 75-90. See also: Sigurd F. Olson, "A Study in Predatory Relationship with Particular Reference to the Wolf," *The Scientific Monthly* 46 (April 1938): 323-336.

However, when the large population of deer put strains on the environment's carrying capacity, it seemed that government policy to increase deer was at fault, a case of "over conservation," according to an editorial in *Bird Lore*.[45]

The Kaibab incident became the standard textbook case in game management: predators—animals or hunters—were needed to reduce game populations when their numbers put pressure on the range's carrying capacity. Conversely, when game populations were too thin, then hunting of game had to be limited and predators reduced. Later studies demonstrated that a lack of predators was an overly simplistic evaluation of the Kaibab problem and other deer "irruptions." In the 1920s, however, the scarcity of predators seemed to be the most compelling explanation, even though studies and reliable, fundamental data, were lacking or were imprecise. For example, estimates of the Kaibab's deer population in 1919 were incredibly wide—between 5,000 and 50,000. Furthermore, the concept of carrying capacity was poorly understood: A typical measure of carrying capacity was the current number of cattle divided by the area, a measure that just sanctioned current conditions. Little was known about what a healthy range should look like. As Nancy Langston points out, "a daunting list of specifics" about soil, water, and plants needed to be understood to evaluate range conditions. Without more accurate information and an understanding of carrying capacity, it is not surprising that the Survey, placed in an advisory position to the National

[45] T. Gilbert Pearson, "A Problem of Over-Conservation," *Bird Lore* 28 (January-February 1926): 88.

Forest Service and National Park Service, did not take sides in the dispute over proposed solutions.[46]

The Survey was also involved in its own controversy over predators. By the 1920s, predator and rodent control, consuming about two-thirds of its congressional appropriation, dominated the Survey's agenda. Moreover, the Survey often received more money for predator and rodent control from states or private associations than from Congress, a point the Survey often cited to illustrate the popularity of its program; predator work by the Survey for the Forest Service, National Park Service, and Office of Indian Affairs was further evidence.[47]

This evidence, however, captured the attention of scientists who did not look favorably on the Survey's predator work, though they realized it was occasionally necessary. Scientists from the Museum of Invertebrate Zoology, the American Association of Mammalogists, and even some within the Survey began expressing their misgivings in scientific publications around the mid-1920s and continuing

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[46] For a discussion of carrying capacity, see: Nancy Langston, *Forest Dreams/Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995), 205-209. The Forest Service advocated hunting to reduce the deer population, while the National Park Service and the state of Arizona, fearing that hunting would reduce the deer population and thus curtail tourism, opposed the Forest Service's recommendations. The Forest Service prevailed in this dispute, although it took a 1928 Supreme Court decision, *Hunt v. the United States* (278 U.S. 96) to settle the disagreement over who had authority—the federal government (owner of the land) or the state (owner of the wildlife)—to set policy. See: Christian C. Young, *In the Absence of Predators: Conservation and Controversy on the Kaibab Plateau* (Lincoln: University of Nebraska Press, 2002), 65-71; and Thomas R. Dunlap, *Saving America's Wildlife* (Princeton: Princeton University Press, 1988), 68.

[47] For example, in 1922, for predator and rodent control, the Survey received $440,121 from Congress and $844,000 from the states. See Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1923* (Washington: Government Printing Office, 1924), 420-422; and Cameron, *The Bureau of Biological Survey,* 64.

throughout the decade.[48] They argued that the Survey's use of poison had unintended effects, most notably the consumption of poison by non-targeted non-predators. Furthermore, some predators were economically valuable for their pelts and for their ability to destroy rodents. One scientist charged that the Survey was "ready to listen to any tale touching upon the interests of the live stock owner or agriculturist" if it resulted in more congressional appropriations. The most salient and consistently voiced argument was the uncertainty and possible

[48] The criticisms and ensuing controversy opened up by the mammalogists have received extensive treatment by scholars and will not be discussed in detail. See: David E. Brown, *The Wolf in the Southwest: The Making of an Endangered Species* (Tucson: The University of Arizona Press, 1983), chapter 2. See the following from Thomas R. Dunlap, "'The Coyote Itself': Ecologists and the Value of Predators, 1900-1972," *Environmental Review* 7 (spring 1983): 54-70; "Values for Varmints: Predator Control and Environmental Ideas," *The Pacific Historical Review* 53 (May 1984): 141-161; *Saving America's Wildlife*, chapter 3; and "American Wildlife Policy and Environmental Ideology: Poisoning Coyotes, 1939-1972," *Pacific Historical Review* 55 (August 1986): 345-369. See also: Bruce Hampton, *The Great American Wolf* (New York: Henry Holt and Company, 1997), chapter 7; Michael J Robinson, *Predatory Bureaucracy*, and Donald Worster, *Nature's Economy A History of Ecological Ideas*, 2d ed. (New York: Cambridge University Press, 1977), chapter 13. For the critics and supporters of predator control, in chronological order, some of the more important essays include: Lee R. Dice, "The Scientific Value of Predatory Mammals," *Journal of Mammalogy* 6 (February, 1925): 25-27; E.A. Goldman, "The Predatory Mammal Problem and the Balance of Nature," *Journal of Mammalogy* 6 (February, 1925): 28-33; Charles C. Adams, "The Conservation of Predatory Mammals," *Journal of Mammalogy* 6 (May 1925): 83-96; Charles C. Adams, "Ecological Conditions in National Forests and in National Parks," *The Scientific Monthly* 20 (June 1925): 561-593; Vernon Bailey, Joseph Dixon, E.A. Goldman, Edmund Heller, and Charles C. Adams, "Report of the Committee on Wild Lifesanctuaries [sic], Including Provision for Predatory Mammals, *Journal of Mammalogy* 9 (November 1928): 354-358; Charles C. Adams, "Predatory Mammal Control Work of the U.S. Biological Survey," *Journal of Mammalogy* 10 (August 1929): 275; and Charles C. Adams, "Rational Predatory Animal Control," *Journal of Mammalogy* 11 (August 1930): 357. E. Raymond Hall, "Predatory Mammal Destruction," *Journal of Mammalogy* 11 (August 1930): 362-372. The entire issue of the *Journal of Mammalogy* 11 (August, 1930) is especially useful, as it contains the proceedings of the "Symposium on Predatory Animal Control," held in May, 1930, at the Museum of Natural History in New York. See also: H.E. Anthony, "The Control of Predatory Mammals," *Science*, n.s., 74 (18 September 1931): 288-90; and Charles C. Sperry, "Winter Food Habits of Coyotes: A Report of Progress, 1933," *Journal of Mammalogy* 15 (November 1934): 286-290. Two articles by Jean M. Linsdale address the controversy over using poison: "Problems of Bird Conservation in California, *The Condor* 32 (March-April 1930): 105-115, and "Facts Concerning the Use of Thallium in California to Poison Rodents: Its Destructiveness to Game Birds, Song Birds, and Other Valuable Wild Life, *The Condor* 33 (May-June 1931): 92-106.

unintended effects of killing predators. If predators become extinct, many scientific questions would be left unanswered.[49]

The debate and controversy intensified near the end of the decade as the scientists mounted an unsuccessful attempt to prevent passage of a ten-year, ten-million-dollar appropriation for the continuance of the Survey's predator work. A lack of convincing evidence made it difficult for each side to prove its argument, and the Survey began downplaying its predator work. Furthermore, several midwestern states began relying on the bounty system instead of the Survey for predator control.[50]

The scientists' criticism did not disappear completely, and a more persistent gadfly, Rosalie Edge, continued the controversy. A former suffragist from a privileged New York background, Edge was an avid amateur bird watcher who objected to the ornithological practice of killing birds for study. She formed the Emergency Conservation Committee in 1930, an organization of scientists and conservationists, including William T. Hornaday, that was scathing in its attack on government conservation efforts.[51] Although other scientists—including some

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[49] Anthony, "The Control of Predatory Mammals," 289; Thomas R. Dunlap, "'The Coyote Itself,'" 56; Lee R. Dice, "The Scientific Value of Predatory Mammals," *Journal of Mammalogy* 6 (February 1925): 27.

[50] Robinson, *Predatory Bureaucracy*, 301-302; and Jay Antle, "Against Kansas' Top Dog: Coyotes, Politics, and Ecology, 1877-1970," *Kansas History: A Journal of the Central Plains* 20 (autumn 1977).

[51] For example, the titles of the Committee's publications did not mince words. See: The Emergency Conservation Committee, *The United States Bureau of Destruction and Extermination: The Misnamed and Perverted "Biological Survey"* (New York: The Emergency Conservation Committee, 1934). Edge was an even bigger thorn in the side of the National Audubon Society, especially long-standing President Gilbert Pearson, who resigned his position in view of her perpetual criticism. See: Dyana Z. Furmansky, *Rosalie Edge, Hawk of Mercy: The Activist Who Saved Nature from Conservationists* (Athens: University of Georgia Press, 2009), 128-133; and Frank Graham, Jr., *The Audubon Ark: A History of the National Audubon Society*

Survey members—agreed with her in principle, they objected to her extreme rhetoric, relentless criticism, and distortion of facts (see chapter three). Nonetheless, she was an indefatigable opponent of the Survey and other conservation organizations, as she lobbied Congress, wrote to newspapers and government bureaucrats, published critical literature, and worked to establish Hawk Mountain, Pennsylvania, in 1934, the first sanctuary for birds of prey. Although Edge disapproved of the Survey's use of poison to control predators and rodents, she was very supportive of the bureau's conservation work, particularly efforts to save migratory waterfowl. One of her pamphlets noted that, unlike other alleged conservation organizations such as the pro-hunting More Game Birds in America and the American Game Association, the Survey did not hesitate to criticize hunting, yet the sportsmen were "deaf" to the Survey's arguments.[52] Edge's wavering support and criticism were indicative of the Survey's dilemma and conflicted mission: The Survey could elicit support from one group of individuals in one context yet lose that support in another context, a constant balancing act the Survey had with stockmen, hunters, and scientists and conservationists.

(New York: Knopf, 1990), 116-117. She also earned the wrath of Horace Albright of the National Park Service for revealing his approval of the poisoning of pelicans on Yellowstone Lake; the birds were competing for the same fish that anglers wanted. See Carsten Lien, *Olympic Battleground: The Power Politics of Timber Preservation* (San Francisco: Sierra Club Books, 1991), 109-110.

[52] Irving Brant, "A Last Plea for Waterfowl," undated (but probably 1934) pamphlet of the Emergency Conservation Committee. Assorted pieces of literature of the Emergency Conservation Committee can be found in Ira N. Gabrielson, Wildlife Management Institute Papers, CONS37, Conservation Collection, The Denver Public Library (hereafter, Gabrielson Papers, Denver), Box 12, Folder 2.

This balancing act was the result of the Survey's work in managing and protecting wildlife, a responsibility that often placed the federal bureau at odds with other groups of potential support. Wildlife conservation won approval from scientists and conservationists, but was opposed by stockmen (because of land withdrawals) and some hunters (because of regulations). The need to withdraw land and impose hunting regulations resulted from historical developments, around the turn of the twentieth century, that pulled the Survey in the direction of the protection of wildlife. Modernization reduced animals' habitats, and the future existence of some animals was in doubt. The desire to protect land and wildlife was related to another nineteenth-century development: a greater appreciation of wilderness and the outdoor experience.

The popularity of wilderness and the outdoor experience was encouraged by the creation of national parks, although it took the development of the automobile in the first quarter of the twentieth century for large numbers of Americans to enjoy the parks. However, the early impetus for national parks was not an effort to protect the environment or to engage in outdoor recreational activities. Instead, according to Alfred Runte, a leading historian of national parks, "America's incentive for the national park idea lay in the persistence of a painfully felt desire for time-honored traditions in the United States." America may have lacked a notable artistic and literary tradition and awe-inspiring architecture, but it had unique geographical features that were a testament to the young nation's uniqueness—"monumentalism," according to Runte. Thus, in 1872, Congress

passed the Yellowstone Park Act, designating the area, with its novel geysers and hot springs, as the nation's first national park. Although national parks, by highlighting the nation's striking landscapes, were a source of cultural pride and nationalism, they also had to have little economic or commercial potential, at least from the standpoint of agriculture and resource extraction.[53] According to Runte, if land had commercial potential, it could be an easy target for development, most famously illustrated in the Hetch Hetchy controversy in the early twentieth century. Residents in San Francisco proposed damming the Hetch Hetchy Valley, a scenic region in Yosemite National Park, to create a water supply and source of hydroelectric power for the city, especially in view of a devastating earthquake and fire in 1906. Opponents of the dam, led by John Muir, viewed the region as one of the great "cathedrals" of nature, but they were unsuccessful in preventing its construction.[54]

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[53] Alfred Runte, *National Parks: The American Experience*, 3rd ed. (Lincoln: The University of Nebraska Press, 1987), 11-49. Other scholars have suggested that Runte's "worthless lands" argument is misleading, because it overlooks the role of profits, a topic pursued by Chris J. Magoc and by Mark Daniel Barringer. Magoc argues that, by the 1870s, "nature as a commodity was surging" and appealed to the "nation's dominant classes." Barringer adds that, "Value could be extracted, wealth generated, only by marketing the parks as 'wonderlands,' open-air museums displaying strange and intriguing phenomena." Chris J. Magoc, *Yellowstone. The Creation and Selling of an American Landscape, 1870-1903* (Albuquerque: The University of New Mexico Press, 1999), xii, 14, 70; and Mark Daniel Barringer, *Selling Yellowstone: Capitalism and the Construction of Nature* (Lawrence: University Press of Kansas, 2002), 35, 58. See also: Richard Sellars, "The National Parks: A Forum on the 'Worthless Lands' Thesis," *Journal of Forest History* 27 (July 1983): 130-134. The establishment of Yosemite Valley preceded Yellowstone's, but the federal government ceded it to California as a state park. However, the state, in 1905, ceded Yosemite back to the federal government, and it became a national park. See: Andrews, *Managing the Environment, Managing Ourselves,* 377.

[54] Runte, *National Parks,* 78-81. Although the Hetch Hetchy controversy is often cited as the quintessential example of wise use conservation clashing with preservationist conservation, Robert Righter points out that there were important political considerations: San Francisco wanted to take control over its water supply and hydroelectric power before a private firm—Pacific Gas and Electric—seized the opportunity first. See: Robert W. Righter, *The Battle over Hetch Hetchy.*

Although preservationists lost the Hetch Hetchy battle by 1913, three years later they gained a victory with the creation of the National Park Service, the result of a nearly twenty-year struggle over determining which governmental agencies should manage the national parks and monuments. To win approval of the National Park Service, however, advocates offered additional arguments besides the need to preserve wonders of nature. Stephen T. Mather, the first director of the National Park Service, along with his assistant, Horace M. Albright, promoted the park idea by stressing the economic benefits parks could generate from a growing tourism industry. Furthermore, other promoters argued that worker productivity would improve with a jaunt to the parks, free from the alleged debilitating influence of overcrowded cities and modernization, an argument that was receiving some scientific support. Outdoor activities in nature—camping, hiking, hunting, fishing, and bird watching—had the additional benefit of being associated with healthful leisure that could uplift people rather than induce idleness.[55]

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[55] Runte, *National Parks,* 99-105. Tracy Cindy Aron discusses the transformation of ideas about leisure time: *Working at Play: A History of Vacations in the United States* (New York: Oxford University Press, 1999). In the same year that the National Park Service was created, two prominent scientists, Joseph Grinnell and Tracy I. Storer, touted the alleged health benefits of the outdoor experience, arguing that, "the modern business man… can now obtain rest in its fullest sense only by resorting for several weeks in the year to the open country or mountains." "Animal Life as an Asset of National Parks," *Science*, n.s., 44 (15 September 1916): 376. For reactions against modernization, see: Jackson Lears, *No Place of Grace: Antimodernism and the Transformation of American Culture, 1880-1920* (New York: Pantheon, 1981); Peter J. Schmitt, *Back to Nature: The Arcadian Myth in Urban America* (Baltimore: The Johns Hopkins University Press, 1990); and David E. Shi, *The Good Life: Plain Thinking and High Thinking in American Culture* (New York: Oxford University Press, 1985). Mather played an instrumental role in the formative years of the National Park Service. See: Robert Shankland, *Steve Mather of the National Parks*, 3d. ed. (New York: Knopf, 1970).

Outdoor activities could also build character, at least according to the sport hunters who distinguished themselves from market hunters. Sport hunting developed one's attributes: the sport hunter abided by a hunter's code of ethics, did not kill the young, and shot a limited number of animals, thus ensuring the preservation of game. Sport hunters also organized. Beginning in the 1840s, they formed hunting clubs and game protective associations and became passionate defenders of wildlife, often encouraging states to pass protective legislation. The Boone and Crockett Club, the most important of these societies, in terms of influence and longevity, was organized by Theodore Roosevelt in 1887. Consisting of prominent, wealthy individuals, the Boone and Crockett Club sought to further big game hunting and champion the preservation of wildlife. Hunters had another steadfast defender of wildlife in George Bird Grinnell, naturalist and editor of *Forest and Stream*, an outdoor sporting journal that advocated wildlife conservation. The Survey benefited from this advocacy, as sport hunters often sided with the bureau when hunting controversies developed in the 1920s and 1930s.[56]

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[56] Barrow, *Passion for Birds*, 110-117. The most complete account of the Boone and Crockett Club is James Trefethen's *Crusade for Wildlife: Highlights in Conservation Progress* (Harrisburg, Pennsylvania: The Stackpole Company, 1961). Trefethen was commissioned by the Boone and Crockett Club to write an official history, but his original project turned into a general history of the conservation of wildlife. John F. Reiger argues that sports hunters, as exemplified by Boone and Crockett members, with their advocacy of wildlife protection, were the forefathers of the conservation movement, an argument that was made in 1928 by John Burnham of the American Game Association. Thomas Dunlap counters that, although sport hunters did much to further wildlife conservation, they are not the founders of the conservation movement, as they lacked the most important attributes of the movement, especially a commitment to scientific management. See: John F. Reiger, *American Sportsmen and the Origins of Conservation*, rev. ed. (Norman: University of Oklahoma Press, 1986); Thomas R. Dunlap, "Sport Hunting and Conservation," Environmental Review 12 (spring 1988): 51-60; and John B. Burnham, "Conservation's Debt to Sportsmen," *The North American Review* 226 (September 1928): 296-302. For a discussion of

Scientists also took up the cause of wildlife conservation. One of the nation's leading ornithologists, J.A. Allen, of the Museum of Comparative Zoology at Harvard, and Smithsonian taxidermist, William T. Hornaday, began documenting the decline of western wildlife while they went on expeditions (on separate trips) to gather specimens. They noted how settlement and market forces threatened the futures of many species, most notably the bison *(Bison bison)*, but also the moose *(Alces alces)*, lynx *(Lynx canadensis)*, gray wolf *(Canis lupus)*, panther *(Puma concolor)*, black bear *(Ursus americanus)*, wolverine *(Gulo gulo)*, caribou *(Rangifer tarandus)*, and elk *(Cervus elaphus)*. Hornaday's 1889 *The Extermination of the Bison* alerted the nation to the seemingly imminent extinction of the once-numerous buffalo.[57]

Supporters of wildlife wanted to enact legal reforms for preserving wildlife, because state laws offered only limited protection. Although most colonies passed some protective legislation, these early laws were designed to protect game as a steady supply of food and trade, not to preserve a species. The Constitution did not specifically address preserving wildlife, as no one in the

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some of the state sporting organizations that formed before the Boone and Crockett Club, see James A. Tober, *Who Owns the Wildlife?: The Political Economy of Conservation in Nineteenth Century America* (Westport, Connecticut: Greenwood Press, 1981), chapter two.

[57] Barrow, *Passion*, 107-110; J.A. Allen, *The American Bison, Living and Extinct* (Cambridge, Massachusetts: Welch, Bigelow, 1876); and William T. Hornaday, *The Destruction of the American Bison* (Washington: Government Printing Office, 1889). Hornaday is usually discussed in most histories of conservation and wildlife. For more in-depth treatment, see: J.A. Dolph, "Bringing Wildlife to the Millions: William Temple Hornaday. The Early Years: 1854-1896" (Ph.D. diss, University of Massachusetts, 1975); and John Gregory Dehler, "An American Crusader: William Temple Hornaday and Wildlife Protection in America, 1840-1940" (Ph.D. diss., Lehigh University, 2001). For studies of the near-extinction of the bison, see: Larry Barsness, *Heads, Hides, and Horns: The Complete Buffalo Book* (Forth Worth: Texas Christian University, 1985); and David Dary, *The Buffalo Book: The Complete Saga of the American Animal* (Chicago: Swallow Press, 1974).

eighteenth century thought extinction was a possibility.[58] The protection of wildlife thus remained a state concern throughout the nineteenth century, with only a limited number of exceptions.[59] By the 1870s, states, partly in response to sportsmen's concern for wildlife, began passing protective measures that set bag limits, established closed and open seasons, placed restrictions on the technology used for hunting, and required licensing fees. These efforts, however, ran into difficulties, especially in rural areas. Local populations often viewed hunting regulations as an attempt to protect elite sportsmen's access to game animals, many of which were consumed for sustenance by non-elites. Juries tended to be sympathetic to non-sportsmen hunters and were hesitant to render convictions. Moreover, hunting regulations lacked uniformity: different states had different sets of rules, and, even within states, some counties maintained different regulations than others. Furthermore, states were reluctant to pass firm

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[58] Donald Pisani makes a similar point: framers of the Constitution were from the humid East and did not realize the importance of water in the West. See: Donald J Pisani "Federalism, Water Law, and American West, 1886-1928" in *Perspectives on Federalism: Papers from the First Berkeley Seminar on Federalism* (Berkeley: University of California, 1987), 117. For a discussion of early America's thinking of the non-possibility of extinction, see: Mark V. Barrow, *Nature's Ghosts: Confronting Extinction from the Age of Jefferson to the Age of Ecology* (Chicago: The University of Chicago Press, 2009). For a brief discussion of colonial wildlife policy, including a comparison with English wildlife policy, see Andrews, *Managing the Environment, Managing Ourselves*, 44-47. For wildlife law in general, see Michael J. Bean, *The Evolution of National Wildlife Law*, rev. ed. (New York: Praeger, 1981).

[59] In 1869, Congress passed legislation protecting the northern fur seal on the Pribilof Islands of Alaska. In 1881, President Benjamin Harrison issued an executive order for the creation of the Afognak Island Forest and Fish Culture Reserve. Since these efforts were not designed to protect endangered animals, they have received little scholarly attention, with a few exceptions: James Thomas Gay, *American Fur Seal Diplomacy: The Alaskan Fur Seal Controversy* (New York: Peter Lang Publishing, 1987); Ken Ross, *Pioneering Conservation in Alaska* (Boulder, Colorado: University Press of Colorado, 2006); and Douglas Brinkley, *The Quiet World: Saving Alaska's Wilderness Kingdom, 1879-1960* (New York: Harper, 2011). Some other notable exceptions to the federal government's general absence of wildlife legislation included laws regulating hunting in Indian Territory, banning the sale of game in Washington, D.C., and protecting wildlife in

legislation, fearing that restrictive standards would drive hunters—and their dollars—to neighboring states.[60]

The states' inability to enact effective legislation and two new issues indicated a need for greater federal involvement in regulating wildlife. Near the end of the nineteenth century, ornamental plumage in the millenary business became high fashion, yet the number of birds killed for the hats outraged nature lovers, wildlife supporters, humane advocates, and some scientists, including Survey members.[61] State efforts to regulate the killing were inefficient, at a time when there was marked awareness of declining bird populations, as exemplified by the soon-to-be extinct passenger pigeon.[62] A second issue involved the English sparrow, a species imported from England in the 1850s for the purpose of eating insects, but

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Yellowstone National Park and Mount Rainier National Park. See Tober, *Who Owns the Wildlife?* 226.

[60] Tober, *Who Owns the Wildlife?* 139-162; Kurpatrick Dorsey, *The Dawn of Conservation Diplomacy United States – Canadian Wildlife Protection Treaties of the Progressive Era* (Seattle: University of Washington Press, 1998), 170-174.

[61] The most extensive treatment of the plumage controversy is Robin W. Doughty's *Feather Fashions and Bird Preservation: A Study in Nature Protection* (Berkeley: University of California Press, 1975). See also: Jennifer Price, *Fight Maps: Adventures with Nature in Modern America* (New York: Basic Books, 1999), chapter two. For a study of the plumage controversy in England, see: R.J. Moore-Colyer, "Feathered Women and Persecuted Birds: The Struggle against the Plumage Trade, c. 1860-1922," *Rural History* 11 (2000): 57-73. The plumage controversy was a rare moment when humane advocates and wildlife supporters worked together. Wildlife supporters often argue that hunting is a legitimate means of maintaining stable animal populations, a position considered anathema by human advocates, who often view hunting as another form of cruelty. For the humane movement, see: Diane L. Beers, *For the Prevention of Cruelty: The History and Legacy of Animal Rights Activism in the United States* (Athens, Ohio: Ohio University Press, 2006); Lawrence Finsen and Susan Finsen, *The Animal Rights Movement in America. From Compassion to Respect* (New York: Twayne Publishers, 1994); and Susan J. Pearson, *The Rights of the Defenseless; Protecting Animals and Children in Gilded Age America* (Chicago: The University of Chicago Press, 2011).

[62] The last passenger pigeon died in captivity in 1914. See: Barrow, *Nature's Ghosts,* 126. State laws that were passed to restrict the shooting of birds usually did not provide provisions for enforcement. Generally, more legislation was passed in northern states than in other regions. Furthermore, there was significant regional variation in the acceptance of birds: For example, bobolinks were loved in the North but hated in the South because of their crop-destroying proclivities. See: Orr, *Saving American Birds,* 67-113.

it began to out-breed and crowd-out other species. By 1900, the species became bird non grata, even among some avian enthusiasts.[63]

The push for federal legislation resulted in the 1900 passage of the Lacey Act, named after its sponsor, Iowa representative John Lacey. Support for the measure came from sportsmen, the Audubon Society, the American Ornithologists' Union, nature lovers, and the Biological Survey, especially T.S. Palmer, who contributed to the writing of the legislation. The Lacey Act provided another opportunity for the Survey to reinvent itself. Until 1900, the Survey's primary interest in wildlife was in taxonomy, biogeography, and food habits. The focus was on the study, rather than the management, of wildlife. With the Lacey Act, however, the Survey took on new responsibilities that gave the bureau more of a regulatory and managerial role. Three stipulations in the legislation influenced the Survey's future direction: 1) it authorized the federal government to support the restoration of declining bird populations—a task that resulted in the Survey's management of wildlife refuges; 2) the importation of foreign species came under federal supervision and would be enforced by the Survey, with its expertise in the identification of species; and 3) it established penalties for the interstate shipment of dead animals that had been killed in violation of a state law and authorized the Survey to enforce this provision of the law.[64] This third component made the

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[63] Robin Doughty, *The English Sparrow in the American Landscape: A Paradox in Nineteenth Century Wildlife Conservation* (Oxford: Oxford Publishing Company, 1978); and Peter J. Schmitt, *Back to Nature*, 33-44.

[64] A firm believer in the conservation of wildlife, Lacey worked on the passage of the first law protecting wildlife and outlawing hunting in Yellowstone National Park in 1894. The 1900 landmark legislation bearing his name is discussed in virtually every history of the conservation of wildlife. For specific analysis, see: Robert S. Andrews, "The Lacey Act: America's Premier

Lacey Act only as strong as existing state laws, and there was still regional variation and limited federal authority.[65] It would take future legislation, stemming from the Survey's role in managing refuges and bird populations, to strengthen legislation for wildlife.

These refuges that fell under the Survey's purview were another federal response to declining wildlife. The wildlife sanctuaries, which were designated as "The National Wildlife Refuge System" in 1996, have received limited attention from historians. According to legal scholar Robert L. Fischman, the refuge system has received less federal money per-acre than other federally managed lands and does not have a "popular mascot like Smokey Bear." Despite this seemingly relative unimportance, the system, as of 2003, included 550 national wildlife refuges covering 95 million acres "of habitat as diverse as the North American continent has to offer."[66]

The management and multiple purposes of the refuge system are just as diverse as the habitats and ecological systems it includes. A refuge can be created by an executive order or by congressional legislation. The size of a refuge could

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Weapon in the Fight against Unlawful Wildlife Trafficking," *Public Land Law Review*, 27 (1995), available at: http://www.animallaw.info/articles/arus16publlr27.htm. [accessed 10 June 2009]; Rebecca Conard, "John F. Lacey, Conservation's Public Servant," in David Harmon, ed. *The Antiquities Act: A Century of American Archaeology, Historic Preservation, and Nature Conservation* (Tucson: University of Arizona Press, 2006), 56-72; and Theodore Whaley Cart, "The Lacey Act: America's First Nationwide Wildlife Statute," *Forest History* 17 (October 1973). When Lacey passed away, Louis Herman Pammel assembled an interesting collection of Lacey's writings and speeches, testimonials about him written by other conservationists, and a brief chronology of his life. See: Louis Herman Pammel, *Major John F. Lacey: Memorial Volume* (Cedar Rapids, Iowa: Torch Press, 1915).

[65] Barrow, *Nature's Ghosts*, 104-105.

[66] Robert L. Fischman, *The National Wildlife Refuges: Coordinating a Conservation System through Law* (Washington: Island Press, 2003), xi-xii. For descriptions of some of the more well-

vary tremendously, from the tiny three-acre Pelican Island to the 19.3 million-acre Arctic National Wildlife Refuge in Alaska. Some refuges expanded in size, some shrank, and others were eliminated. They often resemble a patchwork: private land could be interspersed within a refuge, or a private landowner could lease water rights and easements to the government. A landholder could also sell land to the government, yet still retain the right to harvest timber on that land. In addition to leasing land, the federal government has purchased land, withdrawn land from the public domain, and received donations of land for wildlife protection. A refuge can be managed by several federal bureaus in conjunction with a state. Although the initial impetus was wildlife protection, often with a focus on a single species, some of the refuges have also allowed grazing, timber production, mineral prospecting, military exercises, and recreational use, especially hunting, as long as these activities did not interfere with conservation efforts.[67]

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known refuges, see: George Laycock, *The Sign of the Flying Goose: A Guide to the National Wildlife Refuges* (New York: Natural History Press, 1965).

[67] Fischman, *The National Wildlife Refuges*, 1-32; Eric Jay Dolin, *The Smithsonian Book of National Wildlife Refuges* (Washington: Smithsonian Institution Press, 2003), 70. Sally Fairfax, *Buying Nature: The Limits of Land Acquisition as a Conservation Strategy, 1780-2004* (Cambridge: MIT Press, 2005), 66-72; and Ira N. Gabrielson, *Wildlife Refuges* (New York: Macmillan Company, 1943), 82-88. For a discussion of the development of multiple uses of the refuges, see: Charles G. Curtin, "The Evolution of the U.S. National Wildlife Refuge System and the Doctrine of Compatibility," *Conservation Biology* 7 (March 1993), 29-38. I have used the generalized term "refuge" to indicate land that is set aside for wildlife protection, but there are differences between a "refuge," "reservation," and "preserve." According to game management authority Aldo Leopold, on a refuge, no hunting is allowed, and the excess wildlife is allowed to leave the refuge and "restock" lands adjacent to the refuge. A game reservation is land set aside for wildlife protection, but it does not always include a nearby area that is suitable for the protected species. A "preserve" is a designated shooting ground, usually, but not always, privately-owned. Much to Leopold's chagrin, these nuances in definition are rarely used in wildlife literature. See: Aldo Leopold, *Game Management* (New York: C. Scribner's Sons, 1948), 195-197.

The management of these refuges—and the diverse activities associated with them—required the Survey to reinvent itself again. Because the refuges allowed limited or no commercial activity on them, the Survey assumed more of a preservationist role in managing the lands set aside for wildlife. However, since some of the refuges allowed limited activities, the Survey had to establish relations with local populations. Although the Survey did some promotional work and sent out questionnaires and literature to farmers and ranchers, its most important early work—mapping the continent's flora and fauna and dissecting animal stomachs—required minimal interaction with the public. Management of the refuges, however, necessitated relations with local residents—relations that often had a bearing on how the Survey managed the protected areas.

Because refuges have served such diverse purposes, their relation with local populations defies easy generalization. For the Survey, locals welcomed some of its work on refuges: the cultivation of hay that was shared with residents; the impoundment of water; and wildlife protection, which often enhanced an area's reputation for hunting. On the other hand, since protecting wildlife often resulted in withdrawing parts of the public domain from development, some locals, stockmen in particular, viewed the Survey's work as an intrusion of the federal government on "their" land. Furthermore, federal land reserved for wildlife could not be subject to local taxation. The federal government addressed this contentious issue of lost taxation revenue—albeit not until 1935—by passing the Revenue Sharing Act. Some refuges generated income by outdoor activities and

the sale of hay and timber. The 1935 measure mandated that twenty-five percent of this revenue should be transferred to the counties of the refuges.[68]

Federal refuges were sometimes aided by non-governmental wildlife organizations, a partnership that can be seen in the establishment of the first federal refuges that were managed by the Survey. In 1903, President Theodore Roosevelt, by executive order, established Pelican Island, off the Florida coast, to protect the Brown Pelican from market hunters. Within the next few years, the conservation-minded president established other bird refuges in Florida, Louisiana, Washington, the Hawaiian Islands, and California. Patrolling the refuges, however, was another matter. The Audubon Society, a group of bird enthusiasts who began organizing at the state level in 1885, provided the first warden for Pelican Island.[69] Furthermore, the work could be dangerous: In 1905, warden Guy Bradley, while pursuing suspected illegal hunters, was shot and killed, a tragedy that inspired the uniting of local Audubon societies into a national organization. Although Bradley's death indicated that bird protection was a serious issue, the Survey struggled to get funding and still needed assistance

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[68] Fischman, *The National Wildlife Refuges,* 39.

[69] Nancy Langston, *Where Land and Water Meet: A Western Landscape Transformed* (Seattle: University of Washington Press, 2203), 67-68. Roosevelt went on to establish 52 bird refuges and four big game reservations, an effort that is covered in virtually all histories of wildlife conservation. For a more focused study on his conservation thought and accomplishments, see: Paul Russell Cutright, *Theodore Roosevelt: The Naturalist* (New York: Harper and Brothers, 1956); and Douglas Brinkley, *The Wilderness Warrior: Theodore Roosevelt and the Crusade for America* (New York: Harper Collins, 2009). For the Audubon Society, see: Frank Graham, Jr., *The Audubon Ark*; Oliver H. Orr, Jr, . *Saving American Birds*; and Thomas Gilbert Pearson, *Adventures in Bird Protection: An Autobiography by Thomas Gilbert Pearson* (New York: Appleton-Century Company, 1937).

from the Audubon Society. Even with this support, no one patrolled eight of the Survey's thirteen refuges in 1908.[70]

Organizations and individuals not associated with the government also played important roles in establishing refuges for big game, especially the bison. Nationally-known bison advocate William T. Hornaday persuaded the federal government to acquire six bison for the New York Zoological Park (later renamed the Bronx Zoo) and eighteen for Yellowstone National Park, where poaching had reduced the bison population; the purchases were made from private ranchers who speculated that possessing the last remnants of the herds could generate revenue by selling hunting privileges to elite sportsmen. Hornaday and other wildlife supporters also campaigned for the 1905 establishment of a game reservation in the Wichita Forest Reserve in southwestern Oklahoma, a location chosen by Congress because Oklahoma was still a territory and less likely to offer resistance to the setting aside of land for wildlife. The big game refuge, the first of its kind under federal authority, was initially managed by the Department of the Interior and then later by the Survey in 1935.[71]

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[70] Graham, The Audubon Ark, 44-59; and House Committee on Agriculture: *Hearings before Committee on Agriculture on the Estimates on Appropriations for the Fiscal Year Ending June 30, 1910*, 60th Cong., 2nd sess. (1909), 307; Committee on Agriculture: *Hearings before the Committee on Agriculture, Agricultural Appropriations Bill, 1911,* Vol. I, 61st Cong., 2nd sess. (1910), 153. For details of the murder of Guy Bradley, see: Stuart B. McIver, *Death in the Everglades: The Murder of Guy Bradley, America's First Martyr to Environmentalism* (Gainesville, Florida: University Press of Florida, 2003). Bradley was not the only warden killed by hunters. In 1935, E. Bradford Whitehead of the Survey was killed while inspecting a hunter's bag in Georgia. His death led to legislation that made it a federal offense to interfere with a game warden. See: House Select Committee on Conservation of Wildlife Resources, *Conservation of Wildlife, Hearings ... Pursuant to H. Res. 44*, 74th Cong., 2nd sess. (1936), 184-185.

[71] The Wichita Game Preserve is often addressed in general histories of conversation. For more specific studies, see: S. Matthew DeSpain, "For Society's Sake: The Wichita Mountains, Wildlife, and Identity in Oklahoma's Early Environmental History, *The Chronicles of Oklahoma*

Shortly after the creation of the Wichita reservation, bison advocates argued that disease or a natural disaster on one refuge could doom the large ungulates. Therefore, Hornaday, Madison Grant, the American Bison Society (newly formed in 1905 by writer Ernest Harold Baynes with notable support from Theodore Roosevelt), the Boone and Crockett Club, senator John Lacey, and the New York Zoological Society lobbied Congress to create more refuges. Pinchot of the Forest Service, however, refused to support the proposal. After spending much effort convincing westerners that the forests would not be "locked up," Pinchot did not want to support a measure that might be interpreted as catering to preservationist sentiment, a decision with future implications for the Survey, because it—not Pinchot's Forest Service—assumed more responsibility for managing big game refuges. Hornaday shared Pinchot's fear of western objections to setting aside land for wildlife, so he persuaded the government to purchase land on the Flathead Indian Reservation in Montana. Congress, in 1908, appropriated $40,000 and the American Bison Society successfully raised over $10,000 for the establishment of the National Bison Range in Moiese, Montana. Western states, with the exception of Montana, contributed little to the Bison Society's fundraising efforts, a reflection of regional differences in support for wildlife; it was more likely to come from the East, especially from upper class

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78 (winter 2000-2001); and see the following from Jack Haley, "A History of the Establishment of the Wichita National Forest and Game Preserve, 1901-1908" (M.A. thesis, University of Oklahoma, 1973); "The Wichita Mountains: The Struggle to Preserve a Wilderness, Part I, *Great Plains Journal* 13 (fall 1973): 70-99; and "The Wichita Mountains: The Struggle to Preserve a Wilderness, Part II, *Great Plains Journal* 13 (spring 1974): 148-186. In 1911, elk, transported from Jackson Hole, Wyoming, were introduced to the Wichita Game Preserve. See: Matthew

sportsmen, than from the West, where land set aside for wildlife meant less land for livestock and economic development.[72]

Within the next six years, four new big game reservations—Jackson Hole, Wyoming (1912); Fort Niobrara, Nebraska (1912); Wind Cave National Game Preserve, South Dakota (1912); and Sully's Hill, North Dakota (1914)—were founded and managed by the Survey. All but Jackson Hole featured the bison. The early histories of wildlife conservation viewed the management of the bison as an unequivocal success: in 1891, there were only 1,091 bison (mostly in private herds), but by 1933, that number increased to 21,707. On the other hand, Andrew Isenberg argues that bison preservation was more of a mixed blessing: concentrating the animals into a few isolated reservations reduced the genetic diversity of the herds, thus increasing the possibility of disease. Furthermore, the increase in bison numbers led to overpopulation, and the Survey sent some of the "surplus" population to exhibitions and state and city parks, while others were purchased by the Northern Pacific Railroad for meals in dining cars. Survey leaders did not see "surplus" animals as a problem, since they were marketable and offered the possibility for the refuges to be self-sustaining, a potential that did not materialize.[73]

Allen Pearce, "Bringing Back the Big Game: The Reintroduction of Elk to the Wichita Mountains," *The Chronicles of Oklahoma* 88 (fall 2010): 260-287.

[72] James A. Dolph and C. Ivar Dolph, "The American Bison: Its Annihilation and Preservation," *Montana: The Magazine of Western History* 25 (summer 1975): 15-22; Andrew C. Isenberg, "The Returns of the Bison: Nostalgia, Profit, and Preservation," *Environmental History* 2 (April 1997): 179; and Jonathan Peter Spiro, *Defending the Master Race: Conservation, Eugenics, and the Legacy of Madison Grant* (Burlington: University of Vermont Press, 2009), 41-66.

[73] Daniel Justin Herman, *Hunting and the American Imagination* (Washington: Smithsonian Institution Press, 2001), 242; Andrew C. Isenberg, "The Return of the Bison: Nostalgia, Profit,

The idea of using the refuges to produce "surplus" animals became standard management practice: the extra animals would minimize the possibility of extinction, an important consideration in view of declining animal populations. Thus, big game reservations managed by the Survey often focused on a single species, with bison (the National Bison Range, Sully's Hills, and Wind Cave), elk (Jackson Hole), and antelope (Charles Sheldon Antelope Range and Hart Mountain, both established in the 1930s) the most important species. Moreover, "producing" species on refuges, as if they were crops, harmonized with Progressive Era conservation's wise use approach to natural resources, even though the "natural" resources, big game animals, were semi-domesticated. This approach was sanctioned by Aldo Leopold, founder of game management and author of the discipline's first textbook, published in 1933. He defined game management as "the art of making land produce sustained annual crops of wild game for recreational use" that required a "deliberate and purposeful manipulation of the environment."[74] By the last quarter of the twentieth century, the notion of producing animals for "recreational use" came under attack, and a new, imperfectly realized ideal—the preservation of habitat and ecological systems—

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and Preservation," 190; House Committee on Appropriations: *Hearings before the Subcommittee on the Committee on Appropriations, Agricultural Appropriation Bill, 1926*, 68th Cong., 2nd sess. (1924), 40-43.

[74] Aldo Leopold, *Game Management*, 3, 21. The focus on producing a "surplus" was also indicative of the fisheries industry with respect to a declining salmon population in the Northwest. "Fish culture" required hatching salmon eggs in a controlled, artificial environment, and then placing them back into a natural environment. See: Joseph E. Taylor III, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999).

became an important management objective.[75] During the Survey's time, though, producing animals on protected land suited the twin aspects of the Survey's responsibilities. On the one hand, its focus was preservationist (setting aside land for animals). On the other hand, it was wise-use conservation (producing animals in a sustainable way).

A similar mix of conservation/preservation characterized the Survey's work on the Upper Mississippi Wild Life and Fish Refuge, a departure from other refuges because it focused on a wide area, initially 194,000 acres spanning four states (Iowa, Minnesota, Wisconsin and Illinois) along the Mississippi River. It was also atypical because it protected the habitat of numerous species and allowed hunting, trapping, and grazing, albeit with restrictions. Motivations for creation of the massive refuge reflected its dual focus. On the preservationist side, proponents of the refuge emphasized its scenic quality and its important location for migratory birds. On the conservationist side, there was a desire to arrest the region's decline in fish production. Therefore, the Survey and the Bureau of

[75] Although the preservation of habitat became an increasingly important goal, according to Reed F. Noss, a contemporary ecologist, the passage of the 1973 Endangered Species Act did not guarantee the preservation of habitat. He argues that "shooting a bluebird is illegal; but you can cut down the snag it rests in without penalty, even though cutting down the snag harms the species far more in the long run." See: Reed F. Noss, *Saving Nature's Legacy: Protecting and Restoring Biodiversity* (Washington: Island Press, 1994), 70. For a more extensive discussion of limitations of the Endangered Species Act, see by the same author: chapter one in *The Science of Conservation Planning. Habitat* (Washington: Island Press, 1997); and Daniel J. Rohlf, "Six Biological Reasons Why the Endangered Species Act Doesn't Work—And What to Do About It," *Conservation Biology* 5 (September 1991): 273-282. For perspectives on the dilemmas ecologists encounter about when to intervene to restore habitat, see: David N. Cole and Laurie Yung, eds., *Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change* (Washington: Island Press, 2010).

Fisheries (in the Department of Commerce) jointly managed the refuge that was founded in 1924 with a $1,500,000 appropriation from Congress.[76]

Like other refuges managed by the Survey, the Upper Mississippi benefited from the support of non-governmental organizations, especially the Izaak Walton League. Organized in 1922 in Chicago by advertising executive William Dilg, the League initially was based in the Midwest but soon expanded. Members valued the outdoor experience, but they also called attention to midwestern agricultural development that resulted in the drainage of numerous marshes—the resting-places of migratory birds. In response to these environmental problems, Dilg was able to marshal a wide body of support by uniting several wildlife organizations together and by developing the Izaak Walton League into a much larger organization than other wildlife conservation associations: by 1924, it had over 100,000 members, whereas the National Audubon Society and Sierra Club each had fewer than 7,000 individuals. For the Survey, the support of such a large organization and the creation of the mammoth-sized refuge were unprecedented.[77]

The Survey's management of the Bear River Migratory Bird Refuge was also unprecedented and provided another opportunity for the bureau to reinvent itself.

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[76] Cameron, *The Bureau of Biological Survey*, 109-110; and Dyan Zaslowsky, *These American Lands: Parks, Wilderness, and the Public Lands* (New York: Henry Holt and Company, 1986), 172-174.

[77] John O. Anfinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003), 160-162. There is little scholarship on the origins of the Izaak Walton League, although Fox, in *The American Conservation Movement,* 159-163, discusses it briefly. Conservation-activist William Voigt wrote a brief description of the organization: *Born with Fists Doubled: Defending Outdoor America* (Iowa City, Iowa: Izaak Walton League of America, 1992). For a discussion of the region's wildlife, see: Michael Rahn, *A History of Hunting on the Upper Mississippi River* (La Crosse, Wisconsin: Upper Mississippi River Conservation Committee, 1983). A study that looks at the extensive period of drainage in

In 1928, Congress appropriated $350,000 for the refuge, located at the mouth of Bear River, Utah. It was the first federal effort to develop a refuge on marshes, and it was the Survey's first attempt at re-flooding and reconfiguring a landscape to make it attractive for migratory birds. The Survey was no longer just managing wildlife on refuges but was now attempting to manipulate the landscape, a distinct difference from its earlier work with wildlife. The impetus for this newer approach, in part, resulted from the Survey's attempt to combat a mysterious "duck sickness" that had plagued the species since 1914 in Utah and other parts of the West. (SEE PHOTO) The Survey wanted to prevent salt water from entering the area, mistakenly believing that alkali poisoning was responsible for the ducks' illness (the sickness was later diagnosed as avian botulism). Despite the faulty analysis, the engineering approach to landscape manipulation set a model for the future, an approach to "marsh restoration" that was consistent with wise-use conservation.[78]

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the Midwest is: Mary R. McCorvie and Christopher L. Lant, "Drainage District Formation and the Loss of Midwestern Wetlands, 1850-1930," *Agricultural History* 67 (Autumn 1993): 13-39.

[78] Senate Committee on Agriculture and Forestry, Migratory Bird Refuge, Bear River Bay, Utah: *Hearing before the Committee on Agriculture and Forestry*, 69th Cong., 2nd sess. (1927), 1-10; Senate Committee on Agriculture and Forestry, Bear River Migratory Bird Refuge*: Hearing before the Committee on Agriculture and Forestry*, 70th Cong., 1st sess. (1928), 1-8; Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1931* (Washington: Government Printing Office, 1932), 17-18; Ira Gabrielson, *Wildlife Refuges*, 15-17. For a brief overview of the refuge on Bear River, See: Rachel L. Carson, *Bear River: A National Wildlife Refuge* (Washington: Government Printing Office, 1950).

"Marsh restoration" and environmental manipulation were the Survey's responses to declining migratory waterfowl populations, a problem that began in the late nineteenth and early twentieth centuries, but became more acute during the 1930s, a time when drought added to other factors (drainage, agricultural development, and hunting) that reduced avian habitat and populations. In addition to re-flooding areas that had previously been drained, the Survey constructed artificial islands (with no predators on them) to attract birds, provided supplemental feed, and reconfigured the environment to provide more nesting areas. By 1936, the Survey began reporting increases in bird populations, although it is not clear whether habitat alteration, stricter hunting regulations, or changes in climate and environment caused the increases.[79] The inability to determine the causes of recovering and declining avian populations ensured that disputes over hunting regulations between sportsmen, who argued that drought was responsible for the dwindling numbers of birds, and Survey members, who

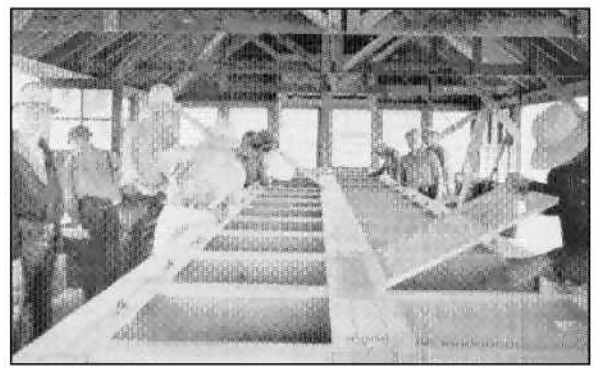

Figure 2: Inside a "duck hospital" on Medicine Lake Migratory Waterfowl Refuge, Montana. Photograph: Congressional report of the Special Committee on the Conservation of Wildlife Resources, 1940.

[79] Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1936* (Washington: Government Printing Office, 1937), 2; Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1937* (Washington: Government Printing Office, 1938),

stated that drought, drainage, and hunting were responsible, would continue throughout the decade.

The Survey's authority to set federal hunting regulations to protect migratory birds was the result of laws passed in 1913, 1918, and 1929. Prior to these laws, federal authority was limited: an 1896 Supreme Court decision, *Geer v. Connecticut*, ruled that states have ownership of wildlife, and the Lacey Act was only as strong as existing state laws.[80] Realizing that federal legislation was needed for more effective wildlife protection, George Shiras, an attorney and one-term representative from Pennsylvania, proposed in 1904 a federal migratory bird law. With the support of the National Association of Audubon Societies and the newly-formed American Game Protective Association, an organization sponsored by gun and ammunition companies with an obvious economic motive to ensure a supply of birds for hunters, the proposal reached fruition with the 1913 Weeks-McLean Act (also known as the Migratory Bird Act). The law gave federal authority over migratory birds and authorized the Department of Agriculture, via the Biological Survey, to set and enforce regulations.

With the passing of the Migratory Bird Act, the Survey went under another reinvention. While the Survey did enforce the Lacey Act, the 1900 federal law was based on violations of state law. The 1913 law granted the Survey the power to develop regulations. Most importantly, the Survey used the law to adjust

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35-36; and Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1938* (Washington: Government Printing Office, 1939), 24-25.

regulations when needed, the adjustment being determined by the Survey's expertise in ascertaining avian populations. Thus the Survey was given a managerial "tool" to manage bird populations, a reflection of Progressive Era conservation's faith in rational decisions made by expert managers. The Survey used this Migratory Bird Act to ban spring hunting (the nesting period) and set a maximum period of three-and-a-half months for hunting in the fall; states were given authority to make the regulations stricter if needed. This law, however, was not set in a secure foundation. President William Taft, who unwittingly signed it (the law was a rider to an agricultural appropriations bill) on his last day in office, believed that it lacked constitutional sanction.[81]

Taft's reservations were well-founded, as the law suffered from weak enforcement and was subjected to constitutional challenges. With minimal funds, the Survey relied on local, federalized game wardens, some of whom were corrupt or incompetent.[82] Members of exclusive duck clubs—and their elected officials in Washington—desired extended shooting seasons and presented states' rights arguments against the new federal legislation. Furthermore, although some district

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[80] Dian Olson Belanger, *Managing American Wildlife: A History of the International Association of Fish and Wildlife Agencies* (Amherst, Massachusetts: University of Massachusetts Press, 1988), 12; and *Geer v. Connecticut*, 161 U.S. 519.

[81] For background on the Weeks-McLean bill, see: Ibid., 20-23; Graham, *The Audubon Ark,* 90-93; Orr, *Saving American Birds,* 189-191; and Thomas Gilbert Pearson, *Adventures in Bird Protection,* 230-235. The most extensive treatment of the legislation is covered in Dorsey, *The Dawn of Conservation Diplomacy.* For the formation of the American Game Protection Association, see: William S. Haskell, *The American Game and Propagation Association: A History* (New York: American Game and Propagation Association, 1937). As a photographer for *National Geographic,* George Shiras also became known for using photography to publicize wildlife conservation. See: Matthew Brower, "George Shiras and the Circulation of Wildlife Photography," *History of Photography* 32 (summer 2008): 169-175.

[82] Dorsey, *The Dawn of Conservation Diplomacy*, 198; and Cameron, *The Bureau of Biological Survey,* 100-101.

courts upheld the law, in two separate cases, the law was ruled unconstitutional. Therefore, the Survey instructed game wardens to enforce the law cautiously.[83]

Supporters of the Weeks-McLean bill anticipated the constitutional challenge. They realized that, if the law could be based on a treaty, it could not be overturned with a state's rights argument. The logical choice for the treaty was Canada, since birds there migrate to the United States. The American Game Protective Association drafted a treaty that was signed by that United States and Great Britain (signing for Canada) in 1916 and made effective in 1918.[84] The new law went further than the previous law, in that some species were placed on a protected list of birds that could not be shot, and the Survey was allowed to set bag limits—an authority that would soon be the source of contention.[85] Bird protection advocates won another victory with Oliver Wendell Holmes' 1920 Supreme Court ruling in *Missouri v. Holland,* a landmark case that upheld the Migratory Bird Treaty Act.[86]

Although the Supreme Court's decision put migratory bird protection on a secure legal foundation, new controversies emerged. William T. Hornaday wanted the Survey to lower the bag limit on the number of birds that hunters

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[83] Ibid., 198-199; Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1915* (Washington D.C.: Government Printing Office, 1916), 244-246; *United States v. Shauver*, 214 Fed. 154; and *United States v. George L. McCullagh*, 221 Fed. 288.

[84] As a former colony of Britain, Canada still had its treaties signed by the imperial power until 1931.

[85] Cameron, *The Bureau of Biological Survey*, 99-103.

[86] Missouri v. Holland, 252 U.S. 416. This decision is usually discussed in histories of wildlife conservation. For an in-depth discussion, see: Charles A. Lofgren, "Missouri v Holland in Historical Perspective," The Supreme Court Review 1975 (1975): 77-122. For a summary of Supreme Court (non-wildlife) conservation cases that were decided before the Holland decision, see: E.A. Sherman, "The Supreme Court of the United States and Conservation Policies," *Journal of Forestry* 19 (December 1921): 928-930.

could shoot. He argued that an evident increase in bird populations was deceiving. As more land came under agricultural development, there were fewer resting-places for migratory birds. Therefore, birds tended to concentrate in larger numbers—thus giving the appearance of an increase—but at fewer locations.[87] Edward W. Nelson, a naturalist who spent many years doing fieldwork for the Survey before becoming chief in 1916, agreed with Hornaday in principle. Nelson also realized societal and technological change made it more difficult to protect wildlife. Improvements in guns, cars, and roads facilitated hunting, and the number of licensed hunters increased from 1,500,000 in 1911 to 4,000,000 in 1924. However, fearful of antagonizing hunters and state game officials, Nelson conceded to moderate hunting regulations. Hornaday's desire to curb hunting, however, became more urgent: a 1930 waterfowl census conducted by the Survey in conjunction with state game departments, conservation organizations, and private individuals, indicated that waterfowl were in decline.[88]

To arrest this decline in waterfowl, conservationists proposed expanding the number of avian refuges, a proposal that was put forward throughout the 1920s.

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[87] Hornaday was not always consistent in his attitudes toward wildlife or hunting, and his critics—usually hunting advocates—called attention to this inconsistency. See: Maitland G. De Sormo, *John Bird Burnham—Klondiker, Adirondacker, and Eminent Conservationist* (New York: Adirondack Yesteryears, Inc., 1978), 170-172. The deceptive appearance of an increase in birds that Hornaday pointed out was a vexing problem for the Survey. A relatively recent study, based on the shooting records of a private club, suggests that habitat loss tends to concentrate birds in greater numbers, but at fewer locations. See: Roy W. Kroll and Jonathan Bart, "Duck Hunting Trends at Winous Point Shooting Club, Ohio, 1863-1987," *Wildlife Society Bulletin* 22 (autumn 1994): 449. For an argument that Hornaday overestimated the role of hunting in the loss of birds, see: Julianne Lutz Newton, *Aldo Leopold's Odyssey* (Washington: Island Press, 2006), 110-112.

[88] House Committee on Appropriations, *Hearings before the Subcommittee of House Committee on Appropriations, Agricultural Department Appropriations Bill for 1930*, 70th Cong., 2nd sess. (1929), 429.

George Lawyer of the Survey drafted a bill that included plans for more refuges and a hunter's licensing fee to finance the refuges. Most controversially, the measure included a stipulation that the refuges would also be used as public shooting grounds for hunters, a response to concerns voiced by Chief Nelson and representative Peter Norbeck that hunting clubs were acquiring shooting grounds for their exclusive use. The bill had the support of many conservation organizations: the American Game Protective Association, the National Association of Audubon Societies, the Campfire Club, the Boone and Crockett Club, and many state game commissioners.[89]

Other conservationists, especially Hornaday, were not as enthusiastic. They believed the public shooting grounds proposal was tantamount to government-sponsored slaughter of wildlife. William Dilg of the Izaak Walton League, Aldo Leopold, and Jay Norwood Darling, a conservationist and nationally-known cartoonist who would later be chief of the Survey, also disapproved of the bill. These conservationists were joined by states' rights politicians, primarily from the South and West, who objected to the licensing fee and the increased federal role in regulating wildlife, traditionally a role for the states. The opponents, though not united, raised enough objections to defeat the bill.[90]

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[88] Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1929* (Washington: Government Printing Office, 1930), 3, 22-23.
[89] Fox, *The American Conservation Movement,* 164; Gilbert Courtland Fite, *Peter Norbeck: Prairie Statesman* (Columbia: University of Missouri Press, 1948), 146, and Graham, *The Audubon Ark*, 108-110.
[90] Belanger, 36-37; Donald C. Swain, *Federal Conservation Policy, 1921-1933* (Berkeley: University of California Press, 1963), 34-38; and Fox, *The American Conservation Movement*, 166-167.

A modified version of the bill, however, was passed in 1929, as the Norbeck-Andresen Act. The law did not include provisions for the public shooting grounds and the licensing fee, but it called for federal funding of new refuges for migratory birds and set rules for acquiring new land: A migratory bird conservation committee, consisting of the Secretaries from the Departments of Agriculture, Interior, and Commerce, and two members from each branch of Congress, would recommend and approve land purchases. States had to approve the purchases, thus easing fears of a loss of states' rights. A new division in the Survey—the Division of Land Acquisition—was created and had the responsibility of examining, classifying, and appraising land for potential purchase.[91] Thus, the Norbeck-Andresen Act provided a legislative basis and procedure for acquiring avian habitat, but nearly ten years of bickering over its terms divided conservationists. Furthermore, the measure did not allocate funds for acquiring property for the refuges.

The possibility of procuring appropriations for future refuges did not look promising, as the federal government turned its attention to the Depression of the 1930s. With the collapse of the stock market, numerous bank failures, falling agricultural prices, unemployment that reached as high as twenty-five percent, and a global depression, government had higher priorities than protecting wildlife. Furthermore, in a budget-balancing effort, funding for numerous federal agencies

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[91] House Committee on Appropriations, *Hearings before the Subcommittee of House Committee on Appropriations, Agricultural Department Appropriations Bill for 1930*, 70th Cong., 2nd sess. (1929), 429; and Department of Agriculture, *Report of the Chief of the Bureau of Biological*

was reduced, with the Survey losing almost a half-million dollars in appropriations in 1933. Research seemed practically vulnerable to cost-cutting. President Franklin Roosevelt wrote to Secretary of Agriculture Henry Wallace, complaining that the "Biological Survey spends too much time on scientific experimentalism" rather than "practical" matters, such as "making birds a valuable crop for the farmer to raise…." Even the predator and rodent program—the bread and butter of the Survey—was a target for elimination in 1934, but pressure from the livestock industry kept the program viable.[92]

Leading conservationists and scientists also came to the defense of the Survey. Between 1935-1936, leaders of conservation organizations and a wide range of university biological scientists—for example, entomologists, ecologists, geneticists, plant pathologists, and wildlife specialists—testified before Congress and praised the Survey's research. Game management authority Aldo Leopold was particularly outspoken, commenting that wildlife research at the University of Wisconsin "would not have been possible without the services of specialists available from the biological survey."[93]

Survey, 1929 (Washington: Government Printing Office, 1930), 3, 22-23. In 1935, Mexico also signed a migratory bird treaty.

[92] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1933*, 72nd Cong., 1st sess. (1932), 203; "Bureaus Wiped Out, Deadwood Cut off by Roosevelt's Axe," *New York Times*, 7 April 1933; Franklin Roosevelt to Henry A. Wallace, 18 October 1933, in Edgar B. Nixon, ed., *Franklin D. Roosevelt and Conservation, 1911-1945* (Hyde Park, New York: General Services Administration, National Archives and Records Service, Franklin D. Roosevelt Library, 1957), 210; and E.R. Sans to Stanley Young, 8 February 1934, Stanley Paul Young Papers, 1921-1965, Record Unit 7174, Smithsonian Institution (hereafter, Young Papers), Box 7, "Correspondence: Appropriations" Folder.

[93] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1935*, 73rd Cong., 2nd sess. (1934), 1080-1249; House Committee on Appropriations, *Hearing before House Subcommittee on*

Although the testimony of these distinguished scientists and conservationists provided a justification for retaining the Survey during the economically-turbulent times, the Depression, perhaps ironically, created an even stronger incentive to maintain government agencies that managed natural resources. President Franklin Roosevelt believed declining agricultural prices and farmers' reduced incomes were partly responsible for the Depression. Agricultural workers comprised approximately one-third of the workforce, and their reduced purchasing power resulted in less demand for manufactured goods, thus creating more industrial unemployment. Therefore, an increase in agricultural wages would benefit the entire nation, and conservation was one measure to facilitate this increase. With the expertise provided by government bureaus, a past history of over-exploitation of natural resources could be corrected, thus encouraging a more efficient, wise, and profitable use of the natural world. Furthermore, in contrast to Progressive Era conservation, government conservation during the Depression provided employment. Thus, conservation was central to economic recovery.[94]

To meet conservation goals, the federal government created numerous programs during the New Deal—Franklin Roosevelt's ambitious attempt to revitalize the economy, provide relief to those suffering from the economic downturn, and create reform measures to prevent further economic collapses. For example, the Tennessee Valley Authority constructed dams, developed a

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Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1936, 74th Cong., 2nd sess. (1935), 726-734.

[94] Sara T. Phillips, *This Land, This Nation: Conservation, Rural America, and the New Deal* (New York: Cambridge University Press, 2007), 1-4.

reforestation program, addressed flood control, and brought electricity to impoverished, rural Americans in the South, especially the Appalachian region. The Public Works Administration and the Works Progress Administration created numerous jobs for the construction of dams and other public works projects. The Civilian Conservation Corps employed young men for conservation projects in rural regions, often in national parks and refuges, as they engaged in ecological restoration, fire suppression, predator and rodent control, erosion control, and the construction of roads and lookout towers. The Soil Conservation Service focused on the Dust Bowl, the result of drought, high winds, and years of plowing on the Great Plains. These New Deal efforts benefited the Survey by putting conservation on the national agenda and by providing labor for many Survey projects. Moreover, Roosevelt wanted to increase agricultural prices, initially through the Agricultural Adjustment Act (paying farmers to limit production) and later by retiring land of questionable productivity, some of which was used for bird refuges. The Depression also created a "buyer's market" in real estate, since there were low prices and willing sellers. The National Park Service, the Survey and the Forest Service all took advantage of these reduced prices: the total acreage of federal land for wildlife increased from 678,943 in 1929 to 13,740,304 in 1941.[95]

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[95] The land acquisition numbers are from Sally K. Fairfax, *Buying Nature,* 116. Although virtually all general histories of conservation discuss New Deal Conservation, some more specialized studies include: Theodore W. Cart, "'New Deal' for Wildlife: A Perspective on Federal Conservation Policy, 1933-1940," *Pacific Northwest Quarterly* 63 (July 1972): 113-120; Richard Lowitt, *The New Deal and the West* (Norman: University of Oklahoma Press, 1993); Neil M. Maher, *Nature's New Deal: The Civilian Conservation Corps and the Roots of the American Environmental Movement* (New York: Oxford University Press, New York, 2008); A.L. Riesch

The New Deal Era included auspicious developments that indicated wildlife research was receiving serious attention from scientists. For example, in 1931, Herbert Stoddard published the first American monograph of a game species, the bobwhite quail. Two years later, Aldo Leopold authored the first textbook on game management and accepted the first university chair (at the University of Wisconsin) created for the newly-emerging field. Conservationists, wildlife managers, and scientists gathered in 1936 for the first North American Wildlife Conference, the beginning of an annual conference and concomitant publication. In 1937, wildlife managers also organized a professional association, the Wildlife Society, and founded *The Journal of Wildlife Management.* The Forest Service was also beginning to look at the relationship between wildlife and livestock. Wildlife research was conducted in national parks, most notably resulting in a multi-volume series, *Fauna of the National Parks of the United States.*[96]

Owen, *Conservation Under F.D.R.* (New York: Praeger Publishers, 1983); Phillips, *This Land, This Nation*; Theodore Saloutos, *The American Farmer and the New Deal* (Ames: The Iowa University Press, 1982); and David B. Woolner and Henry L. Henderson, *F.D.R. and the Environment* (New York: Palgrave, 2005). The first two volumes (of three) of the diaries of Harold Ickes, the Secretary of the Interior, are helpful for understanding the conservation controversies of the thirties. See: *The Secret Diaries of Harold L. Ickes: The Inside Struggle* (New York: Simon and Schuster, 1954). Also helpful for the controversies is Irving Brant, *Adventures in Conservation with Franklin D Roosevelt* (Flagstaff, Arizona: Northland Publishing 1988). Two biographies of Ickes touch on conservation: T.H. Watkins, *Righteous Pilgrim* (New York: Henry Holt, 1990) and Jeanne Nienaber Clarke, *Roosevelt's Warrior: Harold L. Ickes and the New Deal* (Baltimore: The Johns Hopkins University Press, 1996). More disappointing, from the perspective of conservation, is a biography of Harold Wallace, the Secretary of the Department of Agriculture: John C. Culver and John Hyde, *American Dreamer: The Life and Times of Henry A. Wallace* (New York: W.W. Norton, 2000).

[96] Barrow, *Nature's Ghosts*, 273-274; Herbert Stoddard, *The Bobwhite Quail: Its Habits, Preservation, and Increase* (New York: Charles Scribner's Sons, 1931); and Leopold, *Game Management.*. Biologist George Wright, along with the assistance of Joseph Dixon and Ben Thompson, financed and published the first *Fauna* volume. See: George M. Wright, *Fauna of the National Parks of the United States: A Preliminary Survey of Faunal Relations in National Parks* (Washington: Government Printing Office, 1933). The findings in the *Fauna* series, according to biologist Craig L. Shafer, prefigured many of the important concepts used by contemporary

National Parks also furthered the understanding of wildlife—and the need to understand it in an ecological context—with the establishment of Everglades National Park in 1934. Previous national parks featured unique geographical qualities ("monumentalism") or recreational value. The Everglades, however, lacked these characteristics, and some conservationists believed its wetlands made it unworthy of national park status. Park supporters needed a different rationale—the desire to preserve a unique ecosystem—to allow the Everglades to be accepted into the pantheon of the nation's famous parks.[97] The growing importance of understanding ecosystems had important implications for the study of wildlife. Ecology developed with two separate foci, plants and animals. By the 1930s, however, ecologists saw the need to study plants and animals together, and concepts such as the "biotic community" and "ecosystem" gained increased

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conservation biologists. See: Craig L. Shafer, "Conservation Biology Trailblazers: George Wright, Ben Thompson, and Joseph Dixon," *Conservation Biology* 15 (April 2001): 332-334.Although wildlife research in national parks received serious attention in the 1930s, it began to decline by the end of the decade. For research in national parks, see the following from Richard West Sellars: *Preserving Nature in the National Parks* (New Haven: Yale University Press, 1997); and "Science and Natural Resource Management in the National Park Service, 1929-1940," in Harold K. Steen, ed., *Forest and Wildlife Science in America* (Durham, North Carolina: Forest History Society, 1999). Steen's volume is also good for research conducted by the Forest Service and the Soil Conservation Service. Richard West Sellars, "The Rise and Decline of Ecological Attitudes in National Park Management, 1929-1940, Part I," *George Wright Forum* 10 (1993): 55-78 ; See also: Horace M. Albright, "Research in the National Parks," *The Scientific Monthly* 36 (June 1933): 483-501; Thomas R. Dunlap, "Wildlife, Science, and the National Parks, 1920-1940," *Pacific Historical Review* 59 (May 1990): 187-202; and R. Gerald Wright, *Wildlife Research and Management in the National Parks* (Chicago: University of Illinois Press, 1992). The North American Wildlife Conference papers are published as *Transactions of the (First, Second, etc.) North American Wildlife Conference* (Washington: American Wildlife Institute).

[97] Barrow, *Nature's Ghosts*, 213-216; and Runte, *National Parks,* 134-135. An early environmental activist, Marjory Stoneman Douglas, by founding the Friends of the Everglades and by opposing the creation of a proposed airport in the Everglades, played an instrumental role in preserving the Everglades. She recounts these efforts in *The Everglades: River of Grass* rev. ed. (Miami: Banyan Books, 1978). See also: Jack E. Davis, *An Everglades Providence: Marjory Stoneman Douglass and the American Environmental Century* (Athens: University of Georgia Press, 2009); and Michael Grunwald, *The Swamp: The Everglades, Florida, and the Politics of Paradise* (New York: Simon and Shuster, 2006).

currency. Leopold went one step further, arguing that conservationists also needed to study water, soil, rocks, and other inorganic matter to understand ecological systems. When Survey Chief Ira Gabrielson, in 1936, proposed to Congress the establishment of biological stations based on fifteen different ecological regions, rather than state boundaries, he echoed the thoughts of other scientists who increasingly sought to understand nature, including wildlife, in terms of ecology.[98]

For much of the Survey's conservation research in the 1930s, to "understand nature" meant learning how to control it by constructing attractive nesting areas for the "production" of migratory waterfowl. However, the mobility of waterfowl made it difficult to gather basic data. To work around this impediment, the Survey began banding birds in 1921 in an effort to obtain essential factual information and determine migratory routes or "flyways." Nesting birds were banded with tags that specified the location and date of tagging. If a hunter later shot the tagged bird, the hunter, assuming he was willing, removed the tag from the bird and noted where and when the bird was killed. He then mailed the tag, now containing vital data, to Washington. Frederick Lincoln, the Survey's ornithological expert, used the bird banding information, as well as other data, to

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[98] Peter J. Bowler, *The Norton History of the Environmental Sciences* (New York: Norton, 1992), 518-534; Aldo Leopold, "A Biotic View of Land," *Journal of Forestry* 37 (9 September 1939): 729; and House Committee on Appropriations: *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1937*, 74th Cong., 2nd sess. (1936), 983-984. At the Hearing, Gabrielson was proposing an idea that had been put forth by former Chief Ding Darling. In some respects, the notion that state lines are arbitrary and do not conform to ecological regions can be seen as early as the 1870s, when Charles Hallock of *Field and Stream* argued that game laws should be determined by geographical region, not state lines. See: Herman, *Hunting and the American Imagination,* 243-244.

map the four major North American flyways, designated as Atlantic, Pacific, Mississippi, and Central. Although they lacked precise boundaries and overlapped each other, the flyways suggested key locations for establishing bird sanctuaries (SEE PHOTO).[99]

Other aspects of Survey research in the 1930s also reflected wise-use conservation, much of it with potential economic benefits. In an effort to "produce" more ducks, the Survey

Figure 3: Survey Chief Ira Gabrielson releasing a tagged duck, 1940. Photograph: Library of Congress, Prints and Photographs Online.

[99] The practice of banding birds was not invented by the Survey. Originating in Europe, bird banding was first attempted in the United States by John James Audubon. The practice grew with the creation of the American Bird Banding Association in 1909. Insufficient funds resulted in the Survey taking over the Association's bird banding operations. See: Frederick C. Lincoln, "The History and Purposes of Bird Banding," *Auk* 38 (April 1921): 217-221; and Frederick C. Lincoln, "Bird Banding," In Frank M. Chapman and T.S. Palmer, *Fifty Years' Progress of American Ornithology* (Lancaster, Pennsylvania: The American Ornithologists' Union, 1933), 65-87. For an overview of the history of bird banding, see: William E. Davis Jr., Jerome A. Jackson, and John Tautin, *Bird Banding in North America: The First Hundred Years* (Cambridge, Massachusetts: Nuttall Ornithological Club, 2008), especially chapter one. Although flyways and migration routes are often used interchangeably, the terms are not synonymous. According to Frederick Lincoln: "Migration routes may be defined as the lanes of individual travel from any particular breeding ground to the winter quarters of the birds that use them. They may be likened to long trails. Flyways, on the other hand, may well be conceived as those broader areas in which related migration routes are associated or blended in a definite geographic region. They are wide arterial highways to which the routes are tributary." See, Frederick C. Lincoln, *The Migration of American Birds* (New York: Doubleday, Doran, & Company, 1939), 150.

conducted research on avian botulism. "Fur farming," the production of fur-bearing animals, received much attention, including genetic research. Efforts were made to "improve" the quality of Alaskan reindeer for meat production by cross breeding it with native caribou. The use of biological agents for mosquito control became an important research priority for managing the bird refuges, sometimes thought of as "natural laboratories" for experimentation. Vegetation was transplanted to different environments to see how it adapted. Animals were also part of transplantation studies: the musk-oxen, originally from Greenland, was imported to Alaska. Much of the research focused on wildlife, especially after Leopold, the Survey, state game commissions, agricultural colleges, and the American Wildlife Institute helped to establish, in 1935, nine wildlife research stations. Furthermore, in 1936, the Survey established the Patuxent Research Refuge in Maryland, an important center for wildlife studies.[100]

Although the Survey benefited from this growing interest in wildlife research in the 1930s, problems with wildlife management became more apparent and received public attention throughout the decade. Leopold drew attention to the dearth of basic information about wildlife management. In 1931, when he published the results of a game survey of the north central states, he commented that, answers to fundamental questions such as "the composition of the ideal

[100] Much of the Survey's research in the 1930s, sometimes done with the collaboration of the Forest Service, the Bureau of Plant Industry, and the Bureau of Entomology, has not been studied extensively. Brief descriptions can be found in the annual reports of 1930-1939. See also: Paul Redington, "The United States Bureau of Biological Survey," *The Scientific Monthly* 37 (October 1933): 289-306. A government-produced brief early history of the Patuxent Research Refuge is provided by L.B. Morley: "Early History of Patuxent Wildlife Research Center," available at: www.pwrc.usgs.gov/history/cronhist/Morley4.pdf. [accessed 1 March 2011.]

range…. remain largely or totally unanswered," yet the "conservation movement" has been hesitant to realize this gap in understanding. Missouri senator Harry Hawes issued a warning that fish and game were declining rapidly. William Voigt, known more for his warnings of overpopulation, observed that drainage threatened avian habitats. Other natural resource uses came under scrutiny in the wake of the Dust Bowl. *Behold Our Land* by farm journalist Russell Lord documented so many cases of erosion that *Time* called his work a "statistical shocker."[101]

Although Lord praised the Soil Conservation Service, other analysts argued that the government agencies managing natural resource were inefficient and sometimes worked at cross-purposes. Overgrazing on public land generated controversy, leading to the passage of the Taylor Grazing Act of 1934, a measure that required stockmen to obtain grazing permits from the Department of the Interior. Although supporters of the Taylor Act touted it as a conservation measure, it was opposed by the Survey, Forest Service, and the American Forestry Association, for allowing too much local influence on the law's

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[101] Aldo Leopold, *Report on a Game Survey of the North Central States* (Madison, Wisconsin: Democrat Printing Company, 1931), 160; Harry Bartow Hawes, *Fish and Game, Now or Never; a Challenge to American Sportsmen on Wild-Life Restoration* (New York: Appleton-Century Co., 1935); William Voigt, *Thirst on the Land: A Plea for Water Conservation for the Benefit of Man and Wild Life* (New York: National Association of Audubon Societies, 1937) and *Road to Survival* (New York: William Sloane, 1948); Russell Lord, *Behold Our Land* (Boston: Houghton Mifflin Co., 1938), and by the same author, *To Hold This Soil* (Washington: Government Printing Office, 1938); and "Books: Statistical Shocker," *Time* (17 October 1938).

enforcement. Two years after the law's passage, a Forest Service report claimed that eighty-five percent of rangelands were declining.[102]

Historians have argued that it is difficult, if not impossible, to know precisely the extent of the conservation crisis mentioned above. For example, R. Gerald Wright suggests that estimates of the deteriorating range may have underestimated the effects of drought and fire suppression, blaming, instead, the tendency for animals to occupy more concentrated areas in the wake of development. The Forest Service report that criticized the Taylor Grazing Act acknowledged its limitations, conceding that "it is impossible to give an exact or even an approximate estimate of reduction in numbers of wildlife brought about by range depletion and hunting." Robert M. Wilson, who has studied efforts to save migratory birds, notes that only a "rough estimate" of mobile wildlife is possible. Even the most famous and studied wildlife problem, the increase of deer on the Kaibab, was characterized by imprecision: Estimates of the increase ranged between 20,000-100,000. Although exact numbers cannot be known, by

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[102] Leopold, often at the forefront of all wildlife conservation issues, was especially critical of government inefficiency. See: Aldo Leopold, "Conservation Economics," *Journal of Forestry* 32 (May 1934): 537-544. See also: Robert H. Connery, *Government Problems in Wild Life Conservation* (New York: Columbia University Press, 1935); William L. Finley, "Reclamation vs. Conservation," *Nature Magazine* 26 (July 1935): 46-48; Steen, *The U.S. Forest Service,* 205-207; and Letter from the Secretary of Agriculture, *The Western Range... in Response to Senate Resolution No. 289*, 74th Cong., 2nd sess. (1936). Henry Wallace's objections to the Taylor Grazing Act can be found in Edgar Nixon, *Franklin D. Roosevelt and Conservation,* Volume 1, 595-607. For background on the Taylor Grazing Act, see: Kendrick A. Clements, *Engineering the Good Life: Hoover, Conservation, and Consumerism* (Lawrence: University Press of Kansas, 2000), 148-167. For a defense of the Taylor Grazing Act, though not necessarily its subsequent history, see: Michael M. Welsh, "Beyond Designed Capture: A Reanalysis of the Beginnings of Public Range Management, 1928-38," *Social Science History* 26 (summer 2002): 347-391.

the 1930s, there was a sense that something was wrong—and something needed to be done.[103]

The person entrusted with doing "something" was Jay Norwood ("Ding") Darling, appointed chief of the Survey in March, 1934. Darling seemed an unlikely choice: he was a nationally-known political cartoonist, not a bureaucrat or scientist, and he was also a strong critic of federal conservation and the New Deal. However, he had an undergraduate degree in biology and a strong record of successful conservation work in his home state of Iowa.[104] Though Darling's tenure lasted fewer than two years—frustration with Washington politics ensured a brief term of office—he managed to inject energy and enthusiasm into the Survey. Roosevelt promised Darling that he would have autonomy to initiate changes in the Survey. He reorganized the staff, hired more college graduates, and placed the indefatigable John Clark Salyer in charge of acquiring new land for refuges, a responsibility that grew in importance shortly after Darling came to office. Addressing the problem of dwindling avian populations, Darling elicited data from his field workers and refocused the Survey's law enforcement work. The Survey had only twenty-four game wardens for the entire nation, so Darling

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[103] R. Gerald Wright, *Wildlife Research and Management in the National Parks*, 75; Letter from the Secretary of Agriculture, *The Western Range,* 347; Robert M. Wilson, *Seeking Refuge: Landscapes on the Pacific Flyways* (Seattle: University of Washington Press, 2010), 27; and Christian C. Young, "Defining the Range: The Development of Carrying Capacity in Management Practice," *Journal of the History of Biology* 31 (spring 1998): 73.

[104] For biographical material on Darling, see: David L. Lendt, *Ding: The Life of Jay Norwood Darling* (Ames, Iowa: The Iowa State University Press, 1984); Sharon Kaufman, *Important Iowa Conservationists* (Guthrie, Iowa: Iowa Association of Naturalists, 1995); and Philip Du Mont and Henry Reeves, "The Darling-Salyer Team," in A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, *Flyways: Pioneering Waterfowl Management in North America* (Washington: Government Printing Office, 1984). *Flyways* also contains biographical information of other Survey members from the 1920s and 1930s.

organized wardens into small, mobile units that responded to the most troubled areas (generally the two coasts and the central flyway running through Illinois and Missouri). The law enforcement teams conducted a number of "sting" operations that resulted in the arrests of fur traders and duck bootleggers who sold their wares to exclusive restaurants. The arrests occasionally made national news and resulted in the seizure of "punt guns," high power weapons used by market hunters to kill multiple numbers of birds with one shot (SEE PHOTO).[105]

[105] Zaslowsky, *These American Lands: Parks, Wilderness, and the Public Lands*, 170-176; Eric Jay Dolin, *Smithsonian Book of National Wildlife Refuges* (Washington: Smithsonian Institution Press, 2003), 91-93; Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1935* (Washington: Government Printing Office, 1936), 5-10; Trefethen, *An American Crusade for Wildlife*, 219-229; and "Darling Makes Changes in Wildlife Bureau," Press Release, Department of Agriculture, 6 July 1934, available at: http://www.fws.gov/news/historic/. For the "sting" operations, see: House Committee on Appropriations: *Hearing before the Subcommittee of House Committee on Appropriations, Agricultural Appropriations Bill, 1937,* 74th Cong., 2nd sess. (1936), 571-574; Gerald A. Day, "Federal Raiders Ferret out the Sly Runners of Contraband Furs," *Washington Post*, 21 October 1934; "Under-Cover Biological Survey Agents Use Many Disguises to Catch Duck Bootleggers," *New York Times*, 23 December 1935; and "Duck Bootlegger Gang Smashed," *Los Angeles Times*, 5 May 1940.

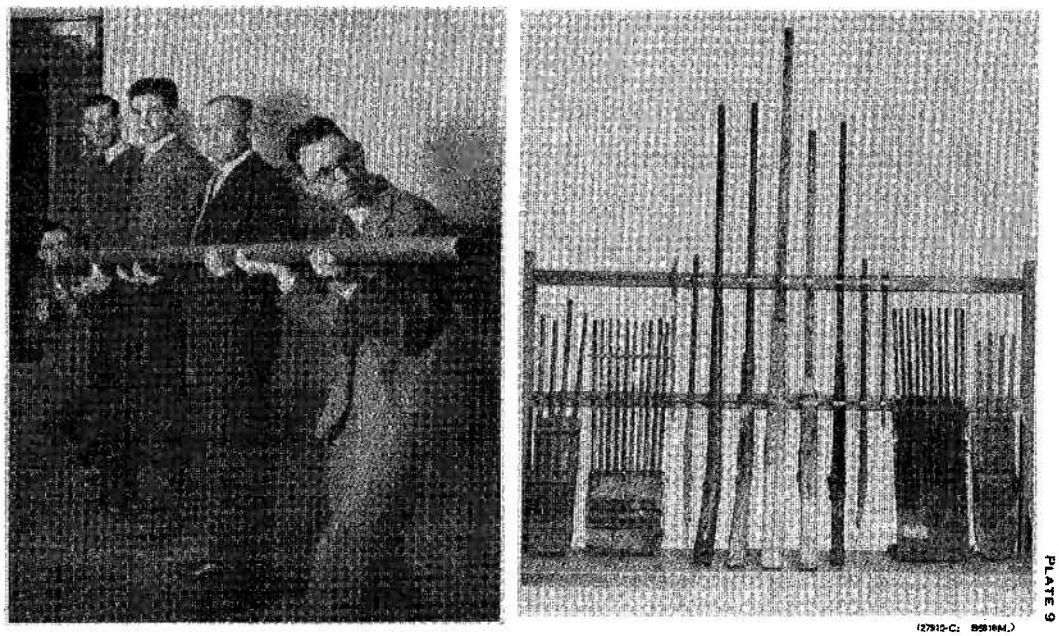

Figure 4: Weapons seized by the Biological Survey. At left is the massive "punt" gun. Photograph: Congressional report of the Special Committee on the Conservation of Wildlife Resources, 1940.

Darling's law enforcement efforts received praise from other conservationists, but his most remembered contribution to conservation is his advocacy of the Duck Stamp Act of 1934, along with his artwork on the stamp (SEE PHOTO). This measure charged a yearly one-dollar licensing fee to hunters, and the proceeds were earmarked for the management and acquisition of refuge land. Many hunters were enthusiastic. Although hunting was initially prohibited on land acquired with duck stamp funds, hunters believed birds on the protected refuges would spill over to non-protected areas. The Duck Stamp Act, together with the Pittman-Robertson Act of 1937 (taxes on sporting goods with the proceeds going to wildlife conservation), fostered a strong alliance between the

Survey (and later the Fish and Wildlife Service) and hunters, since the sportsmen became key financial contributors to wildlife conservation.[106]

The Duck Stamp Act also included an amendment that appropriated six million dollars for wildlife restoration from unused relief funds from 1934.[107]

Figure 5: The Survey's "Ding" Darling designed the first duck stamp, 1934. Photograph: U.S. Fish and Wildlife Service, "Training & Education Materials Production."

The money fueled a vast expansion of the refuge system in the second half of the 1930s; in 1937 alone, sixty-seven refuges and fourteen experimental stations were established. The Survey's other wildlife responsibility—big game animals—also expanded during the 1930s. Similar to other reserves for big game, the Charles Sheldon National Wildlife Refuge in Nevada, founded in 1931, was facilitated by other conservation organizations, as the Boone and Crockett Club and National Audubon Society provided financial assistance. Hart Mountain, in nearby

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[106] The Duck Stamp Act and the Pittman-Robertson Act are discussed in most histories of wildlife conservation. For more specialized studies, see: Jay Dolin and Bob Dumaine, *The Duck Stamp Story: Art, Conservation, History* (Iola, Wisconsin: Krause Publications, 2000); and Harmon Kallman, ed., *Restoring America's Wildlife, 1937-1987: The First Fifty Years of the Federal Aid in Wildlife Restoration (Pittman-Robertson) Act* (Washington: United States Department of the Interior, Fish and Wildlife Service, 1987).

[107] A combination of luck and timing aided the six million-dollar amendment. Darling persuaded Peter Norbeck, the South Dakota senator who had co-sponsored the Norbeck-Andresen Act, to bring the proposed amendment before the Senate. When Norbeck addressed the Senate, he spoke without his false teeth, apparently confusing other members of the Senate, who, nonetheless, approved the amendment. Roosevelt, about to depart for a fishing vacation, signed the measure without reading it. Shortly after, Roosevelt wrote to Darling, explaining that he mentioned to the Director of the Budget, "this fellow Darling is the only man in history who got an appropriation through Congress, past the Budget and signed by the President without anybody realizing that the Treasury had been raided. Nevertheless, more power to your arm! Go ahead with the six million dollars..." See: Lendt, *Ding*, 75-77.

Oregon, became a big game refuge in 1936 and was managed by the Survey along with the Grazing Division of the Interior Department (administrating the Taylor Grazing Act). The Survey's growing number of big game refuges included the Fort Peck Game Refuge, Montana (1936) and the Kofa Game Range and Cabeza Prieta Game Range (both established in Arizona, 1939). Furthermore, the Survey gained authority to manage the big game refuge on the Wichita Mountains, formerly administered by the Department of the Interior.[108] As recent studies have indicated, the big game reservations and (especially) the bird refuges were hybrid landscapes, combining natural and manufactured features to harvest wildlife as if it were a crop. Chief Gabrielson noted that some of the refuges were too small to allow nature "to take her course." When reports indicated that waterfowl appeared to be on the increase in 1936, he triumphantly noted that the engineered refuges were better than "natural conditions" for producing waterfowl.[109] These landscapes that were better than "natural conditions" for the

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[108] Ira Gabrielson, *Refuges*, 92-93. There is virtually no historical scholarship on the Charles Sheldon and Hart Mountain big game preserves. In 1939, Stanley Jewett of the Survey wrote a brief history of Hart Mountain, focusing on topography and wildlife. Bits of the region's history can be found in a Fish and Wildlife Service survey made in 1985, which focused primarily on locating places of historical and architectural interest to place on the National Register of Historic Places. Hallie Huntington wrote a brief history (with no footnotes or documentation) of the efforts of a local conservation group, Order of the Antelope, to preserve the region's antelope. See: Stanley Jewett, *Hart Mountain Antelope Refuge: A National Wildlife Refuge in Oregon* (Washington: Government Printing Office, 1939); "Cultural Resource Inventory: Sheldon National Wildlife Refuge, Hart Mountain Antelope Refuge," (Portland, Oregon: United States Fish and Wildlife Service, 1985), and Hallie Huntington, *History of the Order of the Antelope* (Klamath Falls, Oregon: Smith-Bates Printing Company, 1982). Fredric L. Quivik provides a sketch of Fort Peck in "New Deal Oasis on the High Plains," *Montana: The Magazine of Western History* 54 (winter 2004): 69-74. The big game reservations in Arizona have not been studied by historians.

[109] Ira Gabrielson, "Wildlife Management as Practiced by the Biological Survey," undated transcript of a talk given for the National Audubon Society. Gabrielson Papers, Denver, Box 7, Folder 18; and Department of Agriculture, *Report of the Chief of the Bureau of Biological Survey, 1937* (Washington: Government Printing Office, 1938), 31. For the engineering aspects of the

production of wildlife reflect the dual conservation/preservation approach of the Survey. On the preservationist side, most refuges either limited or prohibited commercial uses, thus preserving land from economic development. On the conservationist side, refuge managers focused on increasing the numbers of wildlife—a quantifiable measure that was a testament to their alleged expert managerial skills.

These skills were often challenged as the Survey attempted to meet its conservation and preservation responsibilities. In some locations, especially along the Pacific Flyway, the hybrid landscape refuges engineered by the conservationist Survey were too successful: as bird populations increased, they often raided the crops on nearby farms.[110] The preservationist Survey ran into complications when it wanted to keep land free from commercial activities, but often had to concede to local populations who had their own ideas about how the land should be used. Testifying before Congress, Chief Darling lamented that "we rented out [refuge land for grazing] rather foolishly and unwisely." As a result, "the grazing reduced the nesting cover and made the eggs and ducklings an easy prey to the crows and other predators."[111] Furthermore, many of the earliest

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hybrid landscapes, see: Langston, *Where Land and Water Meet*; Douglass Harvey, "Learning the Hard Way: Early Water Control Projects at Cheyenne Bottoms Wildlife Area," *Kansas History: A Journal of the Central Plains* 32 (Autumn 2009); Fredric L. Quivik, "Engineering Nature: The Souris River and the Problem of Migratory Waterfowl," *History and Technology* 25 (December 2009); Robert M. Wilson, *Seeking Refuge;* and John L. Zimmerman, *Cheyenne Bottoms: Wetland in Jeopardy* (Lawrence: University Press of Kansas, 1990).

[110] For problems associated with the over production of birds, see Robert M. Wilson, *Seeking Refuge*, chapter four. Wilson notes that the problem of wandering birds became so acute in the 1940s and 1950s that the Fish and Wildlife Service began "herding" the birds by airplanes back to the refuges.

[111] House Special Committee on Conservation of Wildlife: *Conservation of Wildlife, Hearings... Pursuant to H. Res. 237*, 73rd Cong., 2nd sess. (1934), 111.

refuges were located on reclamation projects under the direction of the Reclamation Service, a federal agency that emphasized irrigation and economic development, often at the expense of migratory birds. The Survey's subordinate position to the Reclamation Service did not foster harmonious relations between the two federal agencies. A 1935 cooperative agreement between the Departments of Interior (federal home of the Bureau of Reclamation) and Agriculture for refuges on reclamation projects gave the upper hand to Interior. For example, the Survey could examine grazing and agricultural leases issued by the Reclamation Service, but the "contractual rights" of the lessee "shall be protected to the satisfaction of the Secretary of the Interior." "Where possible," the Reclamation Service "shall save a minimum supply of water in reservoirs or sumps for wildlife purposes." Reclamation mangers could be deputized as game management officers, provided that their new responsibilities were "consistent with their other duties." The Survey's secondary status compared to the Reclamation Service's, combined with the strained relationship between the Survey and farmers (resulting from birds eating crops), furthered the growing alliance between the Survey and sport hunters. After the Fish and Wildlife Service succeeded the Survey, this alliance grew stronger and was criticized by conservationists for chipping away at the hunting restrictions on the refuges.[112]

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[112] "Memorandum of Agreement between the Secretary of the Interior and the Secretary of Agriculture Respecting Administration of Reclamation Projects Which Are Also Bird and Wildlife Reservations and Refuges," 1935, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 2. For the Fish and Wildlife Service's liberalization of hunting privileges, see: Robert L. Fischman, *The National Wildlife Refuges: Coordinating a Conservation System through Law* (Washington: Island Press, 2003), 37-38; Charles F. Wheatley, *Study of Land Acquisition and Exchanges Related to Retention and Management of Disposition of Federal*

The sometimes-contentious relationship between the Survey and the Reclamation Service was overshadowed by a larger struggle between conservation agencies in the second half of the 1930s, a struggle that eventually resulted in the Survey getting transferred to the Department of the Interior. The main issue involved the Forest Service. Historian Richard Polenberg notes that, ever since the Forest Service was transferred from the Department of the Interior to the Department of Agriculture in 1905, every Secretary of the Interior attempted to get it back. In 1935, Interior Secretary Ickes made the acquisition of the Forest Service part of a larger plan to combine all the conservation agencies under one Department of Conservation. Despite initial support from President Franklin Roosevelt, Ickes' larger vision never materialized. The Forest Service opposed the transfer and countered by attempting to move the Interior Department's Grazing Division to the Forest Service. Furthermore, the Department of Agriculture marshaled support from congressional representatives from various committees to oppose the transfer. It was also becoming politically problematic for Roosevelt to further the issue. Under criticism for attempting to enlarge the Supreme Court—seen as an abuse of executive power—and needing support for his foreign policy as Europe was on the brink of war, Roosevelt settled for a compromise reorganization plan, much to the chagrin of Ickes. In 1939, the Bureau of Fisheries (formerly in the Department of Commerce) and the Biological Survey were transferred to the Department of the Interior and merged

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Public Lands (Washington: Public Land Law Review Commission, 1970), 153; and Ron Baker, *The American Hunting Myth* (New York: Vantage Press, 1985).

as the Fish and Wildlife Service in 1940. The biologists of the Wildlife Division within the National Park Service (part of the Department of Interior) were transferred to the Fish and Wildlife Service. The Department of Agriculture received the formerly independent Rural Electrification Administration, while the highly-contested Forest Service remained in the Department of Agriculture. Michael W. Giese argues that, while it is tempting to view the merger of the Survey and the Bureau of Fisheries as a greater awareness of the interconnectedness of land and water resources, the merger was done for cost-cutting and efficiency purposes; the two bureaus initially did not integrate their work [113]

Thus, by 1940, the Survey had a new name (Fish and Wildlife Service) and new home (Department of Interior). Before it arrived at its new governmental location, the Survey went through several reinventions from its original organization of a handful of naturalists who were interested in avian migratory patterns. Historical circumstances provided opportunities for the Survey to reinvent itself and develop different bases of support. Concerns over declining

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[113] Since the Supreme Court ruled that some components of the New Deal were unconstitutional, Roosevelt wanted to increase the number of Justices, a proposal that was not popular and failed. See: David M. Kennedy, *Freedom from Fear: The American People in Depression and War* (New York: Oxford University Press, 1999), 323-337. For Roosevelt's attempt to win support for his foreign policy, see: Wayne S. Cole, *Roosevelt and the Isolationists* (Lincoln: University of Nebraska Press, 1983). The reorganization plan that brought the Survey into the Department of the Interior was part of a larger reorganization plan involving numerous bureaus and departments. For a succinct listing of the transfers, see: "National Affairs: Reorganization II," *Time*, 22 May 1939. For reorganization, see the following two works from Richard Polenberg: *Reorganizing Roosevelt's Government: The Controversy over Executive Reorganization, 1936-1939* (Cambridge, Massachusetts: Harvard University Press, 1966) and "The Great Conservation Contest," *Forest History* 10 (January 1967): 13-23. See also: Michael W. Giese, "A Federal Foundation for Wildlife Conservation: The Evolution of the National Wildlife Refuge System, 1920-1968" (Ph.D. diss., American University, 2008), 168-172.

wildlife resulted in passage of the Lacey Act, a measure that pulled the Survey in the direction of managing, rather than just studying, wildlife. The focus on management was in accord with Progressive Era conservation, a movement that valued expert decision-making based on scientific analysis. Management of wildlife also comported with Progressive Era preservation, because the big game reserves attempted to set aside land that would, as much as possible, allow the animals to exist under natural conditions. The Survey also benefited from the support of conservation-minded scientists and organizations such as the National Audubon Society, the American Bison Society, and sportsmen's associations, especially the Boone and Crockett Club. Although the Survey capitalized on this growing interest in wildlife by building a base of support, protecting wildlife, since it sometimes prohibited the economic use of land, was often at odds with the goals of stockmen, farmers, and the Reclamation Service.

The protection of wildlife created another opportunity for reinvention after Congress passed migratory bird protective laws in 1913, 1918, and 1929. The Survey was no longer just enforcing state laws under the Lacey Act. It wrote the new bird protection laws, and, equally important, had the authority to adjust laws as conditions changed. Thus, the Survey had a managerial "tool" for managing population levels. Furthermore, beginning with the Bear River Refuge in 1928, the Survey developed another managerial technique to manage wildlife. This technique, an engineered landscape to attract migratory birds, was indicative of another reinvention. The Survey used the reconfigured landscapes to "produce"

birds as if they were crops, a testament to the bureau's expertise in resource management and wise use conservation. The creation of the redesigned refuges benefited from New Deal conservation, as different agencies supplied labor, and the hard economic times made inexpensive land available for purchase. The Survey's work in refuge management and law enforcement earned the support of conservationists and scientists, but it created a dicey situation with hunters—who often provided data and supported some conservation measures—when they deemed the regulations too restrictive.

Hunters were not the only source of wavering support, as stockmen—often opposed to setting aside land for wildlife—were influential supporters of the Survey's predator and rodent control, another reinvention for the federal bureau. The Survey, under fire from Congress because few saw practical benefits from the bureau's early work in mapping flora and fauna, seized the opportunity to tout its expertise in predator and rodent control and the gains to the livestock industry. Thus, the Survey could demonstrate "practical" benefits and the talents of its specialized, professional experts. Although predator control allowed the Survey to build a sometime advantageous relationship with the stockmen, by the 1920s, many scientists and conservationists had misgivings about the seemingly indiscriminate nature of the killing of predators. In short, a reinvention could simultaneously build an alliance with one group of potential supporters while losing the aid of another group of potential supporters.

The reinventions allowed the Survey to take advantage of changing circumstances and new demands from Progressive Era conservation through New Deal conservation, but they also made it difficult for the bureau to build unequivocal, long-lasting alliances. The multiple faces of the Survey made the bureau function sometimes with a conservationist perspective, sometimes with a preservationist perspective, and sometimes with a combination of both. The added responsibilities of protecting, managing, and killing wildlife—unlike the Survey's early work in mapping flora and fauna—lacked a strong scientific foundation, a deficiency that caused Survey scientists to question their assumptions about nature and their methods of investigations.

FROM MAPPING TO MANAGING: A CHALLENGE TO THE SURVEY'S SCIENTIFIC UNDERSTANDING OF NATURE

As the Survey became more of a regulatory agency with less emphasis on research, its scientific underpinnings and methodical procedures were challenged by both Survey scientists and non-Survey scientists. The Survey's research before 1900—the study of the distribution of flora and fauna, taxonomy, and food habits research—suggested that nature was relatively stable and orderly. However, once the Survey began predator and rodent control and wildlife management, the federal bureau found that nature was less predictable and more uncertain: managing nature was different than studying and mapping it. As a result of the Survey's added responsibilities, much of its work was challenged and questioned: the life zones theories of the Survey's first chief, C. Hart Merriam, were considered overly simplistic; the understanding of the predator/prey relationship was called into question; the use of non-professionals in the gathering of data was increasingly seen as suspect; the alleged avian benefits to agriculture—the Survey's justification for its food habits research—were disputed; the early focus on taxonomy and the collection of unique specimens were seen as products of an earlier age that created an impediment to understanding nature; and the Survey's management of wildlife on bird sanctuaries and big game refuges made it painfully obvious that the bureau's understanding of wildlife was limited. Through these experiences, generalizing

about nature became more problematic, and much of the Survey's intellectual edifice and understanding of nature became untenable by the 1930s.

A substantial portion of the Survey's earliest science, Merriam's life zone theory in particular, was motivated by efforts to explore the relatively-unknown environments of the American West. As the nation expanded, a desire to understand these regions provided the impetus for surveys sponsored by railroad companies, states, and the federal government. A typical survey mapped the region, cataloged its natural resources, and evaluated its economic potential. Through family connections, C. Hart Merriam, at the age of 16, was fortunate enough to accompany Ferdinand Hayden—most famously known for exploring the Yellowstone region and advocating setting it aside as a national park—on a government expedition. The excursion fascinated the future first chief of the Survey. He began to develop an interest in understanding which environmental factors govern the distribution of flora and fauna, eventually culminating in his life zone theory (as discussed in chapter one).[1]

Merriam's theory, however, was the first component of the Survey's intellectual foundation that scientists challenged. By the early twentieth century, scientists were divided on explaining biological distribution. Some followed Merriam's thought and emphasized the role of temperature. Others, however, followed the thought of C.C. Adams, A.G. Ruthven, and Spencer Trotter,

[1] For the western expeditions, see: William H. Goetzmann, *Exploration and Empire: The Explorer and Scientist in the Winning of the American West* (New York: Vintage Books, 1966); and Donald Worster, *A River Running West: The Life of John Wesley Powell* (New York: Oxford University

pioneering ecologists who emphasized the ecological associations of organisms; temperature was an important but not dominant explanation of plant and animal distribution. While Merriam argued that temperature places "barriers" on the range of a species' distribution, Joseph Grinnell of the Museum of Vertebrate Zoology, University of California, suggested that the concept of a barrier was problematic. He observed that "most barriers are constantly shifting, and the adaptability of the animals themselves may be also undergoing continual modification; so that perfect adjustment [to a barrier] is beyond the limits of possibility so long as topography and climate keep changing. The ranges of species may thus be constantly shifting." Other scientists pointed out that temperature might have the greatest influence in a particular region, but other factors—humidity, soil, disease, topography, predators, and the availability of food and cover—could play the dominant role in other environments. Furthermore, human settlement and alterations of the environment influenced the distribution of animals, sometimes opening up new areas, sometimes closing off others. In short, nature was more dynamic and variable than Merriam's life zones theory implied, thus making it difficult to formulate generalizations.[2]

Press, 2001). For Merriam's experience with the expedition, see: Wilfred H. Osgood, "Clinton Hart Merriam, 1855-1942," *Journal of Mammalogy* 24 (November 1943): 421-436.

[2] Joseph Grinnell, "Barriers to Distribution as Regards Birds and Mammals," *The American Naturalist* 48 (April 1914): 250-251. See also by the same author: "Field Tests of Theories Concerning Distributional Control," *The American Naturalist* 51 (February 1917): 115-128. Joseph Grinnell, by training many future mammalogists, publishing numerous scientific studies, editing *Condor,* advocating the protection of wilderness and wildlife, and criticizing the Survey's conservation and predator work, had an important influence on wildlife conservation during the first four decades of the twentieth century. However, he has received minimal scholarly attention. For a study of Grinnell's efforts to preserve wilderness, see: Alfred Runte, "Joseph Grinnell and Yosemite: Rediscovering the Legacy of a Californian Conservationist," *California History* 69 (summer 1990): 173-181. Grinnell's most noteworthy contribution to science is his study of

Some of the early criticism of Merriam's theory was tempered and indirect. For example, in a review of *Life Zones and Crop Zones of New Mexico, North American Fauna No. 35* by Vernon Bailey (the Survey's Chief Naturalist who was trained by Merriam), the reviewer pointed out that the flora and fauna of various life zones did not seem to fit Merriam's predictions. He found "some rather puzzling discrepancies in the status of some birds in New Mexico and at points further west. Thus the scott oriole [*Icterus parisorum*]… is here listed as Lower Sonoran [one of Merriam's life zones], while in the experience of the present reviewer it is in Arizona and California most emphatically Upper Sonoran." The reviewer, however, qualified his remarks, stating that his comments were not "criticisms." By pointing out the "discrepancies," he intended to "call attention to the various conditions under which species have been found in different portions of their habitats." For A. Brazier Howell of Johns Hopkins University, pinpointing the "various conditions" that determine a species' range proved elusive. For one species, the abert's towhee (*Pipilo aberti*), a bird related to sparrows, Howell admitted that causation was difficult to

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Yosemite: *Animal Life in the Yosemite: An Account of the Mammals, Birds, Reptiles, and Amphibians in a Cross Section of the Sierra Nevada* (Berkeley: University of California Press, 1924). For early ecology in the United States, see: Sharon E. Kingsland, *The Evolution of American Ecology, 1890-2000* (Baltimore: The Johns Hopkins University Press, 2005); and Ronald C. Tobey, *Saving the Prairies: The Life Cycle of the Founding School of American Plant Ecology, 1895-1955* (Berkeley: University of California Press, 1981). Robert A. Croker has written biographies of two of American ecology's founders: *Pioneer Ecologist: The Life and Work of Victor Ernest Shelford, 1877-1968* (Washington: Smithsonian Institution Press, 1991); and *Stephen Forbes and the Rise of American Ecology* (Washington: Smithsonian Institution Press, 2001). An invaluable resource for the history of biogeography is the website of Charles H. Smith, geologist and historian of science. The website contains the writings of hundreds of scientists (including Merriam) who studied the distribution of floral and fauna. See: Charles H. Smith, "Early Classics in Biogeography, Distribution, and Diversity Studies: to 1950," available at: http://people.wku.edu/charles.smith/biogeog [accessed 10 January 2012].

establish: "The primary factor seems to be other than that of either food, climate, or cover, and may be due to a number of causes, perhaps unsuspected."[3]

Other critics of Merriam were more direct. The publication of *North American Fauna 45*, an analysis of Alabama's life zones and mammals, spurred Lee R. Dice of the Museum of Zoology, Michigan, to examine the life zone theory critically. Dice had "only praise" for the sections of the study that listed and described the mammals of the state. However, Dice's appraisal of the application of the life zone theory was not as generous. There was too much variation in the distribution of species to suggest that they belonged to zones. "The common practice… of stating, often without qualification, that a species belongs to a particular life zone, or, still worse, that it is characteristic of the life zone, when in fact it occurs in only a part of the area of the life zone, seems positively misleading." The danger in Merriam's concept is that "a life zone map gives an appearance of finality and precision to the classification of distribution which the facts do not justify." A life zone map is of questionable value because "it is not likely to lead to progress in untangling the complex interrelationships of the numerous factors involved in the limitation of animal and plant distribution." A leading animal ecologist, Victor Shelford, echoed Dice's critique, commenting that the "official adoption" of the life zone concept by the Survey suggests that the question of species' distribution is a "closed subject." Charles S. Kendeigh of

[3] H.S. Swarth, review of *Life Zones and Crop Zones of New* Mexico, by Vernon Bailey, *Condor* 15 (November-December 1913): 232; A. Brazier Howell, "Theories of Distribution—A Critique," *Ecology* 5 (January 1924): 51-53. Also see by Howell, "Agencies Which Govern the Distribution of Life," *The American Naturalist* 56 (September–October 1922): 428-435.

Western Reserve University implied that the life zone concept should be a "closed subject," bluntly stating that Merriam's laws of temperature "cannot be accepted." If the life zone concept is to "survive," then it needs to be based on "the actual distribution of animals and plants," not just theoretical considerations.[4]

Critics of Merriam's life zone concept, as Howell succinctly stated, believed that the distribution of species cannot be "reduce[d] to a formula." There were too many exceptions to develop a general theory of distribution, thus making the life zone concept have little predicative power. Though Merriam's life zone theory was discredited by the 1930s, the basic idea of a life zone was still used by some scientists when describing the relation between a particular region and its characteristic life forms. However, it never regained the prominence it had during the earlier years of the Survey. As H.P. Sheldon, head of the Survey's public relations department, remarked in a 1940 congressional report, the "life zone concept at one time was the object of considerable criticism," but now it is considered "a valuable preliminary to these more detailed [ecological] studies."[5]

The more "detailed" field of ecology and other sciences related to the Survey's work were in their infancy when the bureau took on more responsibilities in the 1900s. When the Survey mapped the flora and fauna of the continent, it worked within the established field of taxonomy, but for the Survey's

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[4] L.R. Dice, "Life Zones and Mammalian Distribution," *Journal of Mammalogy* 4 (February 1923): 39-47; Victor Shelford, "Life Zones, Modern Ecology, and the Failure of Temperature Summing and Life Zones," *The Wilson Bulletin* 44 (September 1932): 153; and Charles Kendeigh, "A Study of Merriam's Temperature Laws," *The Wilson Bulletin* 44 (September 1932): 129-143.
[5] Howell, "Theories of Distribution—A Critique," 53; and Senate Special Committee on the Conservation of Wildlife Resources, *The Status of Wildlife in the United States. Report... Pursuant to S. Res. 246*, 76th Cong., 3rd sess. (1940), 82.

new regulatory roles involving killing predators and protecting wildlife, the relevant sciences were undeveloped or not established. For example, with the founding of the Ecological Society of America in 1915, ecology emerged as a distinct science, but its early focus was on plant ecology rather than animal ecology. An important discipline for the Survey, game management, was not a recognized field of study until 1933, when Aldo Leopold founded a program at the University of Wisconsin and wrote a pioneering textbook. Range management was emerging as a discipline—state agricultural experiment stations conducted research in the 1900s and the University of Montana established a program in 1916—but the relation between livestock and game animals on public lands was not part of the field's early focus. Ethology, the study of animal behavior, was developing in the early twentieth century, but its most important practitioners were European, and its focus was not on wildlife and game management. Ornithology was a recognized science, but in the early twentieth century, it consisted of a mix of professional scientists and amateurs and tended to concentrate on the observation and description of exotic species. Conservation biology was not on the horizon, as it developed later in the twentieth century.[6] As

[6] For ecology in general, see: Peter J. Bowler, T*he Norton History of the Environmental Sciences* (New York: Norton, 1992), chapters 10-11; Robert P.McIntosh, *The Background of Ecology: Concept and Theory* (New York. Cambridge University Press, 1985). For animal ecology, see Edwin M. Banks, "Walter Clyde Allee and the Chicago School of Animal Behavior," *Journal of the History of Behavioral Sciences* 22 (1985): 345-353; and Gregg Mitman, *The State of Nature: Ecology, Community, and American Social Thought, 1900-1950* (Chicago: University of Chicago Press, 1992). For plant ecology, see: Ronald C. Tobey, *Saving the Prairies;* and Sharon E. Kingsland, *The Evolution of American Ecology*. For ethology, see Richard W. Burkhardt, Jr., *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology* (Chicago: University of Chicago Press, 2005); and Gregg Mitman and Richard W. Burkhardt, Jr., "Struggling for Identity: The Study of Animal Behavior in America, 1930-1945, in Keith R. Benson, Jane Maienschein, and Ronald Rainger, eds., *The Expansion of American Biology* (New

the Survey was given the increasingly more complex tasks of managing wildlife and controlling predators and rodents, its lack of a firm scientific foundation became more obvious, and scientists and important members of the bureau began to question some of the underpinnings of its work. These scientists came to realize that nature was much more unpredictable than the fixed and orderly nature implied in Merriam's life zones theory.

An awareness of the unpredictability of nature can be seen in challenges to conventional thinking about the relationship between predators and prey—challenges with implications for the Survey, since predator control became an essential responsibility for the Survey after 1915. The deer "irruption" on the Kaibab Plateau seemed to solidify the growing conventional wisdom: in the absence of predators, a prey species will multiply and overtax its environment by denuding the vegetation. However, this understanding—predators as a check on the potential overpopulation of a prey species—was questioned by scientists, especially Paul Errington and Herbert Stoddard. Similar to Howell's insight that species' distribution "cannot be reduced to a formula," the attack on the traditional understanding of the predator/prey relationship also defied a formulaic analysis.

Brunswick, New Jersey: Rutgers University Press, 1991), 164-194. For ornithology, see: Mark V. Barrow, Jr. *A Passion for Birds: American Ornithology after Audubon* (Princeton: Princeton University Press, 1998). For range management, see: Division of Range Research, Forest Service, United States Department of Agriculture, "The History of Western Range Research," *Agricultural History* 18 (July 1944): 127-143; C.H. Wasser, "Early Development of Technical Range Management, 1895-1945, *Agricultural History* 51 (January 1977), 63-77, and Maarten Heyboer, "Grass-Counters, Stock-Feeders, and the Dual Orientation of Applied Science: The History of Range Science, 1895-1960," (Ph.D. diss., Virginia Polytechnic Institute and State University, 1992).

Paul L. Errington, a non-Survey ecologist, conducted a landmark study of the bobwhite quail. His conclusions demonstrated that prior understanding of predator/prey relations was misleading. He was dissatisfied with current field studies and food habits research, studies that were helpful but did not explain the cause of fluctuations in animal populations. To examine this problem of changing numbers in animal populations, Errington tracked population changes in the bobwhite quail over a four-year period in Minnesota, Iowa, and Wisconsin. His findings defied the orthodox explanation that predators had a large influence in determining population levels of prey. Predators, though they kill individual animals, did not determine the numbers of prey in a given population. The more important consideration was carrying capacity: if the number of individuals of a prey species increases and exceeds the carrying capacity, then they become vulernable to predation. The prey species in an environment with an overtaxed carrying capacity would probably die anyway—with or without the presence of predators. Errington concluded that "the predators consumed mainly an ill-situated surplus. Material predation upon bob-white was rather a symptom of species vulnerability than a factor responsible for… the low or precarious population densities…."[7]

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[7] Paul L. Errington, "Vulnerability of Bob-White Populations to Predation," *Ecology* 15 (April 1934): 110-127. For Errington's thoughts on predators, see his *Of Predation and Life* (Ames: Iowa State University Press, 1967). For an overview of his life and work, see: Robert E. Kohler, "Paul Errington, Aldo Leopold, and Wildlife Ecology," *Historical Studies in the Natural Sciences* 41 (spring 2011): 216-254. Scholars have also pointed out that Errington was one of the first scientists to appreciate the ecological importance of wetlands. See: James A. Pritchard, Diane M. Debinski. Brian Olechnowski, and Ron Vannimwegen, "The Landscape of Paul Errington's Work," *Wildlife Society Bulletin* 34 (December 2006): 1411-1416. For Errington's understanding of wetlands, see: Paul Errington, *Of Men and Marshes* (New York: MacMillian, 1957). For a

Errington sensed that his conclusion was counter-intuitive. In a separate essay, he created a hypothetical situation in which the reader is attempting to determine the causes of losses in the quail population. After demonstrating to the reader that the great horned owl *(Bubo virginianus)* "possibly kills more quail in the north-central States than all other wild predators together," Errington stated: "The reader may conclude, at this point, that the case against the horned owl as a quail enemy appears rather settled...." Further, the reader then learns that there are many horned owls that consume about one quail a week and will continue to do so through the winter and into the following spring. Due to the destruction inflicted on the quail population, "in all probability, some action would be forthcoming" against the horned owl. However, this "action"—an allusion to predator control—would be wrong. Continuing with his hypothetical example, Errington offered his unorthodox conclusion:

> Suppose then, that some person said that, so far as quail conservation was concerned, the owls might as well have been left in peace; and that, for all of the owls killed, there probably would not be appreciably more quail surviving the winter than there would have been otherwise and that the figuring did not mean a thing? It may not sound like good old-fashioned horse sense, but such a person would stand an excellent chance of being right on all counts.

Although this hypothetical person might be "right on all counts," Errington attached several caveats to his argument. He studied only one particular region, and "it does not necessarily typify predator-prey relationships, though some others [regions] seem to be similar. Other relationships are apparently quite

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discussion of changing attitudes and practices associated with wetlands, see: Hugh Prince, *Wetlands of the American Midwest: A Historical Geography of Changing Attitudes* (Chicago:

different; still others consistently defy scientifically acceptable analysis; and, of countless others, it can only be said that virtually nothing is really known of them."[8]

Errington's comment that some relationships "defy scientifically acceptable analysis" seemed prophetic in reference to the collaborative work he did with H.L. Stoddard, a Survey scientist who also studied the bobwhite quail.[9] In a jointly-authored paper, Errington and Stoddard noted some puzzling findings: "Especially intriguing and difficult to explain have been the apparent differences in influence of predation on bobwhite population levels at opposite extremes of its geographical range." Stoddard studied the bobwhite in the Southeast and found a different pattern of predator/prey relations, as "the pressure of certain vertebrate predators upon the bobwhite especially in summer could be severe enough to depress populations below levels that could be maintained when these predators had been reduced." Errington, studying the north-central states, did not find this level of intense pressure from predators. The authors admitted that the causes of these regional differences "are still obscured by unknowns to permit full explanation," but they offered some tentative possibilities. They suggested that

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University of Chicago Press, 1997).

[8] Paul L. Errington, "What is the Meaning of Predation," *Annual Report of the Smithsonian Institution for 1936* (Washington: Government Printing Office, 1937): 243-252.

[9] Stoddard's most notable contribution to the predator/prey question resulted from an effort to arrest declining quail on privately owned land in Georgia. The project was supervised by the Biological Survey and led to the publication of Stoddard's *The Bobwhite Quail: Its Habits, Preservation, and Increase* (New York: Charles Scribner's Sons, 1931). Stoddard also wrote a personal memoir: *Memoirs of a Naturalist* (Norman: University of Oklahoma Press, 1969). For Stoddard, see: Albert G. Way, "Burned to Be Wild: Herbert Stoddard and the Roots of Ecological Conservation in the Southern Longleaf Pine Forest," *Environmental History* 11 (July 2006): 500-526.

there are three different levels of predation, ranging from no influence, to occasional influence, to strong influence. These different levels often reflected differing "local circumstances." In the Southeast, an influential "local circumstance" was the high degree of variability in the cotton rat population, a rodent consumed by many predators in the region. The increase of cotton rats drew more predators, and these predators then "destroy many quail incidentally." Thus, the greater variability of the southeast bobwhite quail was pegged to swings in the cotton rat population. The authors, however, were still not completely satisfied with this conclusion: "All in all predator-prey relationships in the north central region appear to be characterized by vastly more leeway than they do in the southeast. Just why this is should be the case we cannot say with any certainty."[10]

Errington's acknowledgment of the lack of certainty was reflective of a growing sense of uneasiness among both Survey and non-Survey scientists about prior assumptions about the predator/prey relationship. A growing, albeit limited, appreciation of predators, spearheaded by Aldo Leopold, encouraged important members of the Survey to reevaluate their understanding of nature and the Survey's role in predator control and the management of wildlife.[11] Although

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[10] Herbert L. Stoddard and Paul L. Errington, "Some Modifications in Predation Theory Suggested by Ecological Studies of the Bobwhite Quail," in *Transactions of the Third North American Wildlife Conference* (Washington: American Wildlife Institute, 1938), 736-740.

[11] Leopold's change of thought about predators and his roles in the developing field of game management are examined in Susan L. Flader, *Thinking Like a Mountain: Aldo Leopold and the Evolution of an Ecological Attitude toward Deer, Wolves, and Forests* (Columbia: University of Missouri Press, 1974); and Curt Meine, *Aldo Leopold: His Life and Work* (Madison, Wisconsin: University of Wisconsin Press, 1988). The National Park Service's Adolph Murie, brother of Olaus of the Survey, also played an important role in fostering a more favorable view of predators,

scientists in the mid-1920s questioned and debated the need for predator control, by the early 1930s, some supporters of predator control became apprehensive over the killing of so many animals, especially in view of the growing realization that the understanding of the predator/prey relationship—and nature in general—was imperfectly understood.

One unlikely apostate from predator control orthodoxy was former Chief C. Hart Merriam. In the early 1900s, he had the Survey assist states and stockmen in a massive reduction of prairie dogs. His 1907 yearly report called for the "destruction" of animals such as "wolves, coyotes, panthers, and other carnivorous animals" that threaten the western range and wildlife in the national forests. Furthermore, he had the Survey assist the Forest Service in predator control well before the Survey had its own program. For Merriam, predator control would provide an opportunity to demonstrate the Survey's commitment to practical work. Despite his past support for predator control, by 1932, he had reservations. He wrote a letter to the *Journal of Mammalogy*, stating that "in certain places and at certain times," predator control is necessary, but "when it comes to employing upward ***of three hundred men*** to distribute poisons broadcast over vast areas, I must confess that my sympathy is with the animals."[12]

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especially the wolf. See: Timothy Rawson, *Changing Tracks: Predators and Politics in Mt. McKinley National Park* (Fairbanks: University of Alaska Press, 2001).

[12] Susan Jones, "Becoming a Pest: Prairie Dog Ecology and the Human Economy in the Euroamerican West," *Environmental History* 4 (October 1999): 541; Department of Agriculture. *Report of Chief of the Bureau of Biological Survey, 1907* (Washington: Government Printing Office, 1908), 487; and C.H. Merriam, Letter to the Editor, *Journal of Mammalogy* 13 (February 1932): 97. Emphasis in the original.

Another Survey member who had "sympathy" for the animals was Chief Naturalist Vernon Bailey, even though he had been a strong advocate of predator control. Not only was Bailey a staunch supporter of the organization's predator control program during the height of the controversy, but he also had authored the early Survey instructional literature on killing wolves.[13] However, Bailey had another side, one that was concerned about animal suffering, even though he acknowledged that animals have to be killed. His humanitarian temperament was evident in his relatively early days with the Survey. For example, a couple of years before he scribed his manual on killing wolves, he wrote to Merriam, then director of the Survey. Bailey suggested that, if a wolf cannot be killed in less than three minutes, then it should not be terminated. His letter prompted a caustic reply from Merriam: "You had better go at once to the hospital…where you can find a good medical expert and have your head examined. … Inasmuch as no sane man could possibly make such an absurd and utterly preposterous statement as this you are obviously in need of mental treatment."[14]

The predator control controversy may have stirred a deeply-rooted humanitarian ethic in Bailey. In the 1930s, he perfected his "humane trap," a device that captured animals and allowed for their transport without injury.[15] Around the same time, Bailey, in the margins of a photograph of a wolf mangled

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[13] Vernon Bailey, *Wolves in Relation to Stock, Game, and the National Forest Reserve* (Washington: U.S. Dept. of Agriculture, 1907).
[14] Merriam to Bailey, 19 May 1906. Vernon Bailey papers, 1828-1958, Collection Number 00554, American Heritage Center, University of Wyoming (hereafter, Bailey Papers, Wyoming), Box 2, Folder 9.
[15] Vernon Bailey, "Humane Traps," *Nature Magazine* (February 1934): 88+. Bailey earned accolades and an award from the American Humane Association for the development of the trap.

by a trap, made the following comment: "Yes, he is a predator, but did he deserve this?"[16] Furthermore, in a 1936 department memorandum, Bailey expressed reservations about the future of predator and rodent control. He claimed that "no species or group can be wholly condemned," although he did allow for some predator and rodent control. However, "only in extreme cases are extensive control measures necessary and generally the farmers can easily keep down troublesome species on their own land. In most cases extermination of any of the smaller rodents is as impossible as it would be undesirable, and in moderate numbers they are practically harmless and often of considerable interest and value." In reference to larger predators, only coyotes exist in "abundance," but "they are of little consequence except where sheep are not well herded." Coyotes also have a beneficial function in "checking the overabundance of rabbits, ground squirrels, and other rodents."[17] Finally, Bailey gave a glowing review in the *Journal of Mammalogy* to *Wilderness Wanderers* by Lucy and Wendell Chapman. The authors, noted Bailey, advocated studying animals by getting to know them in their natural habitat, "instead of carrying guns and traps and shooting or collecting the animals on sight," the normal method of study employed by many Survey members.[18] Although Bailey did not waver in his defense of the Survey, his

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[16] The photograph is in Bailey Papers, Wyoming, Box 18 Folder 4.
[17] "Memorandum for Mr. Collier," Bailey Papers, Wyoming, Box 8, Folder 5.
[18] Vernon Bailey review of *Wilderness Wanderers,* by Lucy and Wendell Chapman, *Journal of Mammalogy* 18 (August 1937): 374. In praising the study of animals by observing rather than shooting and collecting them, Bailey advocated a position that his wife had made for years. His wife (and sister of C. Hart Merriam), Florence, was also a naturalist. She wrote for a more popular audience than Vernon, but she was well respected and accompanied Vernon on many of his outings. She also had influenced Henry Henshaw, C. Hart Merriam's successor as director of the Survey. Writing a series of short autobiographical essays in *Condor* after he retired, Henshaw,

thoughts on predators indicated that, by the 1930s, he had misgivings about the bureau's policy.

Questions about the predator issue were not limited to Bailey's humanitarian concerns, as the complexity of the predator/prey relationship forced some scientists to realize the limitations of their understanding of nature. For example, J. Stokley Ligon, who initially worked under Bailey, was in charge of predator control in the Southwest in the 1910s and later worked as a game specialist for New Mexico. His early reports to the Survey were brimming with confidence as he predicted the exact time of the wolf's extinction in the Southwest. He even implied an intimate knowledge of the wolf's dietary preferences: "It is a well known fact," he declared, that wolves eat meat "constantly—cattle, horses, or sheep, but they eat the very best obtainable and generally want it fresh."[19]

However, this assured understanding of the reviled predator, the wolf, was missing when Ligon was asked a question about the mountain lion, another predator usually looked upon with disfavor. In 1937, Frank C. Hibben of the University of New Mexico asked Ligon to review his manuscript on the mountain lion. Not surprisingly, Ligon defended predator control. When addressing

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referring to Florence Bailey's belief that live animals, not "stuffed specimens," should be studied, commented: "Though a late, I am a sincere, convert to her creed, so far as my personal practice goes, and for a number of years I have found it impossible to kill birds, or, indeed, to take the life of any living creature." Henry Wetherbee Henshaw, "Autobiographical Notes," *Condor* 22 (March-April 1920): 55-60. For Florence Bailey's thought on the study of animals, see the first chapter in Harriet Kofalk, *No Woman Tenderfoot: Florence Merriam Bailey, Pioneer Naturalist* (College Station: Texas A&M Press, 1989).

[19] J. Stokley Ligon, "1916: Annual Report: Predatory Animal Control, New Mexico-Arizona District, United States Bureau of Biological Survey," in Rick McIntyre, ed., *War against the Wolf: America's Campaign to Exterminate the Wolf* (Stillwater, Minnesota: Voyageur Press, 1995), 179. For background on Ligon, see: David E. Brown, *The Wolf in the Southwest: The Making of an Endangered Species* (Tucson: University of Arizona Press, 1992), 46-54.

fluctuations in the numbers of mountain lions, however, he seemed puzzled: "Just why mountain lions do not or formerly did not become more numerous under favorable conditions is difficult to understand." He extended this conundrum to other species: "This is a big and intricate question. Just why the duck hawk with apparently few enemies and an able killer, does not occur in greater numbers is a puzzle to ornithologists."[20] While there is no evidence of Hibben's reaction to Ligon's comments about the difficulty in understanding animal populations, Hibben's study of the mountain lion reflected much uncertainty and hesitancy to generalize. For example: "More and more, as we go into the life history of the lion with attention to first one individual and then another, it is evident that the variance between single lions is very great. We cannot be too positive upon any one point, for, as sure as a definite rule is laid down, there will crop up an exception."[21]

The possibility of an "exception" making a "definite rule" and generalization problematic was a frequent topic at talks given by Ira Gabrielson, another survey member who expressed disapproval of past predator and rodent control policy. Gabrielson was the most improbable critic of Survey policy. He became director

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[20] Stokley Ligon to Frank Hibben, 25 March 25 1937. J. Stokley Ligon Papers, CONS92, Conservation Collection, The Denver Public Library (hereafter, Ligon Papers), Box 1, Folder 7.
[21] Frank C. Hibben, *The University of New Mexico Bulletin: A Preliminary Study of the Mountain Lion* (Albuquerque: University of New Mexico Press, 1937), 37. More specifically, Hibben attempted to ascertain the condition of deer that were killed by mountain lions. Hunters had claimed that the mountain lion killed the best, healthiest deer, while "the more radical of the conservation interests" argued that the "lion could and did kill only the weak deer." Along with the New Mexico Game Department, Hibben examined in great detail eleven deer killed by mountain lions. All eleven seemed to be more characteristic of the "unfit," not the healthiest deer the hunters had claimed. Nonetheless, Hibben was reluctant to draw too firm of a conclusion: "The fact that, of the eleven deer, all showed abnormal or subnormal characteristics is almost too complete to be mere coincidence, yet coincidence it may be."

of the Survey in 1935, a role that required defending and promoting policy. Furthermore, earlier in his career, he was involved in predator control, and in 1931, he temporarily resigned from the American Society of Mammalogists, because the Society had disapproved of the Survey's predator control policies. Despite this past commitment to predator control, Gabrielson voiced several critical points, even admitting to Congress that farmers and ranchers sometimes "blame all their losses on predatory animals while a portion of such losses may be due to other causes," a startling admission, given the Survey's tendency to quote the stockmen's estimates of damage to livestock from predators.[22]

As director of the Survey, Gabrielson gave talks at various civic and business organizations, conservation associations, and regional Survey branches. His speeches generally promoted conservation, an important part of the New Deal, since conservation was linked to aiding farmers and improving the economy. Gabrielson also explained the work of the Survey, including predator control. His most frank criticism was given at a talk before the Survey's Division of Predator Control in Denver, 1941. The distance in time from the height of the predator controversy and an audience committed to predator work allowed the chief to speak openly.

Gabrielson began by illustrating the Division of Predator and Rodent Control's prior disproportionate influence in the Survey. In 1931, the Division

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[22] Thomas R. Dunlap, *Saving America's Wildlife* (Princeton: Princeton University Press, 1988), 59. House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1940*, 76th Cong., 1st sess. (1939), 773.

received seventy-five percent of the Survey's funds but only ten percent by 1941. "The Predator and Rodent Control Division is no longer the tail that wags the dog, as it was for many years." The Division's influence was felt in other ways. Many in the Division believed that they "were the best in the Service," a belief that "occasionally" resulted in "a feeling of smug superiority." Furthermore, since other Survey departments were under-funded, the Division often "offered the greatest opportunities to gain administrative experience" and move up in the hierarchy.[23]

Gabrielson's most pointed criticism was directed at the Survey's methods and eagerness to engage in predator control. He admitted that, "Undoubtedly one of the earliest and greatest mistakes that the Biological Survey made in starting control work was in not finding out definitely in each case just how much justification there was for it." For some cases, there were "good reasons for the work," but for others, there were "definite limitations on the extent to which it [predator control] should be carried." The Survey "worked by rule-of thumb methods," resulting in the accomplishment of an "immediate objective," but often at the expense of the "ultimate effects upon the species being controlled [and] upon other forms of wildlife…." Additionally, there was a tendency to "overemphasize the importance of predator control in relation to game species." Gabrielson, reflecting Hibben's thoughts on the limitations of making a "definite

[23] Ira N. Gabrielson, "Predatory Animal and Rodent Control Policies," talk given at the Division of Predator and Rodent Control Conference, Denver, Colorado, September 9-12, 1941. Gabrielson Papers, Denver, Box 7, Folder 12.

rule," commented that "some of us have been a bit careless in reasoning from specific instances to general conclusions."[24]

In acknowledging the difficulty of generalizations, Gabrielson echoed other ecologists who found that nature was too variable to be easily categorized. He also drew upon new ecological insights when suggesting that the relation between livestock and predators needed to be rethought. Alluding to Errington's work, Gabrielson remarked that, in all likelihood, predators do not threaten the long-term viability of a species. Thus, the relation between livestock and predators "is not a biological problem, but one in economics and social relationships . . ." For example, biologically, a predator such as the coyote might reduce a sheep population for any given year, but the sheep will probably soon rebound; there is no threat of extinction. Socially and economically, however, "the removal of a very few animals from the flock can and often does so reduce the margin of profit for the owner of the sheep that his family cannot live on what is left."[25]

There was more to Gabrielson's rethinking besides his recasting of the predator question from a biological to a social and economic problem. Similar to Errington, Gabrielson realized that studying predation defied easy conclusions. For example, the Survey conducted a study of crow-waterfowl relations in an attempt to determine the percentage of waterfowl eggs destroyed by crows. The Survey began studies in Canada and then on the Lower Souris Migratory Waterfowl Refuge in North Dakota. The studies' results from these two locations

[24] Ibid., 3-4.
[25] Ibid., 4-5.

contrasted sharply. In Canada, crows destroyed thirty-one percent of the duck nests under observation, while the figure for the Lower Souris was fewer than two percent. The study found more variation. In 1936, in the Lower Souris, the majority of the damage came from skunks, but in 1937, foxes played the more destructive role. Gabrielson concluded: "These studies made evident the danger of sweeping generalizations to justify control operations for the betterment of game. They also indicate that treatment of the control problem may have to be varied not only in different areas but even in the same areas in successive years, depending on the numerical fluctuation and drift of the animal populations."[26]

Gabrielson's caution in drawing definitive conclusions reflected scientists' growing awareness of nature's variability and complexity. As the study of predation on the waterfowl of the Lower Souris suggests, when a generalization was made, new data made it necessary to qualify the generalization. The Lower Souris example also indirectly called into question assumptions about the Survey's view of the animal world. The Survey's early understanding of species had a simple formula: if the species was beneficial to agriculture, then it was a "good" species, but if it was injurious to agriculture, then it was a "bad" species. The good/bad dichotomy was easily extended to categorize some animals as harmful predators and other animals as wildlife in need of protection from predators. However, the Lower Souris fox confounded this simple dichotomy:

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[26] Department of Agriculture. *Report of Chief of the Bureau of Biological Survey, 1937* (Washington: Government Printing Office, 1938), 20. See also the *Report of the Chief* for the following year for a discussion on fluctuations in animal populations, p. 18. For a more detailed explanation, see: E.R. Kalmbach, "A Comparative Study of Nesting Waterfowl on the Lower

was it a good species in 1936 that "went rogue" in 1937 by destroying duck nests? Ecological studies from the 1930s increasingly challenged such simple dichotomies. As Survey biologist Walter P. Taylor remarked, scientists must "surrender the cherished idea that wild creatures generally, and in their native habitats, are either wholly good or wholly bad."[27]

Scientists challenged a related "cherished idea" held by many Survey members. the good bird/bad bird dichotomy. They asked whether the so-called good birds were actually beneficial. It was assumed that certain birds, because of their insect-eating proclivity, were a boon to agriculture. Therefore, the Survey, during its entire duration, used stomach analysis to determine which birds aided or hurt agriculture. Some Survey scientists suggested that stomach studies needed to be supplemented with field studies to determine whether the birds actually prefer the food found in their stomachs. It was possible, they argued, that the birds eat certain foods out of convenience or when their normal food supply was inadequate.[28] Although the Survey debated different methods of investigation, the notion that the good birds aided agriculture was generally accepted.

Studies beginning in the late 1920s, however, cast doubt on the seemingly well-established doctrine of avian benefits. These studies did not suggest that the good bird/bad bird division was incorrect; instead, they argued that the good birds

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Souris Refuge: 1936-1937," in *Transactions of the Third North American Wildlife Conference* (Washington: American Wildlife Institute, 1938), 610-623.

[27] Walter P. Taylor, review of *The Life Histories and Ecology of Jack Rabbits* by Joseph Grinnell, *Journal of Mammalogy* 15 (August 1934): 259-272.

[28] For example, see the Department of Agriculture. *Report of Chief of the Division of Biological Survey,* (Washington: Government Printing Office) for the following years: 1898 (p. 40); 1899 (p. 61); and 1903 (p. 483).

produced only minimal benefits for agriculture. The authors of these studies realized that their work was iconoclastic. For example, C.N. Ainslie disputed "the general and popular view" that "bugs eat the gardens and the birds dispose of the bugs and save vegetation, consequently the birds are the salvation of the gardeners and farmers." His point was simple: insects are a problem when they rapidly proliferate, but birds do not multiply quickly enough to provide a check on the explosion of insect populations; a stable population of birds can consume only so many insects. He concluded that birds "can seldom be depended on, unaided, to rid us of our insect enemies."[29]

Another scientist, E.H. Strickland, provided a more intricate analysis. He, too, was aware that his studies contested established views: "Extravagant claims are made regarding the financial debt that we owe to birds in their role of saving our crops from complete destruction by insects. Few of these claims can be supported by facts." Strickland hypothesized that there must be something else controlling insect populations besides the "somewhat hit-and-miss attacks that are made upon them by birds." The controlling agent, Strickland found in his study of cutworms, was a parasite that infected the cutworm, an insect normally consumed by birds. Timing was the key: "By the time the birds capture and destroy the majority of their complement of cutworms, well over half of them are already parasitized."

[29] C.N. Ainslie, "The Economic Importance of Birds as Insect Predators," *The Wilson Bulletin* 42 (September 1930): 193-196.

Thus, many of the cutworms would have died anyway, with or without the presence of their avian attackers.[30]

The realization that birds might not provide great benefits to agriculture was welcomed unevenly by Survey members. For example, in his 1939 classic, *The Migration of American Birds,* Frederick C. Lincoln, the Survey's ornithological authority, stated that "the student of migration...knows most of the migratory species are an aid to the farmer in the control of weed and insect pests...."[31] On the other hand, Gabrielson and Ding Darling, director of the Survey from 1934-1935, had reservations about the alleged benefits of birds. Gabrielson had sent a manuscript of a book on conservation to Darling for review. Darling replied:

> I noted with satisfaction that you do not think it practical to do away with the Bureau of Entomology and substitute for it a lot of birds to consume the insects. The over-emphasis on the subject of birds as insect exterminators has been one of the serious practical mistakes of the bird conservationists. That is one reason why the farmer looks upon the Audubon Society as a bunch of nuts and I highly endorse your debunking statement.[32]

W.L. McAtee, in charge of food habits research and the Survey scientist most directly connected to the question of avian benefits, agreed that birds have a minor role in controlling insects. However, he was concerned that the above studies would have an "unwarranted" influence on the general population, as they

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[30] E.H. Strickland, "Can Birds Hold Injurious Insects in Check?" *The Scientific Monthly* 26 (January 1928): 48-53.

[31] Frederick C. Lincoln, *The Migration of American Birds* (New York: Doubleday, Doran & Company, Inc., 1939), 1.

[32] Ding Darling to Ira Gabrielson, Gabrielson Papers, Denver, Box 1, Folder 20. Darling's comment on farmers and the Audubon Society alludes to a long-standing tenet of the Survey that was shared by the Audubon Society. The Survey, especially in its earliest years when it emphasized the practical benefits of its work, wanted to "correct" the views of farmers. Many farmers believed birds were destroyers of crops rather than destroyers of insects.

might conclude that parasites, not birds, played a more important role in destroying pesky insects.[33]

Questions concerning predation—the Survey's predator control policies and the insect-eating ability of birds—forced Survey members to reevaluate prior assumptions and understanding of the role of predators. Nature, it seemed, was not quite as simple as the dichotomy of good and bad species and the self-regulating balance of predator and prey. Generalizations became increasingly more problematic as scientists discovered more variation in nature, thus forcing them, at times, to acknowledge the limitations of their understanding. This process of recognizing shortcomings in knowledge continued throughout the 1930s, as other issues—the reliance on non-scientists for data gathering, the difficulty of studying avian populations, a reevaluation of the importance of the collection of specimens, and the management of wildlife—created more uncertainty in scientists' comprehension of the workings of nature.

From the very beginning of the Survey, non-scientists, especially farmers, participated in the Survey's efforts to gather data. Usually, the information collected from circulars sent to farmers helped with the identification of beneficial or injurious species. This information was not as politically-charged as the information sought by the Survey from non-scientists in the 1930s. As the Survey's work expanded, its newer roles—predator control and the management

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[33] W.L. McAtee, "Control of Insects by Birds," *The Wilson Bulletin* 43 (March 1931): 28-29. See also from McAtee, "The Economic Status of Flocking Birds," *Condor* 48 (January-February 1946): 29-31; and "Wherein Lies the Economic Value of Birds?" *Auk* 62 (January 1945): 149-151.

of wildlife—required information acquired from non-scientists that touched on more controversial issues. Data collection, which in principle should be politically neutral, was increasingly influenced by the controversies the Survey became entangled in during the 1930s. The possibility that these data were not neutral compounded the difficulties of understanding nature and man's influence on nature.

One source of information generated by non-scientists was the number of animals killed by trappers employed by the Survey. At the 1930 "Symposium on Predatory Animal Control," a scientific conference held at the Museum of Natural History in New York, Joseph Dixon of the University of California and A.B. Howell of Johns Hopkins University discussed possible misinterpretations of the trappers' data. Although trappers intended to capture coyotes and bobcats, other non-predators often became victims of their traps. These animals, since their pelts did not have a high market value, were not recorded by the trappers. The "trappers claim that it is a loss of valuable time to skin them; and if they are not skinned they never appear on the official records."

Howell and Dixon also argued that stomach contents analysis—a mainstay of Survey research—could be misleading. They pointed out that trappers often use the remains of game birds for bait. When the stomachs of the bobcats that took the bait were examined, the stated result of the contents was: "Game: 100%." Therefore, a "great injustice is liable to be done the bobcat," because the content of the bait was not considered in the stomach analysis, thus making the bobcat

seem more injurious to game than it was. The authors reached the same conclusion in reference to trappers' use of "old horses" for coyote bait. Dixon also pointed out that his own analysis of bobcats' stomachs indicated that the predator was not as injurious as the trappers' data suggested.[34]

Olaus Murie, biologist for the Survey, echoed the concerns of Dixon and Howell in a confidential letter sent to W.C. Henderson, Associate Chief of the Survey in 1931. Murie claimed that "for years we have relied considerably on the information of hunters, trappers, stockmen, sportsmen, guides and anyone who happens to profess interest in wildlife." While some Survey members looked forward to acquiring data from hunters and trappers, Murie noted that, "time after time I proved that certain information so gathered was false." In the field, Murie observed that hunters employed by the Survey were very efficient "in the pursuit of the coyote," but they did not have "the slightest interest in the broader phases of conservation of wildlife." Since these hunters conveyed false and misleading information and made contact with the public through newsletters, speeches, and sportsmen's associations, Murie was worried about their influence on the public's perception of predators. To generate support for their work, trappers and hunters had incentives to make the predator threat seem more menacing than it was; the

[34] The exact figures for Dixon's study of the bobcats stomach contents are, "from man's standpoint," 50 percent beneficial, 33 percent injurious, and 17 percent neutral. See: Joseph Dixon, "Fur Bearers Caught in Traps Set for Predatory Animals," *Journal of Mammalogy* 11 (August 1930): 373-377. Three years after the conference, Charles C. Sperry published a similar analysis of the coyote, suggesting that it also was not as harmful to human interests as the trappers' data implied. Charles C. Sperry, "Winter Food Habits of Coyotes; A Report of Progress, 1933," *Journal of Mammalogy* 15 (November 1934): 286-290.

data they produced reflected those incentives and compounded the difficulties of understanding nature and the predator/prey relationship.[35]

Another perplexing issue that also relied on non-scientists to furnish data was the study of bird population estimates and migratory patterns. The Survey began population studies in the early twentieth century, a time when concern over the decline in bird populations partly inspired the Lacey Act and the first federally authorized bird sanctuary at Pelican Island. The Survey utilized data from non-scientists and encouraged them to participate in the data compilation process.[36] For example, E.W. Nelson, assistant to the chief of the Survey in 1915, solicited aid from the readers of *The Condor* to gather data for a national bird census. Acknowledging that the Survey "has no funds available" for the census, Nelson appealed to the journal's readers: "Anyone familiar with the birds nesting in his neighborhood can help, more particularly as only about the equivalent of one day's work is needed." Despite Nelson's assurances, the requested task was not necessarily easy, especially for a non-specialist. Nelson explained the requirements:

> The general plan is to select an area containing not less than 40 nor more than 80 acres that fairly represents the average conditions of the district with reference to the proportions of plowed land, meadowland, and woods, and go over this selected area early in the morning during the height of the nesting season and count the singing males, each male being considered to represent a nesting pair....The morning count should be

[35] Murie to Henderson, 9 January 1931. Olaus J. Murie Papers, CONS90, Conservation Collection, Denver Public Library (hereafter, Olaus Murie Papers, Denver), Box 1 Folder 36.
[36] Department of Agriculture. *Report of Chief of the Bureau of Biological Survey, 1913* (Washington: Government Printing Office, 1914), 227. For a brief discussion of the Survey's early work in bird conservation, see: Arthur S. Hawkins, "The U.S. Response," in A.S. Hawkins et al., *Flyways: Pioneering Waterfowl Management in North America* (Washington: Government Printing Office, 1984), 2-9.

> supplemented by visits on other days to make sure that all the birds previously noted are actually nesting within the prescribed area and that no species has been overlooked.[37]

The use of non-professionals for a bird census created difficulties of interpretation, a problem acknowledged by Associate Chief Henderson while testifying before Congress in 1928 and 1929. "The trouble with questionnaires," he remarked, is that there was no way to judge whether the respondent was a competent observer, and the Survey thus had to decipher "conflicting evidence" from different respondents. Furthermore, the nature of the problem—attempting to survey a mobile population of birds—created difficulties even for professionals. For a trained observer, it was still next to impossible to determine "whether they [woodcocks, a game bird] are on the increase on the Atlantic seaboard, or whether they have merely shifted their line of flight so that they appear to be on the increase; whether, on the other hand, they have shifted their flight a little bit in other places, but are really holding their own." In short, appearances can be deceiving.[38]

Survey ornithologist Frederick Lincoln also realized it was easy to be misled by appearances. He, too, had reservations about the general population's ability to make accurate contributions to a national census, especially as the need for that census became more urgent. By the 1930s, drought, a growing loss of habitat, and increased hunting (with more accurate guns and better roads and cars)

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[37] E.W. Nelson, "A National Bird Census," *Condor* 17 (March-April 1915): 104-105.
[38] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1929*, 70th Cong., 1st sess. (1928), 377-378; House Committee on Appropriations: *Hearing before House Subcommittee on*

jeopardized populations of migratory waterfowl. Despite the potential contributions of lay observers in documenting the decline in waterfowl, Lincoln preferred the use of experts. The problem, according to Lincoln in a conservation talk given in 1935, was that the non-expert tended to inflate the numbers of birds observed. The exaggerated numbers were "not always a deliberate attempt to pad the account." Instead, "we immediately encounter what seems to be a natural quirk of the average human animal and which is the cause of almost endless difficulty. ... the mental effect of these large numbers." On numerous occasions, Lincoln inspected areas from which he received reports from non-professionals. He found that their estimates of population numbers needed to be reduced "anywhere from 50 to 90 percent."[39] Furthermore, according to an editorial in *Bird Lore*, amateur bird watchers tended to take note of rare and exotic species rather than provide accurate numbers of less unusual birds, thus misidentifying alleged novel species.[40]

Lincoln did not abandon the idea of a census. "For practical purposes," a census was possible, but Survey scientists should conduct it. He believed that the newly-created national refuges for migratory waterfowl offered great potential for study. The scientists could estimate the size of the population, determine the carrying capacity of the habitat, and, as the Survey scientists "would be actually living with these birds day after day," observe the behavior of individual birds.

Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1930, 70th Cong., 2nd sess. (1929), 80.

[39] The text of Lincoln's speech is in Gabrielson Papers, Denver, Box 12 Folder 17.

Despite Lincoln's confidence in the possibility of accurate population estimates, he also pointed to problems: "Total loss from night shooting, illegal trapping and other market hunting, and disease is very heavy. . . ." He was more sanguine about estimating losses from regulated hunting, because the sale of duck stamps provided a "fairly accurate check on the number of duck hunters during each season, while from a large series of observations and reports, it is possible to determine the probable average season bag per hunter."[41] Lincoln suggested that if one multiplies this "probable average" by the number of duck stamps sold, then a fairly accurate estimate could be made of losses from regulated hunting.

This seemingly easy formula, however, assumed that the "large series of observations and reports" would provide an accurate estimate of the hunters' bags; it also assumed a certain degree of sportsmanship by the hunters, an assumption contradicted by Johnson Neff's experience in California and by the hunting controversy in the 1930s (see chapter five). Neff, a Survey biologist in charge of bird control in California, along with Federal Game Warden George Tonkin, solicited the aid of hunters in accumulating data about migratory waterfowl. In 1928, Tonkin sent questionnaires about waterfowl to local gun clubs and compiled a directory of these clubs. This endeavor encountered resistance, as "some clubs failed to respond. Some maintained an air of secrecy and did not want to be listed." In 1933, he attempted to expand the listings in the

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[40] Ludlow Griscom, "Modern Problems in Field Identification," *Bird Lore* 38 (January-February 1936): 12-18.
[41] Lincoln, untitled conservation talk, 1935, Gabrielson Papers, Denver, Box 12 Folder 17.

directory, but again, he "encountered resistance."[42] Neff also contacted sportsmen's clubs, but realized that data acquired from hunters might be of limited value: The knowledge of these hunting club members "is largely confined to observations on their own [hunting grounds] or adjoining clubs, or to hear-say evidence." The information thus conveyed may present the duck situation "in an untrue light."[43]

Neff also faced difficulties in the field as he tried to ascertain the numbers and types of species of birds killed by hunters. He sent a letter to Chief Paul Redington, detailing his work of "conferring with state wardens, checking hunter's bags, watching the flight of ducks, and watching shooting practices." He found minimal enforcement of regulations, and bag limit counts were misleading. Hunters "shoot until the flight is over, then cull their ducks and throw the excess into the cat-tails." Thus, even though the hunters' bags may have indicated that they adhered to the bag limits, in actuality, they exceeded the limit. Furthermore, Neff noted that most hunters could not identify which species were on the list of protected birds. He concluded that the "situation is appalling," and "all of the pleas for sportsmanship and moderation appear to have been to no avail."[44]

Given Neff's troubles in acquiring information and cooperation from hunting clubs, it is not surprising that he wrote to Chief Gabrielson in 1935, stating he would solicit information from only "three or four sportsmens organizations with

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[42] Tonkin to Redington, 13 October 1933. Johnson Neff Papers, CONS52, Conservation Collection, Denver Public Library (hereafter, Neff Papers), Box 2.
[43] Neff to Redington, 17 February 1934. Neff Papers, Box 2.
[44] Neff to Redington, 25 October 1934. Neff Papers, Box 2.

whom I am rather intimately acquainted." He did not indicate he would attempt to contact all of the 160 hunting clubs as he did in prior years.[45] Neff also sent a personal appeal to Judge R.B. Whitelaw of El Centro, California, asking him if he had any "sportsmen friends" and "ranch friends who are dove 'fans'" who would be willing to help gather data while they were hunting. In particular, Neff wanted records of dove nests—their abundance, number of eggs, place of location, and time of observation.[46]

Neff's frustration with acquiring data from hunters was evident in his final report that examined changes in the duck population from 1934-1935. He commented that "it is difficult to form a definite conclusion as to the comparative population," since there was a discrepancy between evidence provided by the hunters and his own investigation that measured quantities of food consumed by the ducks. "Judged from the evidence on duck clubs alone the conclusion would have to [be] about a 50% drop [in population] over 1934…" However, his evidence indicated that "the optimum population of the district shows somewhat of an increase over 1934." The discordance in evidence did not bother Neff. He even seemed to welcome it, because if the hunters thought the duck population was in continued decline, they might be more tractable and willing to adhere to regulations. He concluded: "The gun club shooters call this the worst season on record, and few if any of them realize the very large population that came into the valley. This makes the situation somewhat easier to handle than if the hunters

[45] Neff to Gabrielson, 22 August 1935, Neff Papers, Box 2.
[46] Neff to R.B. Whitelaw, 29 August 1935, Neff Papers, Box 2.

realized the situation."[47] After all of Neff's attempts to get information from the gun club members, it is ironic he dismissed them so easily. Quieting recalcitrant hunters overrode the need to acquire data.

Had Neff been able to acquire more data from hunters, there would still be difficulty in interpretation, a problem that beset Survey scientists studying avian habits and migration patterns. Collecting data on ducks and other migratory waterfowl posed other problems besides uncooperative hunters. Frederick Lincoln, for example, found it necessary to state his arguments cautiously, realizing the difficulty of making generalizations: "There seems reason to believe that although the migratory impulse is basally inherited by each individual and that the act of migration is brought about through the operation of a complex series of stimuli, there is, nevertheless, much individual variation in the effectiveness of the physiological and seasonal rhythms that actually initiate the movement." Lincoln found that some birds do not respond to changes in the seasons and that there was no clearly identifiable characteristic, such as age or sex, that distinguished these birds from other birds. He also attempted to ascertain whether birds repeat the same migratory patterns on a regular basis. Once again, his conclusion cautioned against over-generalization: "An individual bird *usually* behaves the same way in successive seasons. The word 'usually' must be emphasized, as there are cases sufficient to prove that no hard and fast

[47] Untitled report, Neff Papers, Box 2.

law can be established to account for the migratory movements of any one individual bird."[48]

Lincoln continued this cautious assessment of bird behavior by referring to a study by Margaret Nice, a non-Survey ornithologist. Nice studied the migratory behavior in different generations of the song sparrow, attempting to determine whether the behavior is inherited. She found no discernible pattern. Some "resident" (non-migratory) fathers had both resident and migratory sons, while some migratory fathers also had both resident and migratory sons. Some of the offspring changed their pattern from resident to migratory and from migratory to resident. From Nice's work, Lincoln theorized that migratory behavior might be recessive, appearing in one generation and disappearing in another. He also speculated that changes in the environment were responsible for changes in the birds' behavior: "A slight change in the climate, in the nature of the food supply, or even in the physiological condition of the individual bird at the time migration would normally take place would be the deciding factor in any particular season."[49]

Lincoln's cautious conclusions reflected the difficulty of making generalizations. Even when data about migrating populations were available, the variation and diversity of nature made it difficult to arrive at firm conclusions. This difficulty was compounded when the data were suspect—possibly biased by individuals such as trappers or hunters who wanted the data to be interpreted in a

[48] Frederick C. Lincoln, "The Individual vs. the Species in Migration Studies," *Auk* 56 (July 1939): 253.

particular way or who were reluctant to respond to requests for information. Data might also be unreliable because the non-scientists who assisted in data collection often did not have the specialized knowledge to make accurate assessments. These quandaries in compiling data increased the difficulty of discovering patterns in nature.

Some scientists, both within and outside of the Survey, believed that there was a more fundamental problem that hindered the discovery of nature's patterns. The Survey's past emphasis on mapping the distribution of flora and fauna created an enthusiasm for collecting specimens, especially if the specimen was unknown to science or challenged prior understandings of a species' taxonomic status. The accumulation of specimens was in accord with the mission of the early survey, as much of the continent was only superficially mapped, surveyed, and known to scientists. Furthermore, the collection and analysis of specimens illustrated Merriam's life zone theory and became an integral component of the *North American Fauna* series. Although the desire for specimens resulted in the gathering of essential factual information, some scientists argued that it was done at the expense of discovering larger patterns in nature. Furthermore, an emphasis on individual specimens could divert scientists away from studying relationships between organisms. By the 1930s, the limitations of mapping and the collection of specimens were noted by game management specialist Aldo Leopold and Survey biologists Olaus Murie, W.B. Bell, and Walter P. Taylor.

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[49] Ibid., 253-254.

Well before the 1930s, however, biologist Clarence M. Weed also recognized the danger of placing too great an emphasis on collecting and mapping. Weed, in an 1891 essay, examined the roles of state biological surveys that, like the Survey, mapped flora and fauna. He singled out Illinois as the only state that met several criteria, such as adequate facilities and trained experts, for scientific success. He praised the Illinois Survey's study of the state's organisms, because it "is not to be a mere catalogue of forms, but is to include the investigation and discussion of the relations of the organisms to each other and to agriculture."[50]

This "mere catalogue of forms," however, was often valued by the Survey, especially if it involved the discovery of a new specimen that would be catalogued. Chief Edward Nelson realized that Survey field naturalists highly valued collecting specimens, often at the expense of other methods of investigation. Thus, in a memorandum to the scientists in the field, he instructed them to take note of mammals' breeding habits, communication ability, and social behavior. Specimen collection, however, should be kept to a minimum. Rare or very young specimens were desired, but in general, he stated that the Survey's collection of most species is "well-supplied" and that time "will be more profitably spent in obtaining more detailed information on the life habits of these species than in largely increasing the number of specimens." Nelson's final piece of advice was revealing. Summarizing his instructions, Nelson stated: "These suggestions are made to bring to the notice of field men the need of close

[50] Clarence M. Weed, "The Biological Work of American Experiment Stations," *The American Naturalist* 25 (March, 1891): 232-233.

attention to a phase of field investigations which is often neglected in favor of the interesting pursuit of specimens."[51]

This "interesting pursuit of specimens" was indirectly criticized by Aldo Leopold in a talk he gave on the *National Farm and Home Hour* in 1934.[52] The title of his talk, "The Game Cycle—A Challenge to Science," was suggestive of his argument. He began with a provocative assertion: "Nineteen hundred thirty four will go down in history for something more than droughts, strikes, and blood-purges. It is a year of biological eclipse." Many species will experience great reductions in numbers during the year, because "a die-off comes about every 10 years," hence the term, "game cycle." Although Leopold was certain a reduction was imminent, he was at a loss to explain why such fluctuations occur: "I can't tell you what the cycle is because nobody knows." Leopold suspected that disease has something to do with the game cycle, but he also suggested that some scientists believe change in solar radiation might be the causative factor. Furthermore, Leopold noted that it is possible, without a single change to the "make-up" of a particular species, that a "species might change from non-cyclic to cyclic behavior." It was imperative for scientists to learn how such a change was possible, but only a "mere handful of men" have addressed the question. The

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[51] E.W. Nelson, "Memorandum for Field Naturalists of the Biological Survey," 12 June 1917. Bailey Papers, Wyoming, Box 3, Folder 1.

[52] The *National Farm and Home Hour* (1928-1958) was a daily (except Sunday) radio broadcast that aired on 40 NBC stations nationwide. The Department of Agriculture was allotted a 15-minute segment of each broadcast to provide farmers with news of trends in agriculture and changes in market prices. The program has received no scholarly attention, but background information can be gleaned from a biography of Everett Mitchell, the show's long-standing host. See: Richard Crabb, *Radio's Beautiful Day: Everett Mitchell's Memoirs of the First Fifty Years of Broadcasting in America* (Carpentersville, Illinois: Crossroads Communications, 1982).

problem, Leopold noted, was the past legacy of science's focus on studying the distribution and taxonomy of animals, a fair description of the early work of the Biological Survey:

> For two centuries science has been so busy pasting labels on species that it has forgotten to study the animal itself. Science has written tons of learned volumes telling us the color, size, and shape of every feather and every bone in each of a thousand species, and recording the distribution of each and whether it is abundant or scarce, but we have not begun to ponder why any particular species is abundant or scarce.

Though he did not criticize the Survey directly, Leopold noted that the "U.S. government, which is spending scores of millions on conservation projects this year, has [only] one man actively engaged in cycle research, and he only part-time."[53]

Olaus Murie and W.B. Bell of the Survey shared some of Leopold's concerns, especially science's fascination with "pasting labels on species." In 1935, Murie wrote to Bell, the Survey's director of wildlife research, and expressed some reservations about the future of the Survey, suggesting it might become a "second–rate scientific institution." Bell wrote back and attempted to assuage Murie's fears. Bell noted that there are "some people who persist in looking back to the period from 1885 to 1900, as the golden age of the Biological Survey, when the western surveys in new territory yielded new species at every turn, and new species were being described in great numbers." While the quest for new species created great interest among field naturalists, it also fostered a tendency to

[53] The text of Leopold's radio address can be found in Gabrielson Papers, Denver, Box 13, Folder 16. Non-Survey biologist Francis Sumner offered a different critique of the collection of specimens, arguing that it fostered an indifference to conservation. See: Francis B. Sumner, "The

overlook more important scientific issues, especially the condition of wildlife. Bell noted that the field naturalists "apparently took more interest in a few scientific skins and skulls than they did in the living population. It was this attitude and ineffectiveness of work by this element that possibly led to the failure to realize what was going on in the destruction of wildlife and elimination of habitat required for their existence." Despite this past history of a one-dimensional interest in "a few scientific skins and skulls," Bell assured Murie that "we have reached the parting of our ways" with the old approach, and more attention will be given to conservation.[54]

Murie replied to Chief Darling and made reference to Bell's letter; he wanted to ensure that his comments about the Survey possibly becoming a "second-rate institution" were not misunderstood. Murie admitted that he "had never heard of the 'Golden Age' of the Survey, although I can readily understand the reference." Murie was impressed by the "zeal" of the Survey's early field naturalists. "We must feel grateful for the information gathered on distribution in those days, for we have a picture, even if incomplete, of conditions which are now history." The limitations of the field naturalists' research—an over-emphasis on classification and distribution—reflected the context of the times. Science placed a great value on mapping the continent's flora and fauna, and many scientists, not just the Survey's field naturalists, met that challenge but overlooked other important issues. "After all, the taxonomist was not the only one who neglected to see the

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Need for a More Serious Effort to Rescue a Few Fragments of a Vanishing Nature," *The Scientific Monthly* 10 (March 1920): 236-248.

trend of wildlife conditions in those days…." He noted, however, that "our job today is different," and the Survey worker should be "moved by the impulse to delve into mysteries of Biological principles…" [55] This concern with understanding "biological principles" rather than collecting a "few scientific skins and skulls" reflected an awareness of the limitations of the Survey's past research.

To understand truly these "biological principles," according to Survey biologist Walter P. Taylor, the scientist must utilize an ecological approach that examines the relationships between organisms. In a 1936 essay in *Ecology*, he, too, expressed reservations about the past work of garnering specimens: "In field investigations ecology puts emphasis on the quality of ***relations*** discovered rather than on quantity or even variety of specimens collected." For Taylor, ecology was more than just a specialized science; it was an approach that emphasized relations. For example: "Doubtless one could learn something about mechanical objects by amassing great series of bolts and nuts and steel plates and pieces of glass, but in order to build an automobile he would have to bring selected bolts and nuts and steel plates of glass into right relations with each other." In biological studies, the emphasis on relations has not been "sufficiently stressed." Instead, the tendency was to gather large quantities of data with minimal importance placed on the "synthesis which alone will give meaning to the facts in hand."[56]

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[54] Bell to Murie, 1 February 1935. Olaus Murie Papers, Denver, Box 2, Folder 10.
[55] Murie to Darling, 1 February 1935. Olaus Murie Papers, Denver, Box 2, Folder 10.
[56] Walter P. Taylor, "What is Ecology and What Good Is It?" *Ecology* 17 (July 1936): 336 (emphasis in the original).

Taylor's advocacy of an ecological approach reflected the changing nature of the Survey's work. In its earliest years, nature seemed more static: mapping and the collection of specimens, though by no means easy responsibilities, especially considering the uncharted terrain that was traversed, did not present the seemingly intractable problems involved in the control of predators and the management of wildlife, growing commitments of the Survey. The Survey's supervision of the refuges introduced new problems that often revealed the bureau's limited understanding of wildlife. These limitations became evident in the Survey's management of the National Elk Refuge in Jackson Hole, Wyoming.

By the turn of the twentieth century, development and hunting in the West had reduced the habitat of many animals, most notably the bison. Elk, a species that proliferated throughout much of the continent in the seventeenth century, were limited to the Rocky Mountain region and parts of the Pacific Coast. With the development of the town of Jackson, Wyoming, elk habit was further restricted, causing widespread starvation for the once-numerous species (see chapter four). In 1912, Congress established the National Elk Refuge, under the Survey's management, in response to the crisis. The early years of the Survey's supervision of the refuge were uneven, as the number of elk increased in some years and decreased in others. In an effort to understand these fluctuations, a federally authorized Elk Commission was created in 1926.[57]

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[57] Olaus J. Murie, *The Elk of North America* (Harrisburg, Pennsylvania: The Stackpole Company, and Washington: The Wildlife Management Institute, 1951), 1-2; Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1912* (Washington: Government Printing Office, 1913), 675. The Elk Commission was sponsored by the National Conference on Outdoor

Consisting of individuals from the Survey, the National Park Service, the Forest Service, the Wyoming Game and Fish Commission, the governor's office, as well as other conservationists, the Elk Commission issued a report written by Charles Sheldon of the Survey. The report revealed a lack of fundamental knowledge of elk that was indicative of the Survey's growing understanding of a nature that seemed more complex and uncertain than previous knowledge suggested. Sheldon conceded that, even answering the most basic question—the optimal size of the herd—was "speculative." The report noted that the "herd has reached over 19,000 three times in the last 25 years, which may be accepted to indicate that under normal conditions, the herd may be maintained at approximately 20,000 head," a judgment that Sheldon acknowledged might need adjustment with more analysis. He also realized that more analysis was required to explain fluctuations in the size of the herd. These fluctuations appeared to result from "snow conditions affecting the availability of sufficient food supply," thus explaining the increase in herd size from 1912-1916 (mild winters) and decrease in 1920 (severe winter). The herd increased from 1921-1925, a trend he expected to continue. However, "for reasons not known, this [increase] has not occurred although recent winters have been favorable," and hunters killed few elk.[58]

Recreation, a conference that met in 1924 and 1926 and was authorized by President Calvin Coolidge to formulate a national recreation policy. For a discussion of the conference, see: Paul Sutter, *Driven Wild: How the Fight against Automobiles Launched the Modern Wilderness Movement* (Seattle: University of Washington Press, 2002), 41-48.

[58] Charles Sheldon, *The Conservation of the Elk of Jackson Hole, Wyoming. A Report to Hon. Dwight F. Davis... Chairman of the President's Committee on Outdoor Recreation and Hon.*

The answers to other questions were equally uncertain: "little is known" about the ratio of the sexes and age classes; the role of predators "has not been determined with any degree of accuracy;" and "disease and parasites are other factors of which we have no certain knowledge." Elk feeding habits need to be better understood, and a "more accurate determination of the kind, amount, quantity, and distribution of forage species adaptable to elk is a prime requisite in game management…."[59]

The person entrusted with addressing some of the knotty problems mentioned in the Elk Commission report was Olaus Murie, Survey field biologist with extensive experience in Canada and Alaska. His investigations in Jackson Hole culminated in his most famous work, *The Elk of North America.* Although his work did much to further scholarship on elk, Murie's studies also revealed many defects in understanding. He often questioned management policies and developed a heightened awareness of the possibility of policies producing unforeseen consequences, the difficulty of establishing cause and effect, and potential problems associated with introducing animals into new environments and reducing the numbers of animal populations.[60]

Frank C. Emerson, Governor of Wyoming... (Washington: National Conference on Outdoor Recreation, 1927), 13-18, 32-33.

[59] Ibid., 21.

[60] For Murie's pre-Jackson Hole experiences, see: James M. Glover, "Sweet Days of a Naturalist: Olaus Murie in Alaska, 1920-1926, *Forest and Conservation History* 36 (July 1992): 132-140; and John J. Little, "A Wilderness Apprenticeship: Olaus Murie in Canada, 1914-1915 and 1917," *Environmental History* 5 (October 2000): 531-544. For a biographical sketch of Murie, see: Ferris M. Weddle, "Wilderness Champion—Olaus J. Murie," Audubon Magazine 52 (July-August 1950): 224-233.

From Murie's work in Wyoming, he realized that a policy designed to help one species could produce unforeseen consequences that hurt another species. For example, grass was planted "in a well meant attempt to provide more winter forage for elk…." The policy was successful, in that elk were attracted to the grass. However, to get to the newly planted grassy area, the elk had to travel through an area with sage that was mainly consumed by antelope, a species that was also experiencing difficulties in finding sufficient forage. The elk consumed much of this sage. "Thus," Murie noted, "help for the elk had an inadvertent impact against already hard-pressed antelope."[61]

Murie realized the difficulty in predicting consequences of policy, but he also recognized a more fundamental problem: determining cause and effect in nature was a daunting task. The impact of disease was an especially vexatious question for Murie. For example, the tick that caused Texas cattle fever was found on dead elk, but Murie suspected that the tick might have been a "drain on an animal's vitality," thus weakening its immune system and making it prone to other lethal diseases. He also hypothesized that the tick inflicted its greatest damage when animals were malnourished, an indirect indicator of the availability of forage. Murie claimed that it is "notable" that scabies occurred in the winter, "when the resistance of animals is lowest and disappears in spring when rich, new forage becomes available. Is it possible that the disease indicates, in a measure, the condition of the range?"[62]

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[61] Murie, *The Elk of North America*, 255.
[62] Ibid., 164-168.

With so many perplexing questions about nature and wildlife, it is not surprising that Murie was leery about introducing animals to regions previously uninhabited. He noted that there "has been talk of introducing elk to the interior of Alaska...." Murie urged caution. He saw the "possibility" that two herd animals, elk and caribou, would occupy the same range and compete for forage. More than likely, elk would also vie with moose and "invade mountain sheep range." Furthermore, elk carry parasites and disease that would be injurious to Alaska's native species. In short, "the result of the introduction of an exotic species cannot be foreseen...."[63]

Murie voiced concerns to Chief Paul Redington about the introduction of animals. In 1894, the federal government, first through the Department of the Interior and later through the Survey, made efforts to boost the production of reindeer in Alaska.[64] The government brought reindeer and their herders from Siberia to Alaska in an effort to teach reindeer cultivation to the Alaskan indigenous population and stimulate economic activity. The problem, Murie believed, was that if "domestic reindeer become established in this area the caribou will, of course, disappear...." Furthermore, it appeared that the Survey was working at "cross purposes." On the one hand, it managed wildlife, including caribou, in Alaska. On the other hand, it was potentially threatening caribou.

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[63] Ibid., 255-257.
[64] Albert L. Seeman, "Development of Reindeer Activities in Alaska," *Economic Geography* 9 (July 1933): 294-298.

Murie concluded that there was no "immediate danger" but cautioned "we may be committing ourselves to a policy which may be harmful…"[65]

In a different context, Murie voiced a stronger objection to the introduction of exotic species. Survey biologist Waldo McAtee wrote an article for *Outdoor America* that advocated the introduction of species for hunting. Once again, Murie advised caution and wrote to acting Chief Henderson: "The introduction of exotic game is a dangerous policy, in my opinion. It is a favorite pastime of various game commissions and wealthy sportsmen and is a cheap way to gain public favor….but tampering with our native fauna in this way is unpopular with those who have the best interest of our wildlife at heart." Henderson gave an equivocal response to Murie: He commented that "considerable money has been largely wasted in attempting what might have been foreseen as unwise introductions of game species, especially birds, by some of the State game commissions…." However, he also stated: "We do not believe that the door should be entirely closed" to the "introduction of exotic species." McAtee also replied ambiguously to Henderson, claiming "I can not make a very strenuous defense [of my position] as my heart is not really in it." On the other hand, the majority of species that were allowable to be introduced "would fill a different ecological niche" and not crowd out native species. If there were a problem with

[65] Bell (quoting Murie) to Redington, 28 June 1927. Olaus Murie Papers, Denver, Box 1, Folder 49.

an introduced species becoming too abundant, McAtee noted, "they can always be reduced when desired."[66]

Murie, however, opposed animal reductions in principle; they were an example of artificially tampering with nature. He had to directly confront this issue in Wyoming. The need to lower the elk population at Jackson Hole grew acute by the mid-1930s after a period of equilibrium from 1927-1933.[67] The numbers of elk had increased, partly the result of feeding programs established by the Survey, another policy Murie opposed in principle. Artificial feeding placed the animals on the "dole" and "pauperized" them; they became "semi-domesticated," "less thrifty," and began to lose the rustling instinct.[68] Murie realized, however, that feeding the elk was necessary in order to prevent the animals from wandering onto ranchers' land and consuming feed meant for livestock. The feeding programs contributed to a burgeoning elk population that was also consuming much vegetation. Reluctantly, Murie conceded the necessity of elk reduction: "At the present time most of the ranges are so badly used that a temporary drastic reduction of animals should be made, perhaps both outside and

[66] Murie to Henderson, 5 June 1930; Henderson to Murie, 17 June 1930; McAtee to Henderson, 14 June 1930. Olaus Murie Papers, Denver, Box 1, Folder 36. See also: W.L. McAtee, "Game Birds Suitable for Naturalizing in the United States." U.S. Department of Agriculture, Circular no. 96 (Washington: Government Printing Office): 1-23. Victor E. Shelford, animal ecologist and first president of the Ecological Society of America, echoed Murie's concerns: "Biologists are beginning to realize that it is dangerous to tamper with nature by introducing plants and animals, or by destroying predatory animals, or by pampering herbivores." See: Victor E. Shelford, "The Preservation of Biotic Communities," *Ecology* 14 (April 1933): 240-241.
[67] Murie to John C. Pickett, 29 September 1933. Olaus Murie Papers, Denver, Box 1 Folder 49
[68] Murie to Gilbert T. Pearson, 11March 1935. Olaus Murie Papers, Denver, Box 1, Folder 49.

inside the park."[69] Thus, in the winter of 1935-1936, the Wyoming game authorities killed five hundred and forty-one elk.[70]

Despite Murie's recognition of the need to reduce the elk population, he was deeply troubled about the policy's effect on the future of the Jackson Hole herd. The elimination of surplus animals was a way to avoid efforts to expand the range for elk, a more politically problematic, but more ecologically attractive, solution. He also worried that animal reductions might become a "habit." Furthermore, he was concerned about the effects that animal reductions had on the health of the herd. The elk that get shot were the ones that left the refuge in the winter. "Consequently, a somewhat beneficial migration habit has been nipped in the bud..."[71]

Animal reductions might not be so problematic if Murie had answers to some fundamental questions. The issues related to animal reductions were so bewildering that Murie had to acknowledge limitations of science's understanding of wildlife. For example, he commented that a frequent question asked of him is: How small must the herd be for the vegetation on the range to recover? To this question, Murie replied: "So far, there is no universal answer," and "it must be sought on a trial basis."[72] Murie gave a similarly frank assessment of the role of predators in providing a check on over-population. He acknowledged the importance of natural variation, disease, food supply, and predators in influencing

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[69] Murie to John H. Baker, 11 March 1935. Olaus Murie Papers, Denver, Box 1, Folder 35.
[70] Murie, *The Elk of North America*, 271.
[71] Murie to John H. Baker, 11 March 1935. Olaus Murie Papers, Denver, Box 1, Folder 49.
[72] Murie, *The Elk of North America*, 301.

population levels, but he could not be more precise: "It is difficult to assign each factor its relative importance."[73] In reference to motivations for elk migration, Murie offered some speculations, but none of these resembled a testable hypothesis. Seeking to explain why some elk were attracted to certain areas, Murie stated: "Possibly there is greater palatability in the very newest vegetation—difficult for man to measure but detected by elk—that lures the animals upward in the wake of retreating snow; or perhaps there is a stimulant in the early spring atmosphere that creates an impulse to travel—and travel would naturally be over accustomed routes, or maybe there is actual nostalgia for remembered summer pastures."[74]

Murie's inability to determine definite answers to fundamental questions was emblematic of the state of wildlife management. He was not alone in voicing concern over the lack of basic data. For example, Chief Edward Nelson, testifying before Congress, pointed out that livestock and wildlife both used the national forests for forage, but the relation between them was not clear. He lamented: "There has been no definite study made of the food of large game animals sufficient to determine what proportion of their food is really forage that live stock would use." An equally important issue—the carrying capacity—"is not always very rapidly arrived at," because of "widely differing conditions" in different environments, according to Survey biologist E.A. Goldman. The behavior of wildlife was also poorly understood: sometimes they acted in ways

[73] Ibid., 276-280.
[74] Ibid., 62.

that defied the expectations of government personnel, a lesson the Forest Service realized when surplus animals from refuges did not "drift on to adjacent areas and there furnish hunting." Leopold, writing to McAtee in 1935, seemed to state the obvious: "As everybody knows, game management methods are comparatively new and untried."[75]

For members of the Survey, the acknowledgment of limitations in the understanding of wildlife and concerns about unforeseen consequences were part of a tendency to view nature as more complex and varied than an earlier generation that focused on taxonomy and mapping the geographical distribution of flora and fauna. As scientists in the 1930s saw more difficulties in making generalizations, many of the Survey's past assumptions and practices were questioned: predator control, the value of insect-eating birds, the reliance on non-scientists for data collection, and the past fascination with the collection of specimens. The Survey's role as managers of wildlife grew in the 1930s; with this growth came numerous knotty problems, as exemplified by Murie's experience with elk. For Survey members in the 1930s, problems seemed more complex and nature more uncertain—a vastly different world from the world of the pre-twentieth century Survey.

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[75] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1922*, 66th Cong., 3rd sess. (1921), 496-497. E.A. Goldman, "Memorandum for Mr. Darling," 16 April 1934, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 4; Aldo Leopold to W.L. McAtee, 3 January 1935, W.L. McAtee Papers, Library of Congress (hereafter, McAtee Papers), Box 28, "Leopold" Folder. The Forest Service reference is from, "The Western Range: Letter from the Secretary of Agriculture," Senate, 74th Congress, Second Session, Document no. 190 (Washington: Government Printing Office, 1936), 354.

Although nature seemed less certain to some scientists, other members of the Survey did not share their doubt and concerns. In the Survey, scientists who were reluctant to make generalizations about nature existed side-by-side with scientists who did not share the same hesitancy. The contemporaneous existence of these differing sets of beliefs illustrates an obvious point: Change is not always uniform; the old and new can occur simultaneously. Vernon Bailey, long-standing Chief Naturalist of the Survey, adhered to many of the older traditions that other Survey members and scientists questioned. He remained generally confident in his understanding of nature and was not troubled by the lack of certainty that characterized the work of other scientists.

Although Bailey maintained a lifelong interest in minimizing animal suffering and eventually had reservations about the extent of predator control, he often invoked the Survey's early tendency to define animals as either beneficial or injurious to agriculture or livestock production. In his *Animal Life of the Carlsbad Cavern*, for example, the owl is "one of the best friends of the farmer," and the opossum's "value for fur and food" offsets the "occasional mischief" it does in hen houses. The Texas jackrabbit is an "asset" because it is preyed upon by coyotes, eagles, hawks, and owls, thus reducing the "more serious depredations" caused by these predators. Conversely, the mountain lion is "troublesome" to the stockman, and black-tailed prairie dogs are a "serious

handicap to stock raisers as well as any form of agriculture and are generally destroyed in every way possible…."[76]

Occasionally, Bailey expressed regret about the fate of these alleged enemies of agriculture and ranching. For example, he lamented that "it is unfortunate that these good-natured, sociable, interesting little animals [prairie dogs] should conflict with man's interests." However, considering that they consumed the "best range grasses" and the stockman spends "thousands" on damage control, Bailey believed the prairie dog cannot be afforded a place on the range.[77] He also voiced concern about the loss of a species, since this represented a loss for science; he was not troubled by what a loss of a species meant for an ecological system. For example, he believed that there would be "partial elimination" of some poisonous reptiles, but "at least let us show our intelligence by trying to know their habits and understand their natures before we kill them."[78]

Bailey adhered to the Survey's older traditions in other ways besides the beneficial/injurious animal dichotomy. At a time when some Survey members questioned the reliance on non-scientists for information, Bailey praised the trappers who sent him information. While doing research for *North American Fauna no. 56, The Mammals and Life Zones of Oregon*, Bailey wrote to Merriam: "In working with the trappers, I am getting lots of good notes on other things, including bears and game animals." He also hoped that the trappers might supply

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[76] Vernon Bailey, *Animal Life of the Carlsbad Cavern* (Baltimore: Williams and Wilkins Company, 1928), 59-92.

some specimens but acknowledged that specimens were getting more difficult to obtain. Nonetheless, he enthused: "One of the men [trappers] is on the trail of a bunch of timber wolves" and "I hope we will get some specimens" from Washington state.[79]

Bailey's eagerness for specimens was not surprising, considering the critical place they had occupied in the Survey. Although other scientists such as Leopold noted that the emphasis on specimens ("pasting labels on species") encouraged scientists to fail to see larger patterns in nature, Bailey argued for their importance in resolving questions in taxonomy. In a 1933 article in *The Journal of Mammalogy*, Bailey pointed out that many early naturalists were careless in noting the type of species collected and their place of origin. This carelessness resulted in many errors in taxonomy, but Bailey was happy to report that, through a more exact collection of topotypes (a series of specimens illustrating a range of variation in a species), many past errors were now corrected. More topotypes "will eventually help to settle doubtful points in nomenclature"[80]

Although Bailey excelled in specimen collection, he was equally fascinated with observing living animals. When describing these animals, he often employed anthropomorphic language, a common practice in the nineteenth

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[77] Vernon Bailey, *Mammals of the Southwestern United States, with Special Reference to New Mexico* (New York: Dover Publications, 1971), 126. Bailey's work was originally published in 1931 as No. 53 in the *North American Fauna* series.
[78] Bailey, *Animal Life of the Carlsbad Cavern*, 169.
[79] Vernon Bailey, *The Mammals and Life Zones of Oregon* (Washington: Government Printing Office, 1936); and Bailey to Merriam, 22 November 1930, Bailey Papers, Wyoming, Box 4, Folder 9.
[80] Vernon Bailey, "The Importance of Types and Type Localities," *Journal of Mammalogy* 14 (August 1933): 241-243.

century. However, as historian Eileen Crist has demonstrated, scientists in the twentieth century increasingly used less anthropomorphic language in describing animals. Instead, scientists utilized more mechanistic explanations of animal behavior. Animals no longer had will or agency according to the mechanistic perspective. Rather, outside forces, such as stimuli, acted upon the animal, causing it to behave in certain, generally predictable, ways.[81]

Bailey resisted this mechanistic trend in depicting animals. He described animals in anthropomorphic terms, often gave them names, and occasionally kept animals for close observation. Sometimes Bailey used anthropomorphic language to characterize carefree animal behavior. For example, the chestnut mantled ground squirrels are "pot-bellied, lazy little philosophers of the woods" that spend much time lounging around, "as if thinking about a long comfortable sleep." Conversely, Bailey was captivated by animals' work habits. For example, wood rats have "a passion for building houses," and their homes are "so well built that they become large and symmetrical and are rarely broken into by enemies." He was fascinated by these "homes" constructed by animals; perhaps not surprisingly, he penned an article about the architectural talents of beavers.[82]

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[81] Eileen Crist, *Images of Animals: Anthropomorphism and Animal Mind* (Philadelphia: Temple University Press, 1999), 1-10. Anthropomorphism never completely vanished from scientific discourse and remains a contentious subject. For a range of opinions, see: H. Lyn Miles, Robert W. Mitchell, and Nicholas S. Thompson, editors, *Anthropomorphism, Anecdotes, and Animals* (Albany: State University Press of New York, 1997).

[82] Bailey, *Mammals of the Southwestern United States*, 102, 170-172; and Vernon Bailey, "How Beavers Build Their Houses," *Journal of Mammalogy* 7 (February 1926): 41-44. Bailey also had a touch of reverse anthropomorphism (sometimes called "zoomorphism"). He was intrigued by possibility of human hibernation and gave several talks on the subject. See: Vernon Bailey, "Hibernation Good for Mankind, too," *New York Times* (4 July 1926); and "Hibernation as Aid to Nervous Humans," *New York Times* (30 April 1926).

Bailey's anthropomorphism and the detail he gave to descriptions of animals' actions reveal a fundamental aspect of this thought: he focused on individual species, discussing behavior, physical characteristics, breeding habits, and the animal's "economic status" (the extent of a species' beneficial or injurious characteristics in relation to man). Unlike some of the other members of the Survey, he was not inclined to devote much attention to the relations between species, nor was he inclined to think of animals as components of an ecological system. He often studied animal behavior in his home, isolated from an ecological context. He subjected his experimental animals to artificial conditions, because the scenarios he created were not normally part of a species' experience. For example, he observed that kangaroo rats often fight among themselves, and it is rare for "two strangers" to live together. Despite the rarity of this social behavior, Bailey "persuaded two old males" to live "together peaceably for a few days...." However, this amity did not last. Bailey introduced a third male, and shortly after, a "fierce struggle" broke out as the rats "fought like bulldogs," and the newcomer died.[83]

Although Bailey had years of field experience, his experiments on animals isolated from an ecological context gave him a sense of control and mastery over his subjects. Unlike Murie, he did not wrestle with questions of unforeseen consequences. Bailey, through his experiments, even had a sense that he was in control of nature. For example, in an article in *The Journal of Mammalogy*, he provided instructions for deodorizing skunks. "By a simple operation," Bailey

[83] Vernon Bailey, *Mammals of the Southwestern United States*, 250.

wrote, the skunk can be "rendered odorless for the rest of his life, and then introduced to polite society as a gentle pet, or kept in the garden or greenhouse to earn an honest living by destroying insect pests and mice." Bailey speculated further: Currently, "there is little prospect of ever developing a race of odorless skunks, although I would dare to say that it could not be done...."[84]

Bailey's confidence in altering the nature of the skunk—whether through his "simple operation" or developing a "race" of odorless skunks in the future—set him apart from the other Survey members who expressed more reluctance in their ability to understand or control nature. In contrast to Murie, who had qualms about tampering with wildlife by emergency feeding and the reduction of "surplus" animals, Bailey exuded confidence. Writing to Chief Paul Redington, Bailey remarked, "every species should be regulated as to numbers and distribution according to our knowledge of the habits and requirements of each and all. This is not difficult."[85]

Bailey also never lost confidence in Merriam's life zones theory, since it formed the theoretical underpinning of many of his works, even after it was discredited. Bailey's response to a 1936 letter from Carl L. Hubbs, curator of fishes at the University of Michigan, was indicative of his enduring support of Merriam's theory. Hubbs had asked why two very different physical environments were incorporated in the same life zone. Bailey, apparently

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[84] Vernon Bailey, "Deodorizing Skunks," *The Journal of Mammalogy* 18 (November 1937): 481.
[85] Vernon Bailey, "Memorandum for Mr. Redington, 20 March 1929, Vernon Bailey Papers, 1889-1941 and undated, Record Unit 7267, Smithsonian Institution (hereafter, Bailey Papers, Smithsonian), Box 5, "Correspondence" Folder.

misunderstanding Hubbs' question, replied that the "correlation of ecological factors applying to aquatic and terrestrial forms of life, both plant and animal, have not been sufficiently worked out…." Hubbs, somewhat puzzled by Bailey's response, replied to Bailey: "I believe that you did not clearly understand my central question, which was why the humid coast strip of Oregon and the very arid lava plateau of the interior should be classed in the same life zone, when almost no forms of life are common to the two areas." Hubbs went further and implicitly challenged the theory: "I can not seem to appreciate why two areas with so little in common, outside of the mean annual temperature [the criterion used by Merriam], should be classed together. What is gained by doing so?"[86] It seemed that Bailey could not fathom why there might be a problem with the theory, even though Hubbs' example demonstrated that it was problematic to suggest, as Merriam did, that similarities in temperature between two different regions would produce two similar sets of plant and animal life in both regions.

Bailey's failure to reply adequately to Hubbs' question might imply that Bailey, now in the twilight of his career, lost touch with the scientific community. Such a conclusion would be wrong. Bailey remained a well-respected scientist throughout his life, despite not having a college degree. Even near the end of his career, other scientists sent him their work for critical commentary. Textbook publishers asked him to write or review chapters. His work received critical acclaim, especially *Mammals of the Southwestern United States*, published a year

[86] Bailey to Hubbs, 21 October 1936; and Hubbs to Bailey, 23 October 1936. Bailey Papers, Smithsonian, Box 5, "Correspondence" Folder.

before his retirement. Scientific luminaries such as Joseph Grinnell, Tracy Storer, and William Hornaday sent Bailey letters of praise for *Mammals of the Southwestern United States.*[87]

Bailey received this adulation from his scientific peers, even though he adhered to the Survey's older emphasis in taxonomy, specimen collection, the use of non-scientists in data collection, the good animal/bad animal dichotomy, and life zone theory—practices and ideas that were increasingly questioned by the 1930s. Scientists respected Bailey's skill in observing nature and trapping animals, but his method of investigation exemplified the nineteenth-century naturalist tradition, an approach that was losing ground to ecology. Naturalists were not extinct, but, as Waldo McAtee lamented in 1956, "for one with a hankering to be an old-fashioned naturalist, it appears to me that museums offer the only hope." Leopold also took note of the change that was occurring. In his review of *The Wolves of North America,* an exhaustive study published in 1944 by Stanley Young and Edward H. Goldman of the Survey, Leopold praised the work for its extensive history of the wolf. However, "viewed as science, *The Wolves of North America* reflects the naturalist of the past, rather than the wildlife ecologist of today…. At no point in the book do they [the authors] evince any consciousness of the primary ecological enigmas posed by their own work." In addition to a greater focus on ecology, the study of wildlife was also becoming more restrictive, at least for the Survey. While Bailey earned a position of prominence despite lacking a college degree, newer members of the Survey had

[87] For the congratulatory letters, see: Bailey Papers, Wyoming, Box 5, Folder 2.

college and graduate degrees and were more specialized than "the naturalist of the past."[88]

Despite these differences between Bailey, the exemplar of the natural history tradition, and other members of the Survey, they were united in the belief that modern society disturbed the "balance of nature," a concept that has been notoriously difficult to define.[89] Few took this insight—man disturbs the "balance of nature"—as far as Murie did. If humans upset the balance, then is the scientist really observing "nature" or something else? Murie confronted this question when studying migratory waterfowl at Hooper Bay, Alaska. He noted that banding operations often "disrupted goose families." For example, after banding, the young ones often wandered about, leaving them vulernable to "enemies." Murie was uncertain about what can be concluded from his observations: "It is a well known fact that the presence of human beings on a nesting ground is a very

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[88] John K. Terres, "W.L. McAtee, 1883-1962," *The Journal of Wildlife Management* 27 (July 1963): 494-499; and Aldo Leopold, review of *The Wolves of North America*, by Stanley P. Young and Edward H. Goldman, *Journal of Forestry* 42 (December 1944): 928-929.

[89] Historian Frank Egerton argues that the balance of nature concept relied on assumptions; it was notoriously vague and never defined. Examining the concept from antiquity through the twentieth century, he found that it moves from "one cluster of relevant observations [about nature] to another," rather than from one definition to another. Its elusive nature ensured its survival: no one could test it empirically. Its versatility is one reason it still found life in the post-Darwin world. Egerton suggests that the balance of nature concept could have waned with the advent of Darwinism. The extinction of species, an integral component of Darwinism, seems incongruent with an orderly, balanced nature. However, one common interpretation of Darwin emphasized natural selection's regulatory function: through competition, nature placed limits on the potentially unrestrained multiplication of members of a species. Thus, by providing limits to population growth, Darwinism, via natural selection, complimented the balance of nature concept, at least to some scientists. See: Frank N. Egerton, "Changing Concepts of the Balance of Nature," *The Quarterly Review of Biology* 48 (June 1973): 322-335. It should also be noted that the notion that man influences nature was not a new or novel concept. Historian J. Donald Hughes found evidence of this belief, along with its converse—nature influences man and culture—in antiquity. Some Greeks saw this influence as evidence of progress, while others saw it as environmental degradation. See: J Donald Hughes, *Pan's Travail: Environmental Problems of the Greeks and Romans* (Baltimore: John Hopkins University Press, 1994).

disturbing thing. To what extent were the predatory habits of gulls, as observed, due to the opportunities furnished by the observer himself, in his march through the nesting area? That is something which we did not determine."[90]

If the idea that the "nature" that was observed was altered by human activity did not produce an epistemological crisis for Survey scientists, it is because they rarely engaged in theorizing about weighty issues in reference to nature. Leopold noticed this tendency, commenting that the Survey "has led the world in the analysis of ecological factors, but it has not been aggressive in the synthesis or application of its findings to test areas."[91] By examining these "ecological factors," the Survey scientists saw a more diverse and inscrutable nature that often defied generalization, but there was still great distance—intellectually and chronologically—with the ecological thought that emerged by the 1960s that saw nature as random and inherently unstable.[92] Survey members generally did not

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[90] Murie to Redington, 20, September 1929, Olaus Murie Papers, Denver, Box 1, Folder 49.
[91] Aldo Leopold to W.L. McAtee, 3 December 1934, McAtee Papers, Box 28, "Leopold" Folder.
[92] There is no set date for the emergence of "non-equilibrium ecology." The iconic idea of the "butterfly effect," developed by meteorologist Edward Lorenz in 1961, played an important role, although initially it did not receive much attention. Through computer simulations, Lorenz showed that a slight change in initial conditions, such as a butterfly flapping its wings, could produce a radically different outcome. See: Donald Worster, "Ecology of Order and Chaos," *Environmental History Review* 14 (spring/summer 1990), 4-16. For a succinct description of the development of non-equilibrium ecology, see J. Baird Callicott, "From the Balance of Nature to the Flux of Nature: The Land Ethic in a Time of Change," in Richard L. Knight and Suzanne Riedel, *Aldo Leopold and the Ecological Conscience* (New York: Oxford University Press, 2002), 90-105. See also, Donald Worster, *Nature's Economy*, 388-433; and Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-First Century* (New York: Oxford University Press, 1990). Worster points out that many ecologists have not accepted non-equilibrium ecology ("chaotic" ecology in Worster's terms) and still cling to some version of the balance of nature concept. Ecosystem ecologist Frank Benjamin Golley offers a more nuanced understanding of chaotic ecology that does not frame it as an either/or question. He notes that, because of the seemingly inherent randomness of natural events, it is impossible to predict the future state of an ecosystem, but "we can describe broad limits of possibility." He also points out that the degree of randomness depends on the type of ecosystem. In an environment with numerous constraints, such as a desert or tundra, there is less variation and hence less randomness.

make reference to the predatory/prey theories and equations of Vito Volterra and Alfred J. Lotka. The work of these two mathematicians was highly abstract, theoretical, and was tested (by Georgii Gause) on parasites in the lab under controlled conditions, a context very different from the refuges and game reservations managed by the Survey.[93] The only hint of an abstract theory by a Survey scientist came from McAtee, who actually developed more of an "anti-theory." He opposed the idea of Darwinian Natural Selection, because, in nature, random occurrences kill random members of a population, not necessarily the

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On the other hand, where the "biota is active and diverse," variation and randomness play significantly larger roles. See: Frank Benjamin Golley, *A History of the Ecosystem Concept in Ecology: More than the Sum of the Parts* (New Haven: Yale University Press, 1993), 195-202. See also: Joel B. Hagen, *An Entangled Bank: The Origins of Ecosystem Ecology* (New Brunswick, New Jersey: Rutgers University Press, 1992), 189-199. Hagen argues that Botkin overlooked examples of early, pre-chaotic ecologists' awareness of random fluctuations in nature. He also suggests that Botkin did not discuss the persistence of ideas of order and stability in modern ecologists. Thus, non-equilibrium ecology only seemed like a radical break with the past, and Hagen sees some continuity between non-equilibrium ecology and earlier ecological thought. Sharon E. Kingsland, somewhat paradoxically, points out that much of ecological thought throughout the twentieth century attempted to "bring uncertainty under control" by using a "variety of stratagems," including mathematical models, engineering analogies, and computer simulations. See: Sharon E. Kingsland, "Review: The History of Ecology," *Journal of the History of Biology* 27 (summer 1994): 349-357.

[93] These equations illustrate an oscillating pattern of predator-prey relations. As the predator population increases, the prey population decreases. Conversely, as the predator population decreases, the prey population increases. Daniel Borkin observes that "it is impossible to overestimate the influence of these equations in twentieth-century population biology.... [the equations] occur in every ecology and population biology text, underlie hundreds of papers, and have been the subject of repeated, extensive mathematical analyses in long monographs and treatises." See: *Discordant Harmonies*, 38. For controversy in the 1930s over these equations, see: Sharon E. Kingsland, "Mathematical Figments, Biological Facts: Population Ecology in the Thirties," *Journal of the History of Biology* 19 (summer 1986): 235-256. McAtee, always skeptical of theory, wrote to Errington in reference to the equations: "I do not believe that conclusions applicable to conditions in nature can be derived from artificially produced competition in small containers." McAtee to Errington, 10 April 1939, McAtee Papers, Box 21, "Errington" Folder.

ones most adapted to their environment. Thus, random members of a population, not the "fittest," survive.[94]

Although members of the Survey did not participate in theoretical debates, by the 1930s, they had a sense that the stable and orderly vision of the nature that characterized the early work of the Survey was gone. Much of the changed perspective was a result of the newer responsibilities the Survey assumed as a regulatory bureau. These responsibilities introduced complications that the early Survey did not have to address: the dynamics of animal populations and predator/prey relationships were poorly understood; the management of wildlife and waterfowl introduced unique problems that defied easy solutions; policies might produce consequences that could not be anticipated; and man upset nature's alleged balance and made nature more inscrutable. In the process of developing this understanding of a more varied and complicated nature, some scientists realized that making generalizations was problematic, and some scientists from the federal bureau implicitly challenged the foundations of the Survey's earlier work: Merriam's life zones theory had little predictive power; data collection was more problematic than previously thought; the reliance on non-scientists for information had limitations; the good species/bad species dichotomy was viewed

[94] For McAtee's thoughts on natural selection, see: W.L. McAtee, "The Malthusian Principle in Nature," *The Scientific Monthly* 42 (May 1936): 444-456; "The Role of Fitness in Evolution," *The Ohio Journal of Science* 36 (September 1936); "Survival of the Ordinary," *The Quarterly Review of Biology* 12 (March 1937): 47-64; "Effectiveness in Nature of the So-Called Protective Adaptations in the Animal Kingdom: Chiefly as Illustrated by Food Habits of Nearctic Birds," *Smithsonian Miscellaneous Collections* 85 (1932): 1-145; and "The Postulated Resemblance of Natural Selection to Artificial Selection," *The Ohio Journal of Science* 36 (September 1936): 242-252.

as overly simplistic; and the Survey's past emphasis on taxonomy, specimen collection, and geographical mapping diverted scientists away from looking at larger patterns in nature. The pattern that many were seeing in the 1930s was a more complicated, more varied, and more uncertain vision of nature than the stable and orderly view of the pre-twentieth century Survey.

The Survey's journey to this understanding of a more unstable nature raises a question: How does a government bureau respond to a changed intellectual context and challenges that were not part of its original mission? The Survey began with an emphasis on research and was later assigned managerial and regulatory roles. These new responsibilities did not replace one view of nature with another view. Rather, they placed the Survey in a position that lacked an established scientific tradition: there were few guidelines for managing wildlife and the predator/prey relationship, responsibilities the Survey—or any other organization, government and non-government—was not prepared for. The Survey's response to this changed context exhibited signs of continuity and change. On the one hand, the Survey changed, as important members acknowledged the limitations of the bureau's methods and realized it was more difficult to generalize about nature than previously thought. The Survey still gathered "facts," but the facts now seemed more contingent and more likely to be reinterpreted. When a scientist from the United States National Museum, in 1942, criticized a paper written by W.L. McAtee in 1905 about avian benefits to agriculture, the Survey food habits specialist was incredulous, commenting that

the "economic status of a bird is almost certain to change in that length of time."[95] For McAtee, a change in understanding, rather than continuity, seemed more natural, more inevitable. Yet, on the other hand, the Survey maintained ties with its past. Members of the early Survey excelled at collecting information about the continent's flora and fauna. Outside of Merriam's life zones, which did not hold up to critical scrutiny, Survey scientists did little to develop theory. For the later Survey, in Leopold's estimation, it was very good in the "analysis of ecological factors" but short on "synthesis." Thus, an element of the Survey's past—the gathering of information without developing a theory—lived on in the new context, a context that did not eliminate all vestiges of the Survey's approach to understanding nature.

[95] McAtee, "Wherein Lies the Economic Value of Birds?" 149.

MARKETING 101: THE PUBLIC FACE OF THE BIOLOGICAL SURVEY

Despite the growing uneasiness about nature's uncertainty and methods employed to study nature, the Survey, via a 1935 Department of Agriculture press release, proudly announced a solution to the problem of protecting and "producing" wildlife: "A brand new profession is about to be built up in the United States. It is the profession of wild life specialist." The education of this "specialist" would be facilitated by the establishment of nine land grant colleges, "part of the larger scheme of wild life conservation."[1]

Although the emergence of the wildlife manager was a new development and cause for celebration—a testament to the relative novelty of the field—the issuing of press releases to tout the Survey's expertise was part of an established practice to win public approval. From its very beginnings, the Department of Agriculture had distributed literature to farmers demonstrating the benefits they could receive by following recommendations based on the Department's research. As part of the Department of Agriculture, the Survey, in its earliest promotional work, followed in the footsteps of its parent organization, generally by informing farmers which birds were beneficial or injurious to agriculture. However, the Survey's new responsibilities—predator control, enforcement of wildlife legislation, and the management of animal refuges—not only created more uncertainty in its science, but they also involved the bureau in more controversies.

[1] "Land Grant Colleges Study Game," Agriculture Department Press Release, 14 October 1935, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1

As a result, the Survey became more uncertain about its public image and took measures to downplay controversial issues, especially predator control. The Survey still publicized its expertise, especially in wildlife conservation, but when it touched on sensitive issues, the bureau often avoided controversy, glossed over complexity, and used increasingly more authoritative measures to control information that might present the Survey in an unfavorable light. By the 1930s, the Survey thus saw itself in an "information war" that needed to be won to maintain approval from the public and Congress.

The use of the press and media to influence public opinion was certainly not a new concept, but it gained more visibility by the early twentieth century. The sensationalistic "Yellow Journalism" associated with the William Hearst newspapers was a contributing factor in winning public support for American involvement in the Spanish-American War of 1898. The use of media to earn support for war was a lesson not lost on the federal government, as it created the Committee on Public Information, a propaganda agency that helped persuade the American people that entrance into the world war was necessary. Furthermore, the notion that people can be persuaded was a cardinal principle of the advertising industry, an industry that grew in respectability and professionalism in the early twentieth century, as it "erase[d] the Barnum Image," according to advertising historian Roland Marchand.[2]

June 2010]. See also: "Courses in Game Management at the State Universities," *Science*, n.s., 82 (23 August 1935): 164.

[2] Roland Marchand, *Advertising the American Dream: Making Way for Modernity, 1920-1940* (Berkeley: University of California Press, 1985), 5-7. For a general history of American

Wildlife conservationists also saw the value in publicity. For example, William T. Hornaday, in conjunction with the Smithsonian Institution, developed an "Extermination Series," a traveling exhibit that called attention to endangered species. When he shipped bison from the New York Zoological Park to stock the Wichita National Game Reserve in Oklahoma in 1907, Hornaday publicized the event and made sure photographers documented every step of the journey. His actions won kudos from the *New York Times*, as Hornaday "deserves the gratitude and encouragement of the Nation as the chief preserver from extinction of the American bison."[3] The elk of Jackson Hole, Wyoming, while not quite on the verge of extinction, were in a state of almost perpetual starvation in the early 1900s. The nation was alerted to the animals' plight, largely through the efforts of photographer and nature advocate Stephen Leek, who sent photographs of the languishing animals to newspapers and magazines (see chapter four). Moreover, in the background to the Migratory Bird Treaty of 1918, T. Gilbert Pearson of the National Audubon Society hired Thomas R. Shipp and Company, a New York public relations firm, to send favorable stories to newspapers about progress in getting the measure passed.[4]

Government conservation agencies also saw the usefulness of publicity. While Gifford Pinchot was in the Forestry Division, he developed skills in public

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advertising in the post-Civil War and Progressive Era, see: James D. Norris, *Advertising and the Transformation of American Society* (New York: Greenwood Press, 1990).

[3] Daniel Justin Herman, *Hunting and the American Imagination* (Washington: Smithsonian Institution Press, 2001), 241-242; Mark Barrow Jr., *Nature's Ghosts: Confronting Extinction from the Age of Jefferson to the Age of Ecology* (Chicago: The University of Chicago Press, 2009), 122; and "Bison Preserves," *New York Times*, 3 November 1907.

relations, working to lessen opposition to President Cleveland's creation of the forest reserves. When he became head of the newly-created Forest Service in 1905, Pinchot promoted his vision of utilitarian conservation by writing publications, issuing press releases, establishing a professional press bureau within the Service, expanding the Service's mailing list, and hiring lecturers to speak throughout the nation. He collaborated with President Theodore Roosevelt to promote the government's management of natural resources. According to Stephen Ponder, Pinchot's successful publicity work was evidenced by the "angry reaction" of congressmen who objected to the "federal restraints on the use of public resources" that Pinchot advocated. More generally, westerners viewed the conservation efforts of the Forest Service and the Reclamation Service as "threats to the autonomy and authority of their state governments" and thus distrusted the public relations work of those federal agencies, according to Donald J. Pisani.[5]

Pisani also notes that the early work of the Reclamation Service was more about a "triumph of publicity" rather than a victory of science, engineering, and capable management. The Service, from its beginning, saw the value in publicity. A year after it was established in 1902, the federal agency created an "Information Section," headed by C.J. Blanchard, supposedly because potential settlers requested information about government irrigation projects. Under Blanchard's direction, the Information Section supplied the public with stories about the

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[4] Kurpatrick Dorsey, *The Dawn of Conservation Diplomacy: United States – Canadian Wildlife Protection Treaties of the Progressive Era* (Seattle: University of Washington Press, 1998), 216.
[5] Stephen Ponder, "Gifford Pinchot Press Agent for Forestry," *Journal of Forest History* 31 (January 1987): 26-35; and Donald J. Pisani, *Water and American Government: The Reclamation*

building of hydraulic works and the conquest of the desert. He had photographs taken of areas before and after the construction of reclamation projects. He touted the virtues of reclamation projects at lectures—enhanced with almost a thousand slides—given at various civic organizations. In 1908, the Service also created its own journal, the *Reclamation Record*, originally geared toward workers in the agency, but it later highlighted news from reclamation projects and was sent to newspapers, journals, and politicians. Furthermore, Frederick Newell of the Reclamation Service and Pinchot exerted an influence on two journals, *National Geographic* and *Forestry and Irrigation*, encouraging them to be supportive of reclamation.[6]

Blanchard's skill in promoting the Reclamation Service only partly explains the "triumph of publicity." The Service's promise of reclamation was an appealing message, a message that fell on receptive ears, as enthusiasm for irrigation had been developing in the West since the late nineteenth century. The Reclamation Service, however, attempted to win support from the entire nation, not just the West. With reclamation, more areas of the West could be open for settlement, thus providing an opportunity for inhabitants in the East to move westward and homestead. This was a message with a wide appeal, because high rates of immigration in the late nineteenth century caused overcrowding in eastern cities.[7]

Bureau, National Water Policy, and the West, 1902-1935 (Berkeley: The University of California Press, 2002), 103.

[6] Pisani, *Water and American Government*, 101-103.

[7] Ibid., 26-27.

Appealing to a wide base of support could obviously facilitate a government agency's promotional efforts, a lesson learned by Stephen Mather, the first director of the National Park Service. He hired publicity director Robert Sterling Yard to educate Americans about the parks and encourage them to vacation there. To the public, Mather and Yard presented the national parks in a simple and appealing manner: the parks offered respite from fast-paced modern, urban life and allowed visitors to enjoy outdoor recreational activities. Mather also pitched his vision of the parks to influential elites, including legislators, government officials, publishers, lecturers, and journalists. To the elites, Mather emphasized the parks' ability to attract tourist revenue. Thus, Mather was able to appeal to potential visitors as well as potential business interests.[8]

The Survey was never able to offer a message with such a wide appeal, nor was it able to command the public relations resources that the other government agencies possessed. Its ability to appeal to economic interests was limited to educating farmers, aiding stockmen by destroying predators and rodents, and encouraging tourists and hunters to visit areas near the refuges. Although the economic appeal of these activities won some support for the Survey, the bureau was not able to offer an overarching plan that could draw support from the entire nation—something equivalent to the Reclamation Service's ability to interest the West and East. The Survey could not draw tourists to its refuges like the National Park Service could to the parks, since the early refuges, with a few exceptions,

[8] J. Douglass Wellman, *Wildland Recreation Policy* (New York: John Wiley & Sons 1987), 115-116.

were intended to protect wildlife rather than offer recreational opportunities. The Survey's role in managing public lands was minimal, since most refuges, with the exception of the Upper Mississippi River Wild Life and Fish Refuge, were tiny in comparison to the land managed by the Forest Service.

The relatively small Survey could not match the other government agencies' public relations resources. While the Forest Service established a press bureau and the Reclamation Service created an "Information Section" in the early years of both organizations, the Survey did not have an independent Public Relations Division until 1934. While the National Park Service had a publicity director and other government agencies had press agents, the Survey had one employee who doubled as a press agent, and his position was eliminated in favor of an office clerk.[9] The Survey had its own publication, *The Survey*, but unlike the *Reclamation Record*, it remained a house organ. Moreover, the Survey had some influence with the *Journal of Mammalogy*, as many of its scientists contributed articles on a regular basis, but its influence was not equivalent to the Reclamation Service's influence on *National Geographic* and *Forestry and Irrigation.* Actually, the *Journal of Mammalogy*, by the late 1920s, became a vehicle for criticism of the Survey's predator and rodent control program.

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[9] When Westerners, fearing a loss of state autonomy, reacted to the growth of federal agencies, controversy broke out over the use of public money used by the various governmental organizations to hire press agents. Congressional hearings were held and revealed that the Bureau of Soils, Bureau of Public Roads, the Smithsonian Institution, the Post Office, the National Museum, and the Bureau of Education had full-time press agents. The Survey, however, did not have a full time press agent. It did have an employee who handled public relations, but the position was reassigned to clerical work. See: House Committee on Rules: *Department Press Agents, Hearings before the Committee on Rules, under H. Res. 545,* 62nd Cong., 2nd sess. (1912), 10.

Despite the limited resources, the Survey still found ways to promote itself to the public. The focus in the early years was educational. The Survey, capitalizing on the popularity of the nature study movement, provided information to public schools for nature study and for observance of Bird Day (sometimes combined with Arbor Day). World's Fairs and state and local expositions were also auspicious venues for the Survey's educational promotions. The exhibits in these settings showcased the Survey's pure and applied science. For example, at the 1893 World's Columbian Exposition in Chicago, a display of the geographical distribution of animals illustrated Merriam's life zone theory and the Survey's pure science. The Survey featured its applied science with an array of stuffed skins of animals that were found in the stomachs of other animals. Merriam believed that the exhibit was "both instructive and practical and justified the time devoted to its preparation."[10]

By the 1920s, the Survey found other ways of selling itself besides demonstrating its pure and applied science. The roles of the Survey expanded from its early work of mapping the distribution of flora and fauna and assisting farmers. It was now practicing predator control, enforcing wildlife legislation, and managing game refuges and bird sanctuaries as well as enforcing the Migratory Bird Treaty Acts of 1913 and 1918. The Survey's 1920 annual report took note of these expanded roles: "During recent years appreciation of the value

[10] Department of Agriculture. *Report of the Ornithologist and Mammalogist, 1893* (Washington: Government Printing Office, 1893), 232. Survey archives lack documentation of the promotional work done at fairs and exhibits, but brief descriptions can be found in the yearly reports. The most extensive treatment of the nature study movement is by Kevin C. Armitage, *The Nature Study*

of our wild life has grown rapidly, and constantly increasing demands are voiced for the conservation of the useful and harmless forms." At the same time, however, more land was under cultivation, thus necessitating the development of "effective methods for controlling or destroying" animals that were injurious to crops, forests, and livestock. Thus, the Survey experienced "demands from many directions" that required more funds as well as new ways of presenting itself and its assigned responsibilities to the public.[11]

The "many directions" included a wide assortment of the general population: farmers, ranchers, local populations near the wildlife sanctuaries, and a national audience interested in wildlife and conservation. Accordingly, the Survey became more sensitive to the way the general population—not just politicians, ranchers, and farmers—perceived its role in managing wildlife as well as aiding farmers and ranchers. To assess public perception of the Survey and wildlife, a notice was given in the February 1920 issue of the house organ, *The Survey*, requesting employees to be watchful of news items that pertain to "wild life or the work of the Biological Survey" and to send the press clippings to the Washington office.[12]

The "wild life or the work of the Biological Survey" could sometimes strain relations between the bureau and local populations, as the protection of wildlife was often viewed as an unwelcome intrusion in parts of the West. For example,

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Movement: The Forgotten Popularizer of America's Conservation Ethic (Lawrence: University Press of Kansas, 2009).

[11] Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1920* (Washington: Government Printing Office, 1921), 343-344.

[12] *The Survey: Monthly New Bulletin of the Bureau of Biological Survey*, 2 March 1921. Edward William Nelson and Edward Alphonso Goldman Collection (hereafter, Nelson Papers),

at the National Elk Refuge near Jackson, Wyoming, the Survey protected elk—the same elk that raided the hay supplies of local ranchers. H.F. Stone, in charge of reservations, wrote to Chief Nelson, citing specific ranchers' complaints about wandering elk intruding upon private or leased land. He also noted a general hostility to Washington: "The general feeling among the local inhabitants seems to be decidedly antagonistic to the Bureau, but for no definite reason, simply because it is part of the Federal government."[13] Thus, the Survey saw the need to build favorable local sentiment in towns located near its refuges.

The Survey realized that an amiable relationship with the local press could facilitate its objective of establishing cooperative relations with local populations, especially when the creation of a refuge might be perceived as a threat to local customs. For example, before the 1924 creation of the Upper Mississippi Wild Life Refuge, hunters and anglers had frequented its wilderness areas. The Survey wanted to assure local residents that, although the area's designation as a wildlife refuge placed restrictions on hunting and fishing, those outdoor activities were not banned. The refuge's superintendent, W.T. Cox, wrote to Chief Nelson, stating that he was "a little puzzled with regard to publicity" for the refuge. Nelson clarified the Survey's position, instructing Cox to talk with the outdoor enthusiasts and let them know that "every effort will be made to avoid unnecessary technicalities in carrying out the purpose of the refuge." It was also

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Smithsonian Institution, Record Unit 7364,Box 25, Folder 3. There are a few extant copies of *The Survey* in the Nelson files at the Smithsonian, but the holdings are limited and fragmented.

[13] I.F. Stone to E.W. Nelson, 20 January 1921. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 14.

important for the refuge manager to establish friendly relations with the local press and provide information regarding the refuge's progress. However, Nelson also advised Cox to be circumspect when replying to knotty questions. Because the Survey was still uncertain about how much land would be acquired for the refuge, rules and regulations were not completely finalized; more time would be needed to study potential problems. Therefore, Nelson told Cox: "I desire that you should avoid making any specific and definite statements as to what will be done in particular cases in advance, and in other ways committing the Bureau or the administration to any particular line or policies without authorization from this office, since any such statement might place us in an embarrassing position."[14] Nelson's advice was a foreshadowing of two trends that characterized the Survey's response to future controversial issues: 1) In many cases, it was helpful to avoid "specific and definite statements" and gloss over issues the Survey did not want to address. 2) The central office in Washington would play a more authoritative role in controlling information about controversies involving the Survey.

Although the Survey recognized the growing importance of appealing to outdoor enthusiasts during the 1920s, it did not neglect the promotion of its predator work. Predator and rodent control had been one of the earliest ways the Survey highlighted its technical expertise and professionalism—an important characteristic of Progressive Era conservation—while also demonstrating

[14] W.T. Cox to E.W. Nelson, 28 August 1925; E.W. Nelson to W.T. Cox, 2 September 1925. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 159.

"practical" benefits. The Survey continued lauding its predator control for a good part of the 1920s. Responding to a request for information about the Survey's predator work for the year 1924, Chief Nelson told C.B. Smith of the Office of Extension Work that Survey "specialists" assisted the Extension Service in many of the western states by demonstrating methods of predator and rodent control. Nelson also summarized other public relations accomplishments, including "live radio talks, displays and demonstrations at state and county fairs and at livestock shows, and the furnishing of interesting news items to the Press which cooperated heartily in this work."[15]

The Survey also utilized the relatively new medium of film to promote its predator work. *The Cougar Hunt* was a 1926 Department of Agriculture silent film directed by predator control specialist Stanley P. Young. The film chronicles a cougar hunt by the Survey and intersperses bits of information about the economic damage to western livestock interests caused by predators. Predictably, predators (including wolves and coyotes in the beginning of the film) are portrayed savagely consuming dead livestock. However, a rancher calls "Uncle Sam," and then Survey members, aided by dogs, "the traditional enemy of the predator," follow the "warm trail" of the cougar until it is treed and shot. As the film closes, the narration instructs the viewer that "no more will these sharp

[15] E.W. Nelson to C.B. Smith, 17 June 1924. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 231, Box 17.

claws" ravage the stockman's livestock, but it also notes that not all chases have to end in "tragedy," because other cougars are captured and sent to zoos.[16]

Reviewing *The Cougar Hunt* for *The Washington Post*, Alice Watts Hostetler commented: "Although only two human deaths have been charged to this marauder [the cougar], according to the Biological Survey he has made himself a public enemy by his attacks on stock and young deer—colts are his pet delicacy—and as such he is to be exterminated from areas where he is an economic menace." In addition to echoing the Survey's rationale for killing predators, Hostetler noted that Department of Agriculture films are "popular" and can be purchased or borrowed from the Department for the cost of shipping. The films serve to "educate as well as entertain."[17]

The Survey employed this same combination of education and entertainment in its periodic radio broadcasts, another medium used to reach a wide audience.[18] Beginning in 1926, radio shows were used to promote the Survey's work. The earliest broadcasts featured a series of "Autobiographies of Infamous Bugs and Rodents" and "Wild Life Friends and Foes." These "autobiographies" were spoken in the "voice" of the animal, an animal that was often depicted as childish and mischievous. For example, the rabbit, an intruder that "must admit his guilt

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[16] *The Cougar Hunt* is available at Prelinger Archives, available at http://www.archive.org/details/prelinger. [accessed 15 August 2008].
[17] Alice Watts Hostetler, "The Star Role in Uncle Sam's Latest Movie is Given to the Cougar," *Washington Post,* 11 January 1931.
[18] The Survey radio shows began in 1926, but Survey records do not always specify which stations aired the shows. NBC and local stations sometimes broadcast the shows, but it is not clear if these stations aired every show prepared by the Survey or just selected ones. The texts of the radio shows are scattered in Survey records, but a good number of them can be found in: Ira N.

as a frequent offender in the orchard and garden," "told" the radio listeners how he enjoyed going out on moonlit nights:

> What'll I do then? You'll know in the morning. I'll get in that orchard and eat young, sweet, tender bark off the trunks of young fruit trees. They may die on you, but I can't help that. And then I'll call my friends to the feast and soon you may not have a single young fruit tree alive in the orchard. But—I HOPE YOU WON'T POISON THE BARK. That's our ruination. ... Folks, I'm just a shy, sly, cottontail rabbit but my teeth are as sharp as a January blizzard.[19]

The broadcasts often included snippets of an animal's life history—for example, the rat's "forefathers sailed with the pirates on the high seas" and spread disease—but the purpose of the shows was to promote a positive image of the Survey and to let listeners know they can write to Washington and receive literature on the topic of each particular broadcast.[20]

While the radio broadcasts employed occasional humor to reach a popular audience, Stanley Young, director of *The Cougar Hunt,* utilized tragedy in *The Last Stand of the Pack*, a popular account of famous wolves. Co-authored with wilderness advocate and landscape architect Arthur Carhart, the 1929 publication described the "last stand" of wolves that notoriously eluded capture (hence their fame).[21] The wolves, however, were not completely responsible for their nefarious behavior: with the coming of the "white man" to the American West

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Gabrielson, Wildlife Management Institute Papers, CONS37, Conservation Collection, The Denver Public Library (hereafter, Gabrielson Papers, Denver), Box 13.

[19] Gabrielson Papers, Denver, Box 13, Folder 9. Capitalization in the original.

[20] Gabrielson Papers, Denver, Box 13, Folder 9.

[21] Arthur Carhart and Stanley P Young, *The Last Stand of the Pack* (New York: J.H. Sears & Co., 1929). For Carhart, see: Tom Wolf, *Arthur Carhart: Wilderness Prophet* (Boulder: University Press of Colorado, 2008). Stanley Young was the Survey's wolf specialist during the height of the predator controversy in the late 1920s and early 1930s. For a critical assessment of his role in

and with the decline of the bison, the wolf was forced to adjust to an altered environment and learned to kill the settlers' horses, sheep, and cattle. Thus, Young and Carhart evoked a sense of tragedy in *The Last Stand of the Pack*, a quality noted by a critic for the *Washington Post*: "One can not but feel a pulse of sympathy too for these creatures of the plains beaten back to their last stand by the forces of civilization."[22]

Although *The Last Stand of the Pack* implied that history was not kind to wolves, they were still portrayed as rapacious predators.[23] Furthermore, the authors paid homage to western settlers, an important constituency for the Survey. For the settlers, to establish a ranch and "hold it against the battering forces of the frontier, to maintain a foothold and make a living is no soft task. It requires all of the fight that men have everywhere to keep body and soul together...."[24] Even though *The Last Stand of the Pack* was not a commercial success, its glorification of the rancher and vilification of the wolf were echoed by Edward T. Taylor, representative from Colorado, at a congressional hearing, "Control of the

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predator control, see: Michael J. Robinson, *Predatory Bureaucracy: The Extermination of Wolves and the Transformation of the West* (Boulder: University Press of Colorado, 2005).

[22] Elisabeth Poe, Review of *The Last Stand of the Pack*, by Stanley Young and Arthur Carhart, *Washington Post*, 29 September 1929.

[23] The alleged depredations of the famous wolves have recently come under scrutiny by biologists Warren B. Ballard, Philip S. Gipson, and Ronald M. Novak. Based on an analysis of the teeth of some of the famous wolves, the biologists concluded that these notorious wolves did not live long enough to commit all the depredations that were attributed to them. They also argue, based on contemporary studies, that wolves are not nearly as injurious to livestock as it was commonly assumed, even in areas with high numbers of livestock. The authors believe that early literature (1890-1930) on wolves was extremely misleading; they are also highly critical of the Survey's accounts, which informed *The Last Stand of the Pack* and contributed to an overestimate of the damage to livestock. See: Warren B. Ballard, Philip S. Gipson, and Ronald M. Nowak, "Famous North American Wolves and the Credibility of Early Wildlife Literature," *Wildlife Society Bulletin 26* (winter 1998): 808-816.

[24] Carhart and Young, *The Last Stand of the Pack*, 38.

Predatory Animal," in 1930. After stating the stockmen's familiar argument for federal predator control—"the Federal Government should be held financially responsible for their [predators'] depredations" because it is responsible for the public domain—Taylor testified: "Let me suggest that you will find a wonderfully interesting book which has been lately written by Mr. Arthur Hawthorne Carhart and Mr. Stanley P. Young...." Taylor used *The Last Stand of the Pack* to support his request for increased appropriations for predator control and also drew on another familiar argument: public money should be spent on applied, rather than pure, science. Commenting on the recent agricultural appropriation bill, which set aside money for food habits research, Taylor objected: "It is not swivel-chair work here in Washington we want. We want enough men to go into the field and kill these predatory animals."[25]

The Survey's use of film, radio, and Young's popular account of wolves provided justification for killing "these predatory animals." However, the Survey also attempted to promote its work to others besides western stock interests. The 1930 Chief's Report was explicit about the need to communicate with the public. Although a lack of adequate funds prevented the Survey from hiring public relations "specialists" to give public lectures to "conservationists, fur farmers, stockmen, and others whose work is influenced by the wild-life administrative functions" of the Survey, the bureau utilized other mediums to reach the public.

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[25] The authors lamented the low sales of *The Last Stand of the Pack*. See: Jon T. Coleman, *Vicious: Wolves and Men in America* (New Haven: Yale University Press, 2004), 218; and House Committee on Agriculture: *Control of Predatory Animals, Hearings on H.R. 9599*, 71st Cong., 2nd sess. (1930), 10-12.

The Survey made progress in "communicating developments to the press of the country and directly to the public by radio and other addresses given by various members of the staff." Moreover, Survey scientists and division leaders were "constantly contributing articles in their own fields to the popular weekly and monthly magazines and to the outdoor, scientific, and trade journals of the country, thus effectively disseminating the information the public has a right to expect from the 'wild-life service' of the Government."[26]

To maximize public relation efforts, Survey literature had to be distributed efficiently and written clearly. In a 1934 memorandum for division leaders, H.P. Sheldon, head of public relations, specified instructions for writing departmental leaflets. According to the memo, Chief "Ding" Darling wanted to "acquaint the public at more or less regular intervals" of the Survey's work. Copies will be distributed to "editors of outdoor publications, so that the information thus disseminated by the Bureau will have extensive reading throughout this country.... The leaflets needed to be written in a "more or less popular style, so that each may serve not only as a report on accomplishments—technical or otherwise—but also as its own press release for outdoor editors." If the division heads gave "proper attention" to the writing of the leaflets, then "we shall be enabled to give more publicity to our accomplishments and thus interest a wider clientele."[27]

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[26] Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1930* (Washington: Government Printing Office, 1931), 2.
[27] H.P. Sheldon, "Memorandum for Heads of Divisions," 28 November 1934. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 147, Box 12.

Reaching this "wider clientele" grew in importance during the New Deal, as conservation was touted as a means to assist farmers and increase their incomes, thereby helping the economy recover. Government conservation efforts suggested that a past history of over-exploitation of natural resources could be arrested, thus encouraging a more efficient, wise, and profitable use of the natural world. Much of the Survey's promotional work in the 1930s conveyed the notion that the conservation of natural resources was the key to a better future.

To promote the idea of conservation and suggest that government agencies were wise stewards of the environment, the Survey used a variety of media to reach a wide audience. The conservation message stated a problem and proposed a solution. Initially, the earth was a pristine paradise until the "white man" abused it, but now, with wisdom and skill, the problems are solvable. The remedy also drew upon a distinctly religious narrative: At first, everything was good and innocent in the Garden, but after the Fall, nature was abused and problems ensued. However, once humans saw the errors of their ways, Redemption was possible through an enlightened understanding of nature and natural resources, an understanding that would be directed by government agencies.

The Survey presented this account of Garden-Fall-Redemption in a variety of media. For example, in "The History and Significance of American Wildlife"—a leaflet distributed to public schools—the narrative began with a portrayal of early America. The European settlers found a continent with abundant wildlife that made "rapid colonization" possible. After a few centuries, however, the onset of

market hunting resulted in, among other things, the extinction of the passenger pigeon and the "merciless exploitation of buffalo." Despite modern civilization's over-utilization of wildlife, the "era of wildlife exploitation is now drawing to a close," thanks, in part, to the insights of former Chief E.W. Nelson, who had the wisdom to realize that the preservation of species is dependent on the preservation of habitat. With this enlightened understanding, and with the Survey's authority to enforce wildlife legislation, the situation is no longer "dismal," and wildlife will multiply if given the opportunity.[28]

The "opportunity," however, often had to be provided by the Survey, a topic discussed by Survey game management agent James Gerow in a 1936 broadcast of the *Western Farm and Home Hour*. The radio address also employed the Garden-Fall-Redemption narrative as it touted Survey efforts to restore natural conditions in the Charles Sheldon Wildlife Refuge in Nevada. "Let us turn back the years to 1929," Gerow began, before the refuge was created. The land was overgrazed and the "springs and waterholes filled with debris," while the wildlife were "being forced into oblivion." With the Survey's management, however, grazing has been limited, waterholes were restored, and the "deer and antelope began to take notice." Gerow concluded by emphasizing the Survey's redemptive role: "When man invades the last strongholds of our wildlife the balance of nature is upset. But the Biological Survey proposes to re-establish that balance as

[28] United States Department of Agriculture, Bureau of Biological Survey, "The History and Significance of American Wildlife," Leaflet BS-108, March 1938 (Washington: Government Printing Office, 1938). National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 4.

nearly as possible in certain areas where the wildlife native to the region concerned may find sanctuary."[29]

Disturbing the "balance of nature" was addressed in *To Conserve Our Heritage*, a Department of Agriculture film that also utilized the Garden-Fall-Redemption structure.[30] The narrator begins by noting that, almost three hundred years ago, the American continent was "almost untouched by man," as there was but a "handful of human beings on the continent." This "handful of human beings" was a small population of Indians who inhabited a continent with a majestic landscape and boundless resources.[31] The East had imposing forests that "stretched for a thousand miles" where they met the prairies, a region "with knee-high grass that rolled for another thousand miles to the mountains." The land had "range after fertile range, with fertile valleys in between," until terminating at the West Coast. Between the two oceans, the land had "everything man could need": timber, grass, pure water, and enough wildlife "to last until the end of time." However, this cornucopia would not last with the coming of the European settlers who were motivated by "ignorance and greed" to extract nature's resources, including wildlife.

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[29] "Rehabilitating the Range for Wildlife," the *Western Farm and Home Hour*, 23 March 1936. Text available in National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 41.

[30] *To Conserve Our Heritage* was produced by the Department of Agriculture in 1940 and is publicly available on the Prelinger Archives, available at http://www.archive.org/details/prelinger [accessed 30 August 2008].

[31] In Survey publicity efforts that described early America, Indians had minimal influence on the environment, an image of Native Americans that became a significant component of the work of many environmental historians. See: Shepard Krech, *The Ecological Indian: Myth and History* (New York: Norton, 2000).

Despite this legacy of exploiting nature, redemption was possible—just barely: "Only at the eleventh hour did we take steps to save some fragments of the once vast herds and flocks" of declining populations of species. Furthermore, saving species promises monetary benefits as the film alludes to one of the early justifications for the creation of the Survey: by preserving insect-eating birds, "the guardians of our crops," conservation can help the farmer maximize profits while ensuring a reliable supply of food. The camera hints at the role of the Survey in preserving wildlife, as the viewer sees signs bearing the names of national wildlife refuges.

To make the conservation message credible, *To Conserve Our Heritage* also had to sidestep past governmental complicity in the exploitation of resources. For example, the film chastised the cattlemen of Grafton, Utah, a town that learned about overgrazing "the hard way." However, by opening the public domain to grazing, and by authorizing the elimination of predators such as coyotes and wolves on the public domain, the government facilitated much of the overgrazing of public land. Furthermore, the film criticized the "drainage craze" that destroyed wetlands and habitat for waterfowl, yet government agencies, especially the Bureau of Reclamation and the Army Corps of Engineers, were responsible for much of the elimination of wetlands. Thus, *To Conserve Our Heritage* employed a frequently-used tactic the Survey utilized to sell itself to the public: ignore or oversimplify information that could present government conservation in a less-than-favorable light.

Many of the Survey's radio broadcasts frequently employed this tactic of oversimplification or omission. The radio shows that highlighted the "Autobiographies of Infamous Bugs and Rodents" were the most obvious examples of reducing a complex subject to a simple formula, but other topics also received similar treatment. This oversimplification was evident in a 1939 broadcast on the *National Farm and Home Program* that discussed the results of a game census conducted by several government agencies. In 1937, the Survey, in conjunction with the National Park Service, the Grazing Division of the Department of Interior, the Bureau of Indian Affairs, and the Forest Service, participated in a census of big game animals. Several states also provided information from conservation officers, county extension services, and "interested and well-informed local groups and individuals." Animals inventoried included different species of deer and bighorn sheep, elk, caribou, antelope, bison, moose, mountain goats, peccaries, black and grizzly bears, and the "exotic" European wild boars.[32]

The Survey encountered numerous problems compiling the data for the census. These problems were acknowledged in the individual reports of Survey scientists but were glossed over in the radio show. One difficulty was the different degrees of quality and reliability in state game reports. Survey biologist E.E. Horn gathered data from California and Nevada fish and game commissions. While he had no significant criticism of the Californian data, he remarked that,

[32] United States Department of Agriculture Bureau of Biological Survey: Wildlife Research and Management Leaflet BS-122, January 1939 (Washington: Government Printing Office, 1939).

"in Nevada, the Game Commissioner had but a fragmentary idea of numbers, or even species. I consider the Nevada figures far from even a satisfactory guess, and probably not within 500 percent of correct for any species." Sometimes, the type of species and the location of its habitat created difficulty in estimating numbers. Horn noted that determining the black bear population was more of a "guesstimate" than estimate: "No one that I have encountered who knows anything of the northwest coast area, cares to hazard a guess as to the population of bear in this rugged, extremely brushy country." Similarly, "no adequate figures are readily available" for the wild boar "in the extremely rugged terrain it occupies."[33]

Olaus Murie, reporting from Wyoming and Montana, also had doubts about accuracy. Because of migrations, elk might be recorded in data from Yellowstone as well as data from national forests in Montana. Furthermore, he expressed reservations about accepting estimates from state game commissions, but he was unable to provide an independent analysis. For example, he believed the estimate of 250 mule deer in Teton County "seems much too high." However, since he did not provide his own estimate, "I have left this particular estimate just as it was given to me" by the game commission.[34] Walter P. Taylor, assigned to providing estimates from Arizona, echoed Murie's misgivings. Although he welcomed participation from the state commissions, he cautioned, "obviously, the estimates

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National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 4.
[33] E.E. Horn to Chief of Bureau of Biological Survey, 4 October 1939. United States Bureau of Biological Survey, Big Game Estimates and Inventories, 1928-1940. Record Unit 7168, Smithsonian Institution, Box 1, Folder 9.

by different men are not of equal value" and Survey employees were better qualified. However, even Survey personnel were prone to errors identifying species: "There is some confusion in the minds of those reporting, as well as, it may be confessed, in our own minds, regarding the systematic status of the various forms of the white-tailed deer in Texas. Perhaps the same is true of the 'Virginia White-Tailed' deer and the 'Arizona White-Tailed' deer in New Mexico, also."[35]

When presenting the results of the census to the public on the *National Farm and Home Hour*, the Survey neglected to discuss the difficulties encountered in making estimates; a complex undertaking was simplified for public consumption. When the Survey's principle speech writer, Howard Zahniser, appeared on the radio show, the host introduced him and made reference to the five million game animals tabulated by the census: "That sounds like a large number, Howard—a very large number to talk about in a few minutes. You better get started." Zahniser enthused: "I'll tell you how we got this figure. It is the result of a nationwide inventory conducted by the U.S Biological Survey—for the same reason that store keepers take inventory…." However, Zahniser continued, unlike the store keeper taking inventory, the game census taker has a much more complex task and thus requires assistance from other government agencies and "local groups and individuals… In other words, from every possible reliable source…." These "reliable" sources have contributed to the census tabulation,

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[34] Murie to Chief of the Biological Survey, 9 October 1938, Ibid.
[35] Walter P. Taylor to Chief of the Biological Survey (undated), Ibid.

"the most definite total we have ever had for the big game in the United States."[36] Zahniser's oversimplification of the census is perhaps not surprising, considering that he presented the results to a general audience. However, even a more academic essay prepared under the supervision of W.B. Bell, head of the Survey's Division of Wildlife Research, for the *Journal of the American Statistical Association*, also neglected to mention the uncertainties involved in estimating the numbers of game animals.[37]

Another broadcast of the *National Farm and Home Hour* presented by Zahniser, by omitting some potentially embarrassing information, also gave a misleading description of the Survey's work. A 1936 show discussed Murie's investigations of caribou and reindeer in Alaska. Zahniser began by commenting that, while the big game herds of buffalo on the plains are "something of the past," the "caribou herds wandering over their subarctic ranges" still occur and "can be perpetuated." However, the reindeer "was imported to Alaska some years ago," and "whenever the domestic reindeer herds are introduced, the caribou must, of course, disappear, for both cannot live on the same range." Zahniser's explanation, however, conveniently overlooked the Survey's role in assisting with the importation of the reindeer to Alaska "some years ago." A 1930 radio show even boasted of the success of the importation program: "Reindeer were introduced in comparatively small numbers. They increased remarkably. Now

[36] "Five Million Big-Game Animals," the *National Farm and Home Program*, 20 January 1939. Text available from Ibid. For Zahniser, See: Mark Harvey, *Wilderness Forever: Howard Zahniser and the Path to the Wilderness Act* (Seattle: University of Washington Press, 2005).

they form the big livestock industry of Alaska, and reindeer meat from vast herds is found on the bill-of-fare of hotels in our leading cities." Rather than discuss the lack of foresight in the importation program that resulted in caribou and reindeer competing for the same range, the 1936 show proposed a happy solution: reindeer and caribou each needed a separate range in Alaska.[38]

The radio shows' selective use of information allowed the Survey to avoid discussing intricate questions about caribou and about the big game census; press releases by the Survey also followed this same pattern of avoiding complex and difficult issues. As a result, newspapers, quoting or referring to the press releases or yearly reports, often became a mouthpiece for the Survey. Newspapers frequently conveyed Survey information that was used to inform the public: changes in hunters' bag limits or open seasons, announcements for conferences or publications, and requests for volunteers for bird banding. Newspapers also often praised Survey work and policies in news coverage, not just editorials, a pattern indicative of the *New York Times'* coverage of the Survey. For example, in "Uncle Sam, Hunter and Trapper," the *Times* echoed Survey reports about the threat of mountain lions, claiming one mountain lion "killed eighty sheep in a night… These activities [of the mountain lion] explain why Uncle Sam has gone into the hunting and trapping business. The Biological Survey destroys wild

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[37] William H. Marshall, "Methods of Wildlife Censuses," *Journal of the American Statistical Association* 32 (September 1937): 537-542.
[38] For the introduction of reindeer in Alaska, see: "The Reindeer Industry," *Forest and Stream*, 92 (July 1922), 304; and Albert L. Seeman, "Development of Reindeer Activities in Alaska," *Economic Geography* 9 (July 1933): 294-298.

animal pests just as it protects other game."[39] The *Times* also implicitly endorsed the Survey's argument of avian benefits to farmers: "where the bird life is varied [,] protection is assured against practically every sort of insect. "[40]

Although an occasional letter to the editor criticized the Survey, the *Times* seldom did. Even in a rare critical article, the criticism was qualified. Raymond R. Camp, the "Wood Field and Stream" columnist for the *Times,* opposed the Survey's refusal to modify hunting regulations in 1937, despite an apparent increase in waterfowl populations: "It is hoped that the regulations will be relaxed, or at least so regulated that an honest hunter can shoot without fear of violating the law." Camp, however, quickly tempered his criticism: "Never let it be said that we 'have it in' for the bureau. They have done a fine job, a praiseworthy job, in almost every task they started, but it would seem that they leaned over backward to protect ducks in this instance."[41]

The Survey's tendency toward oversimplification and the selective use of information minimized the possibility of negative press coverage, but the bureau also conveyed a more positive message, one that was associated with New Deal conservation. As conservation became an integral aspect of the New Deal, the Survey actively promoted it at talks and conferences to a variety of organizations across the nation. Each talk had a similar message: mistakes were made in the past about the management of natural resources, but now, greater foresight and

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[39] "Uncle Sam, Hunter and Trapper," *New York Times*, 28 December 1924.
[40] "Bird Refuges Increase," *New York Times*, 6 March 1927.
[41] Raymond R. Camp, "Wood, Field, and Stream," *New York Times*, 9 December 1937. Rosalie Edge of the Emergency Conservation Committee, persistent critic of the Survey, occasionally

the growing expertise of the government bureaus will allow society to use resources more intelligently and less indiscriminately. Although the Survey communicated the same basic idea to various associations, there were slight variations in each talk that allowed the Survey to make conservation relevant to each organization. By slightly tailoring the conservation message, the Survey made its conservation message relevant to different civic, business, and conservation organizations.[42]

To make the message resonate with an audience, the Survey often incorporated images or rhetoric suitable for that particular group. For example, Chief Darling, speaking to the National Council of the State Garden Federation at Grand Rapids, Michigan, told the attendees that conservation is like a "big gardening project" that requires the restoration of natural vegetation.[43] In a different venue, Director of Public Relations Howard Zahniser used religious themes and the Garden-Fall-Redemption narrative to advance the idea of conservation. At the Men's Club of the First Presbyterian Church in Cantonsville, Maryland, he referred to the Genesis account of man's dominion over nature. During biblical times, Zahniser declared, wildlife seemed plentiful, and no one thought about conservation, but after man squandered nature's resources, we are

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wrote to the *New York Times*. See her letters on the following dates: 11 June 1934; 1 January 1934; 30 August 1934; and 17 December 1934.

[42] Although it is anachronistic to use the relatively recent term "narrowcasting" to describe the Survey's promotional strategy, the term captures the essence of the Survey's approach to conservation talks: tailor the message to suit a particular "niche market" (another relatively recent term).

[43] Jay Norwood Darling, "The National Conservation Program," talk given at the National Council of the State Garden Federation at Grand Rapids, Michigan, June 6, 1934. Text available in: Gabrielson Papers, Denver, Box 12, Folder 15.

"awakening to our responsibilities." Zahniser also applied another tactic used by the Survey—establishing a personal connection to the audience—by telling the gathering that he "feels right at home" because his father was a preacher.[44] Chief Gabrielson also used this personal approach by telling members of the Illinois Sportsmen Association that he grew up in "duck country" in Iowa and conservation was "very close" to him. As a sportsman, he knew that hunting regulations were "irksome" but necessary for the intelligent management of resources.[45] Before the Junior Chamber of Commerce in Louisville, Kentucky, he commented that the intelligent management of natural resources is no different than the intelligent management of business.[46]

Sometimes the Survey talks linked conservation to specific issues and concerns associated with each organization. For example, at an address before the commissioners of the International Association of Fish and Wildlife Agencies—an organization that often viewed federal authority as being insensitive to local conservation—Gabrielson emphasized flexibility in the implementation of federal conservation efforts. Furthermore, in explaining the migratory bird program, he stated: "We are simply trying to apply to the migratory waterfowl, on a nation-wide scale, the same principle of management that each state is

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[44] Howard Zahniser, "Bird Banding and Man's Responsibility toward Nature," talk given at the Men's Club of the First Presbyterian Church, Cantonsville, Maryland, April 12, 1935. Text available in: Gabrielson Papers, Denver, Box 12, Folder 16.
[45] Ira Gabrielson, "The Problem of Duck Conservation," talk given at the Illinois Sportsmen Association, Chicago, June 29, 1926. Text available in Gabrielson Papers, Denver, Box 7, Folder 10.
[46] Ira Gabrielson, "Conservation," talk given at The Junior Chamber of Commerce, Louisville, Kentucky, March 28, 1937. Text available in Gabrielson Papers, Denver, Box 6 Folder 34.

endeavoring to apply to the upland game species within its own territory."[47] When addressing the Ecological Society of America, Gabrielson told its members that the Survey's new research has "more of an ecological slant than it had it the past."[48] During a talk before the Central States Forestry Congress, Gabrielson argued that, in the future, with the conservation of wildlife, the recreational use of forests would potentially be more profitable than timber production.[49]

At the talks, Gabrielson often used the opportunity to assuage the concerns of organizations that were concerned about the implications of conservation. For example, knowing that sportsmen were sensitive to criticism that they were responsible for the decline in waterfowl, Gabrielson reassured them that the Survey's conservation work did not specifically target them. Drought, the loss of habitat, drainage projects, and the "lavish extravagance" of the use of natural resources by all Americans—not just sportsmen—were the real culprits.[50] Gabrielson also addressed the fears of stock interests at a meeting of the National Woolgrowers Association, a beneficiary of predator and rodent control. He assured the woolgrowers that the Survey did not place the "interests of ducks over

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[47] Ira Gabrielson, "Practical Application of Game Management," talk given at The International Association of Fish and Wildlife Agencies, September 1, 1936. Text available in Gabrielson Papers, Denver, Box 7, Folder 11. For the International Association of Fish and Wildlife Agencies, see: Dian Olson Belanger, *Managing American Wildlife: A History of the International Association of Fish and Wildlife Agencies* (Amherst: The University of Massachusetts Press, 1988).

[48] Ira Gabrielson, "Wildlife Research and Ecology," talk given at the Ecological Society of America, St. Louis, Dec 31, 1935. Text available in Gabrielson Papers, Denver, Box 12, Folder 17.

[49] Ira Gabrielson, "Forest Management Is Wildlife Management," talk given at Central States Forestry Congress, Elkins West Virginia, September 29, 1936. Text available in Gabrielson Papers, Denver, Box 7, Folder 2.

[50] Ira Gabrielson, "The Problem of Duck Conservation," talk given at the Illinois Sportsmen's Association, June 29, 1939. Text available in Gabrielson Papers, Denver, Box 7, Folder 10.

your concerns" and that the Survey "has a large number of western men in our organization—men who are familiar with western problems." He also cautioned them not to believe "a great many wild stories" that "radical eastern conservationists" have claimed that the Survey has "sold out" to the livestock industry.[51]

Although Gabrielson sought to lessen the hunters' and woolgrowers' fears of the implications of conservation, in other talks he was critical of these same groups of resource users. At an address before the Association of Land Grant Colleges and Universities, for example, Gabrielson gave a history of wildlife management. He commented that one of the "curious developments" was that, in the United States, "every man who hunts once a year... thinks he is an expert" on wildlife. These alleged experts have a "solution" for every problem if they could just get the "boneheaded authorities" to listen. No other subject "produces as many nuts," and the Survey is perpetually "swamped" with their proposed recommendations.[52] In reference to the livestock industry, Gabrielson, at the North American Wildlife Conference in 1936, was equally critical. In addition to noting that much of the public domain has been overgrazed, he was dismayed by the "furor of opposition" in some western states over requests to accommodate wildlife. "We have a right to ask the livestock interests to remember that these are public lands, that the wildlife is also a public resource, and that on the public

[51] Ira Gabrielson, "Address to National Woolgrowers Association," talk given at the National Woolgrowers Association, Albuquerque, New Mexico, January 26, 1937. Text available in: Gabrielson Papers, Box 8 Folder 11.

land it is right and proper that provisions be made for the maintenance of these public wildlife resources." Gabrielson, however, quickly softened his criticism: He was "sure" that the opposition to making provisions for wildlife "does not represent the majority of stock owners."[53]

Gabrielson's contrary positions—criticizing yet appeasing hunters and stock interests—reflected the Survey's dilemma: On one hand, the Survey needed the influence of the stockmen, as they financially supported the predator and rodent control program and testified before Congress on the Survey's behalf. On the other hand, the Survey encountered numerous conflicts with the livestock industry in managing wildlife reservations (see chapter four). Similarly, the Survey needed the cooperation of hunters to abide by hunting regulations and to help track the condition of migratory waterfowl, yet hunters often offered strong resistance to those regulations (see chapter five). Thus, it is not surprising that Gabrielson approached these conservation talks with a "strategy" to diffuse the opposition. In his unpublished autobiography, Gabrielson remarked that when he was given "invitations to talk to the more rabid sportsmen's groups," he "learned the hard way to ask for a chance to tell my story before submitting to questions…. this particular strategy paid off, in at least appeasing the more ferocious

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[52] Ira Gabrielson, "Relations of Agriculture and Game Management," talk given at The Association of Land Grant Colleges and Universities, Nov. 19, 1935, Washington D.C., 19 November 1935. Text available in: Gabrielson Papers, Denver, 7, Box 8, Folder 12.
[53] Ira Gabrielson, "A National Program for Wildlife Conservation, " talk given at the North American Wildlife Conference, Washington, D.C., 7 February 1936. Text available in Gabrielson Papers, Denver, Box 7, Folder 8.

sportsmen groups that were made-up mostly of people who owned or leased hunting clubs and who were upset when their hunting was interfered with."[54]

There were other critics of the Survey besides the "ferocious sportsmen." Sportsmen, scientists, stockmen, conservationists, and opponents of the New Deal voiced misgivings about the Survey or New Deal conservation, although the specific targets of the complaints often differed. Each of these groups of critics, however, sometimes supported the Survey. Sportsmen supported the principle of conserving waterfowl but often opposed regulations that limited their freedom to hunt. The *New York Times* succinctly captured the sportsmen's mixed feelings, noting that, after the Survey publicized new hunting regulations for the 1939 waterfowl season, sportsmen reacted with the "usual amount of praise and complaint."[55] Scientists and conservationists endorsed the Survey's efforts to preserve wildlife but objected to the widespread destruction of predators. On the other hand, stockmen were often critical of efforts to protect wildlife but supported predator and rodent control. Although these conflicting interests often pulled the Survey and conservation efforts in different directions, the national press generally endorsed New Deal conservation—one critic charged that no one wanted to be called an anti-conservationist—but there was occasional criticism that government agencies were working at cross-purposes or that conservation

[54] "Memoirs of Ira Gabrielson and What Others Have Said about Him," Ira Noel Gabrielson Papers, 1918-1987, Record Unit 7319, Smithsonian Institution (hereafter, Gabrielson Papers, Smithsonian), Box 6, Folder 5. The memoirs were complied by Gabrielson's son-in-law, Robert A. Nesbitt, and are based on Gabrielson's diaries.
[55] Raymond R. Camp, "Wood Field and Stream," New York Times, July 21, 1938.

programs were typical New Deal boondoggles.[56] Moreover, the Survey felt pressure to produce "results" in Franklin Roosevelt's competitive environment of New Deal agencies and programs. As Roosevelt stated, "There is something to be said…for having a little conflict between agencies. A little rivalry is stimulating, you know. It keeps everybody going to prove that he is a better fellow than the next man."[57]

Most disturbing for the Survey was criticism from non-bureau scientists, especially in reference to predator control and the failure to arrest the decline in migratory waterfowl populations, issues that became more pronounced by the late 1920s. Survey scientists had identities besides their roles as government bureaucrats. They belonged to professional scientific associations and conservation organizations, published technical articles in scientific journals, often did work in museums, and wrote popular articles for magazines such as *Bird Lore* and *Nature Magazine*. Thus, scientific criticism was felt at a professional level, and, at times, at a personal level. While most of the correspondence between Survey and outside scientists was conducted in a professional and academic manner, charges were occasionally directed at the scientific competence of the bureau's scientists. For example, E. Raymond Hall, a prominent

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[56] Albert W. Atwood, "Is This Conservation," *Saturday Evening Post* 209 (26 September 1936): 22+. For a sampling of criticism, see the following: Aldo Leopold, "Conservation Economics," *Journal of Forestry* 32 (May 1934):537-544; "Manicuring the Wilderness," *Saturday Evening Post*, 207 (8 December 1934); "A New Defender of the Wilderness," *Nature Magazine* 26 (September 1935): 178-179; "President Leads Great Conservation Rally," *American Forests* 41 (October 1935): 588-590; "Ding Out," *Time* (25 November 1935); "President's Page," *Bird Lore* 39 (July-August 1937): 1; William Voigt, *Thirst on the Land* (New York: National Association of Audubon Societies, 1937); and "CCC Needs Clearer Policy on Conservation," *American Forests* 44 (May 1938): 224-226.

mammalogist and author of an authoritative text on mammals, complained to the Survey's Waldo McAtee about the use of poison on injurious birds in California: "I believe that you, yourself, do not know enough about the actual conditions... to justify the use of poison in California...." Lack of autonomy was another frequent charge: outside forces—stockmen, Congress, hunters, farmers, state game associations, or other government agencies—seemed to control the Survey's agenda. Aldo Leopold, always a perceptive observer of federal conservation, griped to McAtee that the Survey "has let Congress build its priorities, and Congress obviously doesn't know how." Leopold's specific criticism—too much emphasis on predator and rodent control—was often downplayed in correspondence with other scientists. Writing to ornithologist Margaret Nice, Chief Paul Redington assured her that "the Biological Survey is only engaged experimentally in bird control and has only two men working on the subject in California."[58]

The Survey's efforts to blunt scientific criticism were of questionable efficacy, especially in view of Rosalie Edge's perpetual criticism of the bureau's predator control program. Although Edge was not a scientist, her Emergency Conservation Committee included prominent members of the scientific community. The organization's criticism caught the attention of Survey

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[57] Franklin Roosevelt quoted in Wellman, *Wildland Recreation Policy*, 142.
[58] E. Raymond Hall to W.L. McAtee, 30 December 1931, Johnson Neff Papers, CONS52, Conservation Collection, Denver Public Library (hereafter, Neff Papers), Box 6, "Criticisms" Folder; Aldo Leopold to W.L. McAtee, 3 December 1934, Papers of W.L. McAtee, Library of Congress, (hereafter, McAtee papers), Box 28, "Leopold" Folder; and Paul Redington to Margaret M. Nice, 27 January 1932, Johnson Neff Papers, CONS52, Conservation Collection, Denver

scientists, some of whom agreed with Edge in principle, but disagreed with her methods. For example, Olaus Murie of the Survey believed there was "truth" in Edge's criticisms, but her "misstatements" and "bitterness" hurt the cause of conservation. Responding to another round of Edge's attacks on the Survey, McAtee was exasperated: "I must say that I wish you would not snap at those who are trying to be friendly with you.... You are not really on the firing line in conservation..."[59]

Some non-Survey scientists echoed the sentiment of Murie and McAtee. Tulane University zoology professor E.S. Hathaway, who was critical of predator control, criticized Edge for distorting facts, telling her that "the conservation movement can not afford to have its advocates be so grossly careless in the use of facts." Even an outsider to the predator controversy, Edwin Sanderson of the American Humane Association, sardonically noted that "many" do not want to be "affiliated with her for she makes just as big a fuss when a mouse takes a piece of a child's cheese, as she does if a mountain lion would steal a few sheep." Humor aside, Edge was enough of an irritant to annoy the Survey. Chief Redington, after discussing with Division leaders a controversy between T. Gilbert Pearson of the

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Public Library, Box 6, "Criticisms" Folder. E. Raymond Hall's famous work on mammals was first published in 1959. *The Mammals of North America*, 2nd ed. (New York: Wiley, 1981).

[59] Olaus Murie to T. Gilbert Pearson, 21 September 1932, Olaus J. Murie Papers, CONS90, Conservation Collection, Denver Public Library (hereafter, Olaus Murie Papers), Box 1, Folder 55; and Waldo McAtee to Rosalie Edge, 12 January 1934, McAtee Papers, Box 20, "Edge" Folder.

Audubon Society and Edge, recorded in his diary that everyone agreed that "we could not afford to get into a fight" over the issue.[60]

One way to avoid a "fight" is to not talk about contentious issues. As the controversies of the late 1920s and early 1930s grew more intense, the Survey took more coercive measures to limit the flow of information that might present the organization in a damaging light. The bureau's organizational efforts and instructions to employees indicate that the Survey was becoming increasingly concerned with potentially unflattering information and publicity.

The Survey's instructions for communications between employees demonstrate this developing concern over potentially adverse information. In 1927, Chief Redington issued a memorandum in reference to official correspondence: "Any letter intended to serve as a report upon official work or as instructions regarding official work, or any letter which by reason of the information it conveys should be part of the Biological Survey record in any matter or transaction, and available in the subsequent review or inspection of that record, should bear an official designation and be directed to the Chief of the Biological Survey."[61]

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[60] E.S. Hathaway to Mrs. Edge, 10 March 1935. McAtee Papers, Box 20 "Edge" Folder; Edwin Sanderson to Edward A. Preble, 12 December 1934, Edward Alexander Preble Papers, 1887-1957 and undated, Record Unit 7252, Smithsonian Institution (hereafter, Preble Papers), Box 4, "Sanderson" Folder; Paul Redington, diary entry, 22 January 1933. Paul G. Redington Papers, collection number 07321, American Heritage Center, University of Wyoming (hereafter, Redington Papers).

[61] Paul Redington, "General Memorandum : Personal Correspondence Regarding Official Matters," 15 June 1927. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 13. At the Symposium on Predatory Animal Control in 1930, ecologist and critic of the Survey Charles Adams alluded to the Survey's growing tendency toward secrecy: if the Survey employees "do not agree with the policies of the Bureau they can say nothing except at

In 1929, Redington issued another memorandum, but this one addressed material prepared by Division heads for the Survey's annual reports. He gave instructions regarding what should be included and omitted. For example, a report from a Division head should focus on "problems faced and accomplishments made during the year, so that it should deal with facts and results rather than functions, and should omit philosophical and other discussions of a general nature." Since the annual reports were intended for the public, the year's "accomplishments" should be emphasized, while the phrase "insufficient funds" should not be used, since it implies a failure to complete a project. Redington also placed high importance on reaching "a well informed public" and the "need for public education on a large scale."[62]

The "public education" that the Survey desired, however, was very specific and was directed to avoid touchy issues. A policy report in 1932 for employees of the Division of Predatory-Animal and Rodent Control stated that, "for the purposes of public education," radio talks should emphasize "simplicity, accuracy, and presentation of the facts without controversy." In another effort to lessen controversy, the Survey eliminated its monthly "honor roll," a practice of recognizing hunters who captured the greatest number of predators; the policy statement directed employees to not mention the honor roll "in news letters or other publicity material." Furthermore, manuscripts and radio talks "must be

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the usual risk." Charles Adams, "Rational Predatory Animal Control," *Journal of Mammalogy* 11 (August 1930): 354.

[62] Paul Redington, "Memorandum for Heads of Divisions and Offices," 12 June 1929. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 9.

submitted to the Washington office before publication or broadcast." The report also specified that, although it was acceptable to give "field reports showing the progress of control operations" to local media, the initial results of laboratory research "should not be released in whole or in part either to the press or to private individuals, except as authorized by the Washington office."[63]

Although the directive did not specifically give reasons why laboratory results were not to be shared with the media, laboratory studies focused on food habits research, a method of investigation that might be damaging to the Survey's rationale for predator control: If food habits research indicated that a predator such as the coyote might be more beneficial (by destroying rodents) than injurious, then the Survey's justification for destroying coyotes would be undermined. The Survey's fear of food habits research challenging the basis of predator control soon became manifest when an internal controversy broke out over Olaus Murie's attempt to publish an essay, initially in *The Journal of Mammalogy* and then later in *Bird Lore*, on coyote food habits. Murie's paper, a combination of field and laboratory investigations, suggested that the coyote was not as destructive as conventional wisdom had indicated.

Various Survey members argued that the bureau should not give its imprimatur to Murie's paper. Albert Day, biologist in the Division of Predatory Animal and Rodent Control, wrote to Stanley Young of the same division, commenting that it would be a "mistake to publish this manuscript in the Journal

[63] "General Policies and Instructions for the Guidance of the Personnel Division of Predatory-Animal and Rodent Control, Bureau of Biological Survey," 1932. National Archives. Records of

of Mammalogy in the present form." He believed that Murie's conclusions "no doubt" will apply to some parts of Jackson Hole and Yellowstone Park. However, in areas with large ranching operations, "the coyotes will certainly not prove anything like as beneficial [by destroying rodents] as Mr. Murie has found them in Jackson Hole." Day was also worried about political repercussions: Murie's paper, if published, "would present an admirable opportunity to certain individuals who are not familiar with the facts to criticize us and who would probably cause some embarrassment in the future."[64] Stanley Young also advised against publication of the essay in its current form. He argued that, prior to Murie's investigations, private trappers had reduced the coyote population, thus resulting in atypical conditions. It would be wrong to draw conclusions about the coyotes when trapping had artificially reduced their numbers.[65] On the other hand, Waldo McAtee, head of Food Habits Research, defended Murie. He wrote to W.B. Bell, head of the Division of Biological Investigations, remarking that "Murie's attitude [is] commendably fair throughout.... This is just the kind of investigation that we need as a guide toward policies as to the control of predatory animals and I think shows so far as it goes that coyotes are not to be regarded as a serious foe of big game animals under approximately natural conditions."[66]

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the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 12.
[64] Albert Day to Stanley Young, 8 March 1932. Murie Papers, Box 1, Folder 36.
[65] Stanley Young to W.B. Bell, 15 March 1932, Ibid.
[66] W.L. McAtee to W.B. Bell, 8 April 1932, Ibid.

Despite McAtee's support, Murie never did publish his paper on the food habits of Jackson Hole coyotes in the *Journal of Mammalogy*.[67]

Murie encountered similar difficulties when he attempted to publish an article about coyotes in *Bird Lore*, the magazine of the National Association of Audubon Societies. The editor of *Bird Lore*, William Voigt, asked Murie to write a "defense of the coyote," though he cautioned Murie that the article should not be an "emotional defense of predators." Instead, "we like to have as factual a case presented as possible... our approach to the problems of predation are increasingly given an ecological slant."[68] However, after Murie completed the article, Bell wrote to Voigt, stating that the "Bureau is not warranted in approving for publication at this time the article as submitted by Murie." Bell's grounds for disapproval were Murie's "comparatively limited experience" and a forthcoming bureau publication on the food habits of the coyote that "will afford a sound basis for interpretation of the ecological and economic status of the animal..."[69] After the Survey's disapproval, Voigt apologetically wrote to Murie, stating that "I greatly regret that we must postpone the publication of this Coyote article but the powers on high have spoken and I suppose that settles it."[70]

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[67] Murie to Bell, 22 June 1932, Ibid. Murie wrote to McAtee that he was revising his paper to incorporate some minor suggestions that McAtee discussed with Murie, but there is no correspondence about Murie's revisions. Murie did eventually publish a paper in the *Journal of Mammalogy* on coyote food habits, but it was published in 1945 (after the controversy abated) and focused on coyotes in Montana and British Columbia rather than Wyoming, his original region of study. Olaus Murie, "Notes on Coyote Food Habits in Montana and British Columbia," *Journal of Mammalogy* 26 (February 1945): 33-40.

[68] William Voigt to Murie, 28 February 1936, Ibid.

[69] William Voigt to W.L. Bell, 4 April 1936, Ibid.

[70] William Voigt to Olaus Murie, 24 April 1936, Ibid.

Subsequent correspondence between Murie and the "powers" indicated that the Survey was more interested in avoiding controversy; Murie's alleged inexperience was not a serious reason for rejection. A puzzled Murie wrote to Chief Ira Gabrielson, asking, "Was my coyote article as bad as all that?" Murie defended his decision to write the article. The Audubon Society was beginning a program of mammal conservation, and Murie believed his article would contribute to that program and give a "boost" to the Biological Survey. However, Murie also touched on a potential problem: "Some of the principles I hinted at in connection with predation and game population, I am confident will some day be common knowledge. It remains to be seen whether the Survey will some day take the lead in making them so." Despite his awareness of a possible conflict between his conclusions and the Survey's position on predators, Murie was baffled by the rejection: "The suppression of my article came to me as a great surprise, really a shock, in view of my intentions. Evidently, I have a very wrong impression of the present policies of the Biological Survey."[71] Bell, writing on behalf of Chief Gabrielson, who was out of town, tried to assuage Murie. Bell stated that the article was not approved because Voigt and John Baker of the National Association of Audubon Societies were trying to place Darling and Gabrielson "in an absolutely untenable position before the public" on the predator controversy. Thus, "we wanted to protect both you and the Bureau against misunderstandings that would have been very sure to arise had your article been published in Bird Lore as proposed." This ostensible protection was especially

[71] Olaus Murie to Chief, 26 April 1936, Ibid.

important at a time when "we are endeavoring to move ahead steadily and consistently, and in a way that will inspire and merit public confidence and support." Bell concluded with an attempt to downplay Murie's concerns: "You have a lot to contribute to this program and we are relying heavily on you. So don't have a fit of the blues over this matter or get the idea that everything is going to the eternal bow-wows."[72]

Bell's paternalistic attitude toward Murie seemed disingenuous. In the event of "misunderstandings" or controversy, the Survey, not Murie, would have needed the protection. Murie's "defense" of the coyote illustrated its beneficial role in destroying rodents, thus undermining the Survey's position that the coyote was a menace, a position that the Survey consistently held by marshaling up its authority figures who supported predator control.[73]

The Murie incident was one indication that the Survey was becoming increasingly concerned with its image and made efforts to obstruct potentially damaging information. The Survey's reorganization in July, 1934, put forth by Jay Norwood Darling, was another instance of that concern. Under the reorganization plan, the Division of Predatory Animal Control was renamed the Division of Game Management, thus reflecting the Survey's desire to draw attention away from its predator work. A newly formed Division of Public

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[72] Bell to Murie, 1 June 1936, Ibid.

[73] For example, Secretary W.C. Henderson, at the 1930 Symposium on Predatory Animal Control, stated: "Such outstanding naturalists as Dr. E.W. Nelson, Dr. A.K. Fisher, Major E.A. Goldman, and Vernon Bailey, have reached the conclusion that in most localities the destructive habits of the coyote far outweigh in importance any good that this animal may accomplish in its destruction of rodents." See: W.C. Henderson, "The Control of the Coyote," *Journal of Mammalogy* 11 (August 1930), 338.

Relations, headed by Colonel H.P. Sheldon, assumed the responsibilities of the Office of Editorial and Informational Work and of the Office of Exhibits, Photographs, and Publications Distribution. The elevated rank of the Survey's public relations work—from office to division—was reflective of a greater awareness of reaching the public, as specified in Darling's reorganization instructions: "A closer acquaintance between the Bureau and the public is desirable and possible. This should be one of the objectives of this Division. The tremendous public interest that exists throughout the country may well furnish a much larger audience than has been served heretofore by the Survey."[74] The desire to connect with this "much larger audience," an audience more interested in conservation, wildlife, and the outdoor experience, suggests the Survey was beginning to contemplate the possibility that its future might be tied to a newer constituency—outdoor enthusiasts—and not just its traditional constituencies of farmers and stockmen.[75]

To capture this potential new group of constituents, it was necessary for the Survey to avoid controversy and maintain a favorable image. To meet these goals, the Survey took more authoritative measures to limit or curtail information that portrayed the Survey in a negative light. Under the reorganization plan, the newly-created Division of Public Relations "will be responsible for the editing of all manuscripts for official and outside publication, written by or for members of

[74] Jay Norwood Darling, "General Orders for the Reorganization of the Bureau of Biological Survey," 2 July 1934. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 12.

the Bureau, for all press and radio release, and for the creation and distribution of exhibits, photographs, and bulletins." Furthermore, the Division was charged with enforcing the order "requiring that all writings by employees of the Bureau intended for publication outside the Bureau shall first be submitted for Bureau sanction, approval to be given or withheld by the Division of Public Relations, subject to review by the Bureau Chief on appeal." The reorganization plan also created a new division to address migratory waterfowl, an indication of conservation's greater role in the Survey.[76]

Approximately two and a half months after the reorganization order, Chief Darling issued another reorganization involving reassignments to the Survey's research staff. He was motivated by criticism of the Survey, though not directly in reference to predator control: "This Bureau has been accused, and I believe there has been some ground for the accusation, of the right hand not knowing what the left hand doeth." More specifically, Darling turned his attention to criticism directed at all the government bureaus managing natural resources. He claimed that "in the field of conservation there must come at an early date a realization of the chaos that persists as a result of the contradictory activities of the Government...." He pointed out, for example, that, while the CWA tore away protective vegetation from the sides of hills, the CCC constructed dams for erosion control. Army engineers constructed dams for flood control without

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[75] For the growing importance of outdoor enthusiasts, see chapter two of Paul Sutter, *Driven Wild* (Seattle: University of Washington Press, 2002).
[76] Jay Norwood Darling, "General Orders for the Reorganization of the Bureau of Biological Survey." Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 12.

considering the biological consequences. One government agency drained natural reservoirs to create new farmland, while another purchased land to limit agriculture output. Although Darling felt stung by the criticism that government agencies were working at cross purposes, his September reorganization only shifted personnel in the research divisions so that the "faculties and talents existing in the Bureau" will be "united in its efforts toward a balanced program of wildlife conservation and public service." Nothing was done to address the larger issue of conflicting agendas of different government bureaus.[77]

Cooperative agreements between the Survey and the Forest Service, Bureau of Reclamation, and the Grazing Division within the Interior Department only partially examined the diverging interests of the federal bureaus.[78] These agreements, signed between 1935-1936, asserted the Survey's authority in directing predator work on wildlife refuges, soil conservation projects,

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[77] Jay Norwood Darling, "General Order No. 4: Reorganization of the Bureau's Research Work." 28 September 1934. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 12. Although the reorganization plan did not directly address the criticism, congressional passage of the Wildlife Coordination Act in 1934 tried to minimize the possibility that government agencies were at odds with each other. In particular, the Survey attempted to save habitat for migratory waterfowl, while the Bureau of Reclamation and the Corps of Engineers constructed levees and dams that decimated wetlands. Historians of wildlife legislation claim that, on the one hand, the 1934 Act was unprecedented and addressed neglected problems. On the other hand, the Act did not have much force: it required water resource agencies to confer with state and federal wildlife agencies to minimize damage to habitat. Besides this consultation, however, the Act did not mandate specific measures to minimize damage to wildlife. See: Richard N.L. Andrews, *Managing the Environment, Managing Ourselves* (New Haven: Yale University Press, 2006), 173-174; and Michael J. Bean, *The Evolution of National Wildlife Law*, rev. ed. (New York: Praeger Publications, 1983), 180-182. For background on the passage of the law, see also: House Select Committee on Conservation of Wildlife Resources: *Wildlife Conservation, Report of the Select Committee... Pursuant to H. Res. 237*, 74th Cong., 1st sess. House Report no.1, (1935), 1-38.

[78] The Survey conducted predator and rodent control on lands administered by these other agencies.

resettlement projects, national forests, and private, state, and Indian lands.[79] Noticeably missing was land in national parks, as the National Park Service and the Survey did not have a cooperative agreement. A cooperative agreement would have been improbable: The National Park Service recognized the desirability of predators in national parks and allowed for control measures only in emergency situations, such as the threat posed to other species by predators or the migration of predators on private lands.[80] The cooperative agreements also demonstrated the Survey's concern with limiting potential criticism. All of the agreements issued the following order: "Members of both agencies will refrain from expressing in public a view contrary to the accepted policy or plans of the other agency."

The Survey's increased sensitivity to criticism, evident in the cooperative agreements, grew in the early 1930s. Tensions developed between the Survey and the Cooper Ornithological Society, a group of bird enthusiasts that included members of the Museum of Invertebrate Zoology of the University of California. Some of the club members, especially Joseph Grinnell, had been outspoken critics of predator and rodent control, but by the early 1930s, they increasingly turned their attention to the Survey's bird control work in California, especially the use of poison during the breeding season of brewer blackbirds. The Survey defended this practice with two arguments: 1) The nomadic tendency of the birds made it

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[79] The cooperative agreements can be found in: National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 231, Box 17.
[80] Victor H. Cahalane, "The Evolution of Predator Control Policy in the National Parks," *The Journal of Wildlife Management* 3 (July 1939): 236-237.

"fruitless" to attempt to control them during the non-breeding seasons. 2) If the Survey did not control the birds, farmers would; the Survey, by minimizing damage to other species, was the lesser of two evils.[81]

The Survey's arguments never won over the critics, and each side began to feel it was at war, occasionally suggesting a conspiracy was underway. For example, Grinnell wrote to Bell, the acting chief of the Survey in 1931, and alluded to an unspecified source influencing public opinion. "The 'underground,' even if not as yet published and advertised, knowledge reaching the layman that State and Federal agencies are actively looking for 'efficient' (that is, the cheapest and most lethal) methods of killing birds is spreading everywhere, with the result that the bird-protection sentiment which it has taken years of education on the part of the Audubon societies to develop is being nullified."[82] Grinnell also voiced his arguments at a Cooper Club meeting attended by the public and control workers. Survey biologist and bird control agent Johnson Neff, in his unpublished notes from the meeting, thought Grinnell "read a wild creed… a very cleverly worded piece, and one which took very well with three or four old ladies in the audience." Neff also saw the meeting as a battleground whereby an underrepresented Survey was overmatched: "Meeting so obviously stacked; members of young folk, students, boys and girls, at every wise-crack by the Museum [of Invertebrate

[81] See the following letters for a defense of the Survey's position: Paul Redington to Aretas A. Saunders, 1 February 1932 and Paul Redington to Margaret Nice, 27 January 1932, Neff Papers, Box 6, "Criticisms" Folder. In California, critics also directed their attention to state officials who assisted the Survey in control work.
[82] Joseph Grinnell to W.L. Bell, 19 August 1931. Neff Papers, Box 6, "Criticisms" Folder.

Zoology] boys a titter would run audibly over the crowd."[83] A few days later, Neff reported on the meeting to the Washington office, drawing attention to a paper by Jean M. Linsdale, a critic of poisoning, that was discussed.[84] Without mentioning many specifics, Neff suggested a conspiracy was at work: "From the whole tenor of the meeting," as well as conversations among Cooper Club members and museum personnel, "I see no reason to doubt that the entire set-up, from the publication of the Linsdale article last May, to the present, is premeditated, and is carefully planned."[85]

Another article that drew suspicions from the Survey was an essay published in the *Condor*, authored by T.T. McCabe of the "Berkeley crowd" of the Museum of Invertebrate Zoology. McCabe argued against the Survey's use of poison in bird control work. The Survey objected to McCabe's phrase, "war of extermination against crop-eating birds," and was sensitive to critics who employed similar rhetoric. For example, in a letter to Chief Redington in 1932, Aretas A. Saunders, a zoologist from the New York State Museum and member of the Emergency Conservation Committee, expressed disapproval of the Survey's "extermination" efforts. Redington replied and defended the Survey, arguing that the Survey's work did not justify the use of the term, "extermination." He also suggested that McCabe was an ingrate who betrayed the

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[83] Johnson Neff, "Notes on Cooper Club Meeting," 24 November 1931. Neff Papers, Box 6, "Criticisms" Folder.

[84] Jean M. Linsdale, "Facts Concerning the Use of Thallium in California to Poison Rodents—Its Destructiveness to Game Birds, Song Birds, and Other Valuable Wild Animal Life," *Condor* 33 (May 1931): 92-106; and Joseph Grinnell, "Wholesale Poisoning of Wild Animal Life," *Condor 33* (May 1931): 131-132.

Survey's trust: According to Redington, McCabe spoke of a "policy of concealment" that obscures the workings of the Survey, but McCabe "owes his opportunity for inspecting the [Survey's] work to the courtesy of our representative who showed him about and furnished him with information."[86] Furthermore, McCabe's visit drew suspicion from McAtee. After reading Neff's report about the visit and McCabe's article, McAtee wrote to Neff: "I noticed the discrepancy as to the date of [McCabe's] inspection between your report and McCabe's article and wondered whether he might not have gone back again the next day for a fuller secret examination of the area."[87] The possibility that a seemingly minor detail—the discrepancy in dates—could be thought of as the result of machinations was reflective of the Survey's fear of its critics. If McCabe actually undertook a "secret examination," then the Survey may have been attempting to hide something, or limit McCabe's access to aspects of the Survey's work.

The McCabe controversy was indicative of the Survey's tendency to view issues of bird control in terms of an information war, with the Survey feeling that it was overmatched. For example, after reading criticism of the Survey, Neff lamented to McAtee: "The publicity given our work by the Museum coterie has advertised us more widely—ten times over—than all the grape-vine gossip, and the occasional news stories that will get into the papers no matter how hard you

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[85] Johnson Neff to the Chief, 27 November 1931, Neff Papers, Box 12, Blackbirds 1930-1938 Folder.
[86] Paul Redington to Aretas Saunders, 1 February 1932, Neff Papers, Box 6, "Criticisms" Folder.
[87] W.L. McAtee to Johnson Neff, 10 March 1932, Ibid.

try to keep them out."[88] McAtee replied to Neff and assured him that the Survey will meet the challenge of the information war: "I hope to get out a little propaganda from time to time that will perhaps bring some people over to our side or at least make them lay off of us."[89]

Another way to get critics to "lay off" the Survey was to exercise more caution in its control operations, as indicated in the following instructions issued to Neff from Chief Redington. The instructions also hinted at the secretive nature of the information war. Noting that the Survey has received letters of criticism, Redington advised Neff: "You will realize that your activities are under close and possibly unfriendly observation. It is necessary, therefore to conduct all operations according to your very best judgment and in ways that will assure the minimum of destruction of birds other than the injurious species...."[90]

Ignoring or minimizing unfavorable information about Neff's bird control work was also integral for winning public support. For example, Ira Gabrielson, acting as Regional Supervisor in the West, requested information from Neff and his colleague, Stanley Piper, in preparation for a *Western Farm and Home Hour* radio show in 1934. He asked for information "covering all of the activities of the Bureau," but "it is our desire to keep statistics to a minimum and to interest people indirectly in the Bureau's work by interesting them in the problems we are handling." Most importantly, he asked Neff or Piper to "prepare a talk on your

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[88] Johnson Neff to McAtee, 1 February 1932, Neff Papers, Box 6,"Criticisms" Folder.
[89] W.L. McAtee to Johnson Neff, 19 February 1932, Neff Papers, Box 12, "Blackbirds 1930-1938" Folder.
[90] Paul Redington to Johnson Neff, 9 February 1932, Ibid.

field experiences in economic bird work, leaving out poisons and formulas and things of that type."[91]

Near the end of the decade, the poison controversy in California seemed to abate, but Survey members offered differing interpretations about the possibility of its recrudescence. The Survey continued to view the controversy in terms of an information war. In 1938, when Neff sent a manuscript, "Procedures and Methods in Controlling Birds Injurious to Crops in California," to Washington for approval, he received a mixed assessment. McAtee, now a "Technical Advisor" for the Survey, advised Neff to stop using "pedantic" terms and phrases such as "lethal agent." "It would seem simpler and better to say 'poison' or 'strychnine.'" Furthermore, considering that the paper was written for California's agricultural commissioners, who are not opposed to poison, "there is no need for glossing these words over for the audience you are addressing."[92] On the other hand, Clarence Cottam, the Survey's head of the Food Habits Division of Wildlife Research, suggested to Neff a more cautious approach. Although he did not offer an opinion about the use of the word, "poison," he speculated to Neff, "I was wondering if it would not be advisable to make some comments on other methods of control rather than restricting it almost entirely to the use of poison?" By demonstrating that the Survey advocates other control methods, it would be possible to "ward off criticism" by the "Berkley crowd" and other critics.[93]

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[91] Ira Gabrielson to Stanley Piper, 20 March 1934, Ibid. The word "formula" was often used to describe poisons.
[92] W.L. McAtee to Johnson Neff, 3 May 1938, Neff Papers, Box 2, "General" Folder.
[93] Clarence Cottam to Johnson Neff, 25 April 1938, Ibid.

Neff was cautiously optimistic that the controversy with the "Berkley crowd" would not be reopened. In 1939, T.B. Murray, the Survey's Acting Regional Director for the Far West, requested that Neff attend a meeting of the Cooper Club. He wanted Neff to explain "various phases of your control operations" and provide "much information that will be valuable to members of the Cooper Club."[94] Neff, however, expressed misgivings about attending. He replied to Murray that he "did not feel it best to stir up 'sleeping dogs'... I went through one period of warfare wherein some of the Cooper Club group did not adhere to any rules of sportsmanship." However, noting that Joseph Grinnell, the most prominent critic associated with the "Berkeley crowd," had recently passed away, Neff was a bit more sanguine: "The field has been very quiet and peaceable, and it seems to me best that it be left that way." Neff reluctantly agreed to attend, but he wanted advice from Washington about how to handle bird control issues.[95]

Although Neff hoped that the controversy would remain "quiet and peaceable," the debate over poisoning and predator and rodent control policy would continue long after the Survey was reorganized with the Bureau of Fisheries into the Fish and Wildlife Service in 1940.[96] The Survey and its critics continued to see the conflict over predator policy as an information war. By the late 1930s, some of the critics believed they were losing the battle. For example, in 1938, Grinnell, writing to Victor H. Cahalane of the National Park Service, was

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[94] T.B. Murray to Johnson Neff, 28 November 1939, Ibid.
[95] Johnson Neff to T.B. Murray, 1 December 1939, Ibid. Either Neff did not attend the meeting, or he uncharacteristically left no notes.

dismayed by the government's ability to issue predator control "propaganda." He lamented: "The pity of it is, the public just 'eats' it; and the politicians who put it out of course know this." In addition, "the gov't has enormous resources in the way of means of publicity…." An exasperated Grinnell concluded: "At the moment, I just don't know what to try to do, that isn't practically futile, save to plug away at assembling and interpreting fundamental data."[97] Cahalane shared Grinnell's concerns. He was especially troubled by the films (produced by the Survey and Forest Service) that were shown to the employees of the CCC, a New Deal government program that did conservation work and predator and rodent control.[98] According to Cahalane, the films—with titles such as *Routing Rodent Robbers*—were "unduly prejudiced" against predators and rodents. Since the anti-rodent production "would be wonderful ammunition for the opposition," Cahalane planned to request that "this film and other objectionable ones be blacklisted by the National Park Service."[99]

Richard H. Pough of the National Association of Audubon Societies echoed the anxiety expressed by Cahalane and Grinnell: the critics of predator and rodent policy were losing the information war. Pough wrote to Chief Gabrielson to voice a "mild protest" about Survey employees engaged in predator and rodent control.

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[96] For a discussion of poisoning after 1939, see Thomas R. Dunlap, *Saving America's Wildlife,* chapters 8-11.

[97] Grinnell to Cahalane, 30 January 1938, Victor H. Cahalane Papers, Collection Number 01020, American Heritage Center, University of Wyoming (hereafter, Cahalane Papers). Box 1, Folder 16.

[98] For the conservation work of the CCC, see: Neil M. Maher, *Nature's New Deal: The Civilian Conservation Corps and the Roots of the American Environmental Movement* (New York: Oxford University Press, 2008).

[99] Cahalane to Grinnell, 5 April 1938. Cahalane Papers, Box 1 Folder 6.

These individuals "seemed to be devoting a lot of time to publicity which tended to build antagonism toward various species of wildlife. It sort of struck me that it was very similar to what in business is called 'sales promotion.'" In particular, Pough was troubled by Survey personnel who contacted the local press and spoke at schools, civic organizations, and "even women's clubs…." He urged Gabrielson to "put a stop to this sort of thing, by issuing orders that no publicity be given out by any member of this Division." If the Survey were truly a "scientific organization," then it would realize it has a "duty" to discuss both sides of the issue rather than actively promote its agenda.[100]

Gabrielson was distressed by Pough's comments. He wrote to former Chief Darling, stating he was not opposed to "constructive criticism [,] but when a man descends to innuendo and insinuation against the integrity of the personnel, as Pough did, it seems to me time to call him." Pough, according to Gabrielson, has "no foundation in fact so far as I can find out—only a few newspaper stories." However, Gabrielson conceded that "occasionally one of our boys gets away and puts stuff out that would be better left unsaid." When one of the "boys" gets too voluble, however, Gabrielson preferred to address the matter privately, rather than "publicly calling him before a crowd of people…." By handling problems discreetly, Gabrielson believed employees would develop loyalty to the organization.[101]

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[100] Pough to Gabrielson 28 March 1939, Stanley Paul Young Papers, Record Unit 7174, Smithsonian Institution (hereafter, Young Papers, Smithsonian), Box 7, Folder 9.
[101] Gabrielson to Darling, 26 April 1939, Ibid.

Darling was sympathetic to Gabrielson's predicament and had written to Pough shortly before receiving Gabrielson's letter. He told Pough that he shared his "anxiety" over the "predator control problem," but "if I again had official jurisdiction over the Biological Survey as I did for two years, I doubt if I could be certain of the right procedure." He also explained that unsupervised poisoning is similar to the "'bathtub gin' of the Prohibition days; anyone can make it himself....." Thus, by implying that the Survey's controlled poisoning methods were safer than individual efforts, Darling reiterated the Survey's long-standing justification for its predator work. He also attested to Gabrielson's competency and integrity and urged Pough to understand Gabrielson's dilemma: "He has had a problem to face and it isn't an easy solution to find what is the right thing to do under all the mess that exists....."[102] Darling's advice to Pough alluded to the Survey's conflicted mission: By protecting wildlife, the Survey could win support from individuals such as Pough and the Audubon Society. However, by killing predators, the Survey could quickly lose that support, thus making it difficult to build unequivocal, long-lasting alliances.

Because determining the "right thing to do" was problematic for Darling and the Survey, it was necessary for the Survey to gloss over difficulties in order to promote the organization. This need for putting a "positive spin" on its work was especially noticeable in the 1930s, as the Survey was placed in the paradoxical position of protecting some forms of wildlife (on game refuges and bird sanctuaries) while destroying others (through its predator and rodent control and

[102] Darling to Pough, 18 March 1939, Ibid.

bird poisoning programs). The Survey did not see this paradox as a problem: by controlling the "bad" species it was protecting the "good" species. However, at a talk given before a conference of the Survey's Predator and Rodent Control Division in 1941, Gabrielson alluded to the paradox, a paradox that was at the center of the Survey's conflicted mission: Because the Survey now had a greater role in protecting wildlife, and because the public developed an increased interest in wildlife, it was imperative for the Survey to justify its predator and rodent program. "Today," Gabrielson began, there is "more conservation sentiment than ever before," and "we may be called upon at any time to prove to the public that we know what we are doing." In particular, questions about wildlife management are likely to "intensify as the years pass." However, since some wildlife enthusiasts (including members of Congress) come from the urban East, they do not understand the need for predator and rodent control. Thus, "we always have had, and always will have, the need for selling the control work to our superior officers [in Congress] and to the public."[103]

"Selling" the Survey to Congress and the public was the cornerstone of the Survey's Division of Public Relations. A newly created branch of this division in 1936, the Section of Current and Visual Information, furthered the Survey's ability to engage in the information war and influence opinion. Howard Zahniser, who earlier edited and then wrote press releases, speeches, and radio broadcasts

[103] Ira Gabrielson, "Predatory Animal and Rodent Control Policies," talk given at the Division of Predator and Rodent Control Conference, Denver, December 9-12, 1941, Gabrielson Papers, Denver, Box 7, Folder 12.

for the Survey, was in charge of the new branch.[104] As head of the Section of Current and Visual Information, Zahniser formulated guidelines on how to work with the press to further the Survey's goals. He presented these guidelines in a talk given at the In-Service Training School of the Fish and Wildlife Service (formerly the Biological Survey) in 1941. He gave instructions on how to influence the press; these instructions went beyond the usual practice of avoiding controversy. According to Zahniser, it was extremely important for a government bureau, via the press and radio, to inform the public of its work, because "in a democracy we, as agents of the Government, can do only what the Government—itself an agent—is instructed to do by the representatives of the people...." If citizens are misinformed about the bureau's activities, then they cannot exert a positive influence (from a bureau's standpoint) on the representatives. Thus, it is imperative to inform citizens of the Survey's work, as long as the conveyed information does not appear to be a crass attempt at publicity: "Everyone recognizes that any agency carrying out a public program has need for public support and good will. Yet this public support and good will most surely come and stay with an agency that recognizes the tremendous difference between an information program a mere so-called publicity effort."[105]

To avoid the "publicity effort," Zahniser suggested more of a "soft sell" approach than a "hard sell." For example, Survey employees should "get

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[104] Zahniser also began to write a monthly column for *Nature Magazine* in 1935. Although his role as columnist was not part of his duties for the Survey, many of the topics he covered discussed nature and conservation and were in accord with the Survey's desire to maintain distance from its more controversial work. See: Harvey, *Wilderness Forever,* 21-23.

acquainted with the men that run papers and with the reporters" and furnish them with information and photographs of wildlife. If the newspaper used this information for a story, Survey workers should demonstrate their "appreciation," but "do not thank him for putting your story in the paper." Instead, a Survey employee should tell the newspaper that he was happy to supply the paper with newsworthy material. More specifically, "try to give the impression that you are helping him, as you actually will be.... *Your whole purpose should be to enlist him as a writer for you....*"[106] A Survey employee should also take this soft sell approach when urging the newspaper to write an editorial. If there is an important issue that needs coverage—duck stamp sales, for example—the Survey members should refer to it as a "public benefit" when talking with the editor, but no attempt should be made to ask directly for coverage of the issue: "Don't ask him [the editor] to write an editorial, but solicit his advice and support as one of the leading citizens and offer to provide him with any information he wishes to have. The chances are he'll write an editorial on it."[107]

Survey workers also needed to know how to socialize with editors and reporters and how to respond to questions. It was advisable to invite reporters to the locations of Survey activities, and "when a reporter comes out to see you, make him think that his visit is the most important thing in the world to you at that time, as it should be." If a reporter asks an unfamiliar question, "don't tell

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[105] Howard Zahniser, "On Using the Press and Radio," 31 March 1941, Gabrielson Papers, Denver, Box 13, Folder 4.
[106] Emphasis in the original.
[107] Ibid.

him you do not know anything about it," but provide a general explanation and offer to furnish more information if necessary. Responding to the reporters is crucial, because "for the sake of our good public relations you should not give him the idea that our left hand knows nothing about the right hand." To handle the questions, Survey employees should consult reports, press releases, *Tips and Briefs*, a "monthly clip sheet," and *Current Conservation*, the "Department's clip sheet." Controversial subjects needed to be handled cautiously: "Tell him that that's a matter of controversy and you can't discuss it." For policy questions, "tell him that you can't help him out there. Tell him that your job is to run your refuge, or whatever your job is, and that policy matters are determined by folks that direct your work." If necessary, a question can be directed to the regional office for a response.

Zahniser's strategies of courting the press and avoiding controversy were indicative of the Survey's awareness of the need to control information, a need that grew more acute as the responsibilities of the Survey brought it under greater public scrutiny. The earliest work was generally not controversial, with the exception of convincing members of Congress that the Survey's research had "practical" benefits. However, the Survey's predator control work and management of wildlife made the federal bureau more visible to the public. As a result, the Survey not only took a more proactive approach in influencing public opinion, but it also utilized more authoritative control over information that might portray the Survey in a negative light. In an effort to win the "information war"

that emerged by the 1930s, the Survey's public relations efforts presented the federal bureau as smart stewards of wildlife and either avoided, over-simplified, or suppressed information that did not conform to this idealized portrayal.

Stephen Ponder, in his examination of Gifford Pinchot, argues that the Chief Forester's "propaganda campaign to support government forestry was the benchmark of an important historical development in the role of the executive branch of government in leading public opinion."[108] It is problematic, however, to extend Ponder's assessment to the Survey. Much of the Survey's publicity work became, in effect, "damage control." With so much attention given to warding off criticism, the Survey was not in a position to be a leader of public opinion. The Survey's uncertain base of support, a result of its conflicted mission, placed the bureau in a nebulous realm, making it difficult to earn approval from one group of supporters (for example, stockmen) without offending another group (scientists and conservationists). The perpetual need to balance competing interests diverted attention and resources away from efforts to persuade the public of the necessity of wildlife conservation, an issue Survey members had a stronger commitment to than the "damage control" that preoccupied the bureau in the 1930s.

[108] Stephen Ponder, "Gifford Pinchot: Press Agent for Forestry," 26. See also: Stephen Ponder, "News Management in the Progressive Era, 1898-1909: Gifford Pinchot, Theodore Roosevelt, and the Conservation Crusade" (Ph.D. diss., University of Washington, 1985).

A BALANCING ACT: THE BUREAU OF BIOLOGICAL SURVEY AND THE NATIONAL ELK REFUGE IN JACKSON HOLE, WYOMING

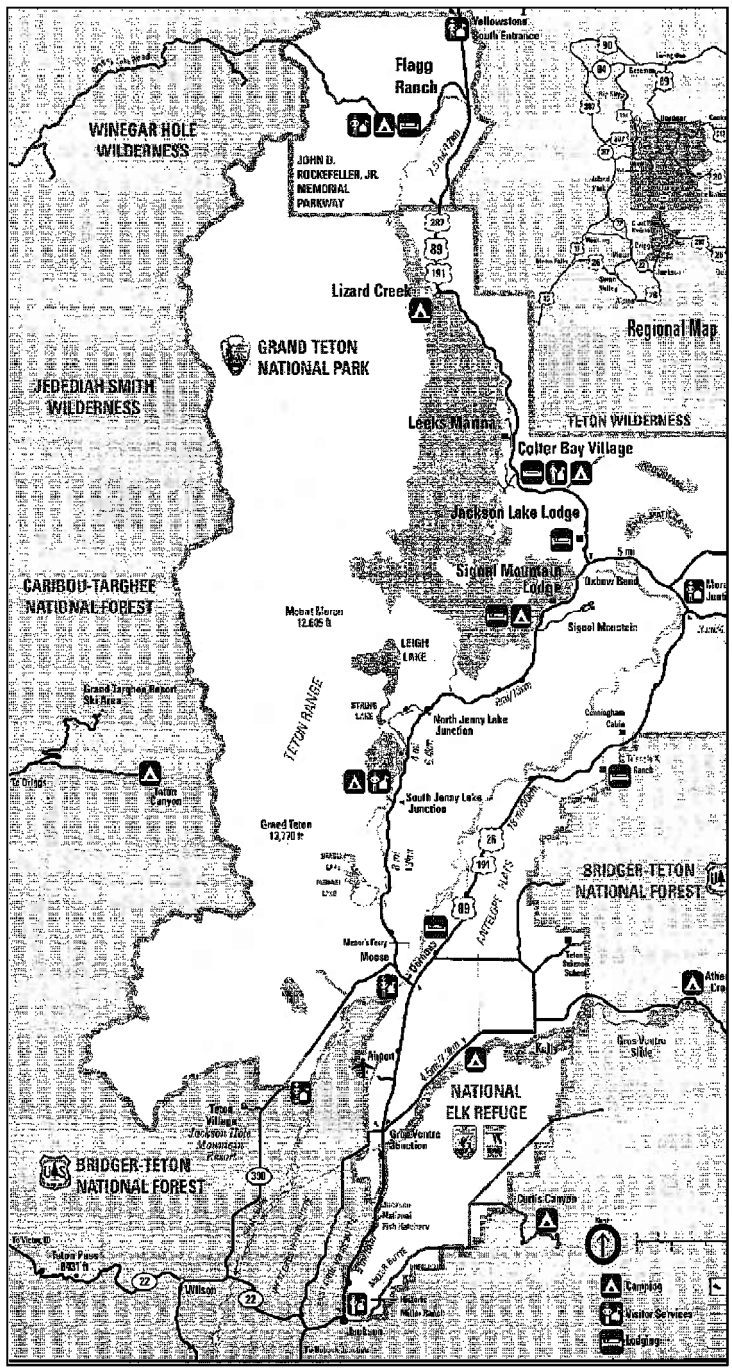

Figure 6: "Jackson Hole Area Travel Map." U.S. Fish and Wildlife Service.

The Survey did not need the service of publicity specialists when it set up the National Elk Refuge near Jackson, Wyoming, in 1912.[1] Wildlife conservation organizations such as the Boone and Crockett Club, the National Association of Audubon Societies, the American Bison Society, and the American Game Protective Association alerted the nation to declining wildlife populations, most notably the bison *(Bison bison)*. The federal government also began taking a more active role in preserving and managing wildlife, traditionally a state responsibility. Congress passed the Lacey Act, the first federal law for wildlife protection, in 1900. Shortly after, the federal government authorized the creation of avian refuges in Florida and other coastal states and big game refuges in Oklahoma and Montana. Thus, during the first decade of the twentieth century, the protection of wildlife was increasingly a national issue.

National attention also focused on the plight of the elk *(Cervus elaphus)*, an iconic species of the West that was starving in large numbers as they migrated from Yellowstone National Park in the winter to nearby Jackson, Wyoming, in search of forage. To assist Wyoming with the elk's dilemma, Congress, in 1911, authorized the Survey to go to Jackson with a three-fold task: 1) study the elk's life history and existing conditions in Jackson Hole; 2) assist in procuring feed for the next winter; and 3) explore the possibility of transporting elk from Jackson Hole to other refuges. A year later, the refuge was established to provide a winter foraging area for the elk. It soon became apparent that the key to a long-term

[1] Jackson Hole refers to a valley that includes the towns of Jackson, Kelly, Moran, Moose, Wilson, and Teton Village. The National Elk Refuge is near Jackson, but not in the town itself.

solution required a larger winter foraging ground for the elk. This solution, easy to conceptualize but difficult to implement, was received unevenly by local residents and by other federal and state agencies responsible for wildlife, thus forcing the Survey to balance competing interests—interests that sometimes shifted over time and were difficult to gauge. The uncertain alliances that characterized much of the Survey's relations forced the federal bureau into a balancing act that encountered resistance from cattlemen, anti-federal sentiment, wavering support from the town, and different goals of other federal and state agencies before the Survey's objective of enlarging the National Elk Refuge was realized by the late 1930s.[2]

The success of the elk refuge and other animal sanctuaries often rested upon local support, but as Chief Ira Gabrielson remarked at a 1939 congressional hearing investigating the conservation of wildlife, "I think we have never put in refuges anywhere that we did not at the outset find opposition to them from the

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[2] Historians have generally neglected the role of the Survey in Jackson Hole and have concentrated on the creation of nearby Grand Teton National Park. The most comprehensive treatment of this subject is Robert W. Righter, *Crucible for Conservation: The Creation of Grand Teton National Park* (Boulder: Colorado Associated University Press, 1982). Several local histories of Jackson Hole are useful for context: Robert B. Betts, *Along the Ramparts of the Tetons: The Saga of Jackson Hole, Wyoming* (Boulder: Colorado Associated Press, 1978); Frank Calkins, *Jackson Hole* (New York: Knopf, 1970); John Daugherty, *A Place Called Jackson Hole: A Historic Resource Study of Grand Teton National Park* (Moose, Wyoming: Grand Teton Natural History Association, 1999), also available online at http://www.nps.gov/history/history/online_books/grte2/hrs.htm; Kenneth L. Diem and Lenore L. Diem, *Community of Scalawags, Renegades, Discharged Soldiers and Predestined Stinkers?: A History of Northern Jackson Hole and Yellowstone's Influence, 1872-1920* (Moose, Wyoming: Grand Teton Natural History Association, 1999); and David J. Saylor, *Jackson Hole, Wyoming* (Norman: University of Oklahoma Press, 1970). The following personal recollections are also helpful for understanding town life: Nathaniel Burt, *Jackson Hole Journal* (Norman: University of Oklahoma Press, 1983); Struthers Burt, *Diary of a Dude Wrangler* (New York: Scribner, 1938); Bertha Chambers Gillette, *Homesteading with the Elk: A Story of Frontier Life in Jackson Hole, Wyoming* (Idaho Falls: Mer-Jons Publishing, 1967); and Margaret and Olaus Murie, *Wapiti Wilderness* (New York: Knopf, 1966).

local people."[3] In Jackson Hole, the stockmen, who could usually be counted on to support the Survey's predator control program, became an important source of local opposition, viewing the elk refuge as an attempt to favor wildlife protection over economic development. The stockmen often had allies in Washington, most notably Wyoming representative Frank Mondell, who often opposed the Survey's work and wildlife conservation in general. However, typical of the Survey's ambiguous relations in Jackson Hole, Mondell, at times, supported the Survey's plans and wildlife conservation. Equally ambiguous was the relationship between the Survey and the Forest Service, the federal agency that dispensed grazing permits to local stockmen. On the one hand, Chief Forester Henry Graves and Survey Chief Edward Nelson jointly developed a plan for the expansion of the refuge. On the other hand, local Forest Service employees were more inclined to side with the stockmen when disputes arose.

One of the most controversial arguments that developed in the region was a proposal for extending the boundaries of Yellowstone National Park, a plan that was supported by the Survey because it would create more protected areas for the elk (hunting was prohibited in the national park). The proposal, however, was viewed more skeptically by the Forest Service, because it potentially could result in more land under the control of the National Park Service rather than the Forest Service. Furthermore, although the interests of the Survey and the National Park Service were tied together—they each managed different herds of the

[3] House Select Committee on Conservation of Wildlife Resources: *Conservation of Wildlife, Hearings before the Select Committee... Pursuant to H. Res. 65*, 76th Cong., 1st sess. (1939), 8.

Yellowstone National Park elk and sometimes shared hay for the elk—a confusing situation developed between the two federal agencies when plans for the extended boundaries resulted in the creation of Grand Teton National Park in 1929. The difficulty was that the land acquisition process, led by the philanthropic activity of John Rockefeller Jr., for Grand Teton, was done secretly, and Survey members were bewildered as land was purchased and withdrawn for seemingly unknown reasons. The Survey was also disconcerted by the state's actions. Initially, the Wyoming legislature passed a resolution requesting federal assistance, but later, state officials opposed the expansion of the refuge; controversy also developed over the state's hunting regulations.

The citizens of Jackson also sent mixed signals to the Survey. In addition to the stockmen, some locals resisted the expansion of the refuge because they feared a loss of tax revenue at a time when Jackson, a town recently settled, needed the money for schools and roads. Land on the refuge was federal land that was not subject to local taxes. Enlarging the refuge, by purchasing private land or by withdrawing land from the public domain that could be available for future homesteading (and local taxes) would decrease the town's potential tax base. On the other hand, some residents saw economic potential in wildlife tourism, especially hunting, and thus supported the expansion of the refuge, as it would ensure a future viable elk population. In sum, the Survey had to navigate through a labyrinth of differing motives, shifting attitudes, and uncertain relationships with locals and government agencies in an effort to further elk protection.

"Elk protection" would have been an odd concept to early European settlers of North America. Although exact records of elk distribution are lacking, scientists, relying extensively on the Survey's Olaus Murie's analysis of early written accounts of elk, have pieced together a map of the animal's range in colonial America. Elk occupied a wide section of the West Coast and most of the West and Midwest. They extended across the continent to some East Coast states, though not the coast itself. Their furthest southern points were in Texas, New Mexico, and Arizona. Despite this expansive range, as western settlement accelerated in the nineteenth century, the elk's range was reduced to primarily the Rocky Mountain area, especially Wyoming, and parts of the West Coast.[4]

Figure 7: Recent photograph of the Jackson Hole Elk. Photograph: U.S. Fish and Wildlife Service, National Digital Library.

As suggested by their former wide distribution, the elk are highly adaptable animals, capable of occupying diverse environments. However, elk have their preferences: as members of the deer family, elk thrive in forests and forest-edge habitats ("ecotones"). They also tend to be bigger and healthier in cold weather locales. They generally eat grass—sometimes putting them in competition with

[4] Olaus J. Murie, *The Elk of North America* (Harrisburg, Pennsylvania: The Stackpole Company), 1-2; and Bart W. O'Gara and Robert G. Dundas, "Distribution: Past and Present," in Dale E. Toweill and Jack Ward Thomas, eds., *North American Elk: Ecology and Management* (Washington: Smithsonian Institution Press, 2002), 85-86.

domestic livestock—but also consume grass-like plants, leaves, and bark, depending on the environment and season. They have evolved traits that provide defense against predators, although at times, the elk, especially the young, could be vulnerable to coyotes, wolves, and cougars. However, their strong sense of smell and hearing make the elk very alert, quick to react to predators. Furthermore, their speed, large size (females average 500 pounds while males average 710 pounds), and leg kick provide some defense. Males also use their antlers (before their annual shedding) for protection. Most importantly, as a gregarious animal, elk work together to ward off predators. A group will have one or more members keep a watchful eye for predators, while other herd members eat or rest.[5] (SEE PHOTO)

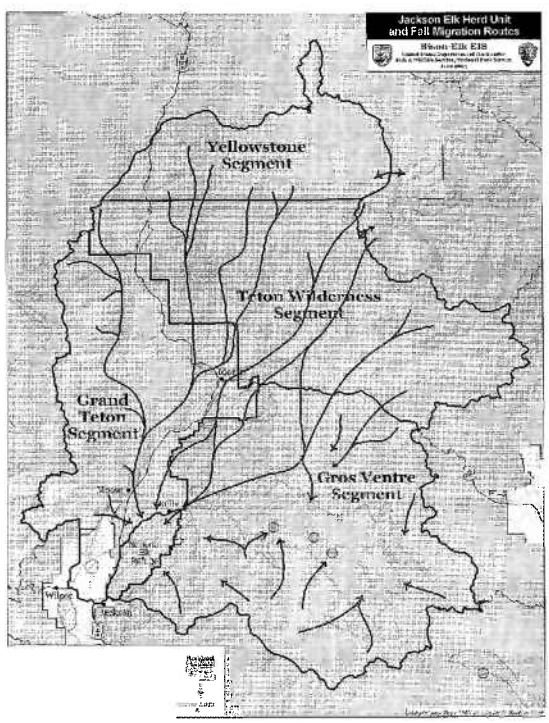

Figure 8: "Jackson Hole Herd Unit and Fall Migration Routes." U.S. Fish and Wildlife Service.

The elk are also adept at responding to changes in the environment. For the elk in Yellowstone National Park, when snow arrives, foraging becomes difficult. One of the elk herds, the

[5] Murie, *The Elk of North America*, 267-283; and Rocky Mountain Elk Foundation, "Fast Facts," available at: http://www.rmef.org/AllAboutElk/FastFacts/ [accessed 28 December 2010].

"southern herd," which normally summers in high elevations, begins a migration southward to lower elevations. (SEE MAP)

Generally, if elk continue to encounter snow and problematic foraging conditions, they keep on moving, sometimes up to 200 miles, and eventually reach towns in Wyoming such as Pinedale, Big Piney, and Fontenell. After spending a considerable portion of the winter in the lower elevations, changes in vegetation in the spring provide a cue to move back to the higher elevations for the approaching summer. Although this southern journey by the elk appears to be deeply rooted, the migratory behavior is not completely instinctual. For West Coast elk in the Redwoods, many of them do not begin the descent to lower elevations when the weather changes. Once elk learn the migratory pattern, however, they tend it repeat and usually prefer the same route as had been taken in the past.[6]

Although this migratory behavior allowed the southern herd to withstand the difficult Wyoming winters, when cattle were introduced into the region in the 1880s and homesteading followed, the southern migratory route, which went through Jackson, was fenced off and blocked. Problems ensued: the elk, now competing with cattle for forage, often resorted to raiding ranchers' hay that was intended to feed domestic livestock in the winter; sometimes, ranchers conceded to the depredations by providing handouts for the elk.[7]

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[6] O'Gara, "Distribution: Past and Present," 112-113; and Murie, *The Elk of North America*, 60-67.
[7] For the years before Survey involvement in Jackson Hole, see: Betts, *Along the Ramparts of the Tetons,* 147-192; Neal Blair, *The History of Wildlife Management in Wyoming*, (Cheyenne: Wyoming Game and Fish Department, 1987), 1-28; Erick K. Cole, David S. Dobkin, and Bruce L.

While the plundering elk created economic difficulties for the stockmen, other Jackson Hole residents saw economic opportunities in maintaining a stable elk population. Sport hunting, tourism, and dude ranching offered potential profits to this small Wyoming town known for its scenic beauty and wildlife, especially elk.[8] However, market hunting and poaching threatened the economic potential of tourism. With the decline of the bison, market hunters increasingly turned to elk, deer, and pronghorn sheep.[9] Ironically, members of the Benevolent and Protective Order of Elks hunted elk for their canine teeth, valued as emblems of distinction.[10] In 1875, Wyoming passed its first legislation to curb market hunting. In 1895, the state required non-residents to obtain hunting licenses and hire local tour guides, a stipulation that added revenue to the region's incipient tourism industry.[11]

A more far-reaching proposal for protecting elk was suggested in 1897 by S.B.M. Young, superintendent of Yellowstone National Park. He wanted to extend the authority of the military beyond Yellowstone to include the elk's

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Smith, *Imperfect Pasture: A Century of Change at the National Elk Refuge in Jackson Hole, Wyoming* (Moose, Wyoming: Natural History Association, 2004), 1-17; John Daugherty, *A Place Called Jackson Hole,* chapter 6; and David J. Saylor *Jackson Hole, Wyoming*, 149-162.

[8] Dude ranching was in its infancy at the end of the nineteenth century, but it became such a strong component of the regional economy that the University of Wyoming offered courses in dude ranching in the 1930s. See: Marshall Sprague, "Dude Ranches Ready," *New York Times* 24 April 1938. For the origins of dude ranching, see the following from Lawrence R. Borne: *Dude Ranching: A Complete History* (Albuquerque: University of New Mexico Press, 1983), and "Dude Ranching in the Rockies," *Montana. The Magazine of Western History* 38 (summer 1988): 14-27. See also: Hal K. Rothman, *Devil's Bargains: Tourism in the Twentieth-Century American West* (Lawrence: University Press of Kansas, 1998).

[9] For example, in 1881, 20,000 deer hides, 53,000 pronghorn sheep hides, and 5,000 elk hides were shipped from the Yellowstone area to eastern markets. See Cole, et al., *Imperfect Pasture*, 17.

[10] Betts, *Along the Ramparts of the Tetons*, 182.

southern migratory route into Jackson. Charles D. Walcott of the United States Geological Survey supported Young's proposal, but also wanted the elk's migratory route included in a separate national park that featured the nearby Grand Teton Mountains. Several editorials in *Forest and Stream* praised these proposals and also discussed the economic importance of wildlife in Jackson Hole.[12] Despite this interest in extending Yellowstone's boundaries, the proposals went into abeyance, even though national newspaper coverage drew attention to the region's ineffective laws and widespread killing of elk. For example, in 1902, the *New York Times* reported that "game hogs or pot hunters" come to Jackson Hole to hunt elk and "begin the carnival of crime, for it is criminal to kill this fast disappearing animal."[13]

In response to the difficulties of protecting elk, in 1905, the Wyoming legislature established the Teton Game Preserve, a refuge for elk and other game in northern Jackson Hole. Hunting was prohibited, and "tusking"—killing elk for

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[11] Cole, et al., *Imperfect Pasture*, 4. For poaching in Jackson Hole and Yellowstone, see: Karl Jacoby, *Crimes against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (Berkeley: University of California Press, 2001), 133-146.

[12] David J. Saylor, *Jackson Hole*, 159-160; "Extending the National Park," *Forest and Stream* 51 (1899): 1; "Yellowstone Park Enlargement," *Forest and Stream* 47 (1896): 1; S.N. Leek, "Jackson's Hole and the Park," *Forest and Stream* 50 (1898): 308; and D.C. Nowlin, "Jackson's Hole and the Park," *Forest and Stream* 50 (1898): 369. In 1894, hunting was prohibited in Yellowstone National Park, and the United States military was responsible for patrolling the park.

[13] "Exterminating the Elk in Jackson Hole," *New York Times,* 22 June 1902. For other examples of national coverage, see: "The Jackson's Hole Scandal," *Forest and Stream* 49 (4 September 1897): 1; W.L. Simpson, "The Jackson Hole's Situation," *Forest and Stream* 51 (17 December 1898): 485; "Poach in National Parks," *Chicago Daily Tribune*, 10 October 1900; "An Appeal for the Wapiti," *Forest and Stream* 56 (6 April 1901); and "Says Elks Slaughter Elk," *New York Times*, 28 February 1904. The elk issue did not escape the attention of President Theodore Roosevelt, an avid wildlife enthusiast. See: Theodore Roosevelt, "Wilderness Reserves," *Forest and Stream*, 63 (27 August 1904): 170. Massachusetts Senator George F. Hoar also weighed in on the controversy, remarking that "ranchmen have fenced up the former elk range in Jacksons Hole County thereby cutting off nearly all the former winter range of great bands of elk…" George F. Hoar, "Suppress the Sportsmen," *Washington Post*, 28 April 1902.

their teeth—was now a felony. Furthermore, area residents formed a vigilante committee to help run the poachers out of town. Although these actions by the state and locals reduced the threat of hunting, other problems with the elk remained. Increased settlement in Jackson Hole and a severe winter in 1908-1909 made foraging more difficult than usual, and elk often raided ranches to get meager helpings of hay; many elk died of starvation. In an effort to reduce the conflicts between ranchers and elk, Wyoming provided 5,000 dollars for emergency feeding, a measure that did not eliminate the problem. The plight of the starving elk received nationwide attention, largely through the efforts of Stephen N. Leek, a photographer who distributed images of the decimated elk to magazines and newspapers. (SEE PHOTO) The situation was so dire that the Boone and Crockett Club grimly predicted that "it seems as if the southern herd of Yellowstone Park must ultimately be exterminated by starvation."[14]

[14] Betts, *Along the Ramparts of the Tetons,* 182-188; and Cole et al., *Imperfect Pasture*, 17. The Boone and Crocket Club quote is from: "The Yellowstone Park Elk," *Forest and Stream* 66 (4 March 1911): 337.

Facing such a dreadful predicament, Wyoming officials requested federal assistance by passing a memorial in 1911 that stated the protection of big game such as elk and moose "is too expensive and burdensome to be borne alone by the

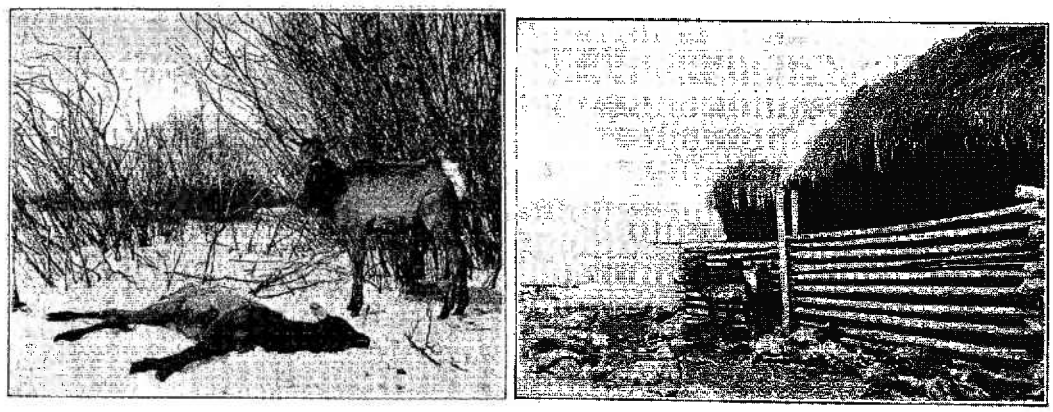

Figure 9: Stephen N. Leek photographs of dead elk in winter of 1910-1911. Right photograph shows ranchers' fenced-in haystacks. (Produced in Preble's Report on Condition of Elk in Jackson Hole).

State of Wyoming." Congress responded with $20,000 for emergency feeding and sent Survey biologist Edward A. Preble to study the condition of the elk and make recommendations. Preble diagnosed several problems. Increased settlement in Jackson Hole resulted in over-grazing and depletion of the elk's former range. With sparse forage, the elk plundered the cattlemen's hay, and settlers "are forced to sleep beside the stacks during much of the winter, a task which is not conducive to a tolerant view of the situation." Even when elk were able to find unsecured hay, the result was horrific for the young, as they were often trampled on by "their larger associates and perish miserably."[15]

[15] Edward Preble, *Report on Condition of Elk in Jackson, Wyoming* (Washington: Government Printing Office, 1911), 8-18 (the memorial is on pp. 7-8); and Jenks Cameron, *The Bureau of Biological Survey* (New York: Arno Press, 1974), 92.

The elk faced other difficulties. Although predators, with the exception of the wolf, were generally not a problem, illegal hunting occurred frequently. Enforcement was lacking. The warden service in Jackson Hole was "inadequate," and federal forest rangers had too many other responsibilities to pay "much attention to game interests." Most of Jackson's inhabitants, however, "are opposed to the killing of elk contrary to law," partly because of the economic importance of wildlife. Since hunters "are obliged to hire guides, packers, cooks, and pack animals," the town earns a considerable profit from hunting. Preble suggested a "conservative estimate" of a hunter's daily expense of fourteen dollars for these services yielded 420 dollars, based on a thirty-day visit. He also noted that elk have a high "food value" for locals who hunt for meat.[16]

Preble offered recommendations to reduce elk suffering. Although some elk had been shipped to the National Bison Range in Montana and the Wichita Game Preserve in Oklahoma, the remote location of Jackson made transportation problematic. Preble also realized that elk needed a winter refuge, an idea the town came to endorse after previously rejecting it.[17]

Starving elk, frustrated stockmen, illegal hunters, and a town seeking to profit from its reputation as a haven for wildlife: these were the characteristics of Jackson Hole that Preble found in his 1911 investigations. The following year, the Survey would gradually find itself enmeshed in these local issues and controversies, as Congress appropriated $45,000 to purchase land for the

[16] Preble, *Report on Condition of Elk in Jackson, Wyoming,* 11-21.
[17] Ibid., 21-23.

establishment of The National Elk Refuge, a 1,760-acre winter sanctuary near Jackson. By 1916, another congressional act and two executive orders increased the refuge to 4,500 acres. The elk reservation had two objectives: 1) prevent the extinction of the southern herd by providing a winter refuge and emergency feeding if needed; and 2) ship surplus elk to other preserves or parks throughout the nation seeking to augment their collection of wildlife.[18] Although these objectives seemed uncontroversial, Survey agent G.W. Field's 1917 report pointed to potential problems. Elk that became accustomed to feed provided by the refuge could become "semi-domesticated" and alter their behavior. He also noted that there was "possible conflict of authority between state and federal jurisdiction." Most importantly, "proximity to stock raisers, who desire to have advantage of pasturing stock upon the public lands within the path of the elk migration," posed a serious problem.[19]

Field had good reason to be solicitous of the stockmen. The Survey developed a conflicted relationship with the stock industry, an outgrowth of the bureau's conflicted mission. On the one hand, stockmen often opposed setting aside land

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[18] Jenks, *The Bureau of Biological Survey,* 93; and Charles Sheldon, *The Conservation of the Elk of Jackson Hole, Wyoming: A Report to Hon. Dwight F. Davis... Chairman of the President's Committee on Outdoor Recreation and Hon. Frank C. Emerson, Governor of Wyoming...* (Washington: National Conference on Outdoor Recreation, 1927), 31. By 1928, 33 states and the District of Columbia received elk from the refuge. A total of 3,937 were shipped, with Montana acquiring the largest share (332) and Georgia receiving the fewest (2). See: Senate Committee on Public Lands and Surveys, *Hearing before the Committee... First Session on H.R. 15,* 70th Cong., 1st sess. (1928), 2-3.

[19] G.W. Field, "Memorandum in Reference to Winter Elk Refuge," 11 June 1917. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 27. Since elk migrate, they move back and forth between land under federal or state control. On federal land in Wyoming, they could be under the jurisdiction of the Bureau of Biological Survey (the National Elk Refuge), the Forest Service (the national forests), or the National Park Service (Yellowstone National Park).

for wildlife. For example, in 1916, a newspaper from nearby Pinedale reported on a resolution sent to Washington by the Green River Valley (Wyoming) Cattle and Horse Growers Association: Because economic development is more important than game protection, the "Association goes on record… against further creation of game preserves" and "so-called winter ranges." On the other hand, two years later, the same association passed a resolution that stated it "appreciate[s] and approve[s] of the work being done by the Bureau of Biological Survey in the extermination of predatory wild animals." The support of cattlemen for the Survey's predator work became so strong that W.C. Henderson, Assistant Chief of the Survey, remarked that he has "met quite a number [of cattlemen in Jackson] that are very zealous friends of the Survey, and who will do whatever they can to help us at any time."[20]

These "zealous friends of the Survey" were not so friendly when Chief Nelson proposed enlarging the refuge. He believed that the feeding program was not a long-term solution and should be reserved for emergencies. Furthermore, as Field noted in his report, "semi-domestication" was not in the elk's best long-term interest: elk might become too tame, relax their fear of humans, lose the tendency to migrate, and become dependent on the feeding program. The high concentration of elk in the feeding areas also increased the possible spread of disease. An extended winter range for elk would minimize the possibility of this

[20] "Protest against Additional Game Preserves," *Pinedale Roundup*, 3 March 1916; and "Stockmen Pass Resolutions," *Pinedale Roundup*, 3 January 1918, available at newspaperarchive.com. [accessed 5 May 2009]; W.C. Henderson to Edward Nelson, 21 January 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 29.

high concentration and the semi-domestication of elk. Nelson offered several ways to enlarge the elk's winter habitat: limit grazing, withdraw public lands from homesteading and livestock grazing, and set aside specified areas in the national forests for game protection. Some cattlemen and homesteaders, however, objected and viewed these suggestions as an intrusion by the federal government. The anti-federal sentiment intensified when the National Park Service revived the idea of extending the borders of Yellowstone.[21] For these cattlemen and homesteaders, it seemed that the federal government was more interested in saving elk and preserving nature rather than allowing the livestock industry the opportunity to prosper in Jackson Hole.

The Survey got an inkling of this growing sentiment when a handful of citizens in 1916 sent a petition to President Wilson that argued wildlife protection should not block economic development. Although there is no evidence that President Wilson saw or responded to the petition, a politician closer to home—congressional representative Frank Mondell—gave a sympathetic ear to the Jackson residents. A longtime advocate of opening the public domain for settlement and development, Mondell expressed his misgivings about federal game protection during a 1916 congressional hearing that examined the possibility of establishing game sanctuaries in national forests. He developed a twofold argument against the sanctuaries. First, citing the 1896 Supreme Court decision in *Geer v. Connecticut*, Mondell argued that, legally and constitutionally,

[21] The proposal to extend Yellowstone, eventually resulting in the creation of Grand Teton National Park in 1929, is discussed by Righter in *Crucible for Conservation.*

states, not the federal government, were responsible for game protection. Secondly, Mondell indirectly challenged the need for game protection. He noted that the fate of the buffalo was "inevitable" with the coming of "civilization." Furthermore, man brought animals that produced "infinitely better meat" and "utilize[d] grasses more economically than the buffalo." Besides, Mondell argued, the "larger wild animals… have a way of coming back later" after settlements become permanent.[22]

Mondell also took issue with the "naturalists and game lovers" who become "impatient" with state efforts to save wildlife. Mondell admitted that, in Wyoming, there are some of these "game lovers" who support federal protection of wildlife, but these individuals are mistaken. They erroneously believe that the "Federal government will appropriate [funds] for taking care of the game and save us [Wyoming residents] the expense." He warned that granting responsibility to the federal government for wildlife would set a dangerous precedent. "Some

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[22] "Undersigned residents of Jackson's Hole," to Woodrow Wilson, 30 October 1916. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 146, Box 22; T.A. Larson, *History of Wyoming* 2nd ed. (Lincoln: University of Nebraska Press, 1978), 319; House Subcommittee of Committee of Agriculture: *Game Refuges, Hearings before the Subcommittee… First Session on H.R. 11712*, 64th Cong., 1st sess. (1916), 4-13. The *Geer* decision (161 U.S. 519), discussed in virtually every history of wildlife, affirmed a commonly-held assumption that wildlife was property of the state where it resided. Thus, wildlife protection was a state responsibility. According to Dian Olson Belanger, the decision became the "rallying cry of state agents fearful of federal encroachment on their management rights." See: *Managing American Wildlife. A History of the International Association of Fish and Wildlife Agencies* (Amherst: The University of Massachusetts Press, 1988), 12. For an extended discussion of the gradual overturning of the Geer decision, finalized in the 1922 case of *Missouri v. Holland*, see Kurpatrick Dorsey, *The Dawn of Conservation Diplomacy. United States – Canadian Wildlife Protection Treaties of the Progressive Era* (Seattle: University of Washington Press, 1998), 177-233

people seem to be willing to sell their State birthright for a very small mess of Federal pottage."[23]

Expressing the West's resentment of federal control over the public domain, Mondell echoed the thoughts of his constituents who wrote to him protesting the regulation of public lands, especially land that was added to the Teton National Forest in 1916. Although grazing was allowed in national forests, one resident, George Dew, feared that the Survey and Forest Service were intending to make the forest's Gros Ventre ("Grovont" in the vernacular) region into an elk range, thus making him "compelled" to bring his stock elsewhere. He asked Mondell to "look into this matter and try to protect us." When Mondell contacted the Survey, Nelson explained to the representative that studies conducted by the Survey and Forest Service "have shown that certain winter range on the Gros Ventre is absolutely necessary to the existence of large numbers of elk that spend the winters in the valley." If the grazing of livestock is not limited in this area, then "thousands of elk" will not find feed, and starvation will be "greatly increased."[24]

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[23] House Subcommittee of the Committee on Agriculture: *Game Refuges,* 14.

[24] George Dew to F.W. Mondell, 7 May 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 146, Box 26; F.W. Mondell to E.W. Nelson 16 May 1918 and E.W. Nelson to F.W. Mondell, 21 May 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. Although Nelson did not provide further details to Mondell, a 1916 Survey study by Alva A. Simpson confirmed the vital role of the Gros Ventre in facilitating increases in the number of elk. The elk frequenting Jackson Hole were subdivided into four geographical areas. From 1912 to 1916, the number of elk in the Jackson Hole herd increased from 18,000 to 19,763, an increase of 1,763 elk. Simpson found that the elk in the Gros Ventre region had the biggest increase (a gain of 2,295 elk). One of the other localities had an increase of 341 elk, while the other two regions suffered losses. Thus, safeguarding the elk in Gros Ventre played an indispensable role in the Survey's work. See: Alva A. Simpson, "Report on the Game Census," March and April, 1916. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 25.

Protecting the elk, however, did not require a prohibition on all livestock grazing in Gros Ventre. Nelson told Mondell that holders of permits granted by the Forest Service would be allowed to graze their cattle on the restricted area from the beginning of spring until June 15. Residents of the Upper Gros Ventre Basin would be allowed thirty days of grazing in the fall, as long as they do not graze more than 500 cattle—the number of cattle owned by residents of the region, according to Forest Service estimates. Nelson noted that he consulted stockmen and "the foregoing restrictions were adopted after full consideration had been given to the needs of the cattlemen." Thus, Nelson, in a scenario that repeated itself many times, needed to balance appeasing the cattlemen with protecting the elk.[25]

Although Nelson stated he was attuned to the needs of the stockmen, some Jackson residents disagreed. On May 27, 1918, Richard Winger, editor of the *Jackson Hole Courier*, sent to the Survey a petition from Jackson Hole residents—mostly cattlemen, ranchers, and a few farmers—that specified a "plan for the settlement of the elk problem which has harassed this country for several years." The plan, according to Winger, had several worthy objectives: it would "mean the salvation of the elk," add "impetus to the livestock industry in Jackson's Hole," and produce more meat for the "war economy." Instead of withdrawing land in the Gros Ventre area, the government should purchase land from settlers who "would prefer to sell [their land] to the government at a

[25] F.W. Mondell to E.W. Nelson 16 May 1918, and E.W. Nelson to F.W. Mondell, 21 May 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146 Box 26.

reasonable price rather than to suffer annually the depredations they are now compelled to endure." If the government bought this land, "the necessity for the withdrawal of valuable cattle range will be eliminated" and the "burdensome restrictions upon cattle grazing [that] merely tend to inflame the stockmen against the elk" would be unnecessary.[26] By reopening the Gros Ventre to grazing, the proposition was fundamentally at odds with Nelson's plan.

To the cattlemen, the petition seemed reasonable and logical. The elk migrated and congregated near the settlers' ranches in an effort to get hay. The petitioners' proposal would essentially preserve this practice, except now the settlers, after selling their land to the government, would no longer own the ranches that were raided by the elk. The plan also provided more access to public lands for grazing cattle, thus making it appealing to the stockmen, but it did not consider the long-term well-being of the elk. The petition noted that "it is not possible to permanently protect every small band of elk ranging in this extensive region."[27] While Survey members would agree that it was impossible to protect all the elk, they would rather see elk forage for food instead of rely on feed provided by the Survey during the winter: the "semi-domestication" of elk that Field discussed in his 1917 report was a perpetual concern of the Survey. Despite the limitations of the petitioners' overture, Nelson was initially receptive, but his

[26] Richard Winger to the Biological Survey, 27 May 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 146, Box 26; and untitled petition. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.
[27] Untitled petition. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

enthusiasm soon dimmed as he realized that the necessary funds would not be available while the nation was at war.[28]

Some of the Jackson Hole inhabitants also grew weary of the federal government's impositions on grazing, inability to solve the elk problem, and failure to purchase the proposed land for sale. Once again, they expressed their grievances to Mondell, who grumbled to the Survey, "I am constantly receiving letters complaining of this situation." The "letters complaining of this situation," however, addressed more than just the restricted use of the range and revealed the mixed sentiment among residents. Some of Mondell's constituents sought to preserve elk, but had misgivings about the potential purchase of settlers' land. Fred Storer believed that the government might selectively purchase some lands, thus leaving other residents with land that still could be frequented by plundering elk. Similarly, Ben F. Garton had mixed thoughts, hoping that elk did not suffer the same fate as the buffalo. However, he complained that "a farmer cant [*sic*] afford to let them [elk] spoil his crops year after year...." He, too, was worried about government purchase of land, but he feared that the purchases would reward unscrupulous land owners. He argued that the government should not "pay for a lot of land that was taken up unlawfully[,] for some of the biggest land-owners in this strip of the country have that kind of land...."[29]

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[28] E.W. Nelson to Richard Winger, 12 June 1918, and E.W. Nelson to F.W. Mondell, 27 June 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146 Box 26.

[29] F.W. Mondell to the Bureau of Biological Survey, 10 September 1918; Fred L. Storer to F.W. Mondell 5 June 1918; and Ben F. Garton to Frank Mondell, 3 June 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 25.

Although the lack of government funds for purchase of these lands made the concerns of Storer and Garton moot, another controversy involving the federal government and land in Jackson Hole captured local and national attention. Stephen Mather, head of the National Park Service, and his assistant, Horace Albright, revived the proposed extension of the boundary of Yellowstone National Park, an idea that had been dormant for a generation. The National Park Service had just been established (1916), and the Mather-Albright combination actively promoted the parks, emphasizing their ability to generate profits.[30] The promotion of Yellowstone's extension, however, ignited a dispute that touched on visions of Jackson's future: would the town embrace tourism or homesteading and ranching? Furthermore, the controversy hinted at a similar question for the Forest Service: would it accept wildlife conservation and recreational values or continue to focus on the issuance of grazing permits, its most important responsibility up to this time? These questions had relevancy for the Survey, since an enlarged Yellowstone would provide more protected range for the elk.

As architect of the proposal, Albright, in July, 1916, along with other federal officials, made an official examination of the Yellowstone area, a region with a tourism industry that sought further development after park officials had recently

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[30] Alfred Runte, *National Parks: The American Experience* 3rd ed. (Lincoln: University of Nebraska Press, 1987), 101-103; and Richard West Sellars, "Manipulating Nature's Paradise: National Parks Management under Stephen T. Mather, 1916-1929," *Montana: The Magazine of Western History* 43 (spring 1993): 2-13. For an overview of the National Park Service, see: Barry Mackintosh, *The National Parks: Shaping the System* 3rd ed. (Washington: United States Department of the Interior, 2000). Horace Albright of the National Park Service wrote a two-volume history of the government organization: *The Birth of the National Park Service: The Founding Years, 1913-1933* (Salt Lake City: Howe Brothers, 1985); and *Creating the National Park Service: The Missing Years* (Norman: University of Oklahoma Press, 1999).

granted automobiles access to the park. The new policy offered the potential of expanding the park's base of tourists, who generally had been upper class individuals traveling by train to the park. Albright later recollected: "When the word reached Wyoming that the trip was to be made by several high Administration officials, nearly every part of the State wanted to have them view their cities and mountain scenery, particularly with reference to the need for roads and publicity." When encountering the Teton Mountains, Albright's entourage "realized that here was one of America's greatest scenic areas[,] and as it was the policy of Congress to protect the supreme natural features of our country in national parks it seemed inevitable that this region must become a park."[31]

Albright believed that the "inevitability" of Yellowstone's extension was soon at hand. Meeting with prominent citizens from Wyoming and Montana, Albright generated interest in extending Yellowstone. He received favorable responses from senators Francis E. Warren, Clarence D. Clark, and even Frank Mondell, the Wyoming representative who often opposed the federal government and the Survey's efforts to extend the refuge. These supporters, Albright noted, "believed the region was fit primarily for recreation and were only concerned that provision should be made for continuance of hunting under State authority...." Chief Nelson also supported the extension, suggesting it "will, in my opinion, block the

[31] Horace M. Albright, untitled essay in *Mr. John D. Rockefeller Jr.'s Proposed Gift of Land for the National Park System in Wyoming, History of the Snake River Land Company and of Efforts to Preserve the Jackson Hole Country for the Nation* (no city or publisher given, 1933). This book consists of essays by Horace Albright, Harold P. Fabian, Vice President of Snake River Land Company, and J.H. Rayburn, President of Teton Investment Company. The *Jackson Hole Courier* compiled the essays before Congress investigated allegations that John Rockefeller Jr., benefactor to Grand Teton National Park, engaged in unethical practices when purchasing land for the park.

pressure by interested parties to get more live stock in that section and in this will be a strong factor in safeguarding the elk." In 1918, Chief Forester of the National Forest Service, Henry Graves, Mather, and Mondell concurred on a plan for the extension of Yellowstone. The next year, Mondell introduced a bill for the extension that was passed by the House of Representatives but not by the Senate. Senator John Nugent of westward neighboring Idaho, responding to Idaho sheep raisers who feared the new park would not allow sheep grazing on the western side of the Tetons, helped defeat the measure—but not the debate over the park's extension.[32]

Some of the debate centered on the role of tourism in Wyoming's future. Home to most of Yellowstone National Park, the state reaped profits from vacationers, sportsmen, and nature enthusiasts. By 1950, it, along with three other states—Montana, Arizona, and Colorado—counted tourism among the state's top three income producing sectors of the economy. The town of Jackson especially benefited from the region's reputation for nature-based tourism. The town cultivated an image of itself as the real, authentic American West. This image was promoted so successfully over the years, that, in 1996, when President William Clinton wanted to vacation in Martha's Vineyard, his pollsters

[32] Ibid., 5-6; E.W. Nelson to Colonel Graves, 19 January 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. Alfred Runte, a leading historian of national parks, suggests that Nugent's effort to block the extension of Yellowstone is an example of the "worthless lands" argument: land could be set aside for scenic or aesthetic purposes only if it did not have commercial potential. See: Runte, *National Parks,* 121. It should be pointed out that acceptance of a national park does not guarantee a lack of controversy, as towns, businesses, and local residents often have differing visions about park policy regarding access, facilities, preserved areas, and commercialization. For a detailed study of one of America's most famous

recommended Jackson Hole instead. He was advised to portray a more rugged image and was photographed hiking, chopping wood, and riding a horse.[33]

Ironically, Clinton's vacation to the "real" West points to reasons why some Jackson residents, desirous of tourism dollars, still opposed the extension of Yellowstone's boundaries. The opposition was especially noticeable among dude ranchers. They believed that the enlargement of Yellowstone would bring modern roads, increased tourism, and commercialism, aspects of "civilization" that would tarnish the pristine image of Jackson Hole. Dude ranchers had a "hatred of government encroachment" and an "equally instinctive hatred of commercial encroachment," according to Nathaniel Burt, son of Jackson Hole dude rancher, Princeton graduate, and popular author Struthers Burt. One might note the irony of Burt, an Easterner, representing the "real" West, but Easterners owned many of the dude ranches, as they had the advantage of knowing how to hobnob with the wealthy clientele they coveted.[34]

If the dude ranchers gave a less-than-enthusiastic response to the Yellowstone proposal, the same can be said for the Forest Service, despite Chief Forester Graves' acceptance of plans for an extension of the park. The opposition came from regional forest officers, who realized that, depending on the exact contours

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national parks, see: Theodore Catton, *National Park, City Playground: Mount Rainier in the Twentieth Century* (Seattle: University of Washington Press, 2006).

[33] Clifford M. Zierer, "Tourism and Recreation in the West," *Geographical Review* 42 (July 1952): 463; and Daniel Stone, "Presidential Vacations Depend on Who Takes Them," *Newsweek,* (24 August 2009).

[34] Nathaniel Burt, *Jackson Hole Journal* (Norman: University of Oklahoma Press, 1983), 129; Lawrence R. Borne, "Dude Ranching in the Rockies," 16; and Earl Pomeroy, *In Search of the Golden West: The Tourist in Western America*, 2nd ed. (Lincoln: University of Nebraska Press, 1990), 167-172.

of the extension of Yellowstone, land that was under Forest Service authority would now be placed under National Park Service authority. Thus, these foresters feared a potential loss of their jobs. Furthermore, the Forest Service was beginning to expand its responsibilities, which had been dominated by supervising grazing in the national forests. In 1915, federal legislation allowed the national forests to be used for recreation. Shortly after, the Forest Service began constructing roads and building campsites in the national forests to attract visitors. According to Samuel P. Hays, after the National Park Service was established the following year, the two federal agencies looked upon outdoor recreation as a "competitive sport" to attract the most visitors. Thus, for the Forest Service to agree to the extension of Yellowstone, it would be tantamount to conceding defeat to a rival.[35]

The Forest Service also had to consider the livestock industry. Local cattlemen opposed the expansion of Yellowstone, because they would lose their grazing privileges on land that would become part of the national park. Cattlemen also exerted a strong influence on the Forest Service. Grazing permits were the "bread and butter" of the Forest Service. Until the late 1920s, they brought in more revenue than timber sales. Wildlife conservation also held a subordinate

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[35] Theodore Catton and Lisa Mighetto, *The Fish and Wildlife Job on the National Forests: A Century of Game and Fish Conservation, Habitat Protection, and Ecosystem Management* (Washington: Government Printing Office, 1998), 43; and Samuel P Hays, *The American People, The National Forests* (Pittsburgh: University of Pittsburgh Press, 2009), 71. Paul Sutter notes that the Forest Service's growing interest in recreational activities was not just about rivalry with the National Park Service. People had been coming to the forests to camp and vacation and created problems with sanitation and fire. Forest rangers thus "had little choice but to provide for visitors who were coming of their own volition." See: Paul Sutter, "'A Blank Spot on the Map': Aldo

position next to grazing permits, thus reflecting Pinchot's belief that wildlife refuges should not be located in the national forests. Moreover, local stock growers associations distributed the grazing permits, thereby facilitating a strong connection between the Forest Service and local interests. As a result, the Forest Service often had to take into account the needs of the stockmen when considering issues relating to wildlife or recreational values. Although Graves limited the number of grazing permits allowed in 1919, he also believed that game should be "restocked" in the national forests "without interfering with the livestock industry." Graves' successor as Chief Forester, W.B. Greeley, similarly cautioned, "we cannot give wild life an absolute right of way on the national forests," because "to do so would cause real suffering [for the stockmen] and start reactions that bode no good to the cause of wild life conservation."[36]

In addition to foresters, stockmen, and dude ranchers, opposition came from other local citizens. Townspeople were worried about the loss of potential tax revenues. If land were added to Yellowstone, it would be federal property, free from state or local property taxes. Although the land designated for Yellowstone's enlargement was already federal property, some residents believed

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Leopold, Wilderness, and U.S. Forest Service Recreational Policy, 1909-1924," *The Western Historical Quarterly* 29 (summer 1998): 198.

[36] Catton and Mighetto, *The Fish and Wildlife Job on the National Forests*, 43; Nancy Langston, *Forest Dreams/Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995), 209; Chester C. Anderson, *The Elk of Jackson Hole. A Review of Jackson Hole Studies* (Cheyenne: Wyoming Game and Fish Commission, 1958), 27; Henry S. Graves, "Recreational Uses of the National Forests," *American Forestry*, 23 (March 1917): 138, and W.B. Greeley, "Wild Life in the National Forests," *The Outlook*, 137 (March 28, 1924): 149-150.

that, in the future, some of the land might be open to homesteading, thus allowing local taxes to be assessed.[37]

The growing opposition led to a resolution that was passed by the Wyoming legislature in February, 1919. The resolution reflected a growing anti-federal sentiment over land ownership and regulations. For example, in reference to the enlargement of Yellowstone, the resolution complained that the federal government is "taking valuable land" from Wyoming. "Said lands are partly and should be further developed into revenue-producing acres by farming and the development of livestock interests of the State of Wyoming…" Thus, the United States is "urged not to extend the boundaries of the Yellowstone National Park…."[38]

Although the proposed extended boundaries of Yellowstone would place more land under the jurisdiction of the National Park Service, sometimes the residents of Jackson directed their anti-federal sentiment toward the Forest Service and Biological Survey as well as the Park Service, a form of guilt by association. For example, on August 25, 1919, a meeting was held at Jackson to discuss the extension of the boundaries. In addition to local citizens, Wyoming Governor Robert D. Carey and members of federal agencies attended. D.C. Nowlin, former state game warden now employed as manager of the Elk Refuge for the Survey, attended the meeting and noted that "very stubborn opposition to this extension

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[37] For locals' resistance to the expansion of Yellowstone, see Righter, *Crucible for Conservation*, 22-42; and Saylor, *Jackson Hole, Wyoming*, 163-178.

was displayed by a large majority of those attending the meeting ... The more radical local opponents were intolerant and inclined to 'bullyrag' Mr. Albright; and there was some bitter reference to the elk, the Forest Service and Biological Survey."[39]

By 1920, these "more radical local opponents" and other opposition helped to lessen the enthusiasm for extending the park's borders, despite a growing national interest in Yellowstone and national parks. For example, the *New York Times* reported favorably on the concept of extending park boundaries and was critical of efforts to block the extension. After describing several benefits—including the preservation of elk—of an enlarged Yellowstone, the *Times* noted that efforts to extend the boundaries met opposition, mostly from "cattlemen, from a little group who have a long purse for propaganda, the object of which is to rouse small owners to an imaginary menace to their grazing interests." The cattlemen were mistaken. Representative Mondell, a man who "cannot be suspected of indifference to the grazing interests of the citizens of Wyoming," would not have supported the enlargement of Yellowstone if its "sole purpose was the preservation of elk."[40]

While the opposition to the enlargement of Yellowstone dampened relations between the cattlemen and the Survey and National Park Service, another controversy further strained relations. Drought and a severe winter in 1919-1920

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[38] "Memorial to the Senate and House of Representatives of the United States, Relating to Public Lands within the State of Wyoming," February 22, 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 25.

caused a scarcity of hay for winter-feeding. These conditions also resulted in a large increase in the price of hay. The cattlemen, however, saw an opportunity in this crisis. They offered to help the Survey with emergency feeding, but in return, they wanted changes in grazing regulations. The Survey viewed the cattlemen's proposal as an attempt to alter grazing regulations by taking advantage of the bureau's need for hay.

The Survey received a hint of the impending disaster when Albright of the National Park Service replied to Chief Nelson's request for information about winter feed for elk. He warned Nelson that if there is a cold winter with deep snow, then the outlook for the elk "is not good," since hay would be scarce, the costs prohibitive, and efforts to acquire hay from outside sources had been unsuccessful. As winter approached, the Survey found few options for securing hay. The remote location of Jackson Hole made it costly and difficult to acquire hay from outside of the area; drought had depleted the quantity of hay; funds were lacking; and the "grass on the range is exceedingly scanty," noted Chief Nelson. Foreshadowing future difficulties, he remarked that the cattlemen are not cooperative and are "bitterly opposed to the protection of the elk herd on account of the fact that maintenance of the elks necessarily means restrictions on the amount of live stock which can be ranged in that region." Nelson bleakly predicted that a harsh winter would cause the deaths of numerous animals, and mid-December weather exacerbated an already dicey situation. The quantity of

[39] D.C. Nowlin to E.W. Nelson, 31 August 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

hay was so depleted that refuge manager D.C. Nowlin decided to "postpone feeding as long as possible...."[41]

Nelson and Nowlin also grew increasingly suspicious of the cattlemen: it seemed that local cattlemen were planning to take advantage of the growing desperation on the Elk Refuge. The cattlemen suggested that they would move their livestock to Idaho for the winter and sell their hay to the Survey. However, Nowlin suspected ulterior motives, especially after receiving a telegram from the local Forest Officer, informing him that no hay would be available until the stockmen's local Advisory Board met with Forest Officers in Ogden, Utah. He then consulted Bruce Coulter, a Forester who was temporarily in charge of the Jackson area. Coulter told Nowlin that R.E. Miller—Coulter's former supervisor—could guarantee 600 tons of hay, "provided the Department [Forest Service] change its grazing regulations." Nowlin believed that Miller was a "confidential advisor" to the stockmen, and his action suggested that the stockmen were looking to exploit the hay crisis to their advantage. A discouraged Nowlin told Nelson he had "no idea" what the Forest Service would do about grazing regulations, and he believed that "it would be folly to allow a stock association to virtually dictate terms of an unforeseen emergency." Nowlin's concerns were indicative of a larger problem the Survey experienced in Jackson Hole: while Nelson and Graves of the Forest Service might agree on policy, local foresters had

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[40] "Yellowstone Park," *New York Times* 8 February 1920.
[41] Horace Albright to E.W. Nelson, 14 August 1919; E.W. Nelson to John B. Burnham, 25 November 1919; and D.C. Nowlin to E.W. Nelson 16 December 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

strong ties with the stockmen and were more likely to advance their interests rather than the Survey's.[42]

Despite the growing antagonism between the stockmen and the Survey, Nelson received encouraging news. Refuge manager Nowlin was able to secure 573 tons of hay from the Ferrin ranch. Nelson was "relieved" to get the information from Nowlin, although he realized the costs would be considerable. Nonetheless, Nelson felt that the combined resources of the Survey, state, and National Park Service should be sufficient to meet the emergency.[43]

Nelson's optimism proved to be fleeting, however. Nowlin's suspicions that the cattlemen would use the hay shortage to press for changes in grazing restrictions were soon confirmed. On January 3, 1920, the advisory board of the Jackson's Hole Cattle and Horse Growers Association sent a proposal to the regional Forest Officer in Ogden, Utah. The essence of the proposal was an offer of assistance from the stockmen in hay production in exchange for lifting grazing restrictions in specified areas. The stockmen presented a list of landowners willing to sell their land that could be used for hay cultivation to the government. Furthermore, "the Jackson's Hole Cattle & Horse Growers Association will endeavor to furnish the funds necessary to finance the project, and loan such funds at a low rate of interest to the Federal Government, to the State of

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[42] D.C. Nowlin to E.W. Nelson, 28 November 1919; D.C. Nowlin to E.W. Nelson 16 December 1919; and D.C. Nowlin to E.W. Nelson 16 December 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. Note: there are two separate letters written from Nowlin to Nelson, both dated 28 November 1919.

[43] E.W. Nelson to D.C. Nowlin, 29 December 1919; and E.W. Nelson to John Burnham, 30 December 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

Wyoming, or any other responsible agency approved by the Federal Government. . . ." The Association was also willing to "concede" that cattle should not be allowed in the Gros Ventre area. In exchange for this apparent magnanimity, the prohibition of grazing on other areas desired by the cattlemen should be relaxed. More ominously for the Survey, the plan also "strongly recommend[ed] that the Federal administration of the elk problem in Jackson's Hole be charged to the Forest Service alone," thus excluding the National Park Service and the Biological Survey.[44]

On January 21, 1920, the advisory board presented its plan at a public meeting in Jackson. Refuge manager Nowlin attended and reported to Nelson: "This plan met with no enthusiastic support and has apparently caused some friction between the large stock owners and the small cattlemen," an observation that pleased Nelson.[45] The chief was also enthusiastic about an alternative plan he was working on with Colonel Graves of the Forest Service, a plan he was "confident" would eventually be implemented once Washington's "financial situation is a little improved. . . ." Nelson, however, shared Nowlin's skepticism about the cattlemen's offer: the cattlemen were going to borrow money at 8-10 percent interest and then lend it to the federal government at a lower rate of interest, a plan redolent of ulterior motives. Nowlin was "frankly suspicious of plans proposed by men who have heretofore fought every proposition that favored the

[44] Jackson's Hole Cattle & Horse Growers Association to District Forester, Ogden, Utah, 3 January 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

perpetuation of this elk herd."[46] Most importantly, Nelson was worried about the elk: if the cattlemen's plan were accepted, and they placed more stock on the range, "the outcome within a few years would be the practical elimination of the elk…."[47]

Nelson shared his qualms with other prominent conservationists. Writing to Edmund Seymour, President of the American Bison Society, Nelson complained that the stockmen believe "that it was through the influence of the Biological Survey that grazing restrictions had been established in that region in favor of the elk as against cattle." Although the cattlemen's proposition, since it called for the purchase of land for hay production, "in some respects follows closely along the lines" of the plan advocated by Nelson and Graves, there were important differences. The stockmen's proposal called for the purchase of ranch land, to be annexed to the Elk Refuge, for elk and for an increase in annual hay production, a model that was unacceptable to Nelson. "The only meaning" of this plan, Nelson observed, "is that all of the elk of that region should be deprived of winter grazing and should be concentrated and fed on a ranch in Jackson Hole like so many cattle in a barnyard." Furthermore, a lack of funds in Washington made the cattlemen's proposition of an annual expenditure of $30,000 for acquiring hay

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[45] D.C. Nowlin to E.W. Nelson, 25 January 1929. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

[46] E.W. Nelson to D.C. Nowlin, 4 February 1920; D.C. Nowlin to E.W. Nelson, 17 February 1920, and E.W. Nelson to D.C. Nowlin, 17 February 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. Nowlin told Nelson that he would look into how the cattlemen could offer this seemingly money-losing proposal, but he never corresponded with the chief further on this issue.

[47] E.W. Nelson to D.C. Nowlin, 4 February 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

"impracticable." In contrast, the proposal from Nelson and Graves required a smaller annual expenditure (approximately $3,000) to acquire a smaller quantity of hay, since more elk would forage for themselves on land coveted by the cattlemen.[48]

Nelson presented his ideas to Seymour not just to inform him, but also to dissuade him from supporting the cattlemen's offer, a proposal that was seemingly championed by William Hornaday, much to the dismay of Nelson. Moreover, Seymour supported Hornaday, calling him a "good strong spirit to get everybody together" to advocate a plan for the elk. Seymour's embrace of Hornaday baffled and upset Nelson. In response, the chief vehemently denounced the cattlemen's proposal and offered a resolute defense of the Survey: "The cattlemen's proposition, which Dr. Hornaday is backing, proposes to take from the Biological Survey the supervision of the Winter Elk Refuge and hand it over to the Forest Service," thus implying "incompetent management on our part...." Nelson did not mince words, haranguing "I shall oppose any such transfer to the utmost of my ability, as being a case of the rankest and most uncalled for injustice."[49]

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[48] E.W. Nelson to Edmund Seymour, 20 February 1920. Nelson sent similar letters to Horace Albright and to George Bird Grinnell, the respected conservationist and prominent member of the Boone and Crockett Club. See: E.W. Nelson to H.M. Albright, 9 February 1920 and E.W. Nelson to George Bird Grinnell, 11 February 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. See also: Henry S. Graves and E.W. Nelson, "Our National Elk Herds: A Program for Conserving the Elk on National Forests about the Yellowstone National Park," United States Department of Agriculture, Department Circular 51 (Washington: Government Printing Office, 1919).

[49] E.W. Nelson to Edmund Seymour, 20 February 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

Nelson's defense of the Survey was indicative of the bureau's sensitivity toward criticism over the increasingly contentious elk issue, an issue that was seemingly dividing wildlife conservationists at a time when they already were disagreeing on key issues such as hunting regulations and public shooting grounds. Seymour and Hornaday detected this sensitivity and apologized to Nelson, who apologized to the other wildlife advocates and emphasized to Hornaday that "we need the united assistance of all who are interested in the subject" of elk conservation. Nelson advised Seymour, "if it became understood among the opponents of conservation that the friends of the elk were working at cross purposes it would result in making a satisfactory settlement more difficult than it is at present."[50]

A "satisfactory settlement," for Nelson, was maintaining restrictions on grazing and expanding the Elk Refuge, "the key to the winter situation."[51] More area for elk to forage, rather than feeding large quantities of hay, was the objective for the Survey. For the cattlemen—ostensibly committed to elk conservation—the production of an ample quantity of hay was a sufficient solution. The "friends of the elk," however, knew that they were in a compromised position with the cattlemen. For example, Seymour stated that "I think it is a very bad policy to have the same men look after the elk that look after the cattle...." Yet he also admitted, it would be wrong to take an "antagonistic"

[50] Edmund Seymour to E.W. Nelson, 24 February 1920; W.T. Hornaday to E.W. Nelson, 27 February 1920; E.W. Nelson to W.T. Hornaday, 4 March 1920; and E.W. Nelson to Edmund Seymour, 5 March 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

position against the cattlemen. Nelson, heedful of the necessity of trying to maintain favorable relations with locals, felt this dilemma acutely. Despite his criticism of the cattlemen, he noted that "it would be indefensible" to attempt a removal of livestock interests from the region: "To do this would be to create such a bitter prejudice among stockmen that it could not be maintained, since pressure would be at once be brought to bear on Congress by stockmen. . . ."[52] Thus, Nelson's hands were tied as he tried to navigate a precarious situation, conceding that livestock interests cannot be eliminated, but realizing that their solution was notably dissimilar to his.

Nelson's predicament became more problematic with a concurrent and related controversy, one that resulted in the Survey alleging that the stockmen colluded to deny the sale of hay. The stockmen, on the other hand, accused refuge manager D.C. Nowlin of turning down their offer of hay so he could purchase it from a family member. The issues were never fully resolved, and the disagreement exacerbated an already trying relationship between the Survey and stockmen.

Nelson received an inclination that something was amiss when D.C. Nowlin wrote to him on January 1, 1920. According to Nowlin, a clerk in the office of the Forest Service stated that the stockmen's advisory board "had decided to sell no hay to the Biological Survey, but would deal exclusively with the Forest Service...." Shortly after, Nowlin received an offer of hay from the Ferrin ranch,

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[51] E.W. Nelson to W.T. Hornaday, 16 March 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

and Nowlin, in conjunction with the local Forest Office, negotiated a transaction. After finalizing the contract, however, Nowlin received word from McCain of the Forest Service. He advised Nowlin not to purchase the hay from Ferrin and stated that two members of the advisory board would be willing to sell hay at a lower price. By this time, however, Nowlin was already committed to purchasing hay from Ferrin. Nowlin suspected there might have been "ulterior motives" in the advisory board's offer, a suspicion he believed was soon confirmed. He wrote to Nelson on January 9, complaining that the "Stockmens 'advisory board' has made a libelous attack upon me—in the 'Salt Lake Tribune'—and I shall insist that Mr. Henderson [of the Survey] make a through investigation of this matter." Summarizing the situation, Nowlin noted: "The gist of the whole matter is that the leading stockmen are excessively peeved that the Bureau was able to secure hay to meet the threatened emerhency [*sic*] before they submitted to the Department certain stipulations as the removal of grazing restrictions."[53]

Despite the growing antagonism between the stockmen and the Survey, especially Nowlin, the people of Jackson supported Nowlin in this ordeal—a strong indication that the stockmen did not have complete control over public opinion in Jackson. On January 12, Jackson citizens held a meeting and passed a resolution that vindicated Nowlin: The *Salt Lake Tribune* article "does not express our sentiments; and we hereby pledge to Nowlin our most sincere

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[52] Edmund Seymour to E.W. Nelson, 20 February 1920; Edmund Seymour to E.W. Nelson, 24 February 1920; and E.W. Nelson to Edmund Seymour, 10 March 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

sympathy and place ourselves as refusing to countenance such reports." At the same meeting, moreover, the mayor of Jackson, Henry Crabtree, also issued a statement dismissing the article in the *Salt Lake City Tribune*. He added that "the elk are being cared for as well as possible under present conditions" and noted that Jackson residents have pledged to cooperate with the Survey with elk preservation. This favorable response from the town, according to Henderson, who investigated the controversy and absolved Nowlin, "was really voluntary and unexpected to myself and Mr. Nowlin." The town's support of Nowlin was indicative of the Survey's experience in Jackson: Survey members were often never quite sure how local citizens would react to the issues and controversies related to elk conservation.[54]

When Henderson looked into the controversy, Bruce Coulter, the acting local supervisor of the Forest Service, informed him of the advisory board's efforts to exploit the severe winter and hay emergency to the advantage of the cattlemen. The board listed three conditions before hay could be sold to the Forest Service: 1) hay would not be sold to the Survey; 2) grazing regulations needed to be modified; and 3) the price of hay must be high enough to make it worthwhile for the cattlemen to move their stock to Idaho for the winter, thus allowing them to

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[53] D.C. Nowlin to E.W. Nelson, 1 January 1920; and D.C. Nowlin to E.W. Nelson, 9 January 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

[54] "Resolution Passed by Citizens of Jackson's Hole in Mass Meeting Assembled at Jackson, Wyoming, January 12, 1920;" Henry Crabtree, "To the People of the United States," 12 January 1920; and "Extracts from letter of Mr. W.C. Henderson, Salt Lake City, Jan. 21, 1920, to Mr. Nelson." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

sell their supply of hay in Jackson. Coulter also advised Nowlin to purchase hay from Ferrin.[55]

Despite Coulter's recommendation to buy from Ferrin, the Survey anticipated trouble, because Ferrin was the son-in-law of Nowlin. Not surprising, representative Mondell, citing the *Salt Lake City Tribune* article, sought an explanation from Nelson, complaining that the charges against Nowlin are "damaging." Nelson responded quickly by defending Nowlin and by pointing out that the cattlemen did not represent the views of the town, as evidenced by the resolution passed by the town and the mayor's statement. Nelson provided copies of both exculpatory documents to Mondell.[56]

The Survey issued a press release to make sure the hay controversy did not turn into a public relations disaster. Remarkably, considering the strained relations caused by the hay controversy, the press release praised the cattlemen for their munificence, a strong indication of the Survey's reluctance to criticize the nation's stockmen, who often supported the bureau in different contexts: "The people of the Jackson Hole section" have informed the Survey that it could receive more hay if needed. "This action on the part of the stockmen is a generous one in view of the great need of all the hay available for the use of live stock." The press release also offered a rosy prognosis: With the work of the government bureaus, the State Game Commission of Wyoming, and local

[55] "Extracts from letter of Mr. W.C. Henderson, Salt Lake City, Jan. 21, 1920, to Mr. Nelson." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

residents, "the appalling losses of elk from starving, which appeared imminent early in the season, will be prevented." By the end of the year, however, Nelson conceded that the winter of 1919-1920 reduced about half the size of the herd.[57]

Forest and Stream repeated much of the Survey's press release verbatim, thus facilitating the Survey's perpetual desire of maintaining a favorable public image.[58] To build an agreeable public image in Jackson Hole, Nelson thought it was important to assess and influence local opinion, especially considering the mixed signals—opposition from the cattlemen, yet signs of support from the town-—the Survey received. He instructed H.F. Stone, a Survey agent in charge of reservations, to visit Jackson Hole and determine "the sentiment of the people in regard to the maintenance of the elk herd." Nelson also expected Stone to influence the local residents by pointing out the elk's ability to draw tourists. Stone was to "impress upon them the real value to the community of the maintenance of the elk herds in interesting people from all parts of the country," people who will visit as tourists and hunters and enhance the local economy.[59]

Nelson thus saw the Survey's potential for aiding tourism as a way to build support in the community. Naturally, he was delighted to see evidence of locals' interest in developing tourism. For example, Smith Riley of the Survey met with

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[56] F.W. Mondell to E.W. Nelson, 6 March 1920; and E.W. Nelson to F.W. Mondell, 9 March 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26.

[57] "Government Saving Elk Herds," Agriculture Department Press Release, 1920, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009]; E.W. Nelson to John Gaines, 30 December 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 29.

[58] "Government Saving Elk Herds," *Forest and Stream* 90 (May 1920): 120.

locals who estimated every elk killed by a hunter brings in about $500 to the economy. Moreover, the *New York Times* reported that, in 1922, tourists spent approximately $500,000 in Jackson Hole.[60] These were promising numbers for a region that was experiencing economic hardship as a result of a decline in the cattle industry in the post-World War I era.[61]

When attempting to encourage tourism, the Survey emphasized that local control would be respected, a reflection of the Survey's limited power to implement its plan and its sensitivity to town sentiment. For example, Stone was instructed to let the citizens know that the Survey is "interested in interfering as little as possible with the business and welfare of the people of that section in the maintenance of the elk herds." In reference to hunting regulations, Nelson sent a similar message to Governor Robert D. Carey, assuring him that "neither the Forest Service nor the Biological Survey has the slightest desire to deprive Wyoming of any material control of its game resources," but is only interested in assisting the state in augmenting those resources.[62] These pledges of non-interference were indicative of the Survey's need to build support in a locale that was not always receptive to federal agencies.

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[59] E.W. Nelson to H.F. Stone, 3 January 1921. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 25.

[60] E.W. Nelson to D.C. Nowlin, 23 November 1920. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 25; Smith Riley to E.W. Nelson 4 March 1923. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 7; and "Jackson Hole," *New York Times,* 10 May 1925.

[61] The economic outlook was so gloomy that T.A. Larson, a leading historian of Wyoming, titles a chapter "Depression Years, 1920-1939" in his comprehensive history of the state, thus suggesting the Depression affected Wyoming before the rest of the nation. See, T.A. Larson, *History of Wyoming*, 411-446.

Although the Survey attempted to generate interest in tourism, the larger issues involving tourism—the enlargement of Yellowstone and the creation and expansion of Grand Teton National Park—involved the National Park Service and the Forest Service more than the Survey. Local opinion vacillated on these questions. After the cattlemen and dude ranchers opposed the expansion of Yellowstone, some dude ranchers came to believe that the National Park Service offered the best chances to maintain Jackson in a near-pristine condition, thus enhancing its tourist potential. The Park Service used this growing interest from the dude ranchers to build support for the 1929 creation of Grand Teton National Park.[63] Efforts to enlarge Grand Teton in the 1930s, however, ran into local opposition, as many residents feared they would not share the benefits of an enlarged Grand Teton. Historian Hal K. Rothman suggests a dichotomy explains the town's positions: "The people who advocated commercial economic use of land were native; those who preserved the scenery and fauna were typically neonative [Easterners who went to Jackson to take up dude ranching]." This dichotomy glosses over much, especially the residents' qualified desire for nature tourism and the dude ranchers' initial opposition to the extension of Yellowstone. Furthermore, many residents who wanted Jackson to be left in a pristine condition to attract tourists also supported the continued development of the livestock industry, not just for the income it generated, but also because ranches added a

[62] E.W. Nelson to H.F. Stone, 3 January 1921. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146 Box 25; and E.W. Nelson to Robert D. Carey, 22 January 1919. Nelson Papers, Box 22, "Limited Licensing" Folder.

touch of authenticity to Jackson's image as the embodiment of the "true" West. Even though opponents objected to the enlargement of the park, they were not necessarily hostile to tourism, as long as local residents—not the federal government—controlled the tourist economy. Their opposition to Grand Teton's expansion was more indicative of an anti-federal rather than anti-tourism sentiment.[64]

At congressional hearings held in 1938, citizens from Jackson and other Wyoming towns expressed their misgivings about the proposed expansion. Their arguments varied, but they all conveyed a sense that local residents would be slighted if the park expanded. Wyoming inhabitants, civic associations, business organizations, labor unions, and chambers of commerce either testified in Washington or had their testimonies read at the hearings.

Anti-federal arguments that had been presented during the controversy over Yellowstone's expansion resurfaced in this new context. For attorney and later governor and senator Milward L. Simpson, representing Jackson, the "the people of Jackson Hole country want to have an end put to this continual effort to take their lands and put them into a national park." Although Simpson conveniently overlooked the fact that many of the "taken" lands were part of national forests or had been sold to Rockefeller by private landowners, his feeling of indignation was shared by others. Indeed, the "taken" lands could no longer be subject to local taxes and would lose potential subsurface mineral rights. Other arguments were

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[63] Betts, *Along the Ramparts of the Tetons*, 167-170; Sayler, *Jackson Hole*, 202-205; and Righter, *Crucible for Conservation*, 33-35.

put forth about federal control of the public domain. The Wyoming Woolgrowers Association claimed that over ninety percent of Wyoming believes in the "doctrine of States' rights" and object to "the long-handed form of government, which at the present time controls our forests, our minerals, our scenic wealth and which now seeks complete jurisdiction over our grazing lands and water." C.W. Erwin, president of the Wyoming Bankers' Association, suggested that the proper role of the federal government is distributing the public domain to individuals, not withdrawing it from public use. These anti-federal arguments had become standard, almost formulaic, by the time the hearings were held.[65]

The citizens' views of tourism, however, were more nuanced and resist easy categorization: they do not fit the pattern described by historian Peter Blodgett, whereby "scores of western cities and towns" sought to profit from tourism in national parks. Many citizens embraced tourism, but they wanted to do it on their terms, not under the authority of the National Park Service. Most importantly, they feared a decline in hunting revenue, because hunting was prohibited in the national parks. The employment of local guides and money spent on lodging and at outfitters' shops benefited the local economy. Furthermore, local owners of lodging facilities and camps argued that they provided a better outdoor experience than the national parks. For example, the proprietor of Wort's Lodge and Camp, testified:

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[64] Rothman, *Devil's Bargains,* 137-140.
[65] Senate Subcommitte of the Committee on Public Lands and Surveys: *Enlarging Grand Teton National Park in Wyoming, Hearings before the Subcommittee... Pursuant to S. Res. 250*, 75th Cong., 3rd sess. (1938), 58-98.

> I would gamble (of course, there is no way to prove it), but 90 percent of the people who come out of Yellowstone Park are dissatisfied not only with their treatment but the conditions in general. There are too many restrictions. You have to have restrictions for that many people... [At my lodge] They can get up and holler at 4 o'clock in the morning here and nobody cares. They build a fire where they please, and they are free here; they are enjoying themselves.[66]

People who hunted and camped in the area also testified at the hearings. A doctor, J. Harry Murphy, from Nebraska, offered a "statement from the tourist standpoint." He commented that, because the owners of these establishments offer much more "hospitality" than the park concessionaires, he prefers to spend his vacation in the Jackson Hole area instead of a national park. It was not just doctors who offered testimony: opponents of park extension often argued that their position provides more benefits for the common person. For example, a member of a local railroad brotherhood testified that his fellow unionists "have no Y.M.C.A. or other kind of recreation in the State, and these laboring men can only look forward to a trip to the country for a vacation for camping or fishing or hunting, and they feel this area will be lost to them for these vacations if this extension goes through." Another union member, Leo Maki of the Wyoming State Industrial Board Council, voiced a complaint that was commonly used against the Survey's conservation efforts (see chapter five): the wealthy gain more benefits than the common person from efforts to preserve nature and wildlife. "Some of these financial magnates who are able to purchase these lands buy them up, and they form gun clubs or sportsmen's clubs or whatever name you want to

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[66] Ibid., 91-92, 150-156; and Peter Blodgett, "Selling the Scenery: Advertising and the National Parks, 1916-1933," in David Wrobel and Patrick T. Long, *Seeing and Being Seen: Tourism and*

call them, and we are denied the privilege of going out to those areas and hunting and fishing. If this land goes into the park... that will be just another such instance."[67]

Opponents of park extension used the common person appeal in other ways. Local proprietors of camping and lodging facilities emphasized that they employed only local residents, "instead of the granting of concessions to a favored few in the national park areas." One rancher complained that Rockefeller's land purchases drove up the cost of real estate, thus making it impossible to acquire more land for his cattle. For some citizens, the Rockefeller land acquisitions made little sense. Embodying the spirit of the Homestead Act, they worked the land, made improvements on it, and now, it seemed, all that hard work was for naught. Joe May, who lived in the region all his life, grumbled that he "lease[d] 100 acres from [Rockefeller's] Snake River Land Co. It is very fertile. I refenced it, broke it up, and put it into grain. They took the land, burnt the buildings, tore down the fences, and turned it back to nature. It was an improved place."[68]

Equally disconcerting for many citizens was the purported need for change. Why, for example, was it necessary to take land under Forest Service authority and transfer it to the National Park Service? For Milward Simpson, the choice between government agencies was not even worth debating: with the National

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the American West (Lawrence: University Press of Kansas, 2001), 283.
[67] Senate Subcommittee of the Committee on Public Lands and Surveys: *Enlarging Grand Teton National Park in Wyoming*, 66, 105,198, 256.
[68] Ibid., 61, 139-163.

Park Service, revenue could be generated by recreational tourism, but with the Forest Service's emphasis on multiple use of natural resources, profits could be made from grazing and timber as well as recreational tourism. A talk given by Forester R.H. Rutledge at the Izaak Walton League meeting in Jackson Hole (read at the congressional hearings) affirmed the Forest Service's commitment to tourism: In 1936, 40,000 visitors vacationed at the Teton Forest (not the Grand Teton National Park) "and enjoyed its fascinating grandeur." Moreover, 155,000 tourists came through the area on their way to other locations and enjoyed the "wonderful scenery and atmosphere. We are planning for all these people by the construction of modern campgrounds, a swimming pool, trails, and footpaths." With the Forest Service telling local citizens that they can profit from tourism and resource use, it is not surprising that people looked skeptically at the National Park Service's Arno Cammerer, who assured residents that tourism at an enlarged Grand Teton National Park would offset other potential economic losses. Without a perceived economic benefit, the proposal for the enlargement of Grand Teton National Park was an unwarranted federal intrusion, a robbing of the "heritage and homes of residents in Teton County," according to the Laramie, Wyoming Chamber of Commerce. With a "heritage" that was often described in glowing terms by national newspapers such as the *New York Times*, it is not surprising that change was not welcomed.[69]

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[69] Ibid., 58-70, 100-103. The *New York Times* often touted the wonders of the Rocky Mountains, with an occasional emphasis on Jackson Hole. For example, see: Dan Hall, "Where the Frontier Lives on," 24 April 1938; Hal Borland, "On the Ranges of the West," 26 May 1940; Blackburn Sims, "On Touring the Rockies," 8 June 1941; Blackburn Sims, "Dudes Can Find the Old West

With local residents' diverse thoughts on tourism, and with mixed signals the Survey received from the town of Jackson, the bureau had better fortunes appealing to other wildlife conservation organizations rather than promoting tourism's potential. The Survey had already received substantial assistance from the National Audubon Societies on the early bird refuges, the American Bison Society for the National Bison Refuge, and the Izaak Walton League for the Upper Mississippi National Fish and Wildlife Refuge. The ideal solution was an expansion of the refuge, a possibility that Nelson discussed with other conservationists. Since government funds were lacking, Nelson sought other ways to finance the expansion. He explained to John Burnham of the American Game Protective Association that he envisioned the "formation of a holding company in New York City among wealthy men for the purpose of putting up the $300,000 needed for purchasing the lands needed to complete the Winter Elk Refuge. . . ." Colonel Graves, Edmund Seymour, and Robert Sterling Yard expressed interest in Nelson's vision, and the chief began soliciting support from other conservationists and associations.[70]

They Read of in Story Books," 10 May 1942; and Ward West, "Real Ranching Awaits Dudes Who Go West," 17 May 1942. The controversy continued throughout the 1940s, especially after President Franklin Roosevelt's executive order established Jackson Hole National Monument in 1943. In 1950, most of the Jackson Hole National Monument became part of the Grand Teton National Park. See: Char Miller, "Showdown at Jackson Hole: A Monumental Backlash against the Antiquities Act," in David Harmon and Francis P. McManamon, and Dwight T. Pitcaithley, editors, *The Antiquities Act: A Century of American Archaeology, Historic Preservation, and Nature Conservation* (Tucson: University of Arizona Press, 2006), 93-107.

[70] E.W. Nelson to John Burnham 12 December 1919. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 26. For correspondence with other wildlife advocates, see the following from the National Archives. Records of the U.S. Fish and Wildlife Service, Entry 146: E.W. Nelson to George Bird Grinnell, 22 January 1920 (Box 29); E.W. Nelson to O.W. Ewing, 11 February 1920 (Box 27); E.W. Nelson to W.C. Stillman, 20 December 1920 (box 25); and E.W. Nelson to John Gaines, 30 December 1920 (Box 29).

Although Nelson's holding company never materialized, he generated interest among other conservationists and organizations, especially the Izaak Walton League. This group of wildlife enthusiasts solicited contributions for the Elk Refuge and raised $36,000, a sum given to the Survey to enlarge the Refuge by 1,760 acres in 1927.[71] There were other encouraging developments for the Survey. Meeting in 1924 and 1926, the National Conference on Outdoor Recreation, a commission authorized by President Coolidge to formulate a national recreation policy, sponsored an Elk Commission and major study of the Jackson Hole elk. Furthermore, Coolidge issued two executive orders that withdrew land from the public domain in Wyoming.[72]

The Elk Commission's report, written by Charles Sheldon of the Survey, revealed significant weaknesses in the Survey's understanding of the Jackson Hole elk (see chapter 2). It also made several recommendations, most notably the need for better state hunting regulations. Current law did not limit the number of licenses issued, nor did it require hunters to identify the class of the hunted animal. Sheldon wanted more specificity to the laws and more flexibility to

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[71] James B. Trefethen, *Crusade for Wildlife: Highlights in Conservation Progress* (New York: Boone and Crockett Club, 1961), 234-235. Several Survey members made small contributions to the fund, ranging from 25 cents to 10 dollars. Untitled document, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 146, Box 7.

[72] Righter, *Crucible for Conservation*, 52-55. Paul Sutter argues that the National Committee on Outdoor Recreation "signaled a new era in American environmental politics in which recreational politics emerged as a central if complex force," in contrast to the Progressive Era's focus on the wise use of natural resources. See: Paul Sutter, *Driven Wild* (Seattle: University of Washington Press, 2002), 41-48. Jackson Hole was in the process of the transition, moving toward the "new era" with its focus on recreation and tourism and away from resource (cattle) use. For a discussion of Jackson Hole's transformation into a beacon for tourism, see: Lawrence Culver, "From 'Last of the Old West' to First of the New West," in Liza Nicholas, Elaine M. Bapis, and Thomas J. Harvey, *Imagining the Big Open: Nature, Identity, and Play in the New West* (Salt Lake City: The University of Utah Press, 2003).

adjust regulations when circumstances change, an acknowledgment of nature's variability: "The licenses should recite on their faces the class of kill permitted, the particular local shooting range, and the period of time for which they are good, which may vary on different ranges." "Paradoxically," protection of the herd might do more harm than good if the elk "multiply beyond the means of subsistence." Thus, regulated hunting could be an effective tool for controlling potentially unhealthy increases in herd size. However, the use of hunting to curb increases made sense only if some of the basic questions about elk could be determined.[73]

The report also pointed to another ongoing problem: while it recommended acquiring more land for elk, it also noted that there was opposition to federal withdrawals because of the loss of potential taxable land. The Survey's sensitivity to this issue of locals' misgivings about withdrawn land can be seen in Sheldon's reaction to Coolidge's second executive order that withdrew land in Wyoming—an executive order that was issued but not understood by Sheldon and the Survey. Unknown to the Survey, John Rockefeller Jr., in conjunction with Horace Albright of the National Park Service, was purchasing land, via his "Snake River Land Company," for a new national park, the Grand Teton National Park, eventually established in 1929. When Rockefeller began acquiring land for the park, he believed that, if people knew that the wealthy tycoon was purchasing land, they would ask for higher prices for their land. In 1926, Albright hired two Jackson businessmen to survey the area for land values. They found that the price

[73] Sheldon, *The Conservation of the Elk of Jackson Hole,* 14-17.

of land had increased since 1916, when Albright first championed the idea of extending Yellowstone's boundaries. Thus, Rockefeller and Albright felt it was necessary not to draw attention to the land acquisition process.[74]

The secrecy of Albright and Rockefeller was disconcerting to the Survey. The National Park Service and the Survey shared a mutual interest in managing elk and sharing resources for feeding. The Survey had advocated increased range for the elk, and information about future land to be withdrawn would have been welcomed. The surreptitious land purchases also touched on a troublesome issue for the Survey: the need to maintain friendly relations with the townspeople who were concerned that the executive orders would reduce potential taxable property. The first executive order, issued on April 15, 1927, was in response to the Elk Commission's recommendation that the Elk Refuge needed more land; this order was anticipated and welcomed. However, on July 7, 1927, another executive order was issued, but this one was issued in response to the plan by John D. Rockefeller and his Snake River Land Company to acquire land. Sheldon was unaware of the Rockefeller-Albright strategy; when the second order was issued, he assumed it was also for the expansion of the refuge, a purpose he knew local interests would oppose. Writing to Chief Paul Redington, he explained that the "Elk Commission gave the equivalent of a pledge [to the state of Wyoming] on

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[74] Horace M. Albright to John Rockefeller Jr., 1 November 1926, in Joseph W. Ernst, ed. *Worthwhile Places: Correspondences of John D. Rockefeller, Jr. and Horace M. Albright* (New York: The Fordham University Press, 1991), 61-64; and Righter, *Crucible for Conservation,* 52-56 . The early history of Rockefeller's activities is recounted by Albright's daughter in: Marian Albright Schenck, "One Day on Timbered Island: How the Rockefellers' Visits to Yellowstone Led to Grand Teton National Park," *Montana: The Magazine of Western History* 57 (summer 2007): 22-39.

the amount of land to be withdrawn," an amount specified in the first executive order. With the issuing of the second order, the people have "good grounds for believing that they have been double crossed," and the "anti-federal sentiment" is likely to increase. Aware that the Survey's work was dependent on not offending local sensibilities, he noted that "Wyoming holds the key to the elk question. Without her full cooperation little can be accomplished." His reaction was illustrative of the Survey's situation in Jackson Hole and other refuges: The extra land, desperately needed for the refuge, would still be problematic without local support.[75]

"Full cooperation," however, was sometimes problematic. Although the Survey often worked in harmony with the Wyoming Game Commission, and although the state and Survey shared expenses in feeding the elk, there were occasional issues and policies that divided the two organizations. For example, the state agency did not approve of the proposals for the expansion of the Elk Refuge: if the Refuge were expanded, hunting would be prohibited in the newly acquired areas, thus potentially increasing the elk population and thus exacerbating the strained relationships between the cattlemen and the agencies responsible for the elk.[76] Furthermore, each agency managed separate areas—the

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[75] Charles Sheldon to Paul Redington, 7 August 1927. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 62. Other members of the Elk Commission, especially representatives of the governor's office, were equally puzzled and annoyed by the withdrawals. See: Undated minutes from meeting of the Elk Commission, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 67.
[76] David J. Saylor, *Jackson Hole*, 181-183.

State managed the Teton Game Preserve while the Survey oversaw the National Elk Refuge—but elk often migrated between the two.[77]

Since both the state and the Survey supervised some of the very same elk, albeit at different times of the year, one organization's policy often had consequences for the other's. For example, in response to stockmen who wanted a reduction of the size of the herd to minimize elk depredations, the Wyoming Game Commission, in the fall of 1934, reversed its long-standing policy, dating back to 1905, of prohibiting hunting in the state refuge. The state's action affected the Elk Refuge. Under pressure from the hunters, about 5,000 elk left the state refuge for the Survey's refuge earlier than anticipated. The Survey was ill-equipped to handle the sudden arrival of elk, as drought from the previous year reduced the availability of hay. Moreover, to further decrease surplus elk, the Wyoming Game Commission authorized "supervised killing" by professional hunters in February, 1935.[78]

These measures by the state divided conservationists as well as local residents. Members of fishing and hunting clubs, wildlife advocates, and local branches of the Izaak Walton League sent letters of complaint to the Wyoming Game Commission. Some Jackson Hole citizens wanted an injunction to terminate the killing. The complaints, however, were not monolithic. As the *New York Times* noted, "all angles of the question are being spiritedly wrangled." For example,

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[77] "Quarterly Report for the Winter Elk Refuge for the Period from October 1, to December 31, 1933." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 247, Box 25.

some residents were divided over the question of whether professional hunters or local citizens should kill the elk. Others wanted to ensure that Wyoming taxpayers received benefits from the hunt. Some voiced complaints over the state's policy of selling some of the elk for meat in eastern markets with the profits used to defray hay costs. Some wildlife advocates were especially troubled over the killing of the elk, in view of a recent controversy involving state authorization of the killing of antelope. In 1929, Wyoming modified its hunting regulations to arrest an increase in the antelope population, a decision that resulted in a "period of terror" for the antelope, according to one local paper. The *New York Times* called the state's decision "reprehensible," because past policies protected the animals and lessened their fear of humans, thus making them easy targets.[79]

Another method of reducing the elk surplus proved to be equally controversial. The state game department built a slaughtering pen on the refuge. When a Cheyenne packing company made a contract with the refuge to purchase 1,000 slaughtered elk, some citizens were outraged. A local attorney was planning on filing an injunction to stop the slaughter, but withdrew because of the money required to go ahead with the proceeding. One night, "unknown persons" disabled the corral fence and freed the remaining elk that were to be slaughtered (about half of the elk had already been killed). Since the identity of the vandals

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[78] George Greenfield, "Wood, Field and Stream," *New York Times*, 18 February 1935; and "Drive on 'Outlaw' Elks Is Started in Wyoming," *New York Times*, 24 February 1935.

was not known, the exact nature of their grievance was also not known, but a general complaint against refuge policy was that Wyoming citizens did not benefit from the reduction of the elk surplus.[80]

Despite these controversies, the Survey came to realize that the state's policies were necessary to maintain the herd at 20,000, as recommended by the Elk Commission.[81] Writing in *Natural History*, Olaus Murie, the Survey's elk specialist, defended the decision to open up the Teton State Game Preserve to hunting. While conceding that many people felt the "elk were getting a 'dirty deal,'" and admitting that "no doubt there have been abuses of the hunting privilege," Murie saw the state policy as the lesser of two evils: "Far better to reduce the herd temporarily [by hunting], in whatever degree that may be attained in an orderly manner, than to injure the range further, and permit the suffering due to food shortage in the winter."[82]

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[79] George F. Gerling, "Slaughter of Elk Protested," *New York Times,* 8 December 1935; "Many Antelope Killed," *The Pinedale Roundup,* 3 October 1929, available at newspaperarchive.com [accessed 1 August 2009]; and "Massacring Antelope," *The New York Times*, 24 October 1929.

[80] "Quarterly Report for the Winter Elk Refuge for the Period from October 1 to December 31, 1935." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 247, Box 25.

[81] "Quarterly Report of the Winter Elk Refuge for the Period from January 1 to March 31, 1936." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 247, Box 25. Federal bureaus and the state adjusted the recommended herd size of 20,000 to a maximum of 7,500 in 1974. See: John Wilbrecht and Russell Robbins, "History of the National Elk Refuge," in Mark S. Boyce and Larry D. Hayden-Wing, *North American Elk: Ecology, Behavior and Management* (Laramie: University of Wyoming, 1979), 252. .

[82] Olaus J. Murie, "The Elk of Jackson Hole," *Natural History* 80 (1935): 239-247. Murie had misgivings on the reduction policy (see chapter 2), but his argument that it was occasionally necessary to reduce animal populations was becoming accepted practice among conservationists, in view of the Kaibab problem. However, in the same article, Murie also offered an unorthodox defense of the subsistence hunter—a type of hunter who was frequently criticized by sportsmen who allegedly practiced a more ethical type of hunting. Sportsmen often viewed themselves as conservationists, because they formulated rules of conduct for ethical hunting and were engaged in the hunt purely for sport. Subsistence hunters, and especially market hunters, in this view, were not motivated by the same ideals as the sportsman. Murie, however, argued that "when local

"Temporarily" is the essential idea in Murie's argument: the reduction programs, as well as the feeding of elk, were supposed to be temporary measures until more fundamental problems were addressed. After beginning his research in Jackson Hole in 1927, Murie spent over a decade pointing out key problems, some of which developed from well-intended policies that had unanticipated consequences: "Some of the very necessary relief measures designed to remedy the elk situation have often been harmful in certain respects…." For example, in 1927-1928, approximately eighteen percent of the calves died of calf diphtheria, or "sore mouth," as a result of consuming hay with squirreltail grass. The high density of elk on the refuge also increased the risk of disease and "is most undesirable and dangerous from a sanitary viewpoint."[83] Murie constantly feared that feeding a large concentration of elk would produce behavioral changes—"pauperization"—that were not fully understood, a fear shared by G.W. Field after his early study of the elk in 1917. Murie was also critical of the ways in which lands were acquired or reserved for elk, a piecemeal process that often resulted in a patchwork-type landscape that created management difficulties:

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residents take some of the surplus game and use the meat, that it is a legitimate use, and the meat becomes a local economic asset." In contrast, the sportsman, especially a "trophy hunter," might be "infinitely less a sportsman" and often goes hunting as an "excuse for an out-of door debauch…" For the sportsmen hunting ideal, see: John Burnham, "Conservation's Debt to Sportsmen," *The North American Review* 226 (September 1928): 296-302; and John F. Reiger, *American Sportsmen and the Origins of Conservation*, rev. ed. (Norman: University of Oklahoma Press, 1986).

[83] Olaus J. Murie, "Elk in Jackson Hole Studied to Facilitate Wild-Life Management," *Yearbook of Agriculture 1931* (Washington: Government Printing Office, 1932), 210-211; and Olaus J. Murie, "Epizootic Disease of Elk," *Journal of Mammalogy* 11 (May 1930): 214-222.

"Public lands in parts of the valley are so interspersed with private land that we are unable to hold the elk where they belong, except by feeding them hay."[84]

Murie realized that it was necessary to continue feeding the elk, even if they were not starving, in order to keep them away from the ranches; sometimes it was necessary to herd the elk away from the ranches to get them onto the Elk Refuge.[85] The constant threat of elk plundering became such a volatile issue that some Jackson Hole citizens made a public declaration akin to war. In 1933, they wrote to the Survey, the State Game Commission, and the *Pinedale Roundup* to give warning that "we will no longer suffer elk depredations upon our lands and we are prepared to and shall go to whatever length necessary to keep them off." One rancher, Ben Coe, was more specific: "Unless this condition is changed inside of three days I am going to start killing elk on my property." Although a settlement of 15,000 dollars from the state helped appease the ranchers, the problems with elk persisted.[86]

The solution—more range for the elk—required funds and willing sellers. Some of the ranchers expressed an interest in selling their land to the federal government, but limited funds made this possible solution problematic.[87]

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[84] Olaus Murie to John C. Pickett 29 September 1933. Olaus Murie Papers Box 1, Folder 49.
[85] Olaus Murie to Ding Darling, 17 January 1935. The Murie Family Papers, Collection Number 11375, American Heritage Center, University of Wyoming (hereafter, Murie Family Papers), Box 27, Folder 1.
[86] "Reasons Set Forth by State Game Commission for Action Taken Regarding Elk Herd," *Pinedale Roundup*, 5 December 1933. Available at newspaperarchive.com [accessed 7 August 2009]. Copies of letters sent to the Survey, the Wyoming State Game Commission, and Governor Leslie Miller can be found in The Murie Family Papers, Box 1, Folder 55. The gist of these letters is similar to the letter sent to the *Pinedale Roundup*.
[87] In his letter to the *Pinedale Roundup*, Ben Coe stated that "I have put up with this unfair condition for years, thinking the government would buy this land..." The Survey had been encouraged in thinking it can receive federal funds for a substantial purchase of land,

However, the Survey's prospects for expansion improved in 1935. In an effort to reverse the decline in the numbers of migratory birds, President Franklin Roosevelt authorized $6,000,000 for land acquisition and wildlife restoration programs. The National Elk Refuge, since it also supplied habitat for migratory birds, qualified for funding.

Although the money for refuge expansion was undoubtedly welcomed by the Survey, the land acquisition process encountered complications. In the 1930s, Rockefeller's Snake River Land Company began purchasing more land for the future expansion of Grand Teton National Park. Members of the Survey, however, were uncertain if the Rockefeller purchases were designated to go to the National Park Service, the Forest Service, or the National Elk Refuge. Furthermore, the Snake River Land Company, by spending generous sums of money for land, encouraged other residents, many of whom were stockmen, to bargain for higher prices when selling their land to the Survey. The residents' attempts at inflating land values incensed members of the Migratory Bird Conservation Commission, a committee consisting of Survey personnel, senator Peter Norbeck (South Dakota), and senator Key Pittman (Nevada) that authorized land purchases for bird conservation. At the committee's 1936 meeting, Norbeck complained that "every time we attempt to buy in here [Jackson], the price of land goes up." Pittman was not as reserved as Norbeck, noting that the people

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approximately 8,000-12,000 acres, after Wyoming representative Charles E. Winter introduced legislation in 1925 to acquire land for the Elk Refuge. However, repeated attempts to pass legislation ran into opposition from the Bureau of the Budget. For a summary of these failed efforts, see "Proposal for Acquisition of Land in Jackson Hole for the Conservation of Elk," 7

have no qualms about accepting federal funding for highways, yet they "obstruct Government work all the time." These former homesteaders "got the land for nothing at all" and now want ten times its value. A frustrated Pittman concluded: "It's totally impossible to deal with these people."[88]

Pittman commented on other obstacles. It was getting unfeasible to protect the elk because the state's hunting regulations were too liberal, an indication of the influence of the stockmen, who "desire nothing better than to kill them [elk] off." The opposition has also "got the legislature all stirred up about taking all the land out of taxation," a long standing complaint voiced by critics of the expansion of Yellowstone and Grand Teton national parks. Norbeck added that the state wants grazing privileges and expects the federal government to purchase hay for the elk. An exasperated Norbeck warned: "unless the State of Wyoming will co-

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February 1934. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 236, Box 110.

[88] At the Commission's 1937 meeting, after being informed of land prices in Jackson, Agricultural Secretary Wallace remarked to the Commission, "I am wondering if your ideas as to [land] value are not a little warped." See: "Excerpt from the Minutes of the Meeting of the Migratory Bird Conservation Committee, January 14, 1936." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 62. See also: " Memorandum Number Eighteen, Elk Refuge, Teton County, Wyoming. Summarized Statement about Lands Recommended for Purchase," 12 January 1937. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 241, Box 2. The meeting notes of Rudolph Diffenbach, head of land acquisition for the Survey, are also useful: "Memorandum for the Files," 18 January 1936. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 236, Box 110. The inflation of land values was possibly the result of an ethically questionable purchase scheme. At the 1933 congressional hearings that investigated Rockefeller's attempt to acquire land for the extension of Grand Teton, witnesses testified that some land owners, after selling land to the Snake River Land Company, would then use their profits to buy more land and resell it to the land company for higher prices. The Hearings looked into charges that Rockefeller, or his company, tried to pressure landowners into selling their land. Rockefeller was acquitted of any wrongdoing. See: Senate Subcommittee of the Committee on Public Lands, *Investigation of Proposed Enlargement of the Yellowstone and Grand Teton National Parks... Pursuant to Res. 226,* 72nd Cong., 2nd sess. (1933); and "Land Profiteering Alleged in Teton," *New York Times* 10 August 1933.

operate with us, we can look for another place in the United States to establish a big herd," a threat that was not seriously considered.[89]

Despite the obstacles discussed by the Migratory Bird Conservation Commission, other factors worked in favor of the Survey's goal of expanding the Elk Refuge. The Depression and drought of the 1930s made it difficult to engage in agriculture and ranching, thus encouraging residents to sell their land. Much of the town's opposition was directed at Rockefeller's and the National Park Service's efforts at enlarging Grand Teton National Park rather than at attempts to add to the Elk Refuge.[90] Most notably, between 1935-1941, a combination of executive orders, purchases made through money from the six million dollar wildlife restoration fund, and leases from the Snake River Land Company, allowed the Elk Refuge to increase to approximately 24,000 acres, a conspicuous difference from the Refuge's initial establishment of 1,760 acres in 1912. Once this expansion was completed, notes a group of wildlife biologists, the refuge was managed "more as a winter range and less as a feedlot—a place merely to hold elk and keep them out of trouble."[91]

The enlarged Refuge was just one indication of the change that occurred on the National Elk Refuge; the mission had changed as well. The Survey's original

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[89] "Excerpt from the Minutes of the Meeting of the Migratory Bird Conservation Committee," 14 January 1936." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 62.

[90] After many years of strife, the enlargement of Grand Teton National Park was finalized in 1950. See: Robert Righter, *Crucible for Conservation*, 140.

[91] Eric K. Cole et al., *Imperfect Pasture,* 94. For brief summaries of these land acquisitions see: Almer Nelson, "A History and Function of the Wyoming Elk Refuge," *Wyoming Wildlife* 3 (March 1940): 4-5, 18; and Russell Robbins and John Wilbrecht, "History of the National Elk Refuge," 248-254.

goal of emergency feeding to prevent starvation and elk depredations quickly changed to establishing and maintaining a refuge on a permanent basis. An awareness of the spatial limitations of the refuge resulted in efforts to expand it for increased range and hay production. After the feeding program was established, the Survey then wanted to minimize the possibility that elk would undergo behavioral changes that were injurious to their viability. To accomplish these emergent goals, the Survey had to contend with several complicating factors: a town deciding its future, anti-federal sentiment, and a cattle industry determined to maintain as much grazing land as possible. For many Jackson residents, elk and tourism offered economic opportunity, but the debate over the proposed national parks intensified an existing anti-federal outlook. The most vehement anti-federal predilection came from the cattlemen, as they perceived an expanded elk range and an enlargement of the national parks as an infringement on their livelihoods. The resistance from the cattlemen, a divided town, and an anti-federal attitude forced the Survey to be mindful of state and local sentiment, yet it was sometimes difficult to gauge the attitude of local residents. Thus, the Survey was often uncertain about how its policies would be received by the locals as well as by the state and other government agencies.

The elk's experience in Jackson Hole was reflective of long-term trends in wildlife history and management. The basic problem for the elk was settlement and development: When settlers came to homestead in Jackson, the elk's customary migratory routes were blocked. This phenomenon—the obstruction of

animal migratory paths—has become so commonplace that conservation biologist David Samuel Wilcove, in an aptly titled book, *No Way Home*, argues that, "simply stated, the phenomenon of migration is disappearing around the world." It is not just the big game animals that have had their highways blocked: similar developments have affected birds, fish, and insects. Wilcove, pointing out that no scientific studies were done when the great herds of bison roamed the Plains, implicitly raises the question. What, exactly, was an animal's "natural" behavior before becoming semi-domesticated by humans?[92] Consider the elk of Jackson Hole: once their migratory route was shut off, a cascade of events occurred that resulted in the desperate animals seeking sanctuary on the refuge. Although the refuge might not be a "feedlot" anymore, the elk have been fed in all but nine years from 1912-1998. Furthermore, to ensure that animals do not produce long-term damage to the range, the Survey, Forest Service, and the National Park Service have employed regulated hunting and other methods of population control.[93] These measures have not only divided wildlife enthusiasts and humane advocates, but they have also raised the possibility that animals protected on refuges are somehow less wild, less natural, than they were in the past. Murie's fear of the "pauperization" of elk that became habituated to the refuge might be a foreshadowing of the future: wildlife will be less wild but not completely domesticated.

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[92] David Samuel Wilcove, *No Way Home: The Decline of the World's Great Animal Migrations* (Washington: Island Press, 2008), 5, 106-109.

Maintaining wildlife in this not-completely-wild state required, as the Survey discovered, balancing several competing interests. In many respects, the balancing act has become more difficult. An anti-federal sentiment is still deeply rooted among state residents, and the elk still raid area ranches, though much less frequently than in the past.[94] Complicating the balancing act are several new wildlife advocacy and humane organizations that have attempted to influence refuge policy.[95] Furthermore, the refuge has developed its own tourist activities, including wintertime sleigh ride tours that allow visitors to view the elk. It also features a greater variety of animals, including the trumpeter swan, a bird at one time on the verge of extinction. These new developments may have added new issues that need to be considered, but recent disputes over state and federal authority, the controversy over hunting as a means of population control, and the role of tourism on the refuges, echo the Survey's earlier experience in Jackson Hole.

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[93] Catton and Mighetto, *The Fish and Wildlife Job on the National Forest*, 85-97; and R. Gerald Wright, *Wildlife Research and Management in the National Parks* (Chicago: University of Illinois Press, 1992), 71-78.

[94] A relatively recent federal-state controversy was the Fish and Wildlife Service's refusal to vaccinate the elk against brucellosis, a decision that was opposed by the Wyoming Game and Fish Department. In 1998, the state sued and lost, but the issue remains problematic. See: Robert L. Fischman and Angela M. King, "Savings Clauses and Trends in Natural Resources Federalism," *William and Mary Environmental Law and Policy Review* 129 (fall 2007).

[95] For some of these more recent developments, see: Anders Halverson, "The National Elk Refuge and the Jackson Hole Elk Herd: Management Appraisal and Recommendations," *Yale School of Forestry and Environmental Studies* (2000), 23-52, available at: http://www.environment.research.yale.edu/documents/downloads/0-9/104Halver.pdf. [accessed 1 May 2010].

"PLAYING SANTA CLAUSE": PROTECTING BIRDS ON AVIAN REFUGES

Much of the Survey's experience in Jackson Hole was duplicated on the bird refuges supervised by the federal bureau. Development and settlement had a strong impact on the elk in Jackson Hole as well as the nation's migratory birds, albeit with some differences. In Jackson Hole, development blocked the elk's migratory routes, but for bird populations, it destroyed breeding and nesting habitat. Other federal agencies played important roles in both Jackson Hole and the bird refuges, although on the avian sanctuaries, the Reclamation Service, not the National Park Service and Forest Service, had the strongest bearing on the Survey's work. The Survey's task was aided by outside conservation organizations, especially the Izaak Walton League, on the refuges as well as in Jackson Hole. Just as the Survey encountered tension with Wyoming, it also experienced conflicts with some of the states and towns that were home to the refuges.

Efforts to protect birds on the refuges encountered problems that resembled the difficulties the Survey found in Wyoming. The Survey attempted to build local support—support that was sometimes difficult to determine and could shift, depending on the circumstances. Establishing strong connections with area residents was hindered by a variety of factors: anti-federal attitudes; a perception that the Survey favored wealthy hunters over the ordinary citizen; a conflicted relationship with hunters; locals' attempts to use the refuges for their own purposes; and a wide range of opinions among area residents, with some

supporting the refuges, some opposed, some indifferent, and some fluctuating between the various positions. Perhaps the biggest challenge—one that distinguishes the bird refuges from Jackson Hole—was the need to convince people of the importance of saving birds. The citizens of Jackson, even the stockmen, did not deny wildlife's potential to generate revenue. However, on the bird sanctuaries, with some exceptions, it was more difficult to convince locals of the economic potential of birds, especially when efforts to protect them were considered an impediment to economic development. Thus, the Survey's goals for the refuges were often at odds with the desires of local populations.

For the Survey, meeting these challenges defied a formulaic response. Senator Key Pittman, Vice-Chairman of the Senate Special Committee on Conservation of Wildlife Resources, observed that "because of the wide variance in topography, altitude, rainfall and water supply, soil, climatic conditions, and relation of areas to established waterfowl flyways, no two refuges present identical problems."[1] Pittman's analysis of the uniqueness of the refuges' physical conditions can be extended to the social, economic, and political background. Each refuge had its own relation between the Survey and local residents, state government, and other federal bureaus. The refuges discussed in this chapter—Lower Klamath Lake Reservation, Clear Lake Bird Reservation, Malheur Lake Refuge, Upper Mississippi National Fish and Wildlife Refuge, Ninepipe National Wildlife Refuge, Pablo National Wildlife Refuge, and Red

[1] Senate Special Committee on Conservation of Wildlife Resources, *Wildlife and the Land: A Story of Regeneration*, 75th Cong., 1st sess. (1937), 14.

Rocks Lake National Wildlife Refuge—are scattered throughout the West and Midwest. They also vary in size and founding dates. Despite the refuges' differences, the Survey's experience with all of them was characterized by uncertainty, though the nature of uncertainty varied. At Klamath and Clear Lake, the Survey's difficulty in establishing favorable relations with local residents and a problematic relationship with the Reclamation Service cast doubt on the future of the refuges. For Malheur Lake, the Survey was uncertain how to proceed with the refuge because of a legal dispute over land, wavering support from locals, and private and state reclamation projects that threatened the area's wildlife. At the Upper Mississippi refuge, a lack of precise boundaries, disputes over the value of land to be acquired, and difficulty in controlling a large area complicated and delayed the completion of the refuge. Dicey relations with hunters at Ninepipe, Pablo, and Red Rocks made the futures of those refuges far from certain. For all these refuges, political, social, and economic relations with locals influenced the Survey's policies and ability to establish avian retreats on a permanent basis.

Figure 10: Pelican Island was the first federal avian refuge. Photographs: Fish and Wildlife Service. "Virtual Exhibit."

Political considerations also marked the very beginning of federal efforts to protect birds. Around the turn of the twentieth century, the slaughter of birds, a profitable enterprise for hunters supplying choice feathers to the millinery business, horrified many Americans as avian populations plummeted. The plumage controversy was especially evident in Florida, where the Audubon Society, along with the American Ornithologists Union, helped to pass a law against plume hunting in the state and hired wardens to patrol rookeries and enforce legislation. These bird enthusiasts coveted tiny Pelican Island, off the Florida coast, and hoped President Theodore Roosevelt would sell the island (SEE PHOTOS). Roosevelt, however, was mindful of political ramifications, believing that selling federal property might create controversy. Instead, he issued an executive order to set aside the area to protect the brown pelican *(Pelecanus occidentalis)* and soon issued more executive orders to establish refuges in Florida, Louisiana, Washington, the Hawaiian Islands, and California. However, setting aside land for wildlife and nature could, on occasion, pit two tendencies of the Progressive Era—wise use conservation and the preservation of nature—against each other, most famously demonstrated in the Hetch Hetchy controversy. The Survey's experience on the Klamath refuge also experienced this tension between conservation and preservation. As Doug Foster argues, when establishing the refuge at Klamath, Roosevelt wanted both, conservation and preservation, a dyad of "incompatible priorities." The refuge was located on a Reclamation Service irrigation project, and reclaiming land for agriculture was

often incompatible with the Survey's goal of protecting birds' breeding and nesting grounds.[2]

The Survey's refuge in Klamath was one of several in southern Oregon, home to extensive wetlands that were important resting-places for birds on the Pacific flyway (SEE MAP). In 1907, William L. Finley, the prominent photographer and naturalist who became an icon of wildlife conservation, described the lake area of southern Oregon as "perhaps the most extensive breeding ground in the West for all kinds of inland water birds." This lake region, which also extends into

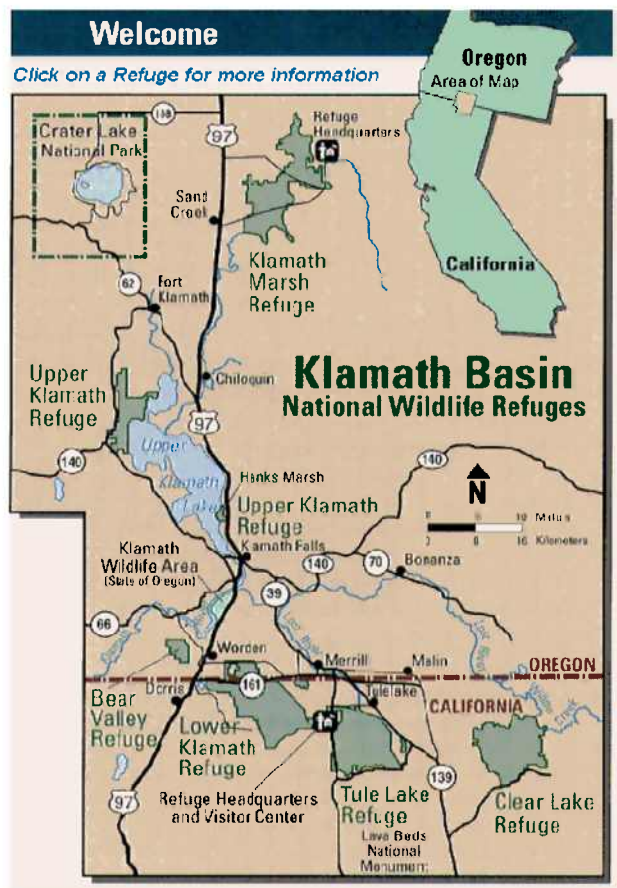

Figure 11: U.S. Fish and Wildlife Service

[2] Nancy Langston, *Where Land and Water Meet: A Western Landscape Transformed* (Seattle: University of Washington Press, 2203), 67-68; and Doug Foster, "Refuges and Reclamation: Conflicts in the Klamath Basin, 1904-1964," *Oregon Historical Quarterly* 103 (summer 2002): 150-155. By 1936, thirty refuges had been established on reclamation projects, although seven of these were vacated. "Refuges on Reclamation Projects," 29 January 1936, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 13. For the plumage controversy, see: Robin W. Doughty, *Feather Fashions and Bird Preservation: A Study in Nature Protection* (Berkeley: University of California Press, 1975). For Hetch Hetchy, see: Robert W. Righter, *The Battle over Hetch Hetchy: America's Most Controversial Dam and the Birth of Modern Environmentalism* (New York. Oxford University Press, 2005).

northern California, eventually became the site of six national wildlife refuges. The first of these refuges, the Klamath Lake Reservation (later designated the Lower Klamath Lake Reservation), created by an executive order by Theodore Roosevelt in 1908, was intended as a breeding ground for migratory birds. The executive order authorized the Survey to manage the avian retreat and protect the birds from unlawful hunting. The Survey's mission, however, was limited from the beginning. Because of the Reclamation Service's irrigation project, only lands that were not suitable for agriculture became part of the refuge. Furthermore, the Survey was not prepared for the responsibilities it was given, lacked adequate funding, and had to navigate through the conflicting demands of the local population—inhabitants who were more inclined to favor agricultural development over bird protection.[3]

Interest in protecting birds in Oregon predated the Survey's involvement in Klamath. Plume hunting intensified around the turn of the twentieth century, as the lake region in southern Oregon was teaming with egrets, terns, gulls, grebes, herons, and pelicans—birds that attracted market hunters looking to profit in the thriving millenary business. As the slaughter of these birds captured national

[3] The six national wildlife refuges in the Klamath Basin include: Klamath Marsh, Upper Klamath, Bear Valley, Lower Klamath, Tule Lake, and Clear Lake. Foster, "Refuges and Reclamation," 150-155; and William L. Finley, "Among the Gulls on Klamath Lake," *Condor* 9 (Jan.-Feb. 1907): 12. Through his photographs, articles written for popular ornithological journals, involvement with wildlife organizations and the state of Oregon, Finley played an important role in furthering wildlife conservation. He is often discussed in historical accounts of bird protection. For a more extensive treatment, see: Worth Mathewson, *William L. Finley, Pioneer Wildlife Photographer* (Corvallis: Oregon State University, 1986). For a general history of the Klamath area, see: *A River Never the Same: A History of Water in the Klamath Basin* (Klamath Falls, Oregon: The Shaw Historical Library, 1999). The volume is a collection of essays that appeared in *The Journal of the Shaw Historical Library.* No editor is listed.

attention, the Oregon Audubon Society helped to pass a state law state protecting non-edible birds. The National Association of Audubon Societies also became involved in enforcing the legislation, as it began paying two state game wardens in 1904 to patrol the lower portion of Klamath Lake and nearby Tule Lake. The National Society also sent Finley, an Audubon member, to the region to assess the situation. He found numerous market hunters, and his subsequent report influenced Roosevelt in creating the refuge in Klamath. Although Roosevelt's decision offered the potential to curb market hunting, no separate appropriation was granted for the refuge, and the salary of the Survey's first warden, L. Alva Lewis, was initially paid primarily by the Audubon Society and the state of Oregon, a familiar instance of the Survey's reliance on outside organizations.[4]

The Survey's lack of funding left it unprepared for its responsibilities. In 1909, his first year on the refuge, Lewis was instructed to take inventory of the birds, but he lamented that "the reserve is altogether too large and bird life is too varied" to make an accurate assessment. Enforcing hunting regulations was problematic, since boundary lines were not clearly marked, and the Survey could not afford another warden, relying on the Reclamation Service to help patrol the area. He believed that "suitable rules for the guidance of the public" must be issued, because he does not have the "power to rid the Reserve of objectionable people." Moreover, hunters "can do as they please so long as they are not caught

[4] Doug Foster, "Refuges and Reclamation," 152, 158; Frank Graham Jr., *The Audubon Ark: A History of the National Audubon Society* (New York: Knopf, 1990): 107-108; and Thomas Gilbert Pearson, *Adventures in Bird Protection: An Autobiography by Thomas Gilbert Pearson* (New York: Appleton-Century Company, 1937), 243-244.

with birds in their possession...." Lewis believed he could partly remedy this situation if he had the authority to issue trapping permits, forbid "objectionable" people from entering the refuge, and carry a firearm. Although he stated that most local citizens have "respected the law," he feared a backlash from hunters who did not believe the federal government had the authority to regulate wildlife, a traditional responsibility of the states.[5]

States still played important roles in supervising wildlife. Before the first federal migratory bird law was passed in 1913, the Survey was essentially enforcing state legislation. Oregon's laws, according to Survey Chief Henry Henshaw, were too liberal, resulting in only four arrests in 1911 on Klamath and contributing to a decline in Canada geese (although ducks "held their own"). The lack of greater enforcement authority limited the Survey's effectiveness. Nonetheless, Henshaw, while testifying before Congress, was optimistic: Although a lack of funding made it impossible to maintain a warden on every bird refuge, the chief stated "we try to enlist the sympathy and aid of the residents" living on or near the refuges. "If we can get them on our side, if we can get them to thoroughly believe in the advantages of having these [bird] sanctuaries, it requires very little supervision."[6]

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[5] L. Alva Lewis, "Warden's Annual Report," 1909. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 126, Box 216, and L. Alva Lewis to T.S. Palmer, 22 January 1912. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 80.

[6] Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1912* (Washington: Government Printing Office, 1913), 673; and House Committee on Agriculture, *Hearings on ... Estimates of Appropriations for the Fiscal Year Ending June 30, 1914* (1913), 218.

The success of the Survey's goals was thus partly dependent on the support of local residents—individuals who had come to the region because of the possibility of irrigation in the early twentieth century to farm, raise cattle or sheep, or speculate in land. By the time the refuge was founded in 1908, there were land claims on approximately one-third of the land within the refuge.[7] To build ties with the local population, the Survey, in 1917, agreed to allow residents to cut hay on the refuge, a decision made in response to a request from California representative John E. Raker. The Survey, however, had some reservations about this arrangement. Permits for hay might increase the tendency to raise more livestock, a problematic situation. George W. Field, the Survey's head of reservations, noted that the permits should be limited and issued in accord with the land's carrying capacity. The Reclamation Service, however, granted grazing permits, and the Survey did not have funds for an independent study of the carrying capacity. Field also noted that cattle wandered on to the refuge, "destroying eggs, nests, or young birds" and "may bring about conditions which may make the reservation unsuitable for the purposes for which it was intended." Even if cattle did not kill the young birds, the destruction of their nests made them vulernable to predators. Although Field mentioned that cattlemen "should be informed of these facts," he advised delaying action until the following year, citing the need to boost agricultural production during the world war. His

[7] Doug Foster, "Refuges and Reclamation," 156; and Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Oxford University Press, 1985), 171-172.

reluctance, however, was also indicative of the need to maintain favorable relations with local residents.[8]

Establishing and sustaining close ties with the community was dicey for the Survey, as many citizens thought the Reclamation Service provided more opportunities for their futures. The Service invested heavily in the Klamath Reclamation Project, despite having few data on the region's rainfall and runoff and evaporation rates, and despite a 1909 Department of Agriculture study that pointed out that the soil was too alkaline to be productive. These drawbacks did not dampen the public's eagerness for reclamation, an enthusiasm the Survey attributed to speculators' extravagant claims and a questionable assumption: if reclamation was successful on nearby Tule Lake, then it should also be successful on Klamath Lake. Public confidence in reclamation received a further boost after Woodrow Wilson's 1915 executive order withdrew over seven thousand acres of marshland from the refuge, thus freeing it for homesteading. In that same year, engineers from the Reclamation Service encouraged marshland owners to form the Klamath Drainage District. Two years later, with the goal of draining the lake and making it suitable for agriculture, the organization successfully lobbied the federal government to have the Reclamation Service close the headgates that supplied water from Klamath River to Lower Klamath Lake, an agreement that

[8] E.W. Nelson to the Secretary of Agriculture, 11 April 1917; G.W. Field to J.J. Furber, 15 August 1917; G.W. Field to George Willett, 11 June 1918; and G.W. Field to J.J. Furber, 2 July 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 80.

several members of the Reclamation Service, including Director Frederick Newell, thought was dubious.[9]

Turning the water off was problematic for both birds and agriculture. In 1920, the Survey reported that "the water table on the lake has been lowered several feet by closing the gates which control the inflow from the Klamath River. This action... has uncovered large areas of alkali mud flats without thus far benefiting the settlers adjoining the lake or opening up additional lands suitable for agriculture." The report also gave a dire prediction for the birds, noting that, without a slightly elevated water level, the future of the refuge would be "seriously jeopardized." The *Los Angeles Times'* criticism was even more explicit: Noting that when the refuge was created, there were "nesting multitudes" of birds and "a great number of cattle," the *Times* stated that everything changed when "land operators and wild-cat schemers... advocated the drying up of the lake by cutting off the water supply from Klamath River.... Instead of the waters we now have desert flats crusted with alkali," a condition that devastated the meadowland used by the stockmen. The Department of the Interior also commissioned a separate study of the area, and its conclusions echoed the Survey's report. These findings, combined with support from

[9] "Memorandum on the Klamath Lake Bird Reservation," Bureau of Biological Survey, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162. Box 81; "Summary of Facts Found by F.L. Lathrop in 1932 Relative to the Restoration of Lower Klamath Lake to Its Original Condition," Bureau of Biological Survey, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 67; and Doug Foster, "Refuges and Reclamation," 156-163. Foster argues that the Reclamation Service's agreement to shut off the water to Klamath, despite earlier problems, and despite Newell's misgivings, was the result of "pragmatism." The contract generated funds for the Reclamation Service because the Drainage

sportsmen, the National Association of Audubon Societies, the state game commissions of Oregon and California, and the Western Association of Game Commissioners rekindled hope that the area could be primarily a bird reservation. In 1924, the Department of Agriculture issued a press release stating that the lower Klamath Lake area would be re-flooded in the near future.[10]

The enthusiasm for re-flooding, however, proved to be fleeting. To assess local opinion, William L. Finley collected articles from area newspapers and saw mixed signals. While he noted "many people" believed that re-flooding would be a "valuable asset," he also observed that the members of the Klamath Drainage District were "united" in their opposition. One article from the *Klamath Sun* stated that, "It has simply narrowed down to a question of whether a flock of pelicans is of greater value to a community than a number of fertile farms. The pelican is picturesque, but he never aided in paying taxes nor in upbuilding the section in which we live."[11]

The Survey also made efforts to determine local sentiment. In 1925, it sent Harold C. Bryant to Klamath to examine physical conditions and survey public opinion. He, too, found a mixed picture. He confirmed Finley's finding that

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District had to pay for past studies of the region. Foster also thinks the engineers shared the common belief that marshlands were unhealthy and should be drained.

[10] The Survey began calling attention to the problems of drainage on bird life in its 1918 report; the issue remained a perpetual concern for the Survey. Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1918* (Washington: Government Printing Office, 1919), 270; "Summary of Facts;" and "Klamath Lake Bird Refuge Likely to be Restored," 20 October 1924, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 81; and "Monuments to Roosevelt," *Los Angeles Times,* 4 January 1920. For the support of the sportsmen, see also from the *Los Angeles Times*: "Save Klamath, Sport Slogan,"10 June 1924; "Sportsmen Urged to Protect State Preserve," 22 June 1924; and "'Klamath Day' for Game too," 4 December 1924.

drainage district members were opposed to re-flooding, but he also noted that sheepmen wanted to use the "dreary waste" of the lake bottom and its weeds as "pasturage for sheep." Some landowners, who purchased land primarily for investment, were also opposed. More surprisingly, ranchers claimed that drainage dried up their wells, making it next to impossible to cultivate hay and rye, yet Bryant claimed they were only "lukewarm to re-flooding." Support for the refuge was more difficult to find. The "only" consistent local support came from sportsmen and residents from the neighboring town of Merrill, who objected to the dust and ash blowing from the wasted lake. More ominously, Bryant observed that advocates of the refuge "admitted that there had been quite a switch in sentiment during the last year or two," with former supporters now pleading for agricultural development or conceding that "it is too late" for the refuge.[12]

When retiring Chief Edward Nelson passed along guidelines about Klamath to incoming Chief Paul Redington in 1927, the outgoing head of the Survey also had a sense of the "switch in sentiment." While still maintaining that re-flooding was "possible," Nelson noted that the situation was "complicated by the various interests involved." For the refuge to have a chance, the "good will of the people" must be earned. Whoever the Survey sends to investigate technical problems "should make the utmost effort to establish a friendly footing not only personally but for the Biological Survey." Furthermore, "publicity" should be eschewed, "in

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[11] William L. Finley, "Ranchers Score Move to Flood Lands in Lower Klamath Lake Basin," National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 67.
[12] Harold C. Bryant, "Present Conditions on Lower Klamath Lake." National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 67.

order to avoid developing unnecessary opposition that might come from newspaper articles." Nelson's tempered and cautious instructions to Redington were indicative of the community's waning interest in the refuge. By the following year, plans for Lower Klamath fell into abeyance. The Survey, however, received some consolation with the 1928 creation of a bird sanctuary on Tule Lake, located within the Klamath irrigation project, a development that "offsets, to some extent the loss of sanctuary caused by the drying up of the lower Klamath refuge," according to the Survey's 1929 annual report.[13]

The area was eventually re-flooded in 1942, but it was done to address an agricultural problem, not to attract birds. It was difficult to build support for avian protection in early twentieth century Oregon. Historian Lawrence M. Lipin, who has examined opposition to a proposed scenic highway in Oregon, argues that the average Oregon citizen viewed nature preservation, game laws, and nature tourism as amusements for the wealthy. Sportsmen, who often opposed the Survey's work in other refuges, supported the Klamath refuge, but this support could not counterbalance the opposition from others who favored the Reclamation Service and agricultural and economic development. In terms of an economic benefit, the best the Survey could do was to suggest that protected birds would help curtail an infestation of grasshoppers in the early 1920s, a suggestion that did not change local opinion. The lack of local support, combined with inadequate

[13] E.W. Nelson, "Memorandum for Mr. Redington, Reflooding Lower Klamath Lake," 21 June 1927. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 67; Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1929* (Washington D.C.: Government Printing Office, 1930), 23.

funding for enforcing regulations and compiling data on birds and grazing animals, resulted in a failed mission in the early years of the Survey's work in Klamath.[14]

Clear Lake, located within the Klamath Basin, became the site of another bird refuge managed by the Survey. Created by an executive order in 1911, the Clear Lake refuge, like the nearby refuge at Klamath, was also located within the Reclamation Service's Klamath Irrigation Project. Management of Clear Lake was similar to management of Klamath. At Clear Lake, the Survey lacked funds to properly manage the refuge, found it difficult to enforce regulations, had conflicting goals with those of the Reclamation Service, and encountered difficulties with local inhabitants, especially sheep raisers.

When L. Alva Lewis inspected the area on several occasions, he was dismayed by the difficulties in managing the refuge. There were no living facilities for the warden, thus leaving the refuge unsupervised at times. The refuge also lacked a boat, a significant shortcoming considering the fifty-five miles of shoreline that needed patrolling. Furthermore, roads near the lake had been submerged in water, and traveling by horseback was too dangerous because of the rocky terrain. Boundary markings and postings of regulations were

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[14] Foster, "Refuges and Reclamation," 173; Lawrence M. Lipin, "'Cast Aside the Automobile Enthusiast': Class Conflict, Tax Policy, and the Preservation of Nature in Progressive-Era Oregon," *Oregon Historical Quarterly* 107 (summer 2006): 166-195. Lipin expands his argument in: *Workers and the Wild: Conservation, Consumerism, and Labor in Oregon, 1910-1930* (Champaign, Illinois: University of Illinois Press, 2007). William L. Finley, "Ranchers Score Move to Flood Lands in Lower Klamath Lake Basin," National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 67; *Klamath Sun*, 30 June 1924. A retyped version of the *Klamath Sun* article can be found in: National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 67.

inadequate and not "accurately understood." It was impossible to stop the shooting of the brewer's blackbird *(Euphagus cyanocephalus)*, a bird protected by state law at this time, because it destroyed crops and was considered a "nuisance."[15] Even more problematic was the scarcity of water in the area, a situation that encouraged sheep raisers to bring their herds to the edge of the lake. W.W. Patch of the Reclamation Service warned that the sheep's presence frightens birds and attracts "large numbers of coyotes which also are very destructive of the nests and young birds." The Reclamation Service, which issued grazing leases to local residents, requested that the Survey issue regulations about watering the sheep near the lake, but T.S. Palmer, the Assistant Chief of the Survey, claimed that "until we have someone to enforce the regulations, there is little use in making rules of this kind."[16]

The lack of grazing regulations—and disputes over grazing and leasing of land on the irrigation project—continued to plague the Survey during the 1920s and 1930s. In 1921, Chief Nelson wrote to the Solicitor of the Department of Agriculture, asking what measures can be taken to prevent stock owners from allowing their animals to enter the refuge. Solicitor R.W. Williams' advice—arrest the stockmen for trespassing—was not a realistic option, considering that the Survey looked to establish friendly relations with local residents. Further complicating the situation was the Reclamation Service's control over grazing

[15] L. Alva Lewis to T.S. Palmer, 27 September 1911; and L. Alva Lewis, "Monthly Report of Conditions on Clear Lake Reservation," March, 1912. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 46.

leases. The Reclamation Service and the Survey could not come to terms over permits for a peninsula that was becoming increasingly important for migratory birds, prompting G.W. Lyons of the Forest Service to comment, "it is extremely unfortunate that this matter [grazing leases] was not taken up by the Biological Survey with the Reclamation Service, who control the lands in question at an early enough date to have secured some protection against sheep grazing on the area in question."[17]

In the early 1930s, the two federal agencies could not agree on another problem involving sheep grazing. The Survey wanted the Reclamation Service to include, in its future land leases, a clause that would prohibit grazing and cutting hay during the critical nesting period (March 1 to July 31) in the Clear Lake area. H.M. Worcester, the refuge's superintendent, received a less-than-enthusiastic response from the Reclamation Service's B.E. Hayden, who informed Worcester that the restrictions would make it more difficult to lease land. Furthermore, Hayden stated that it was the Survey's responsibility, not the Reclamation Service's, to protect the refuge from wandering stock. Besides, placing limitations on the sheep raisers would only result in cattlemen—who did not have leases—using the area for their stock. A frustrated Worcester wrote to Chief

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[16] W.W. Patch to Director, Reclamation Service, 27 April 1912; and T.S. Palmer to L. Alva Lewis, 25 June 1912. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 46.

[17] R.W. Williams to E.W. Nelson, 19 April 1921; Morris Bien, Assistant Director, Reclamation Service, to E.W. Nelson, 28 June 1922; G.W. Lyons to District Forester, 9 May 1923; and E.W. Nelson to Colonel Greeley, 28 April 1923. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 46. The comment from Lyons of the Forest Service, which had rangers stationed in the nearby Modoc Forest, came after Nelson sought a warden from

Redington, saying there is "no remedy" to the grazing and leasing problems as long "as our Refuge is a plaster on Reclamation land." Ironically, though, perhaps Worcester had a moment of schadenfreude when a Reclamation Service engineer asked for his assistance in dealing with horses and cattle that were grazing on land that had been leased by Reclamation Service to sheep owners. Worcester replied that he would like to help, but it was not the Survey's responsibility to look after the leased lands.[18]

Worcester's indifference to the Reclamation Service is not surprising, given the controversy over leases and the Survey's inability to build a base of local support. Unlike the Reclamation Service and its leasing and grazing permits, the Survey had nothing to offer local stockmen. Moreover, farmers complained that protected birds destroyed their crops, prompting the Reclamation Service engineer to advocate an open season on Chinese pheasants, much to the chagrin of Worcester. After one local resident cursed at Worcester for protecting pelicans and gulls, the exasperated superintendent explained to the chief, "that will give you an idea of what I am up against."[19]

Worcester and the Survey were "up against" more than just some disgruntled farmers and stockmen. In a subordinate position, the Survey also had to contend

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the Forest Service to patrol the peninsula. There is no indication that a Forest Service employee was used for this purpose.

[18] Stanley P. Young to Commissioner, Reclamation Service, 4 February 1933; B.E. Hayden to Commissioner, Reclamation Service, 15 February 1933; H.M. Worcester to Chief, Biological Survey, 24 June 1933; and H.M. Worcester to Chief, Biological Survey, 21 July 1933. John Clark Salyer Papers, CONS68, Conservation Collection, Denver Public Library (hereafter, Salyer Papers), Box 10, Folder 27.

[19] Worcester to Chief, Biological Survey, 24 June 1933; and Worcester to Chief, Biological Survey, 21 July 1933. Salyer Papers, Box 10, Folder 27

with the Reclamation Service, a relationship the *Washington Post* described as David vs. Goliath, with the "powerful and pugnacious Harold Ickes" of the Interior Department against the "weaker and far less considerable Biological Survey." The Survey was also "up against" inadequate funding and locals who wanted the land used for agriculture and grazing, not the protection of birds. Under these circumstances, Survey personnel were uncertain how to establish better relations with locals and the Reclamation Service, and the Clear Lake refuge never had a secure foundation.[20]

In southeastern Oregon at the Malheur Lake Refuge, created by an executive order in 1908, the Survey found somewhat similar conditions that prevailed in Clear Lake. In a detailed history of the lake, Nancy Langston argues that the area went through a three-part transition, each with an emphasis on production. In the nineteenth century, cattle barons wanted the land to produce large numbers of livestock. Beginning in the early twentieth century, farmers, with the aid of irrigation, wanted the land for agriculture. By the mid-1930s, wildlife managers, first from the Survey and later from the Fish and Wildlife Service, emphasized the production of migratory waterfowl.[21] The Survey, along with William Finley, facilitated the transition from crop to waterfowl production, a transition that was welcomed with much fanfare as birds were reappearing in the lake by the late

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[20] John Randolph, "Reclamation Schemes Declared Meaningless," *Washington Post,* 21 July 1935.
[21] Langston, *Where Land and Water Meet*, 3-10. For Oregon's enthusiasm for using technology to alter nature, especially for reclamation, see chapter eight, "Engineering Nature," in William G. Robbins' history of Oregon, *Landscapes of Promise. The Oregon Story 1800-1940* (Seattle: University of Washington Press 1997), 238-267. For a description of the birds of the Pacific Flyway, see: Tupper Ansel Blake, *Tracks in the Sky. Wildlife and Wetlands of the Pacific Flyway* (San Francisco: Chronicle Books, 1987).

1930s after their fate seemed doomed by the forces of irrigation and development.[22] To make this transition, the Survey attempted to build support from the area's population, but it was support that was often difficult to determine, sometimes fleeting, and not always consistent. The uncertain support, controversy over private and state reclamation efforts, and legal ambiguity over land ownership hindered the Survey's efforts to maintain a refuge on Malheur Lake in its early years through the mid-1930s.

The Survey's task of encouraging the growth of bird populations was complicated by a dispute over land that Oregon claimed it had acquired through the Swampland Acts. These laws, passed from 1849-1860, were designed to facilitate the transfer of public lands to the states. Wetlands ("swamplands" in nineteenth century parlance) in the public domain that were considered unsuitable for agricultural production were given to the states. Once the states had possession of the wetlands, they could sell them to private investors and use the income to construct levees along the rivers for flood protection, a plan that, in principle, would increase the value of the land.[23] In Oregon, controversy developed over the Swampland Acts, when the state, by 1870, used the legislation

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[22] Earl B. Gilmore, "Pelicans Again Nest in Malheur Lake Refuge," *Los Angeles Times* 4 April 1937; George Greenfield, "Rod and Gun," *New York Times*, 31 October 1934; Scott Hart, "The Federal Diary," *Washington Post*, 4 April 1937; and Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey,* 1936 (Washington: Government Printing Office, 1937), 43.

[23] The swamplands and their unsuitability for agriculture were not clearly defined, and the ambiguity opened the door for fraud. Through the Swampland Acts, states and speculators acquired sixty-five million acres of land, based on the premise that the land was agriculturally valueless, a premise that in many cases was false. See: Richard N.L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy* (New Haven: Yale University Press, 1999), 97-98; and Ann Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands* (Washington: Island Press, 1997), 73-76.

to acquire swamplands. However, because the land that the state allegedly acquired was not surveyed, the General Land Office—responsible for surveying and dispensing the public domain in the nineteenth century—withheld Oregon's claims. Oregon, however, began accepting down payments on 215,000 acres and sent bills of sale to many of the applicants, thus encouraging more settlers to homestead in the area. Oregon and the federal government wrangled over ownership of the land, a controversy that was eventually resolved in 1935 by the Supreme Court.[24] Although the court ruled in the federal government's favor, the years of legal ambiguity hampered the Survey's work, as the bureau feared that its actions and policies might have to be changed. According to a 1941 Fish and Wildlife Service report, this legal uncertainty and the settlers' "intermittent occupation" of the lakebed made it "impossible" to exercise authority over the area.[25]

The lack of control was evident from the beginning of the refuge. Much of the problem was centered on the legal uncertainty of land ownership and the lack of clearly marked boundaries for the refuge, a situation not auspicious for the Survey to establish authority. Since the boundaries were "vaguely defined," Chief Henry Henshaw advised Alva Lewis—sent from Klamath to inspect the area—to enforce regulations cautiously and approach people occupying the lands of disputed ownership with the "proper spirit" to gain their "cooperation." Lewis,

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[24] *United States v. Oregon.* 295 U.S. 1; 55 S. Ct. 610.
[25] Langston, *Where Land and Water Meet*, 36-37, 89; and "Memorandum 'B': Legal Status and Ownership of the Malheur National Wildlife Refuge, Harney County, Oregon," National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 4.

however, presented a bleak picture to Assistant Chief T.S. Palmer: The refuge warden was "inclined to carry diplomacy a little too far," thus encouraging defiance of Survey authority. Furthermore, as long as lands were disputed, any attempts to enforce regulations "are likely to antagonize some of the people" who made land claims. The Survey does not have "sufficient power to handle the situation with a firm hand and as a consequence it is possible for these claimants to fight us openly and even defy us." To Lewis, it seemed that locals did "defy" the Survey: cutting hay on the refuge, setting tule fires which were difficult to control and destroyed nesting areas, grazing livestock, carrying firearms, and trapping—activities that were initially unregulated, much to the dismay of Lewis, who thought issuing permits to regulate these worrisome developments would bring some order to a seemingly chaotic situation.[26]

Granting permits could also generate local support for the Survey. The Survey began issuing permits to trappers in exchange for help in patrolling the refuge. The permit system offered other advantages: it allowed the Survey to collect data on the number of animals caught by the trappers, and, according to Finley, the animals that were caught—mink, otters, and muskrats—occasionally destroyed bird nests.[27] Ranchers were also allowed to cut hay on the refuge in

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[26] T.S. Palmer to William Finley, 16 March 11; Henry Henshaw to L. Alva Lewis, 19 December 11. Salyer Papers, Box 12, Folder 20; L. Alva Lewis to T.S. Palmer, 1 January 1912; L. Alva Lewis, "Monthly Report of Conditions of Lake Malheur," February 1912; and "Conditions on the Lake Malheur Reservation for the Month Ending March 31, 1912." Salyer Papers, Box 12, Folder 21.

[27] William L. Finley to T.S. Palmer, 19 September 1909; William L. Finley to T.S. Palmer, 25 September 1909; and T.S. Palmer to William L. Finley, 16 December 1909. Salyer Papers, Box 12, Folder 20. William L. Finley to T.S. Palmer, 9 December 1909; and L. Alva Lewis to T.S. Palmer, 1 January 1912. Salyer Papers, Box 12, Folder 21.

exchange for assistance with patrolling. Survey reservation inspector George Cantwell eagerly supported this agreement, because it "would have a tendency to greatly popularize the Department." Although there is no evidence indicating that the trappers and ranchers actually monitored the reservation, the agreements with them are indicative of the Survey's perpetual lack of adequate funding for refuge work and the need to establish favorable relations with the area population.[28]

The Survey sought to tap into the support of these local residents to oppose a 1916 reclamation proposal that threatened the future of the refuge on Lake Malheur. Unlike the reclamation projects on Klamath and Clear Lake, the project for Lake Malheur was put forth by a private company, the Harney Basin Development Company, not the Reclamation Service. The company proposed cutting off the lake's water supply to reclaim it for agriculture, a plan lamented by the *New York Times*, commenting that "it would be a pity" if the proposal succeeded, given the recent passage of the Migratory Bird Treaty with Canada.[29]

Since a dry Lake Malheur would have doomed the refuge, the Survey's George Cantwell and George W. Field, on separate occasions, canvassed local opinion. What they found was somewhat encouraging. Some riparian owners and squatters who had land claims opposed the Harney Basin Development Company's proposal. "The riparian owners and some of the squatters," Field noted, "are excellent citizens. Many of them have become wealthy cattle owners." They depended on the water from the yearly overflow of the lake.

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[28] Geo Cantwell to W.F. Bancroft, 11 January 1911; and T.S. Palmer to Geo Cantwell, 18 January 1916. Salyer Papers, Box 12, Folder 22.

Cantwell interviewed a wide swath of the population—ranchers, judges, merchants, and doctors—and found many were skeptical of the company's proposal. Skepticism, however, was not universal. Some thought they would profit from reclamation. Others were ambivalent or tentative. For example, H. Levin, mayor of nearby Burns, saw the bird refuge as an "asset," but if the land "is fit for agriculture," then the refuge should "not stand in the way of progress." The investigations turned up other problems. There was significant overgrazing, a problem that grew worse in the following decade. Furthermore, there were disputes over hay: some people cut hay before it was ripe in an effort to beat others to the goods, while others used "intimidation" in an attempt to monopolize the hay. Some did not have ranches in the area, but came to the area to get "free goods." In short, while the Survey found considerable opposition to the reclamation project, support for the refuge was far from certain.[30]

The Survey could also not count on support from the state of Oregon. In 1920, the Oregon State Land Board declared that the lake bottom of Lake Malheur was open for development, even though its legal status was still not resolved. In an effort to counter the state, the Portland Audubon Society put forth an initiative, the "Roosevelt Bird Measure," that proposed ceding the disputed land as a bird refuge to the federal government. When Oregon citizens voted on the proposal, it fell short in a close vote (78,961 for and 107,383 against), an

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[29] "Birds Threatened Again," *New York Times*, 13 September 1916.
[30] Geo G. Cantwell, "Report on Lake Malheur Oregon Bird Reservation. With Reference to the Reclamation Plans of the Harney Valley Development Company. October 1st to 9th, 1916." Salyer

indication of mixed feelings in the state. Powerless to stop future reclamation projects, members of the Survey and the Audubon Society were horrified as the refuge resembled a barren wasteland by the early 1930s.[31]

Drought and economic hardship—the nation was just beginning to grapple with the Depression—created numerous problems that had few apparent solutions. Several reports indicated that little or no water was reaching the lake from its tributaries in the early 1930s.[32] Cattle were ubiquitous: Future Survey Chief Ira Gabrielson observed that "Malheur Lake Bird Reservation looks far more like some one's cattle ranch than it does a bird reservation." Warden Ray C. Steele complained that the stockmen continued to burn tules to improve forage, much to the detriment of nesting birds.[33] Survey staff was vexed to find answers to these growing problems. Conservation Officer H.P. Sheldon conceded that the grazing of livestock on the refuge is not "ideal," but, given the difficult times, it would be wrong to deny a "reasonable use of grazing or forage on the reservation." Some cattlemen were willing to pay grazing fees, but "a great deal

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Papers, Box 12, Folder 21. George W. Field to Chief, Biological Survey, 25 August 1918. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 89.

[31] Tom McAllister, "Our [the Portland Audubon Society] First Fifty Years—1902-1952," 7. Available at: http://audubonportland.org/about/our-history/first 50 [accessed 30 January 1930]; Ira N. Gabrielson, *Wildlife Refuges* (New York: Macmillan Company, 1943), 154. A yearly listing of Oregon initiatives can be found at: Oregon Blue Book, "Initiative, Referendum, and Recall, 1916-1921," available at: http://bluebook.state.or.us/state/elections/elections13.htm, [accessed 2/5/11]. See also: William Finley, "The Marshes of Malheur," *Nature Magazine* 1 (April 1923): 46-48.

[32] See the following from National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. D.H. Madsen, "Report of Proposed Development of the Lake Malheur Bird Reservation," 23 May 1930, Entry 162, Box 86; "Report on Eastern End of Lake Malheur," 25 August 1933, Entry 162, Box 84; and "Detailed Plans: Lake Malheur Migratory Bird Refuge, Harney County, Oregon," 27 August 1934, Entry 236, Box 86.

of trouble would result" if other stockmen resisted the fees and continued to graze their stock. Despite this "trouble," the Survey and cattlemen did agree to a permit system for grazing, but it had to be tabled because it was viewed as a plan to implicitly prove government ownership of the disputed lands: if stockmen paid grazing fees, it would imply that the federal government owned the land to be grazed, an ownership issue that was still not settled. Steele suggested that building a fence would protect the refuge from cattle, but it would also prevent the thirsty animals from reaching the lake's limited water. He anticipated "serious difficulty" if his suggestion were enacted.[34]

Other proposed solutions also presented difficulties. Survey Inspector D.H. Madsen suggested that diverting more water into the lake would help compensate for the dry conditions, but the diversion would result in less water for farmers, already lacking sufficient water, and they "are not in a temper to permit the diversion of any part of the water for reservation purposes." The situation was so touchy that Madsen "would not vouch for the safety of any Government official sent in there to divert water from any ranch or farm for reservation purposes." Madsen also realized that diverting water, while the legal land issues were still unresolved, was inadvisable. Most worrisome for the Survey was growing hostility to the birds. One resident complained to Senator Charles McNary that

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[33] Ray C. Steele to E.W. Nelson, 18 April 1927; and Ira N. Gabrielson to Chief, U.S. Biological Survey, 27 June 1930. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 89.

[34] Ray C. Steele to Chief Redington, 10 April 1929; H.P. Sheldon to George M. Benson, 22 July 1930; "Report on Eastern End of Lake Malheur," 25 April 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 84; and Ding Darling to Walter M.

birds destroy crops, "pay no taxes," eat fish that would otherwise be consumed by people, and are protected so "the well to do hunters and sportsmen" can "slaughter" them.[35]

If the Survey seemed spineless in not confronting farmers, ranchers, and bird-hating residents, it should be recalled, as Madsen noted, that the Norbeck-Andresen Act stipulated that acquiring land for refuges required state approval. It was becoming increasingly apparent that acquiring more land—with water rights—was necessary to arrest the further drying up of the lake. Since the unsettled legal question made the acquisition of land uncertain, it was "essential" to build a friendly sentiment among locals. Madsen, however, also realized a strong state's rights tradition impeded the Survey's goals and emphasized the need to lessen the anti-federal sentiment.[36]

In 1934, a decision by Chief Ding Darling provided an opportunity for squatters on the lakebed to grow even more hostile to the federal government. The six million-dollar fund won by Darling opened the door for expanding the number and size of wildlife refuges; it also provided the means for the Survey to use the Blitzen River to re-flood the lakebed. Darling, in his estimation, gave fair warning to the squatters on the lakebed, informing them they had to leave the area

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Pierce, 27 February 1935. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 85.

[35] D.H. Madsen, "Report of Proposed Development of the Lake Malheur Bird Reservation," 23 May 1930. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 86; Archie McGowan to Paul G. Redington, 7 April 1928; and Mary C. Marshall to Senator McNary, 11 March 1931. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 84.

and take their property—crops, cattle, hay, fences, and tools—with them. However, squatters—who now believed wealthy hunters enjoyed the benefits of the refuge and bird protection—opposed the re-flooding project and engaged in acts of sabotage. Darling, however, was not to be deterred. In October, 1934, he gave a final warning, and shortly after, opened the sluice to allow water into the lakebed. His motives were diverse: He wanted to restore conditions that made Malheur Lake a haven for migratory birds, but, given the unsettled legal questions, he also feared that the squatters might have legitimate claims to property. Writing to Nathan Moran, conservation director of the Izaak Walton League, he explained that the squatters "were organizing for a threat that boded no good for future control if it ever got into the courts. We figured that turning in the water was a much more direct method and it seems to have worked. We haven't had a peep out of the squatters since that action."[37]

The squatters, however, offered more than a "peep" to object to the flooding of the lake. They found a political ally in Oregon representative Walter R. Pierce, who had previously criticized the expansion of the refuge as a waste of taxpayer's money that benefited only wealthy hunters. Pierce encouraged the squatters to file claims against the government for damages, a legal process that dragged on

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[36] D.H. Madsen, "Report of Proposed Development of the Lake Malheur Bird Reservation," 23 May 1930. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 86.

[37] J.N. Darling to Nathan Moran, 29 October 1934; J.N. Darling to Charles McNary, 6 January 1935. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 85. Langston, *Where Land and Water Meet*, 93-94. Darling's political conservatism probably did not endear him to the squatters. A long-standing critic of the New Deal, he was skeptical of people living on the "dole." See: David L. Lendt, *Ding: The Life of Jay Norwood Darling* (Ames, Iowa: The Iowa State University Press, 1984).

beyond the termination of the Biological Survey but eventually resulted in some victories for the squatters.[38]

In addition to criticism from Pierce and the squatters, the Survey also came under fire from Finley, usually a staunch ally of the Survey, but one who had become critical of the bureau's trepidation in addressing the problems on Malheur Lake. According to the eminent conservationist, "everyone else" but the Survey had access to water, squatters "took possession" of the refuge, and stockmen cut hay and grazed their stock free of charge. In reference to removing squatters, Finley remarked caustically: "The Biological Survey has played Santa Claus and has loaded the stockings of these people with a good cash income. Now there is talk of abolishing Santa Claus. Some of the officials of the Biological Survey should have been retired years ago." The hesitation to act because of the unsettled legal question was no excuse, he argued further, because the executive order that established the refuge settled the question. In addition to oversimplifying a difficult legal question that was finally decided by the Supreme Court, Finley also overlooked the need to establish good relations with Oregon in order to approve future refuges.[39]

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[38] "Memorandum for the Chief [Redington], 23 February 1934; Walter Pierce to J.N. Darling, 27 July 1934; J.N. Darling to Walter Pierce, 27 February 1935. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 85; Langston, *Where Land and Water Meet*, 95-96.

[39] William L. Finley to J.N. Darling, 28 July 1934 and 15 August 1934. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 85. Later estimates by the Fish and Wildlife Service confirmed Oregon's importance for migratory birds. The Klamath Basin (also partly located in California) is used by approximately half of the ducks and geese migrating through the Pacific flyway. See: Nathaniel P. Reed and Dennis Drabelle, *The Fish and Wildlife Service* (Boulder, Colorado: Westview Press, 1984), 19.

The need to cultivate a favorable sentiment from locals always had a bearing on the Survey's refuge work. Without a more firm foundation of local support, the Survey tended to overlook the actions of locals, playing "Santa Claus" in Finley's estimation. Part of the refuge was thus turned into a commons with little oversight. The uncertain support from locals, coupled with the legal uncertainty of land ownership, created an ambiguous situation for the Survey. Perhaps it was inevitable that the Survey played "Santa Claus," but it was also remiss in determining who was "naughty or nice," thus making refuge management vulernable to Finley's accusation.

The criticism from Finley also underscored the larger dilemma and conflicted mission of the Survey: Conservationists such as Finley, a source of support in one context, could be a source of criticism in another context, thus making strong alliances more uncertain. The need to forge enduring connections was especially acute at Lake Malheur because of the many uncertain relations and questions: The Survey was not sure whether it could win the support of locals who were lured by the promise of irrigation and agriculture, whether Oregon would approve of more bird refuges, and whether the Supreme Court would rule against the Survey and thus jeopardize the refuge. Although it was easy for Finley to criticize the Survey, playing "Santa Claus" was one way of navigating through a dicey situation in an effort to build local support for the refuge.

"Santa Claus" appeared in a different form—as a land buying agent—at least in the minds of inhabitants along the Upper Mississippi National Wildlife and Fish Refuge, the most ambitious of the Survey's wildlife protection projects. The refuge, founded in 1924 and jointly managed with the Department of Fisheries, traversed four states and eventually consisted of 240,000 acres (SEE MAP). However, the refuge was not created with precise boundaries and pre-determined tracts of land. Instead, the refuge grew by a piecemeal process that created a paradoxical relationship between the Survey and the local population. Similar to other refuge projects, the Upper Mississippi Refuge needed the support of area inhabitants. To generate support for the midwestern refuge, the Survey needed to convince residents that traditional practices—fishing, hunting, cutting wood, and trapping—would still be allowed, albeit with restrictions. Although the right to continue these established

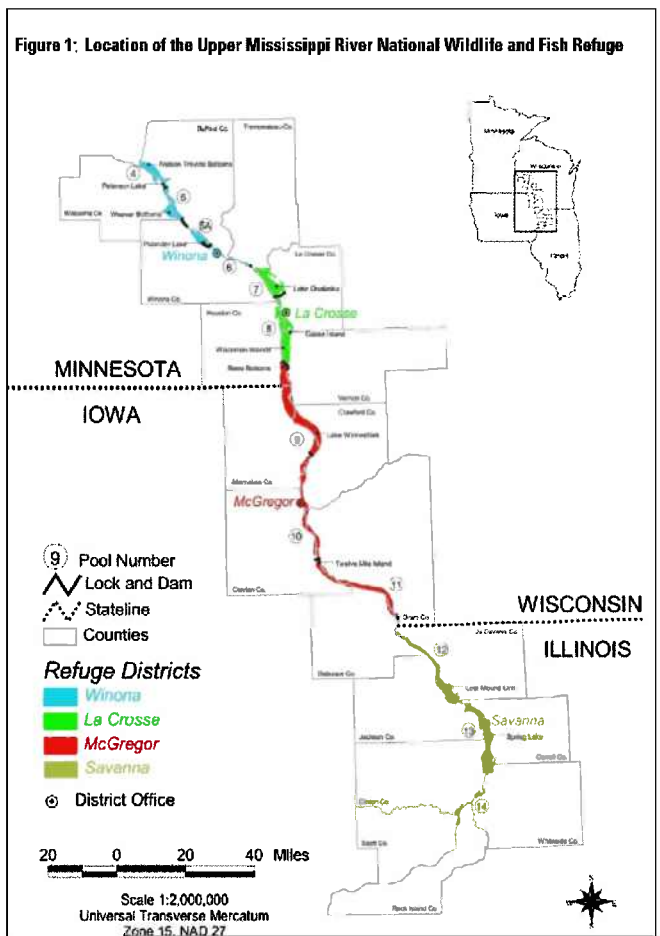

Figure 12: U.S. Fish and Wildlife Service

customs won some support for the refuge, it also fueled a belief among local peoples that, with government protection of the region, the value of land would increase. Thus, locals saw an opportunity: They increased the asking price of their land—land that the government bureaus needed to complete the refuge. Hence, the paradox: efforts to win local support could increase the costs of establishing the refuge. The locals' desire to profit from the sale of land, coupled with ambiguities in determining which lands were suitable for purchase, and a government project to increase the navigability of the Mississippi River, compromised the bureaus' efforts in creating the Upper Mississippi National Fish and Wildlife Refuge.

The creation of the Upper Mississippi Refuge coincided with a growing consumer economy and an increased interest in wildlife, hunting, and the outdoor recreational experience. The number of hunters was on the rise: In 1911, there were 1.5 million licensed hunters, but by 1924, that figure increased to four million. The growing number of specialized periodicals reflected the enthusiasm for hunting. By the early 1930s, forty journals and 1,500 weekly newspaper columns were dedicated to hunting. Hunting was also facilitated by state and federal aid for road construction and the rapid increase in automobile ownership, from 8,000 in 1900 to 10 million in 1922. Americans were spending more, and elements of a consumer culture—mass production, standardized products, advertising, and credit—increased in the 1920s, even though not every American took part in this increased consumption. Americans also consumed new

experiences. A growing interest in recreational activity was part of the impetus for the Calvin Coolidge-sponsored National Conference on Outdoor Recreation, held in 1924 and 1926. Coolidge's successor, Herbert Hoover, also saw the growing importance of outdoor recreation. His President's Committee on Social Trends published a series of monographs, including a study by sociologist Jesse Steiner. *Americans at Play*, Steiner's monograph, demonstrated a growing interest in outdoor recreational activity and increased travel to state and national parks.[40] These national trends boded well for the Upper Mississippi project, since the refuge's allowance of recreational pastimes and the region's scenic beauty—some wilderness and wildlife advocates wanted the area to be a national park—would draw visitors.[41]

Despite the promise and early excitement for the Upper Mississippi Refuge, problems with land acquisition developed early. Soon after congressional approval of the refuge, Chief Nelson wrote to a realty company in Des Moines,

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[40] Paul Sutter, *Driven Wild* (Seattle: University of Washington Press, 2002), 19-48, and Jesse Frederick Steiner, *Americans at Play: Recent Trends in Recreation and Leisure Time Activities* (New York: McGraw-Hill, 1933), chapter three. The numbers of hunters are from House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1924*, 67th Cong., 4th sess., (1922), 333. The numbers on periodicals are from The Special Committee on Conservation of Wildlife Resources, *Consolidation in Federal Conservation Activities*, Report no. 1268, 72 Cong., 2nd sess. (1933), 3. For the growth of consumer culture, see: Richard Wightman and T.J. Jackson Lears, eds., *The Culture of Consumption: Critical Essays in American History, 1880-1980* (New York: Pantheon, 1983).

[41] From 1921-1924, the American School of Wild Life Protection, a wildlife organization with prominent conservationists, advocated the creation of a national park on the area that would become the Upper Mississippi Wildlife Refuge. Congress, however, was reluctant to purchase the necessary lands, since national parks had traditionally been created by withdrawing land from the public domain. See: John O. Anfinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003), 160-162. Anfinson's study covers a wide chronology. For a narrower focus, see: Philip V. Scarpino, *Great River: An Environmental History of the Upper Mississippi, 1890-1950* (Columbia: University of Missouri Press, 1985).

seeking to purchase land at the congressionally-stipulated average price of five dollars-an-acre. The realtors told Nelson it would be "doubtful" to acquire land at that price, noting that "the best land for wild life has been purchased at very high prices for private hunting preserves." Warden B.J. Shaver surveyed the region and confirmed the realtors' assessment. He found four hunting clubs that owned or leased holdings ranging from 166 to 1,400 acres, and "the shooting clubs here keep the price of land up." While some of the sportsmen were in "sympathy" with wildlife protection, others were "not friendly to the refuge." Equally problematic for the Survey was local residents' belief they would get a "fancy price" for the land they would sell to the government. Accordingly, area residents raised their asking prices for land, sometimes by 400 percent, with prices ranging from $2.50 to $33 per-acre. One landowner with especially good trapping grounds, after initially expressing an interest in selling, later refused to name a price. Other locals were worried that, if they sold their land, they no longer would be able to chop wood or cut hay on the land. In short, Shaver thought it was "almost impossible to secure an offer of sale of these lands...."[42]

To facilitate the purchase of "these lands," Rudolf Dieffenbach—soon to be head of the newly established Division of Land Acquisition in 1929—wrote a land acquisition procedural manual in 1926. To begin the process, each of the four states had to pass an enabling act that gave authority to the federal government to establish the refuge. Field agents from the Survey then needed to

[42] Chief of Bureau to N.C. Towne & Son, 26 June 1924; N.C. Towne & Son to E.W. Nelson, 30 June 1924; and B.J. Shaver to E.W. Nelson, 7 July 1924, 28 July 1924 (2 letters dated 7/28/24).

determine basic information: mapping the area, with special attention to the "migratory highways" used by birds; determining market price for land; and locating the landowners, a sometime difficult task, since a piece of land might be owned by heirs who no longer resided in the area.

Dieffenbach's manual also addressed the more vexing issue of inflated prices. Noting that there is "always a residue of tracts" of land with unreasonable prices, condemnation could be used as a last resort to acquire land. It would be better, though, to take preventive measures to minimize the possibility of rising land prices. For example, publicity should be minimal. The lack of publicity would help to prevent speculation and also create the impression that the government did not really need the land and thus could selectively purchase real estate. A successful policy would establish three principles: "(1) there is more land available for purchase that can be bought (2) fair prices and no more will be paid for the land (3) no one area is essential to the success of the project." Most importantly, the purchases should be made at the "lowest possible" price in order to set a precedent and to provide "evidence of market value in condemnation cases."[43]

Dieffenbach's procedural instructions did not curb area residents from seeking higher prices. Ironically, the Survey's work on the refuge added to the people's expectations of higher prices. Dieffenbach commented that newspapers praised

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National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 236, Box 99.
[43] Rudolph Dieffenbach, "Recommended Procedure under the Proposed Migratory Bird Refuge and Marsh Land Conservation Act," Bureau of Biological Survey Report, 3 April 1926. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 17.

Survey efforts to "restock" the area's beaver population, protect muskrats (two species valued for their fur), and aid in "the propagation of wild life generally." Normally, the Survey welcomed this approval, but the positive comments also "had a strong tendency to stiffen the asking price of privately-owned lands...." The refuge's superintendent, W.T. Cox, phrased the irony more bluntly: If government purchased these lands at inflated prices, "the United States would have to pay for values it created." Cox noted other factors that tended to drive up real estate prices: the high values placed on some lands by hunting clubs, the "enhanced or supposedly enhanced" land values resulting from the formation of drainage districts, and "even altruistic projects" such as a philanthropic donation of land for a recreational area and a proposed Will Dilg (founder of the Izaak Walton League) memorial park and wildlife sanctuary. Furthermore, for many citizens, the land was valuable because it provided benefits: hunting, trapping, chopping wood, and cutting hay were traditional practices that helped to sustain local populations. Fear of losing these uses of the land resulted in some opposition to the refuge, a perception that the Survey, along with the Izaak Walton League, attempted to disabuse.[44]

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[44] Rudolf Dieffenbach to Mr. Steele, 16 August 1929. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 41, and W.T. Cox, "Policy and Plan of Administration for Upper Mississippi River Wild Life and Fish Refuge," Survey Report, 17 February 1928. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 23. The granting of permits for grazing, trapping, and cutting wood and hay was modified on a regular basis, depending on drought, the condition of the range, and fire hazards. With the onset of the Depression, "deserving people" were allowed to cut "defective timber," free of charge, and were also allowed to plant small gardens. In return, the permit holders were required to plant grains that were used as a source of winter food for wildlife. See Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey,* (Washington: Government Printing Office) for the following years 1932 (pp. 19-24); 1933 (pp. 25-26); 1934 (p. 23); 1935 (p. 33).

With the value of some lands exceeding Survey expectations, it was becoming increasingly apparent that the limitation of an average buying price of five-dollars-per- acre would have to increase. By 1929, the refuge had acquired 55,750.43 acres at various prices with an average of just under five-dollars-per-acre. Although these lands were obtained within the five-dollar limitation, to acquire other vital lands, "it will be necessary for Congress to authorize consummation of these purchases regardless of the $5.00 limitation," according to the Secretary of the Bureau of the Budget.[45] Thus, the average price was adjusted to ten dollars-per-acre, but this increase did not mean the Survey had to exceed its initial 1.5 million-dollar appropriation. By 1929, the Survey did not plan on acquiring as much land as originally anticipated, partly the result of ambiguity in the bill that authorized the creation of the refuge. The bill did not specify the quantity of land to be acquired. Furthermore, the original bill did not specify the sources—federal; state; city; private, through purchase, lease, or donation—of land to be acquired, and these different sources had different (or no) prices.[46] Therefore, it is not surprising that estimates of costs required constant modification.

The increased average price of ten dollars-per-acre also did not mean that the Survey had an open checkbook. For years, the Survey haggled with the owners of

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[45] "Prices of Lands Acquired for Refuges," Survey Report, 19 January 1929. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 156; and R.W. Dunlap to Col. James C. Roop, 26 May 1930. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 159.

[46] Solicitor, Department of Agriculture to E.W. Nelson, 20 May 1924. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 159, and House Committee on

Delta Fish and Fur Farm to acquire approximately 5,000 acres of its land that was adjacent to the Trempealeau National Wildlife Refuge in Wisconsin, created by an executive order in 1936.[47] The land was a prime breeding ground for muskrats and thus of considerable interest to the farm. The controversy ended in condemnation proceedings, whereby the land was valued at fifty dollars an acre, much to the chagrin of the Survey, which appraised the land at slightly over ten dollars-an-acre. Despite the higher estimated value, the Survey still wanted the land, and Dieffenbach and Survey land inspector John Clark Slayer testified before the Migratory Bird Commission. The Commission, according to terms of the 1929 Migratory Bird Treaty, had to approve all refuge acquisitions for migratory birds. Despite Slayer's plea—"this [land] is in the heart of our famous or most important refuge"—the Commission rejected the proposed acquisition.[48]

Most condemnation cases did not have the visibility and importance of the Delta Fish and Fur Farm controversy. Condemnation was adopted as policy in 1929, but it was employed with reservations, because it was "costly, distasteful, and frequently productive of ill feeling," according to Superintendent Cox. Some condemnation cases involved landowners who sought higher prices for their land, but other cases were tried for less contentious reasons, such as absentee

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Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1929*, 70th Cong., 1st sess., (1928), 645-646.

[47] In 1975, the Dairyland Power Cooperative acquired Delta Fish and Farm and soon after sold 4,778 acres to the Fish and Wildlife Service. See: Department of the Interior, Fish and Wildlife Service, "Trempealeau National Wildlife Refuge," available at: http://www.fws.gov/refuges/profiles/History.cfm?ID=32578 [accessed 3 March 2011].

[48] "Minutes of the Migratory Bird Commission," 9 December 1937; and "Memorandum Number 8, Trempealeau Migratory Waterfowl Refuge," 9 December 1937. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 241, Box 5.

ownership and tax-delinquent lands. Furthermore, Dieffenbach believed that allowing refuge land to be used for grazing and harvesting wood and hay—practices that were "legitimate" and "not detrimental" to the refuge—facilitated good will among some of the region's inhabitants who initially seemed likely to go through the condemnation process.[49]

Although condemnation was not the ideal option for acquiring land, at a 1939 congressional hearing for the conservation of wildlife, Dieffenbach stated the policy was used "somewhere between thirty and fifty" times for procuring land for the refuge that could not be acquired by other means. Although condemnation may have been necessary, it, along with the tendency to hold out for higher prices and other complications, delayed the process of finalizing the refuge: by 1936, Chief Gabrielson admitted that only about one-half of the refuge was acquired. Because land acquisition was accomplished in a step-by-step process, with purchases as low as forty acres, the result was a patchwork, fragmented landscape. According to Survey Secretary W.C. Henderson, by 1929, it was apparent that "we will never be able to have one solid block [for] the entire distance" of the refuge. More equivocally, he noted "we have altogether 79,360 acres under some form of control."[50]

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[49] W.T. Cox, "Policy and Plan of Administration for Upper Mississippi River Wild Life and Fish Refuge," Survey Report, 17 February 1928. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 23; Rudolph Dieffenbach, "Memorandum for Mr. Redington: Land Status on the Upper Mississippi River Refuge and Purchase Policy Pursued There," 7 July 1930. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 41; Rudolph Dieffenbach, "Memorandum for Mr. Redington," 9 March 1932, Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 153.

[50] House Select Committee on Conservation of Wildlife, *Conservation of Wildlife, Hearings ... Pursuant to H.R. Res. 65*, 76th Cong., 1st session (1939), 15-17; House Committee on

"Control," of course, is in the mind of the controller, and the Survey's ability to exercise authority over a large, fragmented landscape was problematic. Most vexing for the Survey was that it could not protect wildlife—its principle responsibility—because inadequate supervision and enforcement made it easy for locals to circumvent state and federal laws. In the 1920s and 1930s, the Survey had approximately twenty-five wardens and limited state assistance to patrol all the refuges. With limited enforcement, Cox observed that there was a general "lawlessness along the River" and listed a number of specific problems: "Spring shooting, market hunting, the killing of large numbers of wood ducks, the taking of fur out of season, spearing and shooting muskrats, and a more or less general disregard of game, fish, and fur laws." Spring shooting, a practice that was illegal but easily ignored, and baiting, later to be declared illegal, were especially troublesome. Cox noted that some hunters and clubs "bait the fowl, thus making it easy to kill the lawful limit of birds in a day—one might say in an hour." Fish fared little better, as "the fierce competition of commercial fishermen goes on in an apparent effort to seine out the last fish in the river." Furthermore, since the states generate revenue by licensing fishing nets, there is incentive for each state

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Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1937,* 74th Cong., 2nd sess. (1936), 575; and House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1929*, 70th Cong., 1st sess. (1928), 646-647.

"to permit as many nets as possible and get the full benefit from fish that otherwise might be taken in the next state."[51]

One particularly beguiling incident of the "lawlessness" of the region involved the construction of a dam by someone unknown to the Survey. Survey warden Ray Steele suspected that sportsmen might have built the dam in an effort to improve shooting conditions, but he was not certain. Investigating charges that the mysterious dam was causing damage to a landowner's property, Steele "sought information from old timers who were familiar with that section of the country" to get a sense of natural conditions and the flow of water into the area. This strange incident was reflective of not only the lack of adequate supervision of the refuge, but also the Survey's limited knowledge of the topography, hence the need to talk to the "old timers."[52]

The changing landscape of the Upper Mississippi River region and a government plan to make the river more navigable also circumscribed the Survey's ability to understand the physical features of the area. The processes of accretion and reliction often altered the relationship between land and water, creating confusion as to the exact boundaries and quantity of land under Survey authority.[53] Sometimes, there were discrepancies between the records of the General Land Office, the federal agency responsible for surveying land, and local

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[51] W.T. Cox, "Policy and Plan of Administration for Upper Mississippi River Wild Life and Fish Refuge," 17 February 1928, Survey Report. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 146, Box 23.

[52] Ray C. Steele to Chief, Bureau of Biological Survey, 3 June 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 159.

[53] Reliction is the gradual receding of water in a sea, river, lake, or stream that leaves a residue of dry land. Accretion refers to the increase in land caused by reliction.

and Survey maps. For example, for Winneshiek Bottoms, the surveyed records indicated that it consisted of 12,200 acres, but when accreted land was factored into the total, the estimate was 12,810 acres. Initially, differences in estimated acreage quantities complicated the land acquisition process, but, upon Dieffenbach's recommendation, General Land Office records were used for conveying property, "paying no attention to accretion."[54]

The War Department's construction of a nine-foot channel to improve navigation on the Mississippi River also complicated the land acquisition process. Testifying before Congress, Gabrielson claimed that the project "has quite changed the picture" in reference to the Survey's land acquisition efforts, because the War Department flooded some lands that the Survey was planning to purchase for the refuge. In general, however, the Survey and the Bureau of Fisheries supported the channel, provided that some issues, such as pollution and water level stability, were addressed. The Survey also argued that wildlife would benefit from the project, an argument that was initially borne out after the project was completed in 1940. However, John O. Anfinson, writing in 2003, argues that the

[54] Rudolph Dieffenbach to Doctor Nelson, 20 January 1926; R.H. Williams to Doctor Nelson, 12 January 1926; and Rudolph Dieffenbach, "Land Status on the Upper Mississippi River Refuge and Purchase Policy Pursued There," 7 July 1930. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 41. For confusion about land boundaries resulting from accretion and reliction, see: W.C. Henderson, "Memorandum for the Solicitor," 24 February 1926; R.H. Williams to W.C. Henderson, 25 February 1926; Chalmer Jackson, "Memorandum for Mr. Dieffenbach," 18 March 1929; "List of Unsurveyed Islands within the Upper Mississippi River Wild Life and Fish Refuge," Survey Report, 8 May 1929; Frank W. Kuehl to Seth Thomas, 21 June 1933; and Seth Thomas to Commissioner, General Land Office, 5 July 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 236, Box 99.

long-term prospects for the area's wildlife are still uncertain, noting that the project may have benefited some species while harming others.[55]

Anfinson's assessment of wildlife's uncertain future is indicative of the general uncertainty that characterized much of the Survey's efforts on the refuge. The mission was fraught with ambiguity from the beginning: the quantity of land to purchase was not specified; the asking prices were not entirely clear; boundaries were often difficult to determine; attempts to control such a large area created unanticipated problems; and the creation of the channel forced the Survey to alter plans. Complicating the acquisition process were local residents and sporting clubs that either did not want to sell their properties or expected to receive a price that exceeded the Survey's budget. These problems were not anticipated and stand in contrast to the enthusiasm that accompanied the founding of the refuge. The esteemed ecologist, Stephen A. Forbes, arguing at a congressional hearing for the creation of the refuge, stated that the proposed legislation is "the most important measure of its kind which we have ever had in the Mississippi Valley...." The Upper Mississippi Wildlife Refuge was the Survey's largest and most ambitious project, yet it was not capable of arresting

[55] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1937*, 74th Cong., 2nd sess. (1936), 574-575; John O. Anfinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003), 275-292; and Jeffrey J. Kollath, "The Environmental History of the Upper Mississippi River at Trempealeau, WI," available at: http://murphylibrary.uwlax.edu/digital/jur/2000/kollath.pdf [accessed 3 March 2011].

the decline of migratory birds, a growing problem that became one of the Survey's most important responsibilities.[56]

The controversies over the dwindling numbers of birds, public shooting grounds, and hunting regulations, did not end with the passage of the Norbeck-Andresen Migratory Bird Conservation Act of 1929 (see chapter one). Agricultural development, drainage of wetlands, increased hunting, and drought resulted in continued decreasing avian populations, an issue that received growing public attention.[57] Proposed solutions to arrest the dwindling avian population—more restrictive hunting regulations and the creation of refuges—provoked controversy among elite and rank-and-file hunters as well as critics of hunting.[58] Although Survey officials realized that more habitat was imperative for a long-term solution, short-term relief could be provided by a reduction in bag limits and a shorter open season. Hunters, with the aid of modern technology—more accurate weapons, cars to easily reach hunting destinations, and boats used during the hunt—were a significant part of the problem, a realization partly based on

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[56] House Committee on Agriculture, *Hearings on H.R. 4088, a Bill to Establish the Upper Mississippi Wild Life Refuge,* 68th Cong., 1st sess. (1924), 62.

[57] For example, see: "Bird Enthusiasts Differ on Solution of Game Problems, *Washington Post*, 17 April 1927; "A Wildfowl Bill for Wildfowl," *Forest and Stream*, 98 (May 1928): 286; William A. Bruette, "Forest and Stream Measures Win Support," *Forest and Stream* 98 (November 1928): 700; "Animals: Game Gossip," *Time*, 16 December 1929; "Animals: Bird Fight," *Time,* 3 November 1930; "Animals: Duck Moratorium?" *Time,* 10 August 1931; "Animals: More Game Birds," *Time*, 24 November 1930; and "Animals: No More Fowling?" *Time*, 27 November 1933.

[58] In 1930, the Survey implemented some limited revisions to hunting regulations, such as shortening open seasons and mandating rest days for some species, measures that prompted "extremists on both sides," hunting enthusiasts and anti-hunting advocates, to criticize these actions as too restrictive or too lenient. The revisions on hunting regulations became more prohibitive during the 1930s, thus heightening tensions that were already manifest in the beginning of the decade. See Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey,* 1930 (Washington: Government Printing Office, 1931), 44.

evidence provided by hunters from the Survey's bird banding studies.[59] The use of this evidence points to a paradox the Survey confronted: the federal bureau needed the hunters to turn in the bird bands and also to make observations and answer questionnaires about the possible increase or decrease in avian populations. Thus, the Survey needed hunters to provide data, but the hunters often protested the regulations imposed by the Survey, resulting in a paradoxical and uncertain relationship between the federal bureau and hunters. Additionally, Chief Paul Redington noted an additional paradox, a paradox that today could be termed a reverse NIMBY (not in my backyard): "Many sportsmen are for waterfowl refuges in the abstract, but when it comes to the placement of a sanctuary where it will take away from them the good hunting to which they have been accustomed they want it placed elsewhere."[60]

Hunting enthusiasts did more than oppose placing refuges in their favorite hunting locales. They objected to the Survey's "immediate relief" recommendations of limited open seasons and reduced bag limits, blaming drought and agricultural development for the diminishing number of birds. Coming together in 1927 to form the American Wild Fowlers, these hunting

[59] Survey biologists banded young birds, still nesting, and requested hunters to return the bands when and if they killed a banded bird. The Survey used this method to track migration patterns and to gain an estimate of an increase or decrease in the number of birds killed by hunters. For a number of years, about twelve-thirteen percent of birds killed by hunters were banded birds. When this percentage increased to eighteen in the 1930s, the Survey concluded that hunters were killing more birds than in the past. W.C. Henderson, "The Waterfowl Crisis," talk given at a meeting of the International Association of Game, Fish, and Conservation Commissioners, Montreal, Canada, September 10 and 11, 1934. Ira N. Gabrielson, Wildlife Management Institute Papers, CONS37, Conservation Collection, The Denver Public Library (hereafter, Gabrielson Papers, Denver), Box 12, Folder 14.

advocates included wealthy sportsmen and some members of the Boone and Crockett Club. Most notably, the association included prestigious members George Bird Grinnell, Charles Sheldon, and John Charles Phillips, naturalists who valued scientific research and encouraged the association to fund Frederick Lincoln's studies that provided insights into the migratory flyways of birds. Although the American Wild Fowlers officially disbanded in 1931, many of its members joined a new organization, More Game Birds in America Foundation, established by Joseph Knapp in 1931. His association was reorganized in 1937, under the title of Ducks Unlimited, a pro-hunting society that restored breeding habitats of birds in Canada.[61]

The hunting advocates, especially Thomas Beck, an original member of the Board of Directors of More Game Birds and first president of the American Wildlife Institute, had considerable political influence.[62] He was also the editor of

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[60] Paul G. Redington, "The Bird Work of the Biological Survey," *Auk* 18 (April 1931): 233. The questionnaires returned by the hunters to the Survey can be found in: National Archives. Records of the U.S. Fish and Wildlife Service. RG 22 Entry 142, Box 6.

[61] Stephen Fox, *The American Conservation Movement. John Muir and His Legacy* (Madison: The University of Wisconsin Press, 1981), 187; and James B. Trefethen, *The American Crusade for Wildlife* (New York: Winchester Press, 1975), 190-193. There is little historical scholarship on these groups of hunting enthusiasts. John C. Phillips of the American Wild Fowlers, more famously known for his four volume tome on ducks, *A Natural History of Ducks* (New York: Dover, 1922), also wrote a short (20 pages) account of the organization, *The American Wild Fowlers. A Brief History of the Association, 1927- 1931* (no city or publisher listed). There is no monograph on More Game Birds in America Foundation, though some information could be gleaned from the organization's *More Waterfowl by Assisting Nature* (New York: More Game Birds in America, 1931). For two celebratory histories of Ducks Unlimited written by its members, see Kip S. Farrington and Lynn Bogue Hunt, *The Ducks Came Back: The Story of Ducks Unlimited* (New York: Coward-McCann, 1945); and Jon R. Tennyson, *A Singleness of Purpose: The Story of Ducks Unlimited* (Chicago: Ducks Unlimited, 1977).

[62] The American Wildlife Institute was formed in 1935. According to Stephen Fox, it "aimed to speak frankly for all industries with a financial stake in hunting, not only gun and ammunition companies but automobile, oil, and railroad corporations as well." Fox, *The American Conservation Movement*, 196. For Thomas Beck, see Thomas Allen, *Guardians of the Wild:* The

Collier's and Chairman of Connecticut's State Board of Fisheries and Game. Recognizing the influence of "our good friend, Thomas H. Beck," President Franklin Roosevelt wrote to Agriculture Secretary Henry A. Wallace in 1933, remarking that "I think it is very important to keep the good will of the fish and game clubs and associations, and the chief point is the necessity of giving them a chance to be heard" before new wildlife conservation measures are passed. Beck soon had his "chance to be heard," testifying before congressional hearings on the conservation of wildlife. At the hearings, Beck's plan for "migratory game restoration" emphasized, among other topics, the restoration of marshlands, water conservation, federal-state cooperation, and a proposal to educate farmers "in the propagation and management of game birds as a new cash crop." He did not discuss more restrictive hunting regulations, much to the dismay of the Survey.[63]

Beck also had his voice heard in a presidential committee that addressed migratory waterfowl. Its members included Beck; Ding Darling, nationally known political cartoonist, member of the Iowa Fish and Game Commission, and soon to be head of the Survey; and game management specialist Aldo Leopold (John C. Merriam of the Smithsonian Institution was originally appointed, but he could not serve and was replaced by Leopold). Darling later recalled that the assembled trio was an unlikely collection of personalities that had difficulty

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Story of the National Wildlife Federation 1936-1986 (Bloomington: Indiana University Press, 1987), 24-28.

[63] Roosevelt to Henry A. Wallace, 29 August 1933, in Edgar B. Nixon, ed., *Franklin D. Roosevelt and Conservation, 1911-1945* (Hyde Park, New York: General Services Administration, National Archives and Records Service, Franklin D. Roosevelt Library, 1957), 203-204; House Special Committee on Conservation of Wildlife, *Conservation of Wildlife, Hearings... Pursuant to H. Res. 237*, 73rd Cong., 2nd sess. (1934), 241-244.

working together. Leopold was a "recognized authority on environmental control" and an "eloquent advocate" of conservation. Beck, in contrast, was "neither a duck hunter nor a scientist; he was a violent and outspoken representative of those whose one and only cure for the duck situation was to throw the Biological Survey out of the window." The Committee's final report echoed Beck's congressional testimony and alluded to throwing the Survey "out of the window." While acknowledging the "talent" of the Survey, the report also claimed that the Survey was a "misnamed, quasi-scientific bureau quite unequal to the present task" of the restoration of avian habitats.[64]

The Committee's report, largely under the influence of Beck, hit some raw nerves. Darling and Leopold disagreed with Beck's characterization of the Survey, and Agriculture Secretary Wallace, who was given the report for review, lamented that it "has become rather a serious embarrassment to me." Wallace also took exception to the report's failure to recognize the need to reduce hunters' annual take of birds. Without the "immediate conservation" of the breeding stock, the rest of Beck's restoration plan is "useless." An editorial in *Nature Magazine* echoed Wallace's concern and also drew attention to the close relationship between Beck and More Game Birds, noting that "we cannot regard any measures sponsored by this organization beyond suspicion." Alluding to the Commission's criticism of the Survey, the editorial argued that the federal bureau

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[64] Lendt, *Ding,* 63-68; Jay N. Darling, "The Story of the Wildlife Refuge System : Part I," *National Parks Magazine* 25 (January-March 1954): 46; "Report of President's Committee on Wild Life Restoration," Agriculture Department Press Release, 8 February 1934, available at the Fish and

should be free from "political influence," and "certain aspersions cast on the Survey's former administration of migratory waterfowl in this report are unjustified."[65]

The controversy over the Committee's report was indicative of the vitriol generated by disputes over the conservation of wildlife, migratory birds in particular. Ding Darling, with the acerbic wit he was known for, did not mince words in an article written well after his retirement. "The sportsmen's fraternity was as full of misinformation as a Soviet broadcast, and it quarreled over as many theories for salvation of the ducks as religionists over formulas for getting into Heaven." He was equally unforgiving on government: "Our nation's timorous chief executives, caught in the jam between the boisterous demands of duck hunters crying for more liberal shooting privileges and the pallid recommendations of the Biological Survey for more rigid restrictions, had hid their heads in the sand and done nothing." Congress, "terrified by the scorn of the hunting fraternity and the one-eyed pilots of the sporting supplies industry, had allowed the legislative measures [it introduced] to be buried in the dusty pigeonholes of Congressional committees." One did not have to be a Survey member to feel the "scorn of the hunting fraternity." The non-Survey ecologist Paul L. Errington, one of the first to challenge assumptions about the predator-prey relationship, complained that *Forest and Stream* rejected one of his articles

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Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009]. "The President's Committee on Wild Life Restoration," *Nature Magazine* 23 (April 1934): 157, 194.

because "it would give too much ammunition to those opposed to hunting as a sport." Somewhat surprisingly, William Hornaday, perpetual gadfly of the Survey and government policy, placed the responsibility on hunting advocates for misguided government policies. Writing to Edward Preble of the Survey, Hornaday claimed he was "not heavily slamming the President [Roosevelt] or Mr. Gabrielson," as "they were under great pressure from outside influences" for more lax hunting regulations. "We all know what political leaders can do when they are egged on by the gun and ammunition manufacturers to urge a certain policy."[66]

The "outside influences" mentioned by Hornaday were up in arms (pun intended) over restrictive hunting regulations issued by the Department of Agriculture in the mid-1930s. For example, after a decade of acrimony, baiting—the use of grain products to lure waterfowl—was outlawed. Live decoys were prohibited; the use of boats and blinds was confined to one hundred feet from shoreline; bag limits on many species were reduced; a three-shell limit was placed on repeating shotguns; and open seasons were reduced from sixty days to a

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[65] Lendt, *Ding,* 67; Henry A. Wallace to Marvin H. McIntyre, 26 March 1934; and Henry A. Wallace to Paul G. Redington, 10 March 1933, in Edgar B. Nixon, ed., *Franklin D. Roosevelt and Conservation,* 267, 219.

[66] Jay N. Darling, "The Story of the Wildlife Refuge System Part I," 6-9; W.T. Hornaday to Mr. Preble, 29 October 1936, Edward Alexander Preble Papers, 1887-1957 and undated, Record Unit 7252, Smithsonian Institution (hereafter, Preble Papers), Box 3, Folder 4. The contentious issue that Errington raised was the possibility that hunters did not cull the weakest members of a herd. Waldo McAtee from the Survey made a similar argument and also had his manuscript rejected. Paul L. Errington to Seth Gordon, 9 May 1933; and W.L McAtee to Paul Errington, 2 March 1932. Papers of W.L. McAtee, Library of Congress (hereafter, McAtee Papers), Box 21, "Errington" Folder.

maximum of thirty (states could proscribe less than thirty if desired).[67] While some sporting organizations, especially the Boone and Crockett Club, welcomed the new regulations, others, most notably More Game Birds in America, opposed them. Objections varied. A long-standing complaint was that the federal government imposed uniform laws while ignoring regional differences. Others argued that the laws were confusing, unjust, and economically injurious to gun manufacturers and wildlife tourism. Some erstwhile supporters of regulations grew skeptical: *New York Times* columnist Raymond R. Camp griped that the Survey "leaned over backward to protect ducks." Illinois was especially vociferous, as it, along with Missouri, had been the most difficult states for the Survey to enforce regulations.[68]

Members of the Survey also realized that the new regulations were an imperfect response to the vexing problem of declining bird populations. Determining bag limits, for example, was a challenge that required much guesswork. Reliable estimates of bird populations did not exist, and gauging

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[67] Department of Agriculture. *Report of the Chief of the Bureau of Biological Survey, 1935* (Washington, D.C.: Government Printing Office, 1936), 39-40. See the following press releases from the website of the Fish and Wildlife Service: "Wild Fowl Season Two Months: Duck Bag Limit Reduced to 10," 11 September 1933; "3-Shell Limit Placed on Wildfowlers' Guns, 8 February 1935; "30 Days of Fall Duck Hunting Allowed by New Regulations,""1 August 1935; "Baiting, Now Banned, Led to Killing of More Than 660,000 Ducks in '34," 9 August 1935; and "Outline Plan for Control of Waterfowl Baiting," 14 August 1934, available at: http://www.fws.gov/news/historic/ [accessed 1 June 2009]. For a list of protected species, see: H.C. Bryant, "Report of the Committee on Bird Protection," *Auk* 52 (January 1935): 70-73.

[68] "Illinois Duck Hunters Will Protest Laws," *Chicago Daily Tribune*, 2 December 1933; Bob Becker, "Rigid Code for Duck Hunters Brings Protests," *Chicago Daily Tribune*, 9 August 1935; Vernon Van Ness, "Rod and Gun," *New York Times*, 24 May 1934; Raymond R. Camp, "Wood, Field, and Stream," *New York Times*, 9 December 1937; and Bob Becker, "Duck Hunters Ponder Protest to Washington," *Chicago Daily Tribune*, 18 December 1937. Larry Merovka recollects the difficulty of regulating hunting in Illinois and Missouri in "A Federal Game Warden," in A.S.

weather conditions was notoriously difficult. Although state hunting licenses and duck stamps provided a rough measure of the number of hunters, the frequency of hunting and the number of birds killed were often a reflection of the economy, another fluctuating variable. The identification of protected species was not easy for hunters, and the Survey, "in response to numerous inquiries," added the following clarification to its 1934 regulations:

> The Federal bag limit on wild ducks is 12, but eider ducks, canvasbacks, redheads, greater scaups, ringnecks, blue-winged teal, green-winged teal, cinnamon teal, shovelers, and gadwalls included in the 12 may not total more than 5. These 5 may all be of one species, or they may represent different species of the restricted class—but in no case may the total number of ducks belonging to these 11 species exceed 5. The number of ducks representing other species that may be hunted is limited only by the provision that the total bag of all ducks taken may not exceed 12.

With such a "clarification," it is no wonder that the Survey's Edward Preble lamented, "there is not one duck hunter in ten who is sufficiently familiar with the various species of ducks, seen at a distance, to keep from violating the law, even if he tries to do so, and there are not many hunters who could be positive whether or not they violated the law, even after gathering up the dead ducks.[69]

Chief Darling also felt that the 1935 revised regulations were an inadequate response to reduce the decline in avian populations. He wanted a year-long closed season but had to make some pragmatic concessions. Without sufficient

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Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, *Flyways: Pioneering Waterfowl Management in North America* (Washington: Government Printing Office, 1984), 27-34.

[69] W.C. Henderson, "The Condition of Our Waterfowl," talk given at the International Association of Game, Fish, and Conservation Commissioners, Columbus, Ohio, 22 September 1933. Gabrielson Papers, Denver, Box 12, Folder 2; "Federal Bag Limits Explained," Agriculture Department Press Release, 2 October 1934, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009]. Edward Preble to J.N. Darling, 27

funds for law enforcement, a closed season "would be entirely impractical." "Additional drawbacks," he noted in a letter to Roosevelt and Wallace, included "the heavy losses in license fees to the States with consequent breakdown of cooperative efforts, total loss of duck stamp revenue and violent repercussions from institutional and commercial interests." The following year, Darling's successor, Ira Gabrielson, also wanted a closed season, but he, too, realized the difficulty of challenging the political power of hunting and gun organizations, believing it was unlikely that Roosevelt would challenge those groups in an election year.[70]

Hunters represented more than just a voting block that needed to be appeased: they symbolized a type of American identity, according to Daniel Herman. His study, *Hunting and the American Imagination*, examines the confluence of two different hunting ideals—the English aristocrat and the backwoods frontiersman—in the United States. The synthesis of these two traditions produced the nineteenth-century non-market hunter-sportsman ideal, most notably represented by Boone and Crockett members. However, another hunting ideal emerged around the same time: the hunter was a symbol of the common-man and "hunting was seen as the embodiment of self-reliance." The common-man theme tapped into ideals of frontier individualism and was often at odds with the elite sportsman, especially when rank-and-file hunters felt that private hunting clubs

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October 1934, Edward Alexander Preble Papers, 1887-1957 and undated, Record Unit 7252, Smithsonian Institution (hereafter, Preble Papers), Box 2, "Darling" Folder.

purchased the best hunting grounds for their exclusive use. Furthermore, as George Ives has shown, ordinary citizens often viewed wildlife conservation and game protection laws as efforts to preserve the hunting privileges of the wealthy. This association of wildlife conservation and class privilege presented difficulties for the Survey, as it was sometimes seen as advancing the interests of wealthy hunters; in one case, the Department of Agriculture launched an investigation into game wardens charged with protecting private hunting grounds while neglecting other responsibilities. Thus, the Survey, on one hand, had to contend with the well-connected hunters associated with More Game Birds. On the other hand, the Survey had to answer criticism that it protected the interests of wealthy hunters. The relationship(s) between the Survey and hunters was indicative of the tendency for the Survey to be pulled in multiple directions and have difficulties with building a reliable base of support.[71]

The Survey encountered the common-man hunting ideal on two small refuges in Montana, the Ninepipe National Wildlife Refuge (2,062 acres) and the Pablo

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[70] Jay N. Darling to Franklin Roosevelt and Henry A. Wallace, 4 February 1935; and Henry M. Kannee to Roosevelt, 11 August 1936, in Nixon, *Franklin D. Roosevelt and Conservation*, 347-348, and 546.

[71] Daniel Justin Herman, *Hunting and the American Imagination* (Washington: Smithsonian Institution Press, 2001); Edward D. Ives, *George Magoon and the Down East Game War: History, Folklore, and the Law* (Chicago: University of Illinois Press, 1988); and Edawrd D. Ives, "The Poacher as Hero: The Graves Case as Exemplar," *Forest and Conservation History* 35 (January 1991): 24-28. For similar analysis, see: Mark H. Davis, "Market Hunters vs. Sportsmen on the Prairie: The Case of William Kerr and Robert Poole," *Minnesota History* 60 (summer 2006): 48-60; Karl Jacoby, *Crimes against Nature: Squatters, Poachers, and the Hidden History of American Conservation* (Berkeley: University of California Press, 2001); and Louis Warren, *The Hunter's Game: Poachers and Conservationists in Twentieth Century America* (New Haven: Yale University Press, 2000). "U.S. Game Wardens Cleared of Charges of Misusing Authority," Agriculture Department Press Release, 25 January 1930, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009]. There is no general historical account (covering all time periods) of hunting in the United States. Matt Cartmill's *A View to*

National Wildlife Refuge (2,542 acres) (SEE MAP). Located within twenty-five miles of each other and close to the National Bison Range, these two refuges were established by an executive order in 1921 for the purpose of providing nesting habitat for birds in the region's rich wetlands. Similar to many other refuges

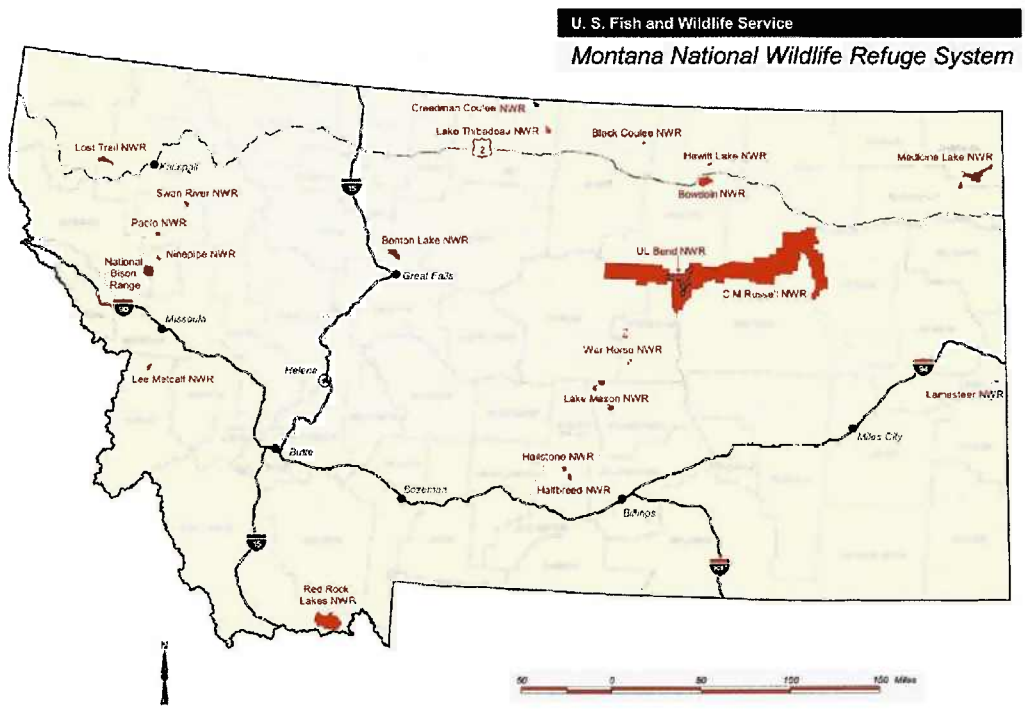

Figure 13: Montana Refuge System.
U.S. Fish and Wildlife Service

managed by the Survey, these two refuges were located on Bureau of Reclamation projects. The refuges, however, were dissimilar to other Survey projects, because they were located on the Flathead Indian Reservation; hunting was also allowed on the refuges, another unusual characteristic. However, when declining bird populations became apparent by the late 1920s, hunting privileges

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Death in the Morning (Cambridge: Harvard University Press, 1996) is a wide and provocative cultural history of hunting, covering aspects of pre-history up to the twentieth century.

were modified in 1930 and terminated in 1931. Montana sportsmen responded with indignation to what they perceived as a loss of a fundamental right. They invoked the common-man hunting ideal and charged the Survey with favoring elite hunters from other states. This charge of elitism, combined with an unpopular refuge superintendent, made it impossible to build favorable relations with local citizens in the two refuges' early years.[72]

Although hunting was permitted in the early years of the Ninepipe and Pablo refuges, it generated opposition from a variety of sources. The Reclamation Service claimed that hunting interfered with its work on the Flathead Indian Reservation. Concerned that hunters trampled through their land, local farmers and the Flathead Project Water Users' Association objected to hunting. Although the Survey did not take a public position against hunting on the refuges, individual members, especially the wardens from the nearby National Bison Range who administered Ninepipe and Pablo, expressed reservations about hunting. They argued that closing the two small refuges to hunting would result in

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[72] Ira N Gabrielson, *Wildlife Refuges* (New York: The Macmillan Company, 1943), 191-192. For general background information, see: Department of the Interior. Fish and Wildlife Service, "Ninepipe National Wildlife Refuge," available at: http://www.fws.gov/bisonrange/ninepipe/ [accessed 2 April 11]; and "Pablo National Wildlife Refuge," available at: http://www.fws.gov/bisonrange/pablo/ [accessed 11 April 2011]. Seven other Survey refuges also switched policy and prohibited hunting in 1931. See: "Close Bird Refuges to Hunting Because of Drought Emergency," Agriculture Department Press Release, 3 September 1931, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009]. Three different government bureaus shared authority on the Flathead Reservation. The Survey attended to the refuges, the Reclamation Service managed water, and the Bureau of Indian Affairs supervised grazing. Kenneth F. Roahen, a game management agent for the Survey, noted that the management agencies tended to ignore the needs of Indians, thus provoking resentment: "Certain conditions prevail on these Refuges, relative to land ownership, in that land within the boundaries of the Refuges is owned by the indians [sic.], and not having been paid for by the Government when taken over for reservoir purposes, therefore a certain resentment against the Bureaus controlling the hunting, fishing, and grazing." In 1948, Congress compensated the Confederated

a more constant source of birds that could be hunted from other nearby sites. These objections turned into "rumors" that reached the ear of Thomas Marlowe of the Montana Fish and Game Commission, an organization that steadfastly defended the right to hunt on the refuges. He wrote to the Survey shortly after the founding of the refuges and presented an argument that would be used frequently through the hunting controversy. He maintained that "to prevent shooting there [on the two refuges] would simply mean that we would raise these birds here for other sportsmen south of us and that we would get no benefits at all from the fact that they were raised here in Montana."[73]

Marlowe's worst fears were confirmed in 1930 when Secretary of Agriculture Arthur Hyde put restrictions of the types of birds that could be hunted on the refuge. The following year, another order closed the entire refuge to hunting, a prohibition that still remains, though initially the order was temporary. Sportsmen and other citizen groups responded swiftly by passing resolutions and writing to their elected representatives and government bureaus. The Ronan Commerce Club, the Whitefish Chamber of Commerce, the Superior Rod and Gun Club, the Missoula Lions Club, and the Western Montana Fish and Game Association were incensed that the federal government, an outside authority, could impose hunting regulations on Montana's hunters—responsible and ethical sportsmen in the view of area residents. Besides, they argued, there seemed to be

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Salish and Kootenai Tribes for prior and future use of the land. Kenneth F. Roahen to Chief, Bureau of Biological Survey, 1 June 1936, Salyer Papers, Box 5, Folder 6.

no shortage of birds, and birds could be protected on other nearby locations that were more inaccessible to hunters.[74]

The strongest opposition to the refuge, not surprisingly, came from the sportsmen. Outraged that Survey Chief Paul Redington stated that a decision to reopen the refuges was not possible without consulting the Migratory Bird Commission's advisory board, Hoy Harter of the Western Montana Fish and Game Association was indignant: "We feel that every community should have its fair share of shooting and that we are being deprived of this right and raising thousands of birds here in Western Montana, feeding them until the freeze-up comes only to send them further South for others to shoot at." E.J. Beckett of the same organization was more threatening, claiming that the denial of hunting privileges "is just going to make a bunch of Radicals in our sportsmen here in Western Montana. . . ." Noting that the sportsmen are taxpayers who "should be given a square deal," he warned, "if we cannot gain our point we are going to

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[73] "Memorandum Re: Ninepipe and Pablo Bird Refuges, Mont.," undated Survey Report; Thomas Marlowe to Dr. E.W. Nelson, 20 August 1921, and 15 March 1922. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 104.

[74] Hay Harter to T.J. Walsh, 17 May 1932; Paul Redington to T.J. Walsh, 24 May 1932; Paul Redington to T.J. Walsh, 28 May, 1932; W.J. Doyle to Jos. M. Dixon, 23 May 1932; Stanley Young to Scott Leavitt, 2 June 1932; John H. Edwards to W.J. Doyle, 16 June 1932; Western Montana Fish and Game Association to Herbert Hoover, 2 June 1932; Paul Redington to W.J. Doyle, 22 June 1932; Hoy Harter to Paul G. Redington, 30 August 1932; H.H. Harter to Arthur L. Hyde, 8 September 1932; W.C. Henderson to C.C. Baldwin, 29 September 1932; H.C. Carrall to Paul Redington, 2 June 1933; J.E. Erickson to Paul Redington, 6 July 1933; H.E. Olsson to John E. Erickson, 30 June 1933; Joseph P. Monaghan to Henry A. Wallace, 9 August 1933; and H.A. Wallace to Joseph P. Monaghan, 21 August 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 104.

fight it to and [the?] end and see if we have any rights as American Citizens and Sportsmen."[75]

Government officials in Washington did not grasp the essence of the sportsmen's complaints—the loss of a fundamental right they possessed as "American Citizens and Sportsmen." Officials explained why the refuges needed to be closed but did not mention the loss of rights. For example, the Secretary of the Department of Agriculture, Henry Wallace, explained to Beckett that waterfowl were experiencing difficulties in "many sections of the country" and that funds were not available to purchase other possible refuge areas. H.P. Sheldon of the Survey thought the sportsmen's gripes resulted from a public relations debacle caused by Robert Norton of the National Bison Range (and administrator of the Nine Pipes and Pablo refuges). Sheldon wrote to Norton, claiming that much of the problem with the sportsmen "is laid on your shoulders…. Perhaps you have been a little too brusque" in explaining the necessity of closing the refuges. Instead, "be very circumspect in what you say on the subject, but by no means should you be abrupt in its discussion." Furthermore, he noted, in "an encouraging nature," explain that there has not been an increase in birds and that "the Survey has gathered data on the situation at Nine Pipe and Pablo"—data that indicated the refuges should be closed.[76]

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[75] H.H. Harter and E.J. Beckett to Arthur L. Hyde, 8 September 1932; and E.J. Beckett to Henry Wallace, 22 August 1933 and 15 September 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 104.

[76] H.A. Wallace to E.J. Beckett, 11 September 1933; and H.P. Sheldon to Doctor Norton, 1 September 1933. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 104.

Sheldon did not clarify how Norton could convey the bad news in an "encouraging nature," nor did he comprehend the nature of the problem, a problem plagued by misunderstandings. The Survey never explained precisely how it and the Migratory Bird Commission arrived at their conclusions and policies. The Washington officials also did not seem to understand the sportsmen's resentment: they felt slighted because they believed liberty was being denied by federal authorities who did not understand local circumstances. The Survey's assurances that the hunters could shoot elsewhere rang hollow for people who thought their rights had been denied. The Montana sportsmen, in expressing their ire, drew upon the "common-man" hunting ideal, especially in their view that the state produced the birds for "millionaire sportsmen" from the South, a perception that Norton acknowledged was difficult to change. It is unlikely that Sheldon's recommendations—deliver information in an "encouraging nature" and provide more "data"—would assuage the sportsmen's feeling of injustice, a feeling that became more exacerbated when the Survey terminated fishing on the Nine Pipe refuge.[77]

The cessation of fishing privileges was a response to vandalism (the destruction of a fence) that occurred on the refuge. Thomas Marlowe was outraged. how can the Survey prohibit fishing when it did not even know the identity of the guilty culprit(s)? Chief Gabrielson attempted to appease Marlowe by explaining that vandalism was just one concern that led to the denial of fishing

[77] Robert S. Norton to Chief Bureau of Biological Survey, 20 September 1932. National Archives. Records of the U.S. Fish and Wildlife Service. RG 22, Entry 162, Box 104.

privileges, the other being the desire to protect birds' nesting areas from trampling anglers. The explanation did not satisfy the sportsmen, and tensions grew even more heated after Norton arrested local citizens for trespassing on the refuge. Canvassing local opinion about the arrest, Survey regional director Leo Laythe placed the blame on Norton for adding fuel to a tense situation. Noting that the sportsmen had previously provided funds for the construction of the fence, Laythe commented that they should have been consulted before a decision was made. He believed that "we should invite their cooperation, rather than take drastic actions and secure their enmity, which seems to be just what happened in this case." The problem was miscommunication: the Survey decided to reinstate fishing privileges and informed the state game warden, who mistakenly gave the wrong date for the opening of fishing season to the fishermen arrested by Norton.[78]

Perhaps better communication between Washington, the state, and Norton would have prevented the arrest of the fisherman. However, the combination of Norton's dedication (perhaps zealousness) and the sportsmen's perception of the Survey made a different outcome unlikely. The Montana hunters viewed the Survey as an alien authority that catered to elite, "millionaire sportsmen." Furthermore, the Survey's refuges suffered from a type of guilt by association. Private hunting clubs often purchased land adjacent to a refuge with the hope that the protected birds would wander off the refuge and onto the private land—land

[78] W.B. Bell to A.B. Levisee, 1 May 1936; Thomas N. Marlowe to Ira N. Gabrielson, 9 May 1936; Ira Gabrielson to Thomas N. Marlowe, 14 May 1936; Leo L. Laythe to S.P. Young, 28 May 1936; and Amos B. Emery to Chief, Bureau of Biological Survey, 31 July 1936. Salyer Papers, Box 5, Folder 6.

that was not accessible to the ordinary hunter. Chief Darling complained to Congress that "we have seen in too many such instances very destructive, commercialized shooting clubs established in close proximity to a refuge." He realized, however, that nothing could be done to stop the shooting clubs and that many people will conclude that the Survey favors elite hunters.[79] This charge of elitism was difficult to refute, was contrary to the common-man hunting ideal, and created obstacles to forging better relations with local populations.[80]

[79] House Special Committee on Conservation of Wildlife, *Conservation of Wildlife, Hearings... Pursuant to H. Res. 237*, 73rd Cong., 2nd sess. (1934), 112-113. Darling was speaking in the abstract, but Survey agent Webster H. Ranson complained that, at Ninepipe, the "monyed [*sic*] duck hunters" have cabins next to the refuge, creating tension "where the shoe pinches" between wealthy and rank and file hunters. See: Webster H. Ranson to Chief Redington, 2 September 1932, National Archives. Records of the U.S. Fish and Wildlife Service. RG 22. Entry 162, Box 104.

[80] The Survey received similar criticism from North Dakota sportsmen who believed that their state was producing ducks for other states. See: Howard Stone, J.C. Salyer, H.D. Ruhi, and F.P. Schwab, "Is the Federal Waterfowl Refuge Program Proceeding Wisely?" in *Transactions of the Third North American Wildlife Conference* (Washington: American Wildlife Institute, 1938), 201-217. The claim that the Survey cultivated ducks for other states added to an anti-elite sentiment that still remains in Montana, according to Paul Robbins and April Luginbuhl. They point out that the current anti-elite sentiment is directed at out-of-state hunters instead of "millionaire sportsmen" from the South. Drawing from a study by the Montana Department of Fish and Wildlife and Parks, they note that in Montana, out of state, wealthy hunters have higher incomes and spend more money while hunting in the state than Montana hunters. They also hunt for different reasons. While 39 percent of Montana hunters claim that hunting to obtain meat is "very important," only 17 percent of out of state hunters express the same reason for hunting. See: Paul Robbins and April Luginbuhl, "The Last Enclosure: Resisting Privatization of Wildlife in the Western United States," *Capitalism, Nature, Socialism* 16 (March 2005): 47.

The Survey's work with a different refuge in Montana, the Red Rock Lakes National Wildlife Refuge (32,174 acres), also generated this same perception of the federal bureau—an intrusive federal authority more concerned with the needs of elite hunters. However, the situation at Red Rock was much more advantageous for the refuge, largely due to differences in space and time. Located in southwestern Montana (in contrast to the central western location of Nine Pipe), and including three separate lakes, the Red Rock Lakes National Wildlife Refuge is situated near Yellowstone National Park. This location, coupled with the refuge's unusual asset—the rare trumpeter swan *(Cygnus buccinator)* (SEE PHOTO), a species that was on the verge of extinction—offered the opportunity to develop a profitable tourism industry, including hunting, in an economically-depressed area. Furthermore, the refuge was established by an executive order in 1935, at the height of the duck controversy, and Washington felt increased pressure to acknowledge the concerns of hunters. This combination

Figure 14: The trumpeter swan, a species on the brink of extinction in the mid 1930s. Photograph: U.S. Fish and Wildlife Service, National Digital Library.

of timing and potentially profitable land allowed the Survey to build stronger ties with the local population.[81]

Not all of the local population welcomed the Survey, however, and hunters charged the Survey with catering to the needs of wealthy hunters. However, the hunters were not the "millionaire sportsmen" of the South but members of the exclusive Idlewild Hunting Club, many of whom came from the Anaconda Copper Company, the largest employer in Montana and the world's largest supplier of cooper during its heyday in the early twentieth century. The problem, according to area residents, was that the Survey was acquiring land for the refuge by condemnation proceedings against individuals and other sporting clubs, but not the Idlewild Hunting Club. This exclusion of Idlewild was a public relations blunder, according to refuge manager A.V. Hull: "By not condemning the Idlewild tract, the public and sportsmen in general will take the attitude that we are creating a project here for this particular group.... [Therefore] we should proceed with our condemnation activities against this tract of land. It will leave a better taste among the public and sportsmen in general."[82]

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[81] Gabrielson, *Wildlife Refuges*, 150. The trumpeter swan has been a perpetual favorite among birders and wildlife observers. In 1935, estimates ranged from 75-200, and efforts to preserve the species, including the establishment of the Red Rock Lakes National Wildlife Refuge, have been relatively successful. The trumpeter swan made a moderate recovery by the late 1930s with the sanctuary provided by the refuge. See: "Trumpeter Swan Holding Own Against Extinction," Agriculture Department Press Release, 22 September 1938, available at the Fish and Wildlife Service website: http://www.fws.gov/news/historic/ [accessed 1 June 2009].

[82] A.C. Elmer to Archie V. Hull, 6 April 1938; A.V. Hull to Chief, Bureau of Biological Survey, 12 April 1938; Rudolph Dieffenbach to Dr. Gabrielson, 25 October 1939; Frank L. Earnshaw to Mr. Laythe, 1 November 1939, Salyer Papers, Box 5, Folder 15; and John Opie, *Nature's Nation: An Environmental History of the United States* (New York: Harcourt Brace, 1998), 297. As of the end of 1939, the status of the Idlewild land was still not settled. Negotiations had broken down and it appeared likely that condemnation proceedings would begin.

To "leave a better taste among the public and sportsmen in general," the Survey also needed to counter the accusation that federal authority was unfairly intruding upon the rights of Montana citizens, a task the Survey had minimal success in accomplishing. The Rocky Mountain Sportsmen's Association voiced strong opposition to the Survey. Writing to Montana Senator James E. Murray, Bernard King of the Association claimed that the state's sportsmen "are honestly endeavoring to protect themselves from inroads which are now under way by Governmental agencies who are disregarding the sovereign rights of our State and our people." He included a long list of complaints, charging that the Survey had no authority to manage the refuge, Gabrielson knew little about wildlife, game wardens were power hungry, the Survey ignored the wishes of the State Fish and Game Commission, and people were unjustly being evicted from the land that will go to the refuge. Gabrielson told Senator Murray that the allegations were "serious in nature" and promised an investigation. Accordingly, he sent regional director Leo Laythe and acquisition agent John Clark Salyer to look into the allegations, specifying that the refuge managers should not be informed of the nature of the investigation, thus increasing the possibility of getting the "facts." Based on the results of the inquiry, Gabrielson conceded that some employees "have on occasion been less courteous than could be wished for," but otherwise defended the Survey. Parts of his defense, however, just shifted responsibility from one federal authority to another. For example, while it was true that the Migratory Bird Commission did not authorize the refuge, an executive order

granted authority to the Survey. The Survey did not evacuate people from their land, but the Farm Security Administration did acquire lands from the region's inhabitants. This defense may have satisfied Murray, but it did not completely counter the perception of an outside and unwarranted federal authority.[83]

A federal presence, however, could be welcomed if it delivered potential economic benefits, a realization evident in the Survey's initial general report (1935) of the area. The community suffered from drought, had limited educational facilities, no churches, and "booze and fights are usually in evidence." Jobs would be welcomed in the community, and the report touted the employment opportunities associated with hunting, especially work for hunting guides and boatmen. The region could thus capitalize on its reputation as a choice duck shooting location. Although Survey officials debated the merits of allowing hunting, considering that the trumpeter swan was on the brink of extinction, Chief Darling believed that, if only a limited number of areas on the refuge were open to regulated hunting, the rare bird would be protected. The trumpeter swan would also be a drawing card, as "scientists and nature lovers" would journey "long distances" to see the exquisite species. John T. Tucker of the Montana State Water Conservation Board, in discussing water issues with the Survey, was even more glowing about the possibilities of the refuge. Noting that the refuge was located near Yellowstone National Park, "the great national recreational center,"

[83] Bernard King to James E. Murray, 16 March 1938; Chief Gabrielson to James E. Murray, 25 March 1938; Chief Gabrielson to Leo L. Laythe, 25 March 1938; Chief Gabrielson to Mr. Salyer, 25 March 1938; and Chief Gabrielson to James E. Murray, 25 April 1938. Salyer Papers, Box 5, Folder 15.

he believed that the Survey's project would foster interstate cooperation and will "gain the good will" of government agencies and local businesses.[84]

Some of these businesses, as well as sporting associations and civic groups, began praising the Survey for its restoration work on Red Rock and other Montana refuges. Letters of adulation were sent to the Survey from the Havre Board of Commissioners, the Hill County Rod and Gun Club, independent stockmen, the Musselshell County Sportsmen's Association, the Roundup Bottling Works, the Ronan Kiwanis Club, the Roundup Rotary Club, the Musselshell County Commissioners, the Retail Clerks' International Protective Association, the Stillwater County Commissioner, the Lake County Sportsmen's Association, and the Polson Board of Country Commissioners. Much of the praise pointed to benefits stemming from water projects on the refuge. Stockmen looked forward to a steadier supply of water, while sporting organizations and business groups envisioned wildlife drawing tourists to the area. Others applauded the jobs created by WPA projects on the refuge. The *Billings Gazette*, noting that wildlife "is becoming a more valued asset to the state and nation," placed the importance of wildlife in a wider context. "With recognition of its value is coming also recognition of the fact that no well-founded plan for the economic security of a

[84] "Detailed Plan: Red Rock Migratory Waterfowl Refuge, Project of the Bureau of Biological Survey," 15 March 1935; John T. Tucker to J. Clark Salyer, 29 May 1935; and "Memorandum for the Secretary," 24 September 1936. Salyer Papers, Box 5, Folder 13.

state of the nation should disregard the part that wild life is playing and will continue to play in man's existence."[85]

Montana residents near Red Rocks increasingly saw wildlife playing a role in their "economic security," a sentiment not found in the inhabitants near Ninepipe and Pablo. Other federal agencies and state wildlife and game associations realized the potential economic benefits of wildlife. A 1936 Forest Service report noted that, on the western range, sportsmen purchased guns, ammunition, clothing, transportation, and fishing tackle. They employed guides, spent money on lodging, and paid fees for the right to hunt on private lands. Areas lacking a large quantity of exploitable natural resources—"worthless lands" in Runte's often quoted phrase—could especially benefit from wildlife tourism. Because the Southwest, for example, has much "desert waste land," the wildlife in the mountains "becomes a major attraction and therefore of great economic importance." Likewise, in the mountains of Montana, "where so much area is of

[85] Hill County Rod and Gun Club to Bureau of Biological Survey, 21 September 1937; W.P. Brickley to W.A. Rodgers, 24 February 1938; the Roundup Rotary Club to Bureau of Biological Survey, 25 February 1938; L.G. Bradbrook to W.A. Rodgers, 25 February 1938; Park Newton and John P. McCleary to Bureau of Biological Survey, 26 February 1938; John Formento to Bureau of Biological Survey, 26 February 1938; Charles T. Hunter to Project Administrator, Bureau of Biological Survey, 28 February 1938; A.E. Christensen to Bureau of Biological Survey, Billings, Montana, 28 February 1938; W.M. Bailey to Project Administrator, Bureau of Biological Survey, 28 February 1938; W.A. Jensen to Frank Van Kent, 1 March 1938; Lake County Sportsmen's Association to Mr. Van Kent, 2 March 1938; H.E. Olssen to Frank Van Kent, 2 March 1938; Ed Bough to W.A. Rodgers, 7 March 1938; and Musselshell County Sportsmen's Association to W.A. Rodgers, 25 March 1938. Salyer Papers, Box 4, Folder 19; "Bureau Restores Waterfowl Nesting Places," *Billings Gazette*, 29 May 1938, available at: newspaperarchive.com [accessed 1 June 2009].

little use to livestock, is inaccessible, and has only low-value timber, the presence of game and desirable fishing is a real asset."[86]

The rational use of "real" assets of "economic importance," including wildlife, was a principal feature of Progressive Era conservation. Decisions on resource use were to be made in Washington by experts with specialized knowledge, part of a trend that facilitated modernization in the United States, according to Samuel Hays. In his influential *Conservation and the Gospel of Efficiency*, Hays argued that "the broader significance of the conservation movement stemmed from the role it played in the transformation of a decentralized, nontechnical, loosely-organized society, where waste and inefficiency ran rampant, into a highly organized, technical, and centrally planned and directed social organization which could meet a complex world with efficiency and purpose."[87] Although federal bureaus grew and became more specialized and professional, the Survey's work with avian refuges suggests that there are limits to Hays' argument that central planning fostered efficiency and overrode local concerns. For example, on Klamath Lake and Clear Lake, efforts to save birds and develop irrigation resulted in government working at cross-purposes, with the Survey pitted against the Reclamation Service. Lake Malheur, for a while, turned into a desiccated commons with the Survey playing "Santa Claus" in an effort to appease local interests. On the Upper Mississippi refuge, the Survey, as much as it planned to

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[86] Letter from the Secretary of Agriculture, *The Western Range... in Response to Senate Resolution No. 289*, 74th Cong., 2nd sess. (1936), 349-351. For information on states and wildlife tourism, see: Special Committee on Conservation of Wild Life Resources: *Wild Life Conservation*, Senate Report no. 1329, 71st Cong., 3rd sess. (1931).

acquire land according to prices set by Washington, found that locals could upset those plans by inflating prices or ignoring regulations—regulations that were next-to-impossible to enforce on such a large territory. On the Pablo and Ninepipe refuges in Montana, locals felt that the right to hunt birds, their "real asset," was being usurped by the federal government's centrally-planned wildlife regulations that ignored local conditions.

Because the Survey had to consider the interests of area residents, planning and implementing policy was usually characterized by uncertainty. On numerous occasions, the Survey attempted to gauge local opinion, since it could have a bearing on the success of the refuge. Locals did not necessarily reject the Survey's presence, as they wanted a variety of particulars—access to hay or water, grazing permits, irrigation, lucrative real estate prices, an increase in wildlife that would draw tourists, and less restrictive hunting regulations—but they were rarely monolithic and often competed against each other for the same goods, especially hay and water. However, while the Survey was accepted, even welcomed, in some situations, the bureau often confronted anti-federal attitudes and a belief that it favored wealthy hunters over ordinary citizens. The mixed sentiments of local populations, along with other complications—an unresolved legal dispute, ambiguity in the land acquisition process, and conflicts with other government agencies—heightened the uncertainty as the Survey attempted to establish and maintain avian refuges.

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[87] Samuel P. Hays, *Conservation and the Gospel of Efficiency* (Cambridge, Massachusetts: Harvard University Press, 1959), 265.

The most important problem involving uncertainty was the most basic: How could the Survey convince public opinion, especially people living near the refuges, that wildlife, the bird in particular, was a "real asset" worthy of protection? While residents near the Red Rocks refuge saw economic potential in wildlife, others were more skeptical, even disdainful at times. As the resident living near Lake Malheur grumbled, the birds "pay no taxes." Convincing people that these avian tax delinquents should be the object of government protection—and taxpayers' dollars—was not easy. The standard argument for the economic value of birds (they destroy insects) was beginning to be questioned in scientific circles, even by Survey scientists. Legally, the need to protect birds was unevenly interpreted. Although the courts affirmed the Department of Agriculture's authority to regulate hunting (by prohibiting practices such as baiting), some judges believed that bird protection was not a high priority for the courts. A District Court judge in Montana, for example, stated that violations of the "sunset" laws (shooting after dark) "are more or less unintentional and trifling infractions of statutory regulations… it is not to the interest of society that every person be prosecuted and reduced to the status of convicts, even were there jails enough for all." Bird protection laws were so "trifling" that, when Supreme Court Justice Willis Van Devanter was arrested for hunting without a duck stamp, he confessed that he knew of no such law.[88]

[88] 281 F. 546; 1922 (22 June 1922); and "Supreme Court Justice Pleads Ignorance of Law," *Los Angeles Times*, 17 January 1937. For cases upholding the Agriculture Department's authority to issue specific regulations, see: *United States v. Griffin*, 12 F. Supp. 135 (5 September 1935);

For some members of Congress, bird protection seemed to be "for the birds." During the hearings for the Agricultural Appropriations Act for 1931, after Chief Paul Redington noted that progress had been made in limiting the killing of egrets for their feathers, the following exchange took place between Redington and chair of the Appropriations Committee, James P. Buchanan:

> Buchanan: These birds are of no great value except that some of them have pretty feathers?
> Redington: I beg your pardon.
> Buchanan: These birds are of no great value except that they have handsome plumage.
> Redington: They are the remnants of very notable species and races of birds.
> Buchanan; What are they good for—to look at?
> Redington: To exist as a remnant of the species.
> Buchanan: They are water birds, are they not?
> Redington: Yes.
> Buchanan: And about all they are good for is to eat all the fish they can catch. But you have your reservations, and I suppose you have got to hold them.[89]

Although the decline in migratory waterfowl received sympathetic treatment in the national press, when critical choices had to be made—the allotment of congressional appropriations or the priorities of the legal system—it was more difficult to make an argument for bird protection. Similarly, for people living near the refuges, if a choice had to be made between economic development or bird protection, the tendency was to pick development. This proposition—development vs. wildlife protection—not only hindered the Survey's goals of

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Cerritos Gun Club et al v. Hall, 21 F. Supp. 163; 1936 (18 November 1936); and *United States v. Nielsen* et al, 25 F. Supp. 54; 1938 (10 October 1938).

[89] House Committee on Appropriations: Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1931, 71st Cong., 2nd sess., (1929), 487.

establishing avian refuges, but it also continues to influence governmental decisions about policy and the allocation of funds.

CONCLUSION:
THE BIOLOGICAL SURVEY AND AMERICAN AMBIVALENCE TOWARD WILDLIFE

On September 26, 2008, during a nationally-televised debate between presidential candidates John McCain and Barack Obama, government spending came under fire. Senator McCain, fuming about "pork-barrel spending," zeroed in on the seemingly most obvious example of wasteful government expenditures: "You know, we spent $3 million to study the DNA of bears in Montana.... it [spending] has got to be brought under control." For McCain, as well as Agriculture Appropriations Chair James Buchanan while questioning Chief Redington in 1929, it was self-evident that wildlife considerations should not fall under the purview of the federal government, especially during economically-depressed times. Senator McCain's comments, although put forth to score points during the debate, implicitly raise two important questions: 1) What is the proper role of the national government; and 2) What place should wildlife have in American society? These questions were at the center of many of the Survey's responsibilities and assignments.[1]

The duration of the Survey (1885-1940) roughly correlates with the growth of the federal government, industrialization, urbanization, and modernization. Scholars have examined the expansion of the federal government within the

[1] For a transcript of the debate, see MSNBC.COM, "Presidential Debate Transcript," available at: http:www.msn.com/cleanprint/CleanPrintProxy.aspx?unique=1301678952 [accessed 1 April 2011].

context of these wide-reaching changes.[2] Their insights and arguments are useful for assessing how the Survey functioned in a rapidly-changing American society and growing national government. Stephen Skowronek notes that the expansion of the federal government that emerged by 1920 was not necessarily from the demands of managing a more complex society, but from changes initiated by new political elites that gained ascendancy during the Progressive Era. The result of this changed political climate was "a politics distinguished by incoherence and fragmentation," an analysis that could be applied to many government operations involving the Survey.[3] For example, the placement of bird refuges on Reclamation Service projects seemed "incoherent" to some members of the Survey as well as the bureau's critics. As exemplified in the Survey's refuges on the West Coast, the Reclamation Service's emphasis on agricultural development was at odds with the Survey's goal of protecting avian nesting and breeding grounds. Furthermore, the Reclamation Service often drained wetlands, while the Survey attempted to restore them, since they provide critical habitat for migratory birds.

The conflicts the Survey experienced with the Reclamation Service suggest that the federal bureau did not have what political scientist Daniel Carpenter calls,

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[2] Scholars continue to debate the nature of this government expansion and whether it indicates that the United States has a "strong" or "weak" state. For a recent lively exchange of ideas, see: William J. Novak, "The Myth of the 'Weak' American State, *American Historical Review* 113 (June 2008): 752-772; Julia Adams, "The Puzzle of the American State … and Its Historians," *American Historical Review* 115 (June 2010): 786-791; Gary Grestle, "A State Both Strong and Weak," *American Historical Review* 115 (June 2010): 779-785; and William J. Novak, "Long Live the Myth of the Weak State? A Response to Adams, Grestle, and Witt," *American Historical Review* 115 (June 2010): 792-800.

"bureaucratic autonomy." Government agencies with bureaucratic autonomy develop "a reputation for expertise, efficiency, or moral protection and a uniquely diverse complex of ties to organized interests and the media…" Thus, an agency can "induce politicians to defer to the wishes of the agency even when they prefer otherwise."[4] However, Carpenter's notion of bureaucratic autonomy has limited applicability to the Survey. Local populations, with the occasional support of their representatives in Washington, exercised too much influence to claim that the Survey had bureaucratic autonomy. Locals did not always resist the Survey, as some sought to gain from the establishment of game reservations and bird refuges. Some wanted access to the refuges to cut hay or graze animals. Others, hoping to benefit economically from hunting and nature tourism, welcomed wildlife protection. The influence local residents had on the Survey was not absolute: they were not able to impose their demands on the Survey, but neither was the Survey able to force locals into accepting policy without having their concerns considered. Give-and-take was necessary on both sides. Donald Pisani notes that many historians have argued that federal authority over natural resources developed at the expense of local control, but he also points out that "a process of negotiation" characterizes efforts to implement policy.[5]

For Carpenter, a key attribute of agencies with bureaucratic autonomy is the ability to "change minds" and win support for their programs, an argument with

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[3] Stephen Skowronek, *Building a New American State: The Expansion of National Administrative Capacities, 1877-1920* (New York: Cambridge University Press, 1982), viii.
[4] Daniel Carpenter, *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovations in Executive Agencies, 1862-1928* (Princeton: Princeton University Press, 2001), 4.

questionable applicability to the Survey.[6] Much of the publicity work of the Survey went from emphasizing its expertise to downplaying its role in predator control. Survey scientists coveted the approval of the scientific community, but by the late 1920s, other scientists increasingly cast doubt on the need for so much predator work. It is doubtful that the Survey scientists changed many minds about predators, except, perhaps, some of their own, as important members of the bureau, even some former supporters of predator control, began having second thoughts.

If the Survey lacked the bureaucratic autonomy to change minds and compel locals to accept federal policy unquestionably, it is partly because of the tangled relations between the states and the national government, the subject of Barry Karl's *The Uneasy State.* Karl argues that, as modern society grew in complexity, it seemed that the nation was moving in the direction of a more centrally-planned government with the New Deal. However, a historical distrust of central authority, and a legacy of federalism—divided authority between state and national government—prevented the realization of an expanded federal government, despite efforts by New Dealers to enlarge the scope of government. The result was an "uneasy state" with the executive branch advocating the national interest and Congress promoting local concerns.[7]

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[5] Donald J. Pisani, *Water and American Government: The Reclamation Bureau, National Water Policy, and the West, 1902-1935* (Berkeley: University of California Press, 2002), 292.
[6] Carpenter, *The Forging of Bureaucratic Autonomy*, 274.
[7] Barry D. Karl, *The Uneasy State: The United States from 1915 to 1945* (Chicago: University of Chicago Press, 1984).

The Survey experienced much of this federal-state tension. Managing wildlife can be viewed as a national interest, but many species migrate between states (and nations). Individual states sometimes had their own views about the desirability of wildlife. Not surprisingly, senators, congressional representatives, and governors often differed with the Survey over hunting regulations and the use of refuge land. Furthermore, conflicts over wildlife often existed within states. In Oregon, for example, hunters welcomed birds but farmers opposed them because of their tendency to destroy crops. In Montana, locals near the Ninepipe and Pablo refuges saw hunting regulations as a denial of a basic right, but citizens near the Red Rocks refuge believed wildlife protection could facilitate tourism. Thus, for the Survey, differing local concerns created difficulty and uncertainty in attempting to develop a national policy for the management of wildlife and the refuges, sometimes resulting in inconsistent policies. For example, on Malheur Lake, Chief Darling flooded the lakebed to evict squatters, but on the Upper Mississippi refuge, squatters were allowed limited use of the land.

While the state/federal perspective is commonly used to evaluate conservation issues, the state/society relationship is less often utilized. Timothy Mitchell argues that, too often, political scientists have treated the state and society (public and private) as discrete entities, yet "no simple line" separates the two, as the boundaries, though real, are permeable.[8] There is also no "simple line" that

[8] Timothy Mitchell, "The Limits of the State: Beyond Statist Approaches and Their Critics," *American Political Science Review* 85 (March 1991): 88-90. See also: William J. Novak, "The Pluralist State: The Convergence of Public and Private Power," in Wendy Gamber, Michael

separates much of the Survey's work into unequivocal boundaries between public and private. For example, funding for predator and rodent control came from a variety of sources: federal, state, and local government, as well as from private citizens and livestock associations. The nature of the work also blurred boundaries. The Survey conducted a large portion of its predator work on the public domain, where the federal government owned the land, states owned the wildlife on the land, and private citizens leased the land for grazing. This mix of federal-state-private led to some knotty issues about appropriations for predator control. For example, at the hearings for the Agricultural Appropriation Bill of 1928, chair of the Appropriations Committee Buchanan implied that, since grazing permits for the public domain were leased at one-sixth of their market value, the land used for grazing on the public domain was more like private property. When the Secretary of the Survey, W.C. Henderson corrected Buchanan by stating, "But the lands do belong to the Government," the representative snapped back, "I know, but the animals do not damage the land. The use of it is private, is it not? When it is leased, it is privately used, is it not?"[9]

The federal-state-private combination also characterized the Survey's wildlife responsibilities. Private wildlife organizations such as the American Bison Society and the Izaak Walton League helped finance game refuges. The National Audubon Society assisted with patrolling the refuges in their early years. The

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Grossberg, and Hendrik Hartog, eds., *American Life and the Historical Imagination* (Notre Dame, Indiana: University of Notre Dame Press, 2003), 27-48.

Boone and Crocket Club became an important ally for wildlife advocacy. Private citizens played important roles, as hunters provided data that were used to help formulate hunting regulations. They also provided funds for habitat restoration by purchasing duck stamps. States, sometimes in conjunction with the Survey and sometimes on their own, were a key component of wildlife conservation. After passage of the Norbeck-Andresen Act of 1929, states had the authority to approve or reject new bird refuges. States also assisted in managing some of the refuges, helped the Survey enforce protective legislation, and maintained their own sanctuaries for wildlife.

The shared responsibility and sources of funding of the federal-state-private mixture obscures the state/society distinction, and the division of authority between federal and state is reflective of the split authority of federalism. Political scientist Thomas J. Anton argues that the United States places great value on efficiency, but the divided authority of federalism can hamper efficiency. For Anton, the framework for federalism is centered on two issues: "efficiency" and the "national purpose." Efficiency is generally entrusted to the states, as they are perceived to be less wasteful and corrupt than the federal government. The national purpose is assigned to the federal government, as it can act in the best interests of the entire nation. Furthermore, government is not passive, responding to external concerns. As government grew in size and complexity, government

[9] House Committee on Appropriations, *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1928*, 69th Cong., 2nd sess. (1926), 445.

officials have provided the impetus for new programs and ideas and have become "mobilizers of popular support" for those programs.[10]

For the Survey to be "mobilizers of popular support," it needed to convince the American public that wildlife conservation was part of the "national purpose." To this end, by the 1930s, the Survey directed more of its public relations to conservation and downplayed its predator control program. However, protecting wildlife was not always an "easy sell" to Americans, westerners in particular, who believed that the use of land for agricultural development and livestock production should take priority over wildlife conservation. On the other hand, the emergence of wildlife advocacy organizations, the passage of protective legislation, and the growth of hunting and nature tourism indicate that concern for wildlife was gaining currency in American culture. Thus, the place of wildlife in American society was, and is, decidedly mixed.

Several scholars have commented on America's ambivalence about not just wildlife, but also about animals and the environment. Although polling data about attitudes toward wildlife do not exist for the time period of the Survey's duration, forestry professor Stephen R. Kellert—better known, along with Edward O. Wilson, for the development of the biophilia thesis—has examined twentieth-century attitudes about wildlife.[11] His study examined nearly 5,000 newspaper

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[10] Thomas J. Anton, *American Federalism and Public Policy. How the System Works* (Philadelphia: Temple University Press, 1989), 8-11, 31-33.

[11] Kellert defines biophilia as "the idea that humans, having evolved with the rest of creation, possess a biologically based attraction to nature and exhibit an innate affinity for life and lifelike processes." See: Stephen R. Kellert, *Kinship to Mastery: Biophilia in Human Evolution and Development* (Washington: Island Press, 1997). See also: Edward O. Wilson, *Biophilia* (Cambridge, Massachusetts: Harvard University Press, 1984).

articles about animals over a seventy-five year period (1900-1976), using a mix of urban and rural papers. He employed ten different categories such as "aesthetic," "negativistic," and "utilitarian" to describe the content of the articles. The utilitarian attitude was dominant for most of the time period examined, although it decreased slightly in more recent years, especially in the urban newspapers. Kellert concludes: "Americans have apparently remained a highly pragmatic and commodity-oriented people in relation to animals and the natural world."[12]

In addition to being "pragmatic," Americans also seem to have mixed thoughts about animals. In a different study, Kellert analyzed responses to a questionnaire completed by 3,107 randomly selected individuals. He employed the same typology of ten categories to analyze the data. His findings suggest Americans are divided over the perception of animals. Kellert notes that the "attitudes can be conceptually subsumed under two broad and conflicting perceptions of animals," with each perception differing over the acceptable use of animals for human benefit.[13]

Americans also have preferences about which species are worthy of protection. Kellert suggests that large carnivores and omnivores are favored over

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[12] Stephen R. Kellert, "Historical Trends in Perceptions and Uses of Animals in 20th Century America," *Environmental Review* 9 (spring 1985): 31.

[13] Stephen R. Kellert, "Perceptions of Animals in America," in R.J. Hoage, *Perceptions of Animals in American Culture* (Washington: Smithsonian Institution Press, 1989), 11. For other works examining conflicting ideas on animals and the environment, see: Jan E. Dizard, *Going Wild: Hunting, Animal Rights, and the Contested Meaning of Nature* (Amherst, Massachusetts: University of Massachusetts Press, 1999); Adrian Franklin, *Animals and Modern Cultures: A Sociology of Human-Animal Relations in Modernity* (London: Sage Publications, 1999); Willett Kempton, James S. Boster, and Jennifer A. Hartley, *Environmental Values in American Culture* (Cambridge, Massachusetts: MIT Press, 1995); and Herda-Rapp and Theresa L. Goedeke, eds., *Mad about Wildlife. Looking at Social Conflict over Wildlife* (Leiden, The Netherlands: Brill, 2005). With the exception of Franklin's study, the above works address relatively recent issues.

less aesthetically pleasing and less charismatic species, a partiality that can conflict with conservation goals. Other surveys indicate that Americans support activities involving wildlife, but the significance of the studies is sometimes difficult to interpret. For example, a 2007 Fish and Wildlife Service survey reports that 87 million Americans participated in wildlife-related recreation. However, the majority of these wildlife pursuits consisted of viewing wildlife from one's residence, not more specific recreational activities that required greater time and expense. Furthermore, Americans generally accept hunting as a means to control wildlife populations, but they tend to have contempt for hunters. More broadly, polling data on environmental values also suggest mixed results: There is wide agreement on the need for environmental protection and rigorous standards, but the environment is considered a lower priority than other pressing concerns. R. Shep Melnick describes these polling data as "high popularity but low salience."[14]

Although the above-mentioned poll and studies measured recent beliefs, the findings have wider applicability. Much to the dismay of Survey members,

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[14] Stephen R. Kellert, "The Contributions of Wildlife to Human Quality of Life," in Daniel J. Decker and Gary R. Goff, *Valuing Wildlife; Economic and Social Perspectives* (Boulder, Colorado: Westview Press, 1987), 222-232. For the Fish and Wildlife Service study, see: Michael J. Manfredo, *Who Cares about Wildlife? Social Science Concepts for Exploring Human-Wildlife Relationships and Conservation Issues* (New York: Springer, 2008), 3-4; R. Shep Melnick, "Risky Business: Government and the Environment after Earth Day," in Morton Keller and R. Shep Melnick, eds., *Taking Stock: American Government in the Twentieth Century* (New York: Cambridge University Press, 1999), 159. The bear is perhaps the most iconic example of a species loved by the public. See: Alice Wondrak Biel, *Do (Not) Feed the Bears: The Fitful History of Wildlife and Tourists in Yellowstone* (Lawrence: University Press of Kansas, 2006). Another study examining the public's preferences for certain species is: Thomas H. Stevens, Jamie Echeverria, Ronald T. Glass, Tim Hagger, and Thomas Moore, "Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?" *Land Economics* 67 (November 1991): 390-400.

wildlife conservation seemed important but often had a secondary importance to other perceived needs, especially ranching and reclamation projects. Before additional funds became available in the latter part of the 1930s, many of the bird refuges were placed on Reclamation Service projects, and cooperative agreements between the two bureaus gave greater authority to the Reclamation Service. At the 1936 North American Wildlife Conference, Chief Ira Gabrielson called attention to the apparent lack of governmental interest in wildlife, observing that national programs existed for agricultural education, reclamation, flood control, highways, and forestry, but nothing equivalent for wildlife.[15]

The Survey had to contend with more than equivocal thoughts on wildlife in the abstract before wildlife conservation could be thought of as something with "national purpose." Popular understanding of wildlife was often at odds with the concept of preserving or protecting animals. Throughout the nineteenth century, Americans ate a wide variety of animals: moose, squirrels, beavers, badgers, mules, hares, woodchucks, opossums, antelope, porcupines, raccoons, otters, muskrats, mountain goats, bighorn sheep, elk, and deer. They also ate avian species, including swans, geese, ducks, robins, grouse, coots, cranes, loons, blackbirds, sparrows, thrushes, warblers, vireos, woodpeckers, gulls, goldfinches, and passenger pigeons. Moreover, by the end of the nineteenth century, many profited from the killing of animals: market hunters, milliners, tanners, furriers, and proprietors of restaurants, cold storage facilities, meat warehouses, as well as

[15] Ira Gabrielson, "A National program for wildlife conservation. Revised Transcript of Address Given at North American Wildlife Conference, Washington, D.C., Feb 7, 1936. Gabrielson

the railroads that shipped the animals. In this context, protecting wildlife was new, seemed to make little sense, and was unevenly accepted. As Olaus Murie lamented: "As for the people of Wyoming, this is a frontier country and in such cases organized bird protection is slow in arriving."[16]

For many Americans, protecting wildlife was odd enough by itself, but conserving wildlife for the benefit of wealthy hunters was downright wrong. The Survey constantly had to contend with the charge of elitism, a criticism that was also used to voice opposition to national parks. As the experience in Montana indicated, the Survey could not completely refute this accusation, since wealthy hunting clubs purchased land near the refuges in a desire to hunt birds that had the misfortune of straying from the protected areas. An even more damaging charge was that wildlife supporters were "sentimentalists," an epithet similar to the more contemporary "tree-hugger." An extreme "sentimentalist" suffered from "zoophil-psychosis," a disease identified by neurologist Charles Loomis Dana in 1909 to describe someone, usually a female anti-vivisection supporter, who suffered from an excessive fondness for animals. While no one claimed that Survey members suffered from this curious malady, they often felt it was necessary to maintain distance from beliefs associated with sentimentalists. Indeed, Kurpatrick Dorsey argues that, for the migratory bird laws to be passed, it

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Papers, Denver, Box 7, Folder 8.

[16] Jonathan Peter Spiro, *Defending the Master Race: Conservation, Eugenics, and the Legacy of Madison Grant* (Burlington, Vermont: University of Vermont Press, 2009), 19-20; and Olaus Murie to Gilbert Pearson, 21 September 1932. Olaus J. Murie Papers, CONS90, Conservation Collection, Denver Public Library, Box 1, Folder 55.

was necessary to "cast aside" sentimentalism and employ a more "rational approach" that emphasized birds' ability to destroy insects.[17]

For the Survey, an even bigger obstacle than association with hunting elites and sentimentalists was the zero-sum thinking that implied wildlife conservation had to come at the expense of something—agricultural development, land for grazing, or a loss of hunting privileges. Efforts to promote hunting and nature tourism had limitations, as not every refuge was located in a region that drew tourists.[18] Thus, the Survey had few opportunities to appeal to the economic interests of local populations. It is instructive to compare the two great geographical concentrations of elk, Wyoming and Washington state, around the turn of the twentieth century, to demonstrate the role of economic interests in determining the outcome of proposed game reserves. In Jackson Hole, in addition to a humanitarian concern to reduce elk suffering, the animals had economic importance as a drawing card for hunting tourism. Furthermore, elk raids on the

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[17] Duane Hampton, "Opposition to National Parks," *Journal of Forest History* 25 (January 1981): 36-45; Craig Buettinger, "Antivivisection and the Charge of Zoophil-Psychosis in the Early Twentieth Century," *The Historian* 55 (winter 1993): 277; and Kurpatrick Dorsey , *The Dawn of Conservation Diplomacy : United States – Canadian Wildlife Protection Treaties of the Progressive Era* (Seattle: University of Washington Press, 1998), 166.

[18] In addition to lacking infrastructure for tourism, some towns argued that the establishment of a refuge would hurt the local recreation economy, an obstacle the Survey encountered in the creation of Monomoy National Wildlife Refuge in Cape Cod, Massachusetts. See: Douglas Doe, "The Early Years of the Monomoy Wildlife Refuge," *Historical Journal of Massachusetts* 24 (October 1996), 125-144. The overall economic effects of nature-based recreational tourism have been difficult to assess, partly due to the vexing task of accounting for all of the economic ripple effects associated with tourism. While some towns such as Jackson, Wyoming, profited from the elk refuge, the picture is less clear elsewhere. For example, according to a 2005 study, Swain County, North Carolina, has the highest (in comparison to other rural counties in the state) revenues generated by nature-based activities *and* high rates of poverty and unemployment, a condition the authors do not attribute to one single cause. See: Kate Fuller, Mahri Monson, Jennifer Ward, and Leah Gordon Mathews, "Can Nature Drive Economic Growth?" *Review of Agriculture Economics* 27 (winter 2005), 621-629. See also: Gundaris Rudziths and Harley E.

ranchers' hay cut into the profit margins of the stockmen. Thus, elk had consequences for the local economy. In Washington, however, the elk were less fortunate. In 1904, congressional representative Francis Cushman introduced a bill for the creation of "Elk National Park." However, despite assurances that the proposed park would still allow logging, and despite a report from the Department of Interior that called attention to the "slaughter" of "one of the very few bands of elk remaining in the United States," the proposal failed. Fears of the loss of timber cultivation, combined with Gifford Pinchot's efforts to build support for the Forest Service, killed enthusiasm for the park.[19]

Without perceived economic benefits, it was difficult to generate congressional support for not only the elk refuge in Washington, but also for wildlife conservation. For James Buchanan, the chair of the Appropriations Committee who frequently questioned the need for the Survey's work during the 1920s and 1930s, it seemed that wildlife conservation should, at some point, be over, a completed accomplishment. At hearings for the agricultural appropriations for 1929, Survey Secretary W.T. Henderson argued that additional reserves, beside the National Bison Range, needed to be created and maintained to ensure that the animals would not be concentrated in one area and thus be more

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Johansen, "How Important is Wilderness? Results from a United States Survey," *Environmental Management* 15 (1991), 227-233.

[19] Carsten Lien, *Olympic Battleground: The Power Politics of Timber Preservation* (San Francisco: Sierra Club Books, 1991), 33-36. For the Department of Interior report, see: House Committee on Public Lands: *Elk National Park, Washington,* Report no. 1874, to accompany H.R. 10443, 58th Cong., 2nd sess. (1904). Efforts to establish a national park in the area eventually came to fruition with the establishment of Olympic National Park in 1938. Elk also received protection in Canada with the establishement of a game sanctuary in 1906 in Alberta. The protected area for the elk later became Elk Island National Park in 1930.

vulnerable to disease. Additional bison refuges, however, for Buchanan, seemed redundant, because "we ought to have been conducting the experiment long enough to ascertain the best place to have a real preserve and concentrate them there and keep them there." Justifying the study of wildlife was equally problematic. When Henderson, at the hearings for agricultural appropriations for 1933, requested funds for wildlife research, Buchanan asked, "Do you expect this appropriation to continue practically forever, or will you ever get through with learning the habits of wild animals, or such wild animals as we have?"[20]

Buchanan's fear that wildlife research might persist "forever" alludes to a problem for government bureaus. Political scientist Robert Higgs argues that government power increases during periods of crisis. When the crisis is over, however, a "residual" part of that increased power remains.[21] If responding to a crisis was at least one of the ways government grew, then the Survey had its own crisis: There was no consensus, especially among some congressional representatives, that the Survey's research should continue "forever" or that the

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[20] House Committee on Appropriations: *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1929*, 70th Cong., 1st sess. (1928), 620; House Committee on Appropriations: *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1933*, 72nd Cong., 1st sess. (1932), 516; House Committee on Appropriations: *Hearing before House Subcommittee on Appropriations of the Committee on Agriculture, Agricultural Appropriation Bill, 1922*, 66th Cong., 3rd sess. (1921), 241.

[21] Robert Higgs, *Crisis and Leviathan: Critical Episodes in the Growth of American Government* (New York: Oxford University Press, 1987). Higgs' contention that government grows in response to crisis is not accepted by all political scientists. As Anton suggests, government is not passive, waiting for external events to force it into action. Higgs is more generally criticized for an excessive devotion to free market libertarianism. James Livingston, for example, while admiring Higgs for writing a "profound and provocative book," argues that the free market in [Higgs'] *Crisis and Leviathan* has the same functions that God did in most pre-Enlightenment philosophy: it "acts as a suprahistorical presence or primary reality that requires neither ethical evaluation nor historical explanation because it is presumed to reveal the principles and purposes

perceived need to conserve wildlife was a "crisis," something that could be thought of as a "national purpose." Furthermore, even if wildlife conservation was deemed a worthy goal, it was far from certain whether the federal government could address the quandary. During the height of the conservation problems of the 1930s—declining bird populations and an overgrazed range—it was common to argue that drought was responsible for these conditions, a plausible explanation that was impossible to refute or prove completely, especially considering the rudimentary state of wildlife science. Thus, there was little government could do to "fix" the problems. There was also no agreement that the federal government, let alone the Survey, was responsible for addressing these problems, even if there was agreement that something needed to be done.

When it came to "fixing" problems, one difficulty for the Survey was the undeveloped nature of the relevant sciences, especially wildlife management and ecology. These sciences eventually matured in the twentieth century, but when the federal government increased the Survey's responsibilities by authorizing it to protect and kill wildlife, the sciences were still in an incipient stage. While the early Survey was skilled in taxonomy and mapping the distribution of flora and fauna, the study and management of mobile animals required specialized knowledge that was in a formative state of development. Concepts that were crucial for the Survey's management of wildlife—carrying capacity, game cycles, animals' susceptibility to disease, the predator/prey relationship, the influence of

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of human nature and reason." See: James Livingston, "Radicals All!," *Reviews in American History* 16 (June 1988): 310.

animals on the forest and range, and the relationship between game and livestock—were imperfectly understood. Even the most basic question—how many animals occupy a given area?—was vexing, as population estimates varied widely. Furthermore, it seemed that, as soon as it seemed plausible to make a generalization about wildlife, counter examples were found that cast doubt on the original finding. Understanding wildlife was more complex, more variable, and more uncertain than the Survey's early research focus.

Compounding the difficulties for the Survey to make a stronger case for wildlife conservation was its inability to argue from a position of strength. Its uncertain base of support forced the Survey to balance various claims that placed the federal bureau in an awkward position. Reliable allies in one context were foes in another. The stockmen supported the Survey's predator work but objected to land set aside for refuges. Hunters approved of the creation of bird sanctuaries but often resisted changes in hunting regulations. Scientists and conservationists supported the refuges and the Survey's management of wildlife but had misgivings about predator control. Farmers had mixed thoughts on avian protection, welcoming birds for their alleged insect-destroying ability but opposing them when they destroyed crops.

The Survey was thus pulled in multiple directions as it navigated through the competing claims of stockmen, conservationists, farmers, and hunters, a balancing act that was not unique to the Survey among other federal agencies. The Forest Service needed to balance the needs of stockmen, lumbermen, and recreational

users of the national forests. The National Park Service attempted to maintain some of the park lands in a relatively pristine condition, while still allowing recreational use of the parks. Although each of the three federal agencies had to balance competing claims, the Forest Service and the National Park Service possessed advantages that the Survey lacked. The Forest Service (and the Reclamation Service) could point to potential economic benefits, while the National Park Service inherited the legacy of "monumentalism" and could also point to the popularity of the national parks. Land managed by the Survey, however, was not very lucrative, nor did it attract many tourists.[22] Perhaps it is not too surprising that, in some of the biggest conservation controversies, the Survey played a secondary role to the other agencies. For example, in the height of the Kaibab controversy over the deer "irruption" in the 1920s, Survey members played an advisory role, but the most significant issue—who has the authority to make policy?—involved the state of Arizona and the Forest Service. The main issue of the reorganization controversy of the 1930s was determining whether the Forest Service would remain in the Department of Agriculture or get transferred to the Department of the Interior. In Jackson Hole, the most contested issue was the creation and expansion of Grand Teton National Park, essentially a struggle between the National Park Service and the Forest Service.

[22] Some of the refuges managed by the Survey eventually allowed multiple uses, but these came after the Survey was terminated and subsumed in the Fish and Wildlife Service. The Survey did attempt to draw visitors to the Sullys Hill Refuge in North Dakota but had limited success.

Although the Survey did not have the same status as the other federal agencies, it managed to survive for fifty-five years, partly by its ability to reinvent itself and respond to new responsibilities that were created by historical circumstances from Progressive Era conservation to New Deal conservation. Most important for the growth of the Survey was the growing awareness of problems stemming from the exploitation of natural resources, including wildlife. Concerns over the overuse of resources led to the passage of the 1891 Forest Reserve Act, a measure that changed the federal government's role from a dispenser to manager of public land. Samuel Hays notes that the "primary implication" of this change in governmental roles "was the belief that private owners could not be relied upon to accomplish a wide range of public objectives," including recreational parks, land with historical or archeological significance, a steady supply of timber, and wildlife. Private enterprise sought to utilize these resources without considering their long-term viability. Therefore, the federal government stepped in and attempted to provide the "wide range of public objectives" that markets did not.[23]

This understanding of the purpose of the federal government—to pursue the national interest and provide public benefits that markets fail to deliver—is a common framework for political scientists and applies to the Survey's work in wildlife conservation, an added responsibility of the Survey that provided opportunity for growth. Market incentives not only failed to safeguard wildlife,

[23] Samuel P Hays, *The American People, The National Forests* (Pittsburgh: University of Pittsburgh Press, 2009), 2-3; Anton, *American Federalism and Public Policy*, 28.

but they were also responsible for the late nineteenth century's precipitous drop in wildlife numbers. For the Survey and wildlife enthusiasts, it became increasingly important to convince the public that arresting the sharp decline in wildlife was in accord with the "national interest," a malleable concept. As legal scholar Charles A. Lofgren argues, Justice Oliver Wendell Holmes' decision that sanctioned more federal authority in managing wildlife was based on the notion that the "national interest" was not a "fixed category" and changed over time.[24]

In addition to varying over time, concepts of the "national interest" could differ by region. Thus, a policy such as wildlife conservation, justified as furthering the national interest, could be accepted unevenly throughout the nation. Furthermore, federalism, with its divided authority, encourages states and local citizens to further their own interests—interests that might conflict with the nation's interests. Thus, if the federal government attempts to furnish a public benefit not provided by the market, it could encounter multiple "publics" that may or may not welcome the perceived public good. Even within a state, as the Survey discovered in Montana, the public's willingness to accept federal wildlife policy varied by region. Moreover, the market's failure to furnish a public good could result from several factors, including low demand, high costs, and a lack of expertise in providing the benefit. For the Survey, the market's inability to conserve wildlife meant that there was limited experience to draw upon in

[24] Charles A. Lofgren, "Missouri v Holland in Historical Perspective," *The Supreme Court Review* 1975 (1975): 77-122

managing wildlife populations.[25] The few private game preserves that existed catered to the needs of wealthy hunters and were not focused on protecting species. The private sector's lack of experience in managing wildlife, combined with the scientific community's limited understanding of wildlife, guaranteed that the Survey's foray into wildlife conservation would be a "baptism by fire."

Government foraging into uncharted territory was a notable attribute of the Progressive Era, a time that provided multiple opportunities for the Survey to grow. Experiments in state and local government and an unprecedented use of federal power to curb the growth of business monopolies were some of the novel attempts to use government to address problems that had been developing during the nineteenth century. The depletion of natural resources caught the attention of government officials, and some of them, especially President, naturalist, and wildlife advocate Theodore Roosevelt, began touting the virtues of conservation. While not an entirely new concept, conservation gained increased visibility during the Progressive Era, as an earlier belief in the abundance of natural resources gave way to a realization that resources were limited.

Private wildlife advocacy groups also extolled the benefits of conservation. During the Progressive Era, it was common for businesses, professionals, laborers, and farmers to organize to promote their interests.[26] The Survey

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[25] Although market forces contributed significantly to the decline of wildlife in the nineteenth century, by the twentieth century, there have been several private attempts to make the protection of wildlife profitable. See: Victoria Edwards, *Dealing in Diversity: America's Market for Nature Conservation* (New York: Cambridge University Press, 1995).

[26] According to Samuel P. Hays, organizing was such a distinguishing feature of the late nineteenth and twentieth centuries that one chapter from his *The Response to Industrialism: 1885-1914* (Chicago: The University of Chicago Press, 1957) is titled "Organize or Perish." Another

benefited from this organizational activity, as the National Association of Audubon Societies, the American Bison Society, and the American Game Protective Association formed between 1905-1911. These groups joined the existing Boone and Crockett Club in furthering the Survey's goals and providing material assistance on occasion.

The Survey also profited from the Progressive Era's emphasis on solving problems with the application of knowledge from skilled professionals. Survey members may have been fledgling wildlife managers, but their early work in mapping the distribution of flora and fauna made them experts in species identification, a talent that was needed when the Survey was given the responsibility of enforcing the Lacey Act in 1900. The Survey was called on to ensure that potentially disease-carrying foreign species did not gain entrance to the United States. The 1900 landmark legislation also included a stipulation for the Survey's management of wildlife refuges, another new responsibility that soon grew in importance: Gifford Pinchot of the Forest Service believed he would lose the support of stockmen if his agency managed big game reservations, thus making the Survey the default agency to specialize in big game wildlife conservation.

Although the Survey's management of big game often created conflict with stockmen, they welcomed and benefited from the federal bureau's growing expertise in predator and rodent control. The ranchers' desire for predator control

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group of wildlife supporters, the Izaak Walton League also assisted the Survey, but its founding date (1922) is later than the dates of the above mentioned organizations.

is part of the complicated politics of the American West, where, on the one hand, locals view federal authority as an affront to local autonomy. However, on the other hand, they often seek various benefits from the federal government. Donald Pisani remarks that westerners viewed federal reclamation "as what we would today call an 'entitlement program.'"[27] The same can be said for federal predator and rodent control, especially, though not exclusively, when the public domain was leased to stockmen. The Survey's work in eradicating the enemies of the stockmen and farmer received an additional boost from World War I, as increased agricultural and meat production were considered essential for aiding the war effort.

Scientists and conservationists began criticizing predator and rodent control in the 1920s, but New Deal conservation provided new opportunities for the Survey. Under President Franklin Roosevelt's direction, conservation was tied to economic recovery, and the Survey was the recipient of New Deal programs that supplied labor for many of the federal bureau's projects, especially the construction and maintenance of avian refuges. The acquisition of these havens for migratory birds was facilitated by the reduced real estate prices that occurred during the Depression.

Thus, historical circumstances created opportunities for the Survey to grow: market forces decimated wildlife; the Progressive Era emphasized applied knowledge, organizational activity, and the use of the federal government to

[27] Donald J. Pisani, "Federal Reclamation in the Twentieth Century: a Centennial Retrospective," in *The Bureau of Reclamation: History Essays from the Centennial Symposium* (Denver: US.

address conservation; the demand for predator and rodent control increased as a result of the political power of stockmen and the exigencies of World War I; and New Deal conservation provided labor, land, and the linkage of conservation to economic recovery. These historical developments, however, should not obscure the role of the Survey's chiefs or influential individuals. Throughout its history, the Survey was led by six different heads, each with different attributes, accomplishments, and limitations. There was no monolithic "bureaucratic personality" that defines the Survey leaders.

C. Hart Merriam, the first chief of the Survey, served from 1885-1910 and established two precedents that characterized the future of the bureau. First, he set exacting standards for species' collection and identification. He thus established the Survey as a scientific organization that earned high praise from other scientists. Even during the height of the predator control controversy, the Survey still received commendation for its classification and mapping of the geographical distribution of species. Second, Merriam recruited people with a passion for natural history, educated or not, who gave years of dedicated service to the Survey. Although key members of his early staff had medical degrees—Albert Fisher (predator control specialist) and Theodore Palmer (wildlife specialist)—he also brought under his tutelage Vernon Bailey, Edward Nelson, and Edward Goldman, individuals who lacked college degrees yet played important roles in the Survey. On occasion, however, Merriam's reliance on these uneducated but talented naturalists created difficulties for Merriam. For example, while doing

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Department of the Interior, Bureau of Reclamation, 2008), 613.

fieldwork, their lack of education occasionally resulted in failure to correctly identify and label species and other awkward moments: Merriam had to reprimand his field agents for sending live snakes and turtles in the mail—reptiles that escaped from their packing crates and wreaked havoc in the Washington Post Office.[28] In general, however, the lack of a college degree did not hinder these naturalists from publishing in scientific journals while meeting their responsibilities to the Survey. Although the overall trend of the Survey was to require more educational credentials, even as late as the early 1930s, some members of the bureau lacked college degrees, while others had college and graduate degrees. The diversity of educational backgrounds also reflected differing perspectives, as the early members were more likely to exemplify the more generalized natural history tradition, while newer members tended to be more specialized.[29]

While Merriam's passion for natural history inspired him to make the Survey a first-rate scientific agency, his distaste for politics and frustration with finding a balance between his scientific interests and the need to demonstrate practical benefits limited his effectiveness as a leader. His successor, however, Henry Henshaw, at the helm from 1910-1916, was more comfortable with Washington and envisioned the Survey as a bureau that tackled "practical" problems.

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[28] Keir B. Sterling, "Builders of the Biological Survey, 1885-1930," *Journal of Forest History* 33 (October 1989): 186.

[29] Merriam lamented the trend toward specialization in the curriculum of university biology departments. He extolled the older natural history tradition, remarking that, "in trying to reconstruct a general naturalist at the present day, I would rather have the farmer's boy who knows the plants and animals of his own home than the highest graduate in biology of our leading

Although Merriam's biographer, Keir B. Sterling argues that Henshaw made the Survey a more "stable" organization, little is known of the Survey's second chief. He left no papers, wrote only a handful of ornithological and popular articles, and corresponded minimally with his staff (at least in comparison to other heads of the Survey). Sterling also points out that Henshaw became somewhat paranoid and spent his last years in a mental hospital, but a lack of sources makes a full analysis of Henshaw elusive.[30]

After Henshaw, the Survey was led by Edward Nelson (1916-1927) and then Paul Redington (1927-1934). Historians often group these two leaders together, because major controversies over hunting and predator control occurred during their administrations. Historians have also been critical of the Survey chiefs for an inability to stop a decline in avian populations and a failure to enact stronger hunting regulations—"faltering leadership," according to Keir Sterling. However, the squabbles and divisions among scientists and conservationists made it next-to-impossible to satisfy all the disputants and limited the chiefs' options. Hostilities were so intense that John B. Burnham of the American Game Protective Association successfully sued William Hornaday for libel. Despite the tumultuous times, Chief Nelson demonstrated an ability to compromise, a trait that could be interpreted as weakness. He managed to enact more hunting

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university." See: C. Hart Merriam, "Biology in Our Colleges: A Plea for a Broader and More Liberal Biology," *Science* 21 (30 June 1893): 352-355.

[30] Keir B Sterling: *Last of the Naturalists: The Career of C Hart Merriam* (New York: Arno Press, 1977), 77-79, 106. Even an obituary of Henshaw, written by Edward Nelson, who was appointed chief of the Survey by Henshaw, is lacking a discussion of Henshaw's tenure with the Survey. See: Edward William Nelson, "Henry Wetherbee Henshaw: Naturalist 1850-1930," *Auk* 49 (October 1932): 399-427.

regulations, though not as restrictive as others wanted. He worked to modify Alaskan game laws, a task that required juggling the demands of sport hunters, commercial interests, conservationists, and the indigenous population, a balancing of competing interests similar to his experience in Jackson Hole.[31]

Nelson was passionate about wildlife, especially the Jackson Hole elk, and gave an urgent testimony before Congress. After explaining that money had to be taken from different appropriations to pay for emergency hay in the winter of 1919-1920, Nelson stated that, without more funding, "we can live by simply stopping work." Pressed further by Appropriations Chairman James W. Good, Nelson stated that "the cooperation with the people in saving live stock and crops from destruction by predatory animals and injurious rodents," would be terminated. Nelson's targeting of predator control, rather than wildlife protection, as a source of elimination reflected his commitment to wildlife. Furthermore, he was the first important Survey member to call attention to drainage's harmful effect on birds and the need to protect habitat to guarantee the birds' future viability. While Nelson could be criticized for "faltering leadership," the

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[31] Sterling, "Builders of the Biological Survey," 187. For Nelson's work in Alaska, see: Sherwood Morgan, *Big Game in Alaska :A History of Wildlife and People* (New Haven: Yale University Press, 1981), chapter three. For the Hornaday court case, see: *John B. Burnham v. William T. Hornaday*, 130 Misc. 207; 223 N.Y.S. 750 (1927). For other critical assessments of Nelson and the Survey in the 1920s, see: Stephen Fox: *The American Conservation Movement: John Muir and His Legacy* (Madison: The University of Wisconsin Press, 1985), 156-182; and Donald C. Swain, *Federal Conservation Policy, 1921-1933* (Berkeley: University of California Press, 1963), 44.

turbulent times and controversies made it difficult for Nelson to accomplish more than the perpetual balancing act that characterizes much of the Survey's history.[32]

Paul Redington, Nelson's co-conspirator in "faltering leadership," also worked through agitated times. Unlike Nelson, who spent his entire career with the Survey, Redington was a transplant from the Forest Service. His outsider status did nothing to lessen the controversies, and he, too, needed to balance competing claims and visions for the Survey and for wildlife. Under Redington's administration, the completed waterfowl census provided data, after years of speculation, that demonstrated the decline in avian populations. Wildlife advocates welcomed the census, but much to the chagrin of scientists, Redington also pushed for more appropriations for predator control. However, in an attempt to appease the critics, Redington emphasized "control" of predators rather than "eradication" or "extermination," conceding that predators should be afforded a place to exist, albeit far away from civilization.[33] Critics of predator control, however, saw Redington's explanation as a devious way to silence them while still keeping money flowing into the Survey for predator work. While critics and historians have viewed Redington's apparent disingenuousness as an attempt to quiet his scientific critics, considering the uncertain politics of the times and the

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[32] Subcommittee of House Committee on Appropriations, *Hearing before Subcommittee of House Committee on Appropriations in Charge of Deficiency Appropriations for the Fiscal Year 1920 and Prior Fiscal Years*, 66th Cong., 2nd sess. (1920), 349. Nelson's most noteworthy contribution to science was, typical of the natural history tradition, a generalist volume on mammals: *Wild Animals of North America, Intimate Studies of Big and Little Creatures of the Mammal Kingdom* (Washington: The National Geographical Society, 1918).

[33] Paul Redington, "Policy of the U.S. Biological Survey in Regard to Predatory Mammal Control," *Journal of Mammalogy* 10 (August 1929): 276-279.

general lack of acceptance of predators in American culture, a different policy from Redington would have been unlikely.

In contrast to Chief Redington and his propensity for maintaining the status quo, Chief Jay Norwood ("Ding") Darling came to the Survey with the idea of shaking things up. Darling was an outsider to the Survey and to federal government service. He was a nationally-known political cartoonist who also had a background in conservation. His brief tenure (1934-1935) belies the lasting influence he had on the Survey and on wildlife conservation. James Trefethen, who wrote the first comprehensive history of wildlife conservation, gave kudos to Darling for his wildlife conservation efforts, a depiction of the Survey's fifth chief that has been echoed by historians and wildlife advocates.[34] His accomplishments were many: working on passage of the Duck Stamp Act, organizing wardens into mobile units that responded to trouble spots, and jump-starting the avian refuge program by acquiring funding from Franklin Roosevelt. Darling's achievements, however praiseworthy, can obscure his more pragmatic side that made concessions to hunters and his authoritarian side that required Survey members to gain approval from Division leaders before publishing their work.

In appealing to hunters, Darling followed in the footsteps of other chiefs who had to balance competing interests. However, Darling was different from his predecessors, in that he offered more of a structural critique of governmental management of conservation problems. As an outsider with no career ambitions

[34] James Trefethen, *Crusade for Wildlife: Highlights in Conservation Progress* (Harrisburg: The Stackpole Company, 1961), 264-270.

in public service, Darling did not hesitate to draw attention to governmental agencies that worked at cross-purposes with each other, money allocated for programs of questionable merit, and wildlife conservation's relative lack of importance in comparison to other priorities. He was often scathing in his critiques. For example, testifying before Congress, he fulminated: "If there is any department of the United States Government which is guilty of a greater crime against conservation than the Department of the Interior, I want to know it," specifically pointing to Interior's Bureau of Reclamation, Taylor Grazing Administration, and Bureau of Public Roads as foes of conservation. Darling, however, in keeping with his focus on structural problems rather than just individuals, was quick to defend Secretary of the Department of the Interior, Harold Ickes, stating "I would be perfectly willing to rechristen Secretary Ickes and call him St. Francis of Asazzi." The problem, however, was inertia within the Department of the Interior, a problem "neither Ickes nor any other man" could change.[35]

Darling's outspokenness generated controversy: When his successor, Ira Gabrielson, took charge of the Survey, he told the listeners of the National Farm and Home Hour that "everyone tells me" I am in the "hottest spot in the Government service."[36] Nonetheless, he vowed to continue Darling's conservation efforts. Like Darling, Gabrielson could point to many achievements

[35] House Select Committee on Conservation of Wildlife Resources. *Conservation of Wildlife, Hearings ... Pursuant to H. Res. 44*, 74th Cong., 2nd sess. (1936), 476-477.
[36] Ira Gabrielson, "Greetings to Wildlife Conservationists," talk given on November 22, 1935 for the National Farm and Home Hour. Text available in Gabrielson Papers, Denver, Box 7, folder 4.

under his administration, especially the expansion of the refuge system, the passage of the Pittman-Robertson Act, and the establishment of the Patuxent Wildlife Research Refuge. Unlike Darling, however, Gabrielson had a long tenure (1935-1946) with the Survey and the Fish and Wildlife Service, a reflection of Gabrielson's more conciliatory approach to administration.

Among Survey chiefs, Gabrielson was best suited to understand the bureau's conflicted mission of killing and protecting wildlife. He began with the Survey specializing in predator and rodent control and later made several contributions to scholarship on wildlife, especially birds. He realized that, since the Survey's conflicted mission pulled the bureau in multiple directions, it would receive criticism from diverse sources. Oddly, though, the complaints were an indication of the Survey's effectiveness. Gabrielson believed that, since "human nature" made individuals think they—not other people—were "unfairly penalized" by the Survey's policies, it was not surprising that they criticized the bureau.[37] He also believed, however, that if people truly knew the scope of problems associated with wildlife conservation, then they would cooperate fully with the Survey's policies, a testament to his belief in the power of education.[38]

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[37] Ira Gabrielson, "Conservation of Our Natural Resources," text of speech, May, 1939. Gabrielson's document does not state specifically where the speech was given. Gabrielson Papers, Denver, Box 6, Folder 34. Gabrielson co-authored three ornithological works. See: Ira Gabrielson and Stanley Jewett, *Birds of Oregon* (Corvallis, Oregon State College, 1940); Ira Gabrielson and Frederick Lincoln, *The Birds of Alaska* (Harrisburg: Stackpole Company, 1959); and Ira Gabrielson and H.S. Zim, *Birds: A Guide to the Most Familiar American Birds* (New York: Simon and Schuster, 1949). He also wrote three generalized studies: *Wildlife Conservation* (New York: Macmillan, 1941); *Wildlife Refuges* (New York: Macmillan, 1943); and *Wildlife Management* (New York: Macmillan, 1951).

[38] Ira Gabrielson, "Waterfowl Restoration: The Plain Facts," talk given at the meeting of Maryland State Game and Fish Protective Association, Baltimore, 14 December 1936. Gabrielson Papers, Denver, Box 7, Folder 18.

For Gabrielson, education meant convincing hunters that avian populations were in jeopardy; it was not about furthering a more tolerant understanding of predators. Although Gabrielson came to believe that the Survey was initially overzealous in its pursuit of predators (as discussed in chapter two), he still believed in the necessity of controlling predators and rodents. For critics who saw a contradiction in the Survey's killing and protecting wildlife, Gabrielson offered an analogy: The "function" of government, he argued, is to "promote the well-being of citizens," but this role does not preclude the government from imposing the death penalty on unlawful citizens. Thus, for Gabrielson, as well as other Survey members, the conflicted mission was not about attempting to reconcile the two seemingly discordant practices of killing and protecting wildlife. Rather, it was about the difficulty of balancing the interests of conservationists and scientists, sportsmen, hunters, farmers, and stockmen—constituents who attempted to influence Survey policy. By killing the "bad" species to preserve the "good," Survey policy reflected commonplace views of wildlife and predators. Even Peter Norbeck, who has earned a place of honor in wildlife conservation history for his work on the 1929 Norbeck-Andersen Migratory Bird Treaty, did not see a conflict in the Survey's mission: He sponsored a bill in 1930 to extend the Survey's predator and rodent control program.[39]

The Survey's leaders were thus a diverse lot, from the combative Darling to the amicable Gabrielson, the scholarly Merriam to the more practical Henshaw,

[39] Ira Gabrielson, "Talk to Oregon Wildlife Federation," 8 December 1937. Gabrielson Papers, Denver, Box 8, Folder 14. For Norbeck's bill, see: Senate Committee on Agriculture and

the lifelong Survey employee Nelson to the newly-arrived Redington. Although they all shared an appreciation and concern for wildlife, their different backgrounds, leadership styles, and accomplishments and limitations make generalizations about the chiefs problematic. Similarly, the Survey's various roles defy easy categorization. The Survey's responsibilities blurred the distinctions between state and society, federal and local; market and non-market; placed the bureau in relationships with constituencies that might or might not be supportive; encountered resistance as well as support when attempting to conserve wildlife; and involved the bureau in projects that sometimes worked at cross-purposes with other governmental goals. Although the Survey's varied experiences obscure boundaries that allow for a tidy classification, they raise important issues about the two questions posed at the beginning of this chapter: What is the proper role of the national government and what place should wildlife have in American society?

Because its early work lacked perceived economic benefits, the Survey reinvented itself as it grew with the added responsibilities of predator and rodent control, the management of animal refuges, and the enforcement of wildlife legislation. These added roles, however, resulted in a conflicted mission: Since the Survey had to protect and kill wildlife, it was pulled in multiple directions and had to address ambivalent views of wildlife. Some valued wildlife for its economic potential to draw tourists, while others viewed the animals as an impediment to economic development. Some wanted to preserve wildlife for its

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Forestry, *Control of Predatory Animals,* 71st Cong., 2nd and 3rd sess. (1931).

own sake, while others viewed it as a resource to be used. Sometimes the protection of wildlife was valued in principle, but not at the expense of other priorities. With such divergent views of wildlife, it was far from clear whether wildlife deserved protection for its intrinsic value, or whether it deserved protection so it could be used as a natural resource. Thus, it is not surprising that government policy incorporated both perspectives, with big game animals, especially the bison, earning protection for its own sake (and as an iconic symbol of the West) and birds gaining protection so they could help farmers destroy insects or be used as a resource by hunters.

The conceptual difficulties of viewing wildlife as a "natural resource" is, perhaps, one reason why environmental historians of the Progressive Era have focused more attention on other federal agencies such as the Forest Service and the Reclamation Service rather than the Survey. Wildlife—sentient creatures with nervous systems and social lives—seems to be fundamentally different from other natural resources and thus fits uneasily into Progressive Era conservation's objective of the efficient use of resources. Furthermore, the Survey, since some of its refuges allowed for multiple uses, does not seem to harmonize with Progressive Era preservation. Thus, the Survey was neither a Progressive Era conservation agency or preservation organization. On the other hand, the Survey exemplified conservation principles. Survey members (and others) viewed wildlife as a resource. "Bad" wildlife (predators and rodents) could be controlled or destroyed, while "good" wildlife, especially migratory birds, could be

protected or produced by altering landscapes. Furthermore, by setting aside some refuges for the exclusive purpose of protecting wildlife, the Survey was a preservation organization. It seems, then, that the Survey was both a conservation and preservation organization and neither a conservation and preservation organization. Therefore, the Survey was in an ambivalent realm, sometimes assuming the role of a conservation or preservation organization, sometimes assuming the role of neither.

The multiple faces of the Survey were partly the result of the bureau's reinventions as it expanded beyond its initial focus on research, thereby adding predator and rodent control, wildlife management, and law enforcement. These new responsibilities, however, exposed the limits of the Survey's understanding of wildlife, a reflection of the relatively-undeveloped field of wildlife management. The "nature of the beast" was the problem: wild animals are mobile, difficult to study, and the conditions that govern key issues such as the predator-prey relation vary according to region or environment, thus making generalizations problematic. As a result, the Survey's understanding of wildlife was marked by uncertainty, and members of the bureau and other scientists began to question prior assumptions about life zones, avian benefits to agriculture, the use of non-scientists in data collection, food habits research, and the collection of specimens. The difficulties experienced by the Survey raise questions about environmental policy. The federal government—executive orders, congressional legislation, Supreme Court decisions, and the Department of Agriculture—placed

expectations on the Survey for the management of wildlife. The science needed for this management, however, was imperfectly understood, a perpetual problem, not only for managing wildlife, but also for the more recent problem of determining which animal and plant species should be placed on, or removed from, the endangered species list.

Complex issues such as endangered species require specialized knowledge that is beyond the reach of the average citizen—and beyond the reach of the press. The Survey's public relations and control of information raise troubling concerns about government accountability. Members of the press lacked the technical expertise to scrutinize the Survey and did not observe the ways in which policy was implemented. Without the press playing a "watchdog" role, the Survey was free to release information with relative impunity. For example, it touted the benefits of insect-destroying birds and claimed the stockmen saved a large sum of money by the Survey's predator control program—assertions with minimal supporting evidence.

Although much of the Survey's public relations work was not controversial and provided general descriptions of the federal bureau, by the 1930s, disputes over predator control and hunting regulations produced much strife. As a result, the Survey became more tightlipped over these controversies and took more authoritative measures to control the flow of information, essentially downplaying its predator control programs and emphasizing its wildlife conservation. It was as if the Survey confronted both sides of its conflicted mission and saw that

wildlife conservation resonated more favorably with the national public in the 1930s. The Survey's efforts to promote wildlife conservation and draw attention away from predator control was not completely successful, as the contested issues, despite the lack of a critical press, generated a good number of opponents of Survey policy. The critics, however, like Survey scientists, lacked persuasive data that would have quelled the disputes.

It would have taken more than data, however, to convince some residents living near the refuges that protecting wildlife was in their best interests. As Louis Warren succinctly remarked, "The issue of local response to the imposition of state control over wildlife lies at the heart of wildlife conservation history."[40] Local responses were highly ambivalent about wildlife and often left the Survey uncertain about how to win local favor and how to develop and implement policy. The situation on the National Elk Refuge in Jackson Hole was especially vexing: Some locals, especially stockmen, saw wildlife protection as an impediment to economic development, while dude ranchers, after initial misgivings, believed elk drew tourists. Others supported elk protection and nature-based tourism but had misgivings about the federal presence in Wyoming. The Survey, and, more generally, federal policy, could not ignore local concerns, as area residents sought to influence government policy, a policy that also needed to consider the National Park Service, Forest Service, and the Wyoming Game Commission. Although the

[40] Louis S. Warren, "Poachers, Conservationists, and Ecosystems: Local Struggles over American Wildlife," in *Transactions of the Fifty-Seventh North American Wildlife and Natural Resources Conference*, ed; Richard E. McCabe (Washington: Wildlife Management Institute, 1992), 711-716.

elk refuge eventually grew, the tangled relations that the Survey had to navigate through made the National Elk Refuge the Survey's most vexing balancing act.

The balancing act continued on the avian refuges, but the Survey found it even more difficult to convince local populations that birds deserved protection. Although conditions were never exactly identical on the refuges, for many of them, other priorities seemed more important to local residents. Farmers wanted irrigation projects; stockmen wanted to use the refuges for grazing or cutting hay; and hunters wanted access to shooting or more liberal regulations, believing that most hunting restrictions favored elite sportsmen. Although locals did not object to bird protection in principle, they also believed it should not come at the expense of economic development. This ambivalence toward wildlife, combined with the refuges' imprecise boundaries, distrust of federal authority, legal squabbles over land, limited funding for the refuges' maintenance in their early years, conflicts with reclamation projects, and disputes over the value and proper use of land, put limitations on the Survey's ability to safeguard avian populations. These limitations did not doom the refuges, as avian numbers began rebounding in the mid-1930s (though the reasons for the increase are not clear). They did indicate, however, that government policy toward wildlife conservation needed to consider social, economic, and political, not just ecological conditions, for a refuge to be successful.

Ascertaining these non-ecological factors was difficult for the Survey, as locals, as well as scientists, conservationists, and anyone who attempted to

influence policy, never spoke with one voice. For Survey scientists, non-ecological issues hamstrung policy, a constraint that seemed would never change. Writing in 1954, Olaus Murie, the Survey biologist who studied the Jackson Hole elk and other species, penned an article, "Ethics in Wildlife Management," for the *Journal of Wildlife Management*. While observing that wildlife managers had gained greater "proficiency" in understanding waterfowl ecology and animal populations and disease, Murie was nonetheless dismayed. He pleaded, "for the sake of the future of wildlife we earnestly pray that such proficiency in wildlife management will become accepted by sportsmen and political bodies more generally than is now the case."[41]

As Murie's statement suggests, the protection of wildlife was never about just protecting the animals, as political, social, and economic issues needed to be considered. As a result, the wildlife that was protected was no longer completely "wild." For the birds, the Survey altered landscapes and attempted to monitor and control their numbers. Historian Robert M. Wilson notes the irony when the Survey realized avian botulism was responsible for the birds' decline in the Bear River refuge in Utah: "Agency personnel tried to prevent the ***unintended*** deaths of waterfowl by avian diseases so the ***intended*** deaths by hunters could continue." This charge—avian populations were managed for the benefit of hunters—was a frequent complaint of conservationists who criticized the Survey, and, after 1940, the Fish and Wildlife Service. Murie noted that this grievance had merit: "Our

[41] Olaus J. Murie, "Ethics in Wildlife Management," *The Journal of Wildlife Management* 18 (July 1954): 289.

work is generally directed toward the maintenance of this sport [hunting]. But... Are we satisfied with the low standards, or lack of standards, that we encounter among those who carry guns?"[42] For big game animals, their numbers were also controlled, usually by emergency feeding and supervised hunting, much to the lament of Murie, who conceded these measures were necessary. Murie feared that these management practices would "pauperize" the elk, a concern that still remains, since wildlife management continues to play a significant role in the viability of big game animals. In an unintended revealing statement, H.P. Sheldon, the Survey's public relations specialist, testifying before the Senate, noted the recovery of the bison. He claimed that, "for scientific and educational purposes," the future of the iconic species of the Plains "has been reassured." Perhaps it was inevitable, with the development of modern society, that wildlife would be preserved for "scientific and educational purposes" rather than for its own sake.[43]

Though modernization may have consigned wildlife to a managed existence, the Survey was not in a position to provide alternatives. A combination of its conflicted mission (resulting in equivocal alliances), intellectual uncertainty, the

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[42] Robert M. Wilson, *Seeking Refuge. Landscapes on the Pacific Flyway* (Seattle: University of Washington Press, 2010), 79, and Murie, "Ethics in Wildlife Management," 290. Ron Baker elaborates on criticism of hunting and refuges in: *The American Hunting Myth* (New York: Vantage Press, 1985). For a discussion of the relationship between hunting and wildlife conservation, see: Eugene C. Hargrove, ed. *The Animal Rights/Environmental Ethics Debate: The Environmental Perspective* (Albany, New York: State University of New York Press, 1992); and Damian Duda and Kira C. Young, "American Attitudes toward Scientific Wildlife Management and Human Use of Fish and Wildlife: Implications for Effective Public Relations and Communications Strategies," in *Transactions of the Sixty-Third North American Wildlife and Natural Resources Conference* (Washington: Wildlife Management Institute, 1998), 589-603.
[43] Senate Special Committee on the Conservation of Wildlife Resources, *The Status of Wildlife in the United States. Report... Pursuant to S. Res. 246*, 76th Cong., 3rd sess. (1940), 139.

divided authority of federalism, and ambivalence toward wildlife limited the bureau's effectiveness. Since the Survey had a conflicted mission of killing and protecting wildlife, it was difficult to build alliances that unequivocally supported the bureau's policies; support from one group of constituents in one context could vanish in another context. The Survey's options were also constrained by its uncertain science; the best policies were rarely self-evidently clear, as the bureau's added responsibilities of predator control, wildlife management, and law enforcement exposed limits to the bureau's understanding of wildlife and nature. It was also never certain how to address local populations, given the ambivalence over the place of wildlife in local communities and the nation in general. This quartet of constraints—conflicted mission, federalism, intellectual uncertainty, and ambivalence—circumscribed the Survey's ability to exert stronger leadership—to "change minds," in Daniel Carpenter's notion of "bureaucratic autonomy."

The inability to exercise more "bureaucratic autonomy" does not mean the Survey's efforts were doomed to failure. The Survey did provide sanctuary for big game animals and aided in the rebounding of avian populations. However, there was much on the Survey's agenda that was too politically and financially problematic to realize fully: more land for big game animals; stricter hunting regulations, more money for basic logistical necessities, such as fences and signs for the refuges; basic research, not connected to economic issues, on animals and habitats; more money for printing departmental literature; and more wardens to

enforce hunting regulations. Most importantly, Survey members, more by implication than direct argument, desired a recognition that wildlife deserved a place in American society, preferably without being "pauperized" and regardless of its ability to draw tourists or aid farmers.

This recognition of wildlife's place in American society remains an open question. Ambivalence and uncertainty marked the Survey's experience. Later developments after the Survey's termination exhibit the same tendencies. The Endangered Species Act was passed in 1973, but enforcement, most famously in the spotted owl and snail darter cases, generated much controversy.[44] The "Buffalo Commons," an ambitious concept put forth by geographers Deborah and Frank Popper of Rutgers University, also engendered significant controversy. They proposed allowing bison (and other wildlife) to roam more freely in parts of ten prairie states, where bison can draw tourists and be slaughtered for meat. In a scenario members of the Survey would recognize, the Poppers' suggestion has been received unevenly: Nature-based organizations and some bison ranchers have welcomed the proposal, while many locals have viewed it as another attempt

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[44] The first federal law to protect endangered species, besides the migratory bird treaties, was passed in 1966. The 1966 law, along with amendments made to it in 1969, was limited in scope in comparison to the more widely-known Endangered Species Act of 1973. See: Richard L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy* (New Haven: Yale University Press, 1999), 292-294. Although the spotted owl and snail darter received much media attention, many other species that did not receive the same coverage benefited from the Endangered Species Act. Critics have noted, however, that some species on the endangered species did become extinct and other species not on the list also became extinct. See Rocky Barker, *Saving All Parts: Reconciling Economics and the Endangered Species Act* (Washington: Island Press, 1993), 20-22. For discussion of the spotted owl, snail darter, and the Endangered Species Act, See: Shannon Petersen, *Acting for Endangered Species: The Statutory Ark* (Lawrence: University of Kansas Press, 2002); and David Samuel Wilcove, *The Condor's Shadow: The Loss and Recovery of Wildlife in America* (New York: W.H. Freeman and Company, 1999).

by outsiders to decide what is best for the West.[45] Thus, the ambivalence over wildlife and its place in American society continues, even though the issues might be somewhat—but not completely—different from the concerns that the Survey had to address.

With such ambivalence over wildlife's place in American society, the implications for the present and future are far from clear. Wildlife's future will continue to create controversies and generate multiple responses as long as it involves divided authority over its management; the influence of local populations on the implementation of policy; new, unforeseeable problems such as climate change that create scientific uncertainty; competing ideas over use of the public domain; and ambivalence over wildlife's place in American society. The past might not repeat itself, but it could look eerily familiar.[46]

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[45] The Poppers' proposal was not motivated by a nostalgic yearning for the past. They noted that rural areas of the Plains states, since the 1920s, were becoming increasingly depopulated, and much of the range was overgrazed. Unlike domesticated cattle, bison are native to the area and less taxing on the range. The best economical use of the land, therefore, would be bison ranching. See: Deborah Epstein Popper and Frank J. Popper, "The Great Plains: From Dust to Dust: A Daring Proposal for Dealing with an Inevitable Disaster," *Planning* 53 (1987): 12-18. For controversies that followed the Poppers' proposal, see: Amanda Rees, "Buffalo Chips or Computer Chips? The Battle over the Future of the Great Plains," in Liza Nicholas, Elaine M. Bapis, and Thomas J. Harvey, *Imagining the Big Open: Nature, Identity, and Play in the New West* (Salt Lake City: The University of Utah Press, 2003), 183-202; Ernest Callenbach, *Bring Back the Buffalo: A Sustainable Future for America's Great Plains* (Washington: Island Press, 1996), chapter nine; and Anne Matthews, *Where the Buffalo Roam: Restoring America's Great Plains* (Chicago: The University of Chicago Press, 2002). For an overview of prairie ecology and history, including a brief discussion of the Poppers, see: Richard Manning, *Grassland: The History, Biology, Politics, and Promise of American Prairie* (New York: Penguin, 1995).

[46] The effects of climate change on wildlife are becoming more manifest. For example, like the elk of Jackson Hole, elk in the northern mountains of Arizona normally migrate to lower elevations once winter and snowfall arrive. However, with a rise in average temperature and a decrease in mountaintop snowfall, the elk do not have to descend to lower elevations to browse. As a result, the elk's year-round foraging in the higher elevations has overtaxed the region's vegetation, much to the detriment of songbird populations. See: Joseph Castro, "Climate Change Ripples through Mountain Ecosystems," *Live Science* (17 January 2012), available at: http://www.livescience.com/17949-climate-change-cascading-effects-html [accessed 20 January 2012], and Thomas E. Martin and John L. Maron, "Climate Impacts on Bird and Plant

Communities from Altered Animal-Plant Interactions," *Nature Climate Change* (10 January 2012), available at: http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate1348.html [accessed 7 February 2012].

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