BOMBS AWAY: NEW GEOGRAPHIES OF MILITARY-TO-WILDLIFE CONVERSIONS IN THE UNITED STATES

David G. Havlick

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctorate in Philosophy in the Department of Geography.

Chapel Hill
2006

Approved by:

Advisor: Scott Kirsch

Reader: Lisa Campbell

Reader: J. Robert Cox

Reader: Martin Doyle

Reader: John Pickles

ABSTRACT

DAVID G. HAVLICK: Bombs Away: New Geographies of Military-to-Wildlife Conversions in the United States
(Under the direction of Scott Kirsch)

From 1988 through 2006, the United States closed nearly two dozen large military sites and reclassified them to become national wildlife refuges. In this dissertation I examine the production of these places, covering more than one million acres of land and marine territory, as they have been represented through political and scientific discourses. In particular, I consider the implications of "ecological militarization," which casts military practices and environmental conservation as compatible activities. Military-to-wildlife (M2W) conversions include some of the nation's worst sites of contamination and most protected ecological habitat. The seeming paradox of these lands creates challenges to wildlife managers and other federal officials as historically restricted military places open to new kinds of public attention and use.

The purpose of my research is to examine military-to-wildlife conversions through two main questions: How have these particular landscapes been produced, and how do they then function as public lands? I approach the first of these research questions by asking how M2W sites have been cast by politics, science, and certain narratives to effect their conversion. Second, I assess how these places work as integrations of nature and society to function as new national wildlife refuges, as former military lands, and as new geographies

where projects of militarism and environmentalism appear to coincide as complementary endeavors.

I apply methods of document and discourse analysis, as well as semi-structured interviews and site visits, to focus on two case studies: the Rocky Mountain Arsenal in Colorado, and the Big Oaks National Wildlife Refuge in southeastern Indiana. These present different details of contamination, remediation, legislation, and public use, but highlight common themes of institutional control, science and technology, and discourse. I conclude that military-to-wildlife conversions and the broader framing of ecological militarization will only contribute to genuine social change, democratic politics, and environmental protection if they are linked to new roles for science and technology, a transfer of institutional control, the publicizing and preservation of M2W landscape productions, and attentiveness to impacts beyond the boundaries of base closure sites.

ACKNOWLEDGMENTS

This research was supported by a number of institutions and people who deserve my thanks. I am grateful to the National Science Foundation's Science and Technology Studies for a Doctoral Dissertation Research Improvement grant (# 0521728) and to the University of North Carolina Department of Geography's Eyre Travel Fund, which supported my research and travel.

My principal advisor at UNC, Scott Kirsch, has guided me from the outset with candor, keen insight, and good cheer. I feel fortunate to have found a mentor with such intellect, patience, and vision who was able to "take the gloves off" on occasion without leaving me permanently bruised.

The Geography Department at UNC-Chapel Hill has been a wonderful academic home that supported me at many turns and challenged me to confront new kinds of texts, spaces, and ideas. John Pickles was responsible for bringing many of these challenges my way and he generously included me in a number of his seminars and advising groups. Martin Doyle helped me bridge to the "other side" of the discipline at times, and kept me feeling grounded and sane when the chasm loomed. I also dropped in repeatedly for conversation, questions, or counsel with Tom Whitmore, Wendy Wolford, Larry Band, Steve Walsh, Leo Zonn, Wil Gesler, Altha Cravey, Chip Konrad, and Banu Gokariksel.

I couldn't have asked for a better cohort of colleagues; thanks to Dilys Bowman, Brian Doyle, Clark Gray, Jon Lepofsky, Tina Mangieri, Carlos Mena, Christian Sellar, and Dan Weiss. I'm also grateful to Barbara Taylor and Nell Phillips in Geography, and Holly McPherson and Linda Comer at UNC's Center for Urban and Regional Studies, for their skill in threading me through the labyrinthes of UNC's administration.

Outside the department, Robbie Cox, in Communication Studies, and Lisa Campbell, at Duke's Nicholas School of the Environment, made time for me whenever I came asking, and pressed me to consider new perspectives on environmental communications and conservation narratives.

I turned to an array of federal, state, and county officials, librarians, and citizen activists to glean information and insights about the military conversions at the core of my project. I owe particular thanks to Dean Rundle and Joe Robb of the U.S. Fish and Wildlife Service; Amira Hamdy at the Rocky Mountain Arsenal's JARDF; Barbara Nabors of the Colorado DPHE; the Army's Ken Knouf; Jaleh Azelian and Doug Denne of the Hanover College archives; and Bill Haskins of the Big Sky Conservation Institute.

More personally, my parents, Spense and Val Havlick, have supported me in more ways than I could acknowledge. My sister Jenny and nephew Spenser enthusiastically joined me for a day of touring the Rocky Mountain Arsenal. Mary and Jim Hourdequin also offered steady encouragement and support. Finally, thanks to Marion Hourdequin, who first alerted me to the 2000 Fire Management plan for the Big Oaks National Wildlife Refuge. The paradox and intrigue we found there, and the realization it spurred of a larger phenomenon of military-to-wildlife conversions, led in due course to this dissertation. She also prompted my move from Montana to North Carolina, which in turn brought me to Geography and the

University of North Carolina. For this, and much more, I remain extremely grateful. In so many ways, I wouldn't be where I am without her.

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CHAPTER ONE

INTRODUCTION

The existence of a vast domain of federally managed public lands is one of the defining characteristics of the United States. For more than a dozen decades, the U.S. has reserved certain lands for public uses ranging from aesthetic appreciation and recreation to timber harvest, military activities, and wildlife conservation. To many, these national parks, national forests, and other public lands "have become a cherished birthright of the citizenry, a fundamental part of what it means to be an American."[1]

These lands are also places of change subjected to shifting political agendas, legislation, physical processes, ecological succession, and public attention. In this dissertation I focus on one particular type of change that has grown increasingly common since the late 1980s: the conversion of military lands to new classifications as national wildlife refuges. During this time, nearly two dozen military sites have closed and are being reclassified and converted into national wildlife refuges. As new refuges born from military-to-wildlife conversions, these lands present places where we may consider the compatibility of defense activities and environmental protection. As landscapes that are seen as both *militarized* and *natural*, military-to-wildlife refuges emerge not as singularly natural or social

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[1] Wilkinson, Charles, from the foreword to Dombeck, Michael P., Christopher A. Wood, and Jack E. Williams, *From Conquest to Conservation: Our Public Lands Legacy* (Washington, D.C.: Island Press, 2003), p. xvi.

spaces but as interrelated networks of natural, social, and technological elements.[2] At one level, my research describes these places as they exist in the world and how they are represented. By working to understand how these places are actively *produced*, however, through a combination of politics, science, and discourse, I seek also to illuminate and clarify the underlying ethics of defense and the environment that such conversions represent as an expression of democratic politics, and what this portends as a contribution to the public spaces associated with federal lands. Considering these discursive and material changes may also then inform our views of nature, technology, and society more broadly.

These changes are important for their scope and their substance, as well as for what they represent and reveal. Military conversions to wildlife refuges, or military-to-wildlife (M2W) conversions, now involve more than one million acres of land and marine territory, including a mix of some of the United States' most contaminated and most preserved habitats. The complexity and difficulty of cleaning up and managing obsolete military facilities offers important insights to the science, politics, and public understanding of ecological restoration projects in these places and elsewhere. Closing military sites and turning them to wildlife conservation purposes also suggests that militarized spaces can change character, a change that could signal different national priorities and values.

Although federal lands on the whole attract more than 730 million visitors each year,[3] the two categories I attend to here rest largely apart from popular tourist destinations. The National Wildlife Refuge System is the least visited of the four largest federal land categories

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[2] See Latour, Bruno, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

[3] Havlick, David G., *No Place Distant: Roads and Motorized Recreation on America's Public Lands* (Washington, D.C.: Island Press, 2002), pp. 3-4. Most land management agencies track "visitor days," representing one person visiting for a 12-hour period, rather than individual visitors.

– accounting for less than five percent of all public use – and the vast majority of military lands managed by the U.S. Department of Defense receive only a relative handful of non-affiliated public visits.[4] The process of military base conversion itself promises to open historically restricted places to new kinds of public attention, and brings to the surface new kinds of challenges to wildlife managers and other federal officials. My work here identifies and illuminates military-to-wildlife conversions as a particular phenomenon and adds to our understanding of what the new kinds of places that result may mean as products of nature and society.

The purpose of my research is to examine military-to-wildlife conversions through two main questions: How have these particular landscapes been produced, and how do they then function as public lands? I approach the first of these, the production of military-to-wildlife lands, by asking how these sites have been cast as political and scientific narratives to effect their conversion. Second, I assess how these places work as new combinations of nature and society.[5] For this, I ask how military conversion sites function as new national wildlife refuges, as former military lands, and as new geographies where projects of militarism and environmentalism appear to coincide as complementary endeavors.

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[4] National wildlife refuges received just 35 million visitors in 2000. See http://refuges.fws.gov/centennial/index.html, [21 February 2001]. By "non-affiliated" I mean the visiting public that is neither employed by the DOD nor related to military and civilian personnel. The exception are the three large military academies at West Point, NY; Colorado Springs, CO; and Annapolis, MD; which have become tourist destinations in their own right.

[5] Mitchell, Don, *The Lie of the Land: Migrant Workers and the California Landscape*, (Minneapolis, MN: University of Minnesota Press, 1996), takes a similar approach to theorize and understand landscape.

A Notion of Compatibility

On 6 September 1990, U.S. Secretary of Defense Dick Cheney called to order an unusual meeting of environmentalists, military leaders, and other federal officials to discuss the relationship between national defense and the environment. The U.S. Department of Defense generates more pollution than any other institution in the nation, but Secretary Cheney encouraged the assembly to focus upon a bracing notion of compatibility: "Defense and the environment is not an either/or proposition. To choose between them is impossible in this real world of serious defense threats and genuine environmental concerns. The real choice is whether we are going to build a new environmental ethic into the daily business of defense."[6]

Cheney's remarks signal several themes that I take up in this dissertation. First, we find a refutation of any dichotomy between military defense and the environment. If this holds, then military geography itself must be reevaluated – as a discipline it has long been dedicated toward projects that pit human interests against environmental characteristics, such as terrain analysis, militaries surmounting environmental challenges, or using and modifying natural features for tactical advantage. There is also Cheney's intimation that the business of defense is ready not just for *an* environmental ethic, but that such an ethic can accommodate progressive military and environmental concerns. And finally, there is the fact that a Secretary of Defense was taking the time to concern himself with the military's productive relationship with the environment, and to bring that relationship to the attention of an elite

[6] Dumanoski, Dianne, "Pentagon Takes First Steps Toward Tackling Pollution," *Boston Globe*, 9 September 1990.

group of policymakers. Cheney's discursive framing of the challenges facing the military and the environment was no doubt intended to convey a particular sensibility to an attentive audience. The role of this discourse proves to be important as we look further into contemporary connections and changes involving the U.S. military and the environment.

Defense Lands and National Wildlife Refuges

Before addressing the particular category of lands at the center of my research, I will first introduce federal lands generally, then turn to the two types of federal lands that encompass military-to-wildlife conversions: military lands managed by the U.S. Department of Defense (DOD) and the national wildlife refuges managed by the U.S. Fish and Wildlife Service (FWS).

Federal lands in the United States comprise 634 million acres or nearly thirty percent of the nation's total landmass.[7] An array of agencies manage these lands and each category comes with a unique mission, from the conservation-oriented charge of the National Park Service – steward of Yellowstone and other sites such as the Grand Canyon, Great Smoky Mountains, and Yosemite – to the U.S. Forest Service's more utilitarian pledge to provide a sustainable supply of timber and water resources to the nation. The mission of Department of Defense lands has historically been to support the preparation and housing of troops, testing

[7] *Statistical Abstract of the United States 2002* (Washington, D.C.: U.S. Census Bureau, 2001), p. 210.

of weapons, and other national security needs; these purposes continue, though in recent years an explicit emphasis on environmental protection has also been incorporated.[8]

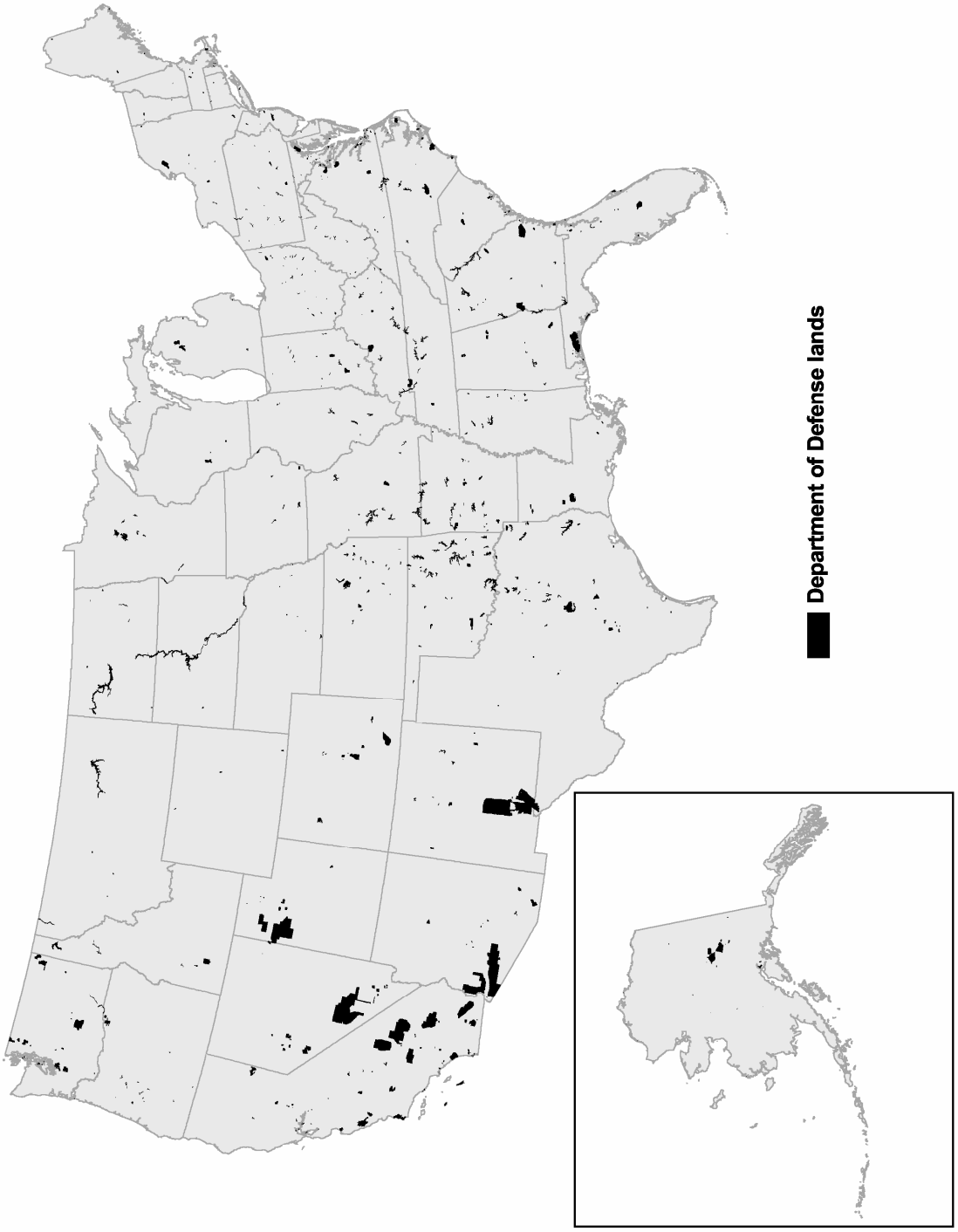
Defense Lands

Though often overlooked as part of the federal public domain, the 25 million acres of military bases, bombing ranges, and other installations in the U.S. rank the Department of Defense as the fifth largest land management agency in the nation (see Figure 1-1: Map of Department of Defense Lands in the United States). Vast as this sum seems, it has actually decreased by nearly half since 1945 and the close of World War II.[9] Since 1988, in the interest of improving its strategic capabilities, the DOD has sought to further streamline its domestic holdings with five rounds of systematic base closures directed by the Base Realignment and Closure Commission, or BRAC. Some of these BRAC closures – promulgated in 1988, 1991, 1993, 1995, and 2005 – continue to work their way toward resolution. To date, eleven BRAC closures and approximately 80,000 acres have been converted to national wildlife refuges (see Table 1.1: Status Report on Transfers and Refuge Overlay Agreements). With an average lag of nearly seven years between closure and

[8] For example, the first page of the 2004 Defense Installations Strategic Plan states, "DOD is working to endure that it is delivering cost effective, safe, and environmentally sound capabilities and capacities to support the national defense mission." Viewed online at http://www.acq.osd.mil/ie/irm/irm_library/2004DISPfinalsigned.pdf [14 September 2006].

[9] Palka, Eugene J. and Francis A. Galgano, *The Scope of Military Geography: Across the Spectrum from Peacetime to War* (NY: McGraw-Hill, 2000), p. 377, report that at end of WWII the DOD held 46 million acres.

Figure 1.1: **Department of Defense Lands in the United States**[10]



[10] Map credit: Bill Haskins, Big Sky Conservation Institute.

transfer from military to Fish and Wildlife Service management, the final results of BRAC conversions will continue to emerge for years to come.

Unlike more visible categories of federal lands such as national parks or national forests that welcome a range of public activities and attract annual recreational visits numbering in the hundreds of millions, the DOD has tightly controlled access to its lands and many Americans remain only dimly aware that millions of acres of defense lands exist as part of the federal domain. To many Americans the military connotes men and women in the armed forces, but little domestic commitment of facilities or land to train, house, assemble, or heal these same troops. With the notable exception of those communities actually dominated by a military presence, the DOD seems to inhabit an invisible geography that few civilians enter or imagine.[11]

Where bases do occur, the level of broader public awareness and interaction often varies depending upon the character of the base itself. In communities proximate to large residential bases or host to high-profile academies at West Point, Annapolis, and Colorado Springs, military and civilian economies often mix considerably. In some cases this relates to a proliferation of chain stores, heightened rates of domestic violence, and socioeconomic dislocations;[12] in other instances, the base may even become a tourist attraction: the single

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[11] The exception of military-dependent communities is a dramatic one, as even a short visit to places such as Fayetteville, North Carolina, or Cannon, New Mexico, can illustrate. For an anthropologist's view of the former, see Lutz, Catherine, *Homefront: A Military City and the American Twentieth Century* (Boston, MA: Beacon Press, 2001).

[12] See Lutz, 2001; De Yoanna, Michael, "Pattern of Misconduct: Fort Carson Soldiers Allege Abuse and Intimidation," *Colorado Springs Independent*, 13-19 July 2006, pp. 14-19.

Table 1.1: Status Report on Transfers and Refuge Overlay Agreements in the U.S.[13]

Refuge Name	State	Acres	FWS Acquisition
BRAC Transfer			
Aroostook NWR	ME	4,510	Fee
Occoquan Bay NWR	VA	642	Fee
Oxbow NWR[2]	MA	850	Fee
Nomans Land Island NWR[2]	MA	620	Fee
Big Oaks NWR	IN	51,000	Agreement
Nansemond NWR[2]	VA	208	Fee
Pearl Harbor NWR[2]	HI	37	Fee
Assabet River NWR	MA	2,292	Fee
Great Bay NWR	NH	1,054	Fee
Mountain Longleaf NWR	AL	7,632	P.L. 107-314
Upper Mississippi River National Wildlife & Fish Refuge[2]	IL	9,404	Fee
Non-BRAC Transfer			
Guam NWR	PI	23,228	Fee
Midway Atoll NWR[3]	PI	581,864	Fee
Shawangunk Grasslands NWR	NY	575	Fee
Kingman Reef NWR[4]	PI	426,392	Fee
Rocky Mountain NWR	CO	17,000	P.L. 102-402
Caddo Lake NWR	TX	8,500	Agreement
Vieques NWR	PR	3,100	P.L. 106-398
Vieques NWR	PR	15,587	P.L. 107-107
Patuxent Research Refuge	MD	12,841	Fee
Fishermans Island NWR	VA	1,896	Fee
		1,169,232	

[1] Some or all of base ownership has not transferred, and/or managed as a U.S. FWS overlay property.
[2] Addition to an existing national wildlife refuge.
[3] Authorized by Executive Order 13022. Includes marine holdings within 12 miles of emergent land/barrier reef.
[4] Authorized by Special Order 3223

[13] Modified from original provided by Barbara Wyman, Realty Division program manager for base conversion lands, U.S. Fish and Wildlife Service, Washington, D.C. (6 October 2003), and incorporating additions provided by Cathy Osugi, Personal communication with Division of Refuge Planning BRAC Coordinator, U.S. Fish and Wildlife Service, Portland, OR (25 February 2004); and Doug Vandegraft, U.S. Fish and Wildlife Service Chief Cartographer (13 September 2006).

most popular tourist site in Colorado Springs, for example, is the U.S. Air Force Academy.[14] At bases where weapons development and testing or tactical training are the focus, the military-civilian barrier is much less permeable and non-credentialed visitors may be barred outright or allowed access only under tightly regulated conditions for a brief hunting season or "open house."[15]

In this respect, military lands stand anomalous among most other federal lands.[16] Though defense lands are considered part of the public domain – owned by and managed for the citizens of the nation as a whole – public access to these same lands is extremely limited. The need to maintain high-security areas for training or munitions tests also exempts most military lands from residential developments and extractive industrial use, as well as most recreational uses, whether by backpackers or off-road vehicle drivers. This lack of access has kept many of these lands outside the civilian purview of environmental laws, monitoring, or enforcement.[17]

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[14] http://www.pikes-peak.com/facts_co_spgs.htm, viewed online [21 December 2005].

[15] Training bases such as North Carolina's Camp Lejeune and Fort Bragg house tens of thousands of Marines and Army personnel respectively, while the million-acre expanses of the Yuma Proving Grounds or White Sands Missile Base have relatively small residential populations and visitors are essentially excluded. See Evinger, William R., ed., *Directory of U.S. Military Bases Worldwide* (Phoenix, AZ: Oryx Press, 1995).

[16] Three million acres of federal Department of Energy sites such as Hanford, Oak Ridge, Rocky Flats, and Los Alamos have been managed in a similarly exclusive condition. See, for example, Brown, Kathryn S. "The Great DOE Land Rush?" *Science* 282(23 October 1998): 616-617.

[17] Dycus, Stephen, *National Defense and the Environment* (Hanover, NH: University Press of New England, 1996); Shulman, Seth, *The Threat at Home: Confronting the Toxic Legacy of the U.S. Militar*y (Boston: Beacon Press, 1992); Lanier-Graham, Susan D., *The Ecology of War: Environmental Impacts of Weaponry and Warfare* (NY: Walker and Company, 1993).

While military bases have been used to prepare troops for war and for the testing of munitions, the restrictions on many other kinds of uses on these large tracts of land has, at the same time, led to the production of high ecological values in many places. Though the contrast could hardly be more striking in some cases – for example, where unexploded ordnance, toxic waste, or depleted uranium shells clutter the surface – some scientists consider military lands, by a species-to-area measure, the richest reserves of biodiversity of any of the nation's public lands.[18] In addition to providing habitat for more than 300 species currently considered or already listed for protection as threatened or endangered, DOD lands cover most of the nation's ecological regions and include some of the largest tracts of land reserved from human use in recent decades.[19] (See Figure 1.2: Hot Spots of Rarity and Richness.) The Department of Defense also budgets approximately $150 million annually for its conservation programs.[20]

Despite these conditions, the ecological significance of military lands has remained largely overlooked by most environmental groups and the general public.[21] Military lands

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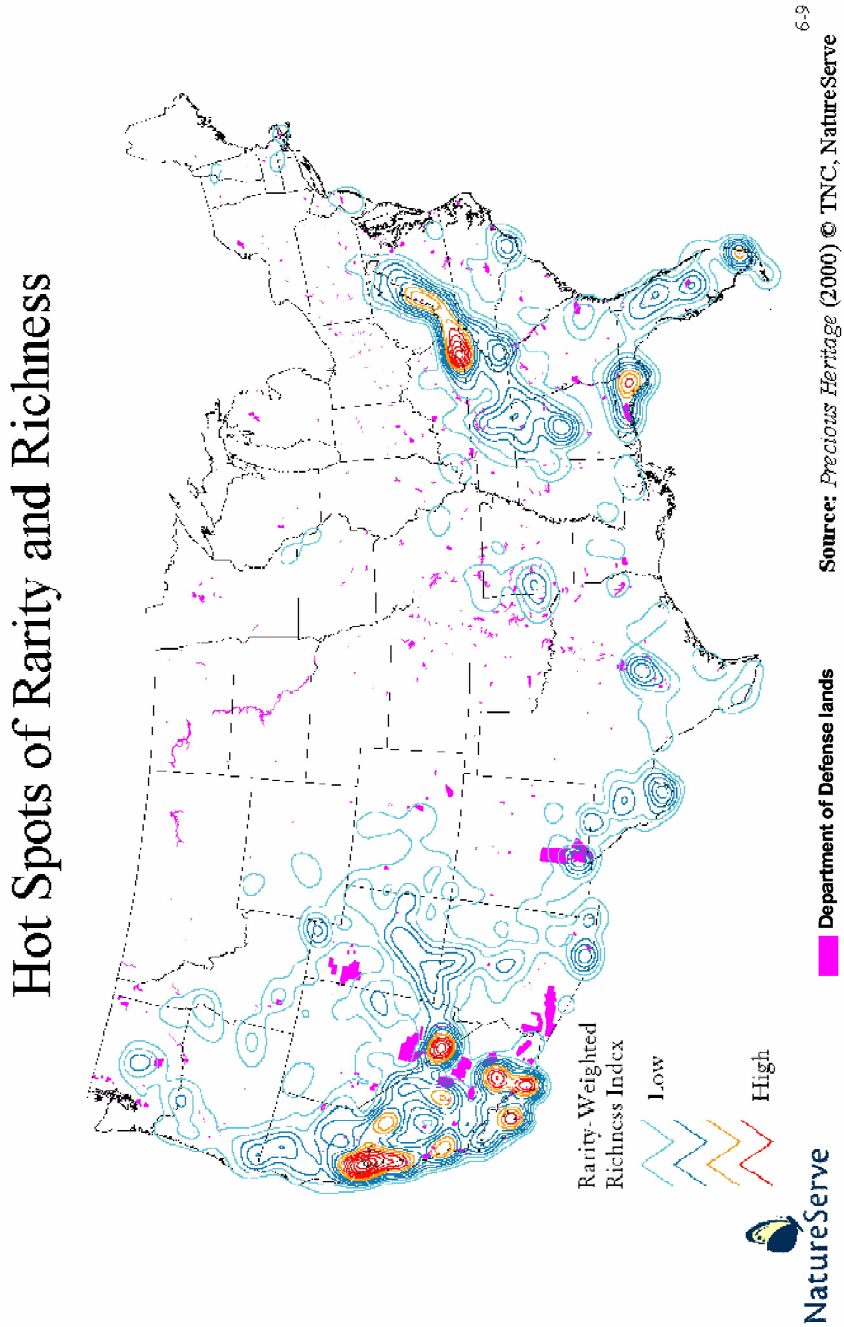
[18] Leslie, Michele, Gary K. Meffe and Jeffrey L. Hardesty, *Conserving Biodiversity on Military Lands: A Handbook for Natural Resource Managers* (Washington, D.C.: The Department of Defense Biodiversity Initiative, U.S. Department of Defense, and The Nature Conservancy, 1996), pp. 1-2.

[19] Palka and Galgano, p. 387.

[20] *FY 2001 Defense Environmental Quality Program Annual Report to Congress* (Washington, D.C.: U.S. Government Printing Office). Critics can, of course note that compared against annual spending this amount represents just a fraction of a percent of the DOD's budget.

[21] Mann, Linda K., Patricia D. Parr, Larry R. Pounds and Robin L. Graham, "Protection of Biota on Nonpark Public Lands: Examples from the US Department of Energy Oak Ridge Reservation," *Environmental Management* 20(1996): 207-218.

Figure 1.2: Hot Spots of Rarity and Richness[22]



[22] Map credit: Bill Haskins, Big Sky Conservation Institute. Source information for rarity and richness is from Stein, Bruce A., Lynn S. Kutner, and Jonathan S. Adams, (eds.) *Precious Heritage: The Status of Biodiversity in the United States* (Oxford: Oxford University Press, 2000). The rarity and richness measure highlights species limited in abundance and range, illustrating what Stein et al. call an "index of irreplacibility" (p. 172).

have long been at the center of environmental and political contestations, however, from their early designations and removal from civilian uses, to Congressional wranglings over base sitings and closures. With citizen concerns increasingly being raised about hazardous wastes, munitions, or the preservation of biodiversity, these lands have developed rich environmental histories that deserve critical attention.

Beginning with large-scale base closures and M2W conversions late in the twentieth century, the United States has, in fact, recently opened a new chapter in this history. A number of decommissioned bases are now emerging into more public management strategies. With these transitions, defense officials, wildlife biologists, recreation planners, conservationists, and others are finding themselves faced with a number of challenges, opportunities, and decisions that come from the past but also may reflect values and priorities casting well into the future.

This paradox of ancillary production of wildlife habitat from military spaces is not a particularly limited or new phenomenon. Written accounts date back to the journals of the Lewis and Clark expedition (ca. 1806) of wildlife-rich buffer zones existing in areas contested by indigenous nations.[23] The Demilitarized Zone between North and South Korea currently provides habitat and refuge for endangered cranes and other rare species, while the former chemical weapons facility at Porton Down, England, is thought to host more than 80

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[23] See Hickerson, Harold, "The Virginia Deer and Intertribal Buffer Zones in the Upper Mississippi Valley," pp. 43-66, in Anthony Leeds and Andrew Vayda, eds., *Man, Culture, and Animals* (Washington, D.C.: American Association of the Advancement of Science, 1965); Martin, Paul S. and Christine R. Szuter, "War Zones and Game Sinks in Lewis and Clark's West," *Conservation Biology* 13:1(1999): 36-45; Flores, Dan, *The Natural West: Environmental History in the Great Plains and Rocky Mountains* (Norman, OK: University of Oklahoma Press, 2001).

percent of all butterfly species extant in Great Britain.[24] Another category of militarized space in the U.S., Department of Energy weapons laboratories, have also attracted attention in recent years for their wildlife habitat.[25] Even within the particular category of national wildlife refuges in the U.S. there are examples of formal military-wildlife coexistence, perhaps most notably at Crab Orchard National Wildlife Refuge in southern Illinois, which was created in 1947 explicitly for, "the conservation of wildlife, and for the development of the agricultural, recreational, industrial, and related purposes."[26] To this day, Crab Orchard NWR includes a 1.2 million square foot industrial complex that includes military munitions manufacturing and storage.[27]

Of course, the limited public access granted to most military lands facilitates control not just over particular "naturalizing" spaces, but also over information about the military and its operations more broadly. In this regard, the conversion of military lands to new

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[24] On the DMZ, see Higuchi, Hiroyoshi, Kiyoaki Ozaki, Go Fujita, Jason Minton, Mutsuyuki Ueta, Masaki Soma, and Nagahisa Mita, "Satellite Tracking of White-naped Crane Migration and the Importance of the Korean Demilitarized Zone," *Conservation Biology* 10:3(1996): 806-812; Kim, Ke Chung, "Preserving Biodiversity in Korea's Demilitarized Zone," *Science* 278:5336(10 October 1997): 242-243; on Porton Down, see McCarthy, Michael, "The Secret of Porton Down: Behind its defences it has created Britain's finest wildlife reserve," *The Independent* (UK), 11 August 2003.

[25] See Brown, Kathryn S. "The Great DOE Land Rush?" *Science* 282(23 October 1998): 616-617. Among these, the DOE site at Rocky Flats, Colorado, has been redesignated as a new national wildlife refuge.

[26] PL-361 (61 Stat. 770, 5 August 1947).

[27] Crab Orchard National Wildlife Refuge Draft Environmental Impact Statement/Comprehensive Conservation Plan, Appendix J: Compatible Uses (Ft. Snelling, MN: U.S. Fish and Wildlife Service, September 2005), p. 326, viewed online at www.fws.gov/midwest/Planning/craborchard/DraftEIS/deisAppendixJ.pdf [28 June 2006].

designations can present an important opening of military places and activities to a more visible condition. As Woodward indicates, "…the conversion of military establishments is important to consider as part of a discussion of military economic geographies because of the transparency the conversion process brings to an otherwise seemingly opaque world of military economic impacts."[28] This points to one way in which military-to-wildlife conversions can lead us to a more democratic politics that opens military spaces to greater public intervention and oversight.

Far from being limited to economic impacts, military conversions also provide opportunities to examine other kinds of impacts in productive new ways. At sites where military bases are being converted to become national wildlife refuges, environmental attributes in particular come to the fore. Considering the opportunities that military conversions present to ecologists, wildlife biologists, and other scientists, these changes have attracted surprisingly little directed inquiry from some quarters. According to Brzoska, "Base closure and redevelopment is the resource re-use issue which has received the least attention from social science research…"[29] Even less noticed is the phenomenon of military conversions and reclassifications to become national wildlife refuges.

National Wildlife Refuges

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[28] Woodward, Rachel, *Military Geographies* (Oxford: Blackwell, 2004), p. 54.

[29] Brzoska, Michael, 1999, "Military Conversion: The Balance Sheet," *Journal of Peace Research* 36(2): 131-140, p. 136.

The National Wildlife Refuge System contains slightly more acreage than U.S. national parks, but is far less visited and less widely known. More than five hundred individual refuges in the United States cover approximately 95 million acres.[30] By area, most refuge lands exist in multimillion-acre Alaskan tracts such as the Yukon Flats or Arctic National Wildlife Refuges, though by *number* of refuges, states along the central waterfowl flyway in the upper Midwest contain the most units, many coming in the form of small "prairie pothole" wetlands. (See Figure 1.3: U.S. National Wildlife Refuge System.) Of all categories of federal public land, national wildlife refuges are the most likely to be found within an hour's drive of any city in the U.S.[31] Despite this fact, the refuge system attracts fewer visitors than national parks, national forests, or the vast tracts of western lands managed by the Bureau of Land Management.[32] Where they exist, visitor services at national wildlife refuges are often quite simple. In many cases national wildlife refuges have come to their current mission from any number of previous uses.

Managed by the U.S. Fish and Wildlife Service (within the U.S. Department of the Interior), national wildlife refuges can be established by presidential decree, administrative action, or act of Congress for the primary purpose of conserving wildlife, plants and habitat. In deference to this primary mission, however, a broad array of secondary uses may also be permitted on refuges including hunting, fishing, and other forms of recreation; educational

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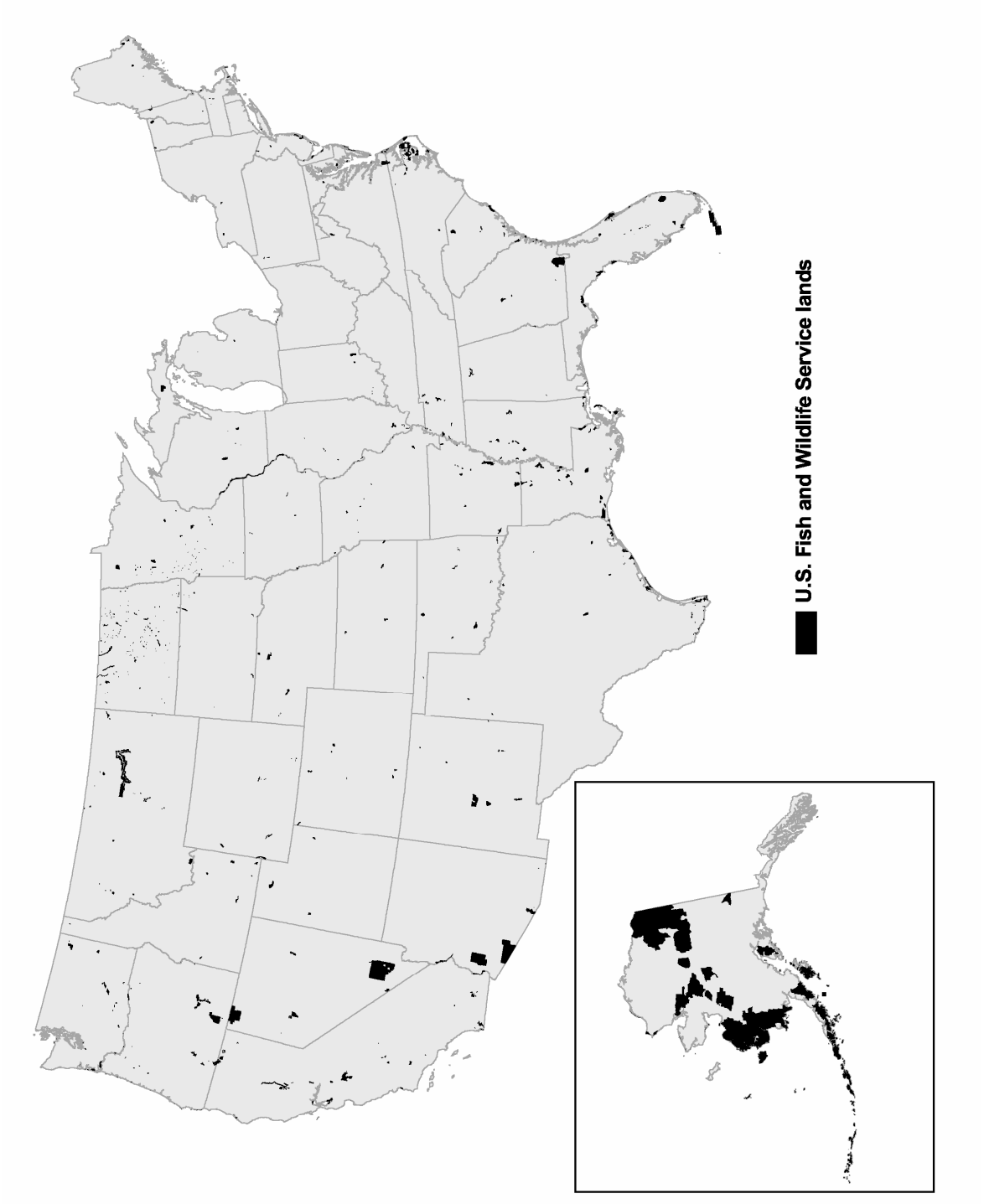
[30] See Fischman, Robert L., *The National Wildlife Refuges: Coordinating a Conservation System Through Law* (Washington, D.C.: Island Press, 2003), p. 21.

[31] *Fulfilling the Promise: The National Wildlife Refuge System*, 22 March 1999, (Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service, National Wildlife Refuge), p. 43.

[32] Viewed online at http://refuges.fws.gov/centennial/index.html [21 February 2001]. See also Fischman, 2003, p. 30.

Figure 1.3: U.S. National Wildlife Refuge System[33]



[33] Map credit: Bill Haskins, Big Sky Conservation Institute.

programs; livestock grazing; water diversions and impoundments; oil and gas production; road construction; military overflights; and more. In a number of instances, these or other subsidiary uses pre-date the creation of the refuge itself. Despite a common public impression of wildlife refuges as inviolate sanctuaries, there are in fact any number of past histories, current uses, and future plans that coexist with (and in some cases undermine) their conservation mission. This mix of current and historic uses actually leads Fischman to describe the National Wildlife Refuge System as the best model for international conservation of any of the U.S. public lands – one that could accommodate both conservation interests and an integrated, non-dualistic management philosophy.[34]

Even considering the array of prior and current uses of national wildlife refuges, however, the transitioning of military bases to become new wildlife refuges stands out as an extraordinary turn of events. As my case studies in Chapters Four and Five attest, military-to-wildlife conversion sites are diverse and include a mix of characteristics. Some former bases such as the Rocky Mountain Arsenal remain relatively prominent due to their size or historic notoriety, while others continue largely in obscurity. As a category they effectively highlight important aspects of militarism and conservation and how these seemingly disparate worlds can intersect.

M2W

Between 1988 and 2002, the U.S. Department of Defense closed or reclassified approximately four hundred military sites, including about one hundred major military

[34] Fischman, 2003, pp. 209-210.

installations of at least 10 acres or $1.5 billion in assets.[35] In 2005, twenty-eight additional major installations were similarly identified for realignment or closure.[36] During this period, twenty-one bases on more than 1.1 million acres have been transferred to the U.S. Fish and Wildlife Service for management as part of the National Wildlife Refuge System.[37] With the 2005 round of closures and the lag time for closure and conversion that I noted earlier, additional military-to-wildlife conversions are bound to occur.[38] (See Figure 1.4: National Wildlife Refuges Conversions from Military Base Closures; Figure 1.5: DOD Lands Closed and Reclassified as National Wildlife Refuges; and Table 1.2: Inventory of Military-to-Wildlife Conversion Locations in the United States.)

Of all the options available when a military base closes, rebirth as a national wildlife refuge is not often the most obvious. To many observers it surely seems only a modest

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[35] Department of Defense Base Structure Report Fiscal Year 2003 Baseline (Washington, D.C.: U.S. Department of Defense, 2002).

[36] http://www.brac.gov/docs/final/ExecutiveSummary.pdf viewed online [21 December 2005].

[37] Wyman, Barbara, Personal communication with Realty Division program manager for base conversion lands, U.S. Fish and Wildlife Service, Washington, D.C. (6 October 2003); Vandegraft, D., Personal communication with Chief Cartographer, U.S. Fish and Wildlife Service Realty Division (16 October 2003); Shaffer, Linda, Personal communication with Chief of Cartography and Spatial Data Services Branch, U.S. Fish and Wildlife Service, Hadley, MA (19 January 2004); Osugi, Cathy, Personal communication with Division of Refuge Planning BRAC Coordinator, U.S. Fish and Wildlife Service, Portland, OR (25 February 2004). At some of these sites land title remains with the DOD. Acreages include several Pacific Island sites that contain extensive marine holdings.

[38] The Alameda National Wildlife Refuge (formerly Naval Air Station Alameda) in the San Francisco Bay area has already been identified as an active M2W site – the FWS requested 900 acres for use as a wildlife refuge - but official designation has been delayed by questions relating to cleanup and long-term liability.

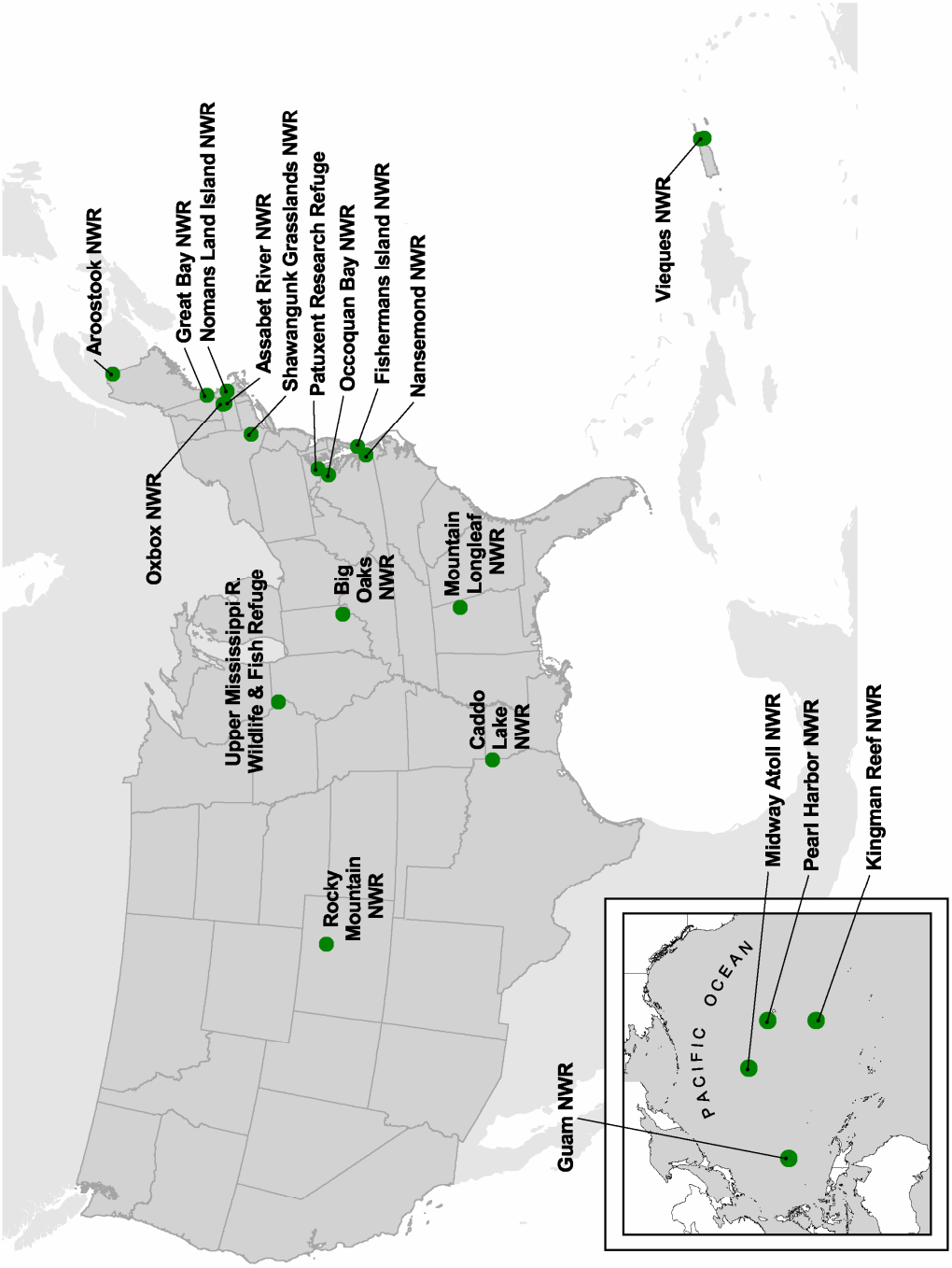
change to convert an Air Force base to become a commercial airport, for example, or to renovate Army housing to serve civilian residential needs. Such conversions of course require careful planning and a number of economic, social, and physical adjustments, but the categories of use seem largely consonant. There is something rather jarring, however, when we learn of a bombing range or chemical weapons plant segueing into a new mission of conserving wildlife.

Reclassifications of military lands to wildlife refuge designation in many ways highlight an environmental paradox: DOD lands on the whole are both more contaminated and more biologically diverse than other federal lands such as national parks or national forests.[39] Indeed, the coupling of military activities with environmental conservation comes as a surprise to any who view the former as centering upon violence and the destruction of life, and the latter as dedicated to wildlife and habitat protection. While the primary purposes of the DOD and FWS remain very different, in recent years a new relationship between these agencies has grown increasingly evident. In this view, military production and environmental protection are not cast into opposition, but rather may be seen as compatible.

At the July 2000 dedication of the Big Oaks National Wildlife Refuge, for example, FWS director Jamie Rappaport Clark offered the following remarks to welcome the lands of the former Jefferson Proving Ground into her agency's system: "Back in the late '80s, I

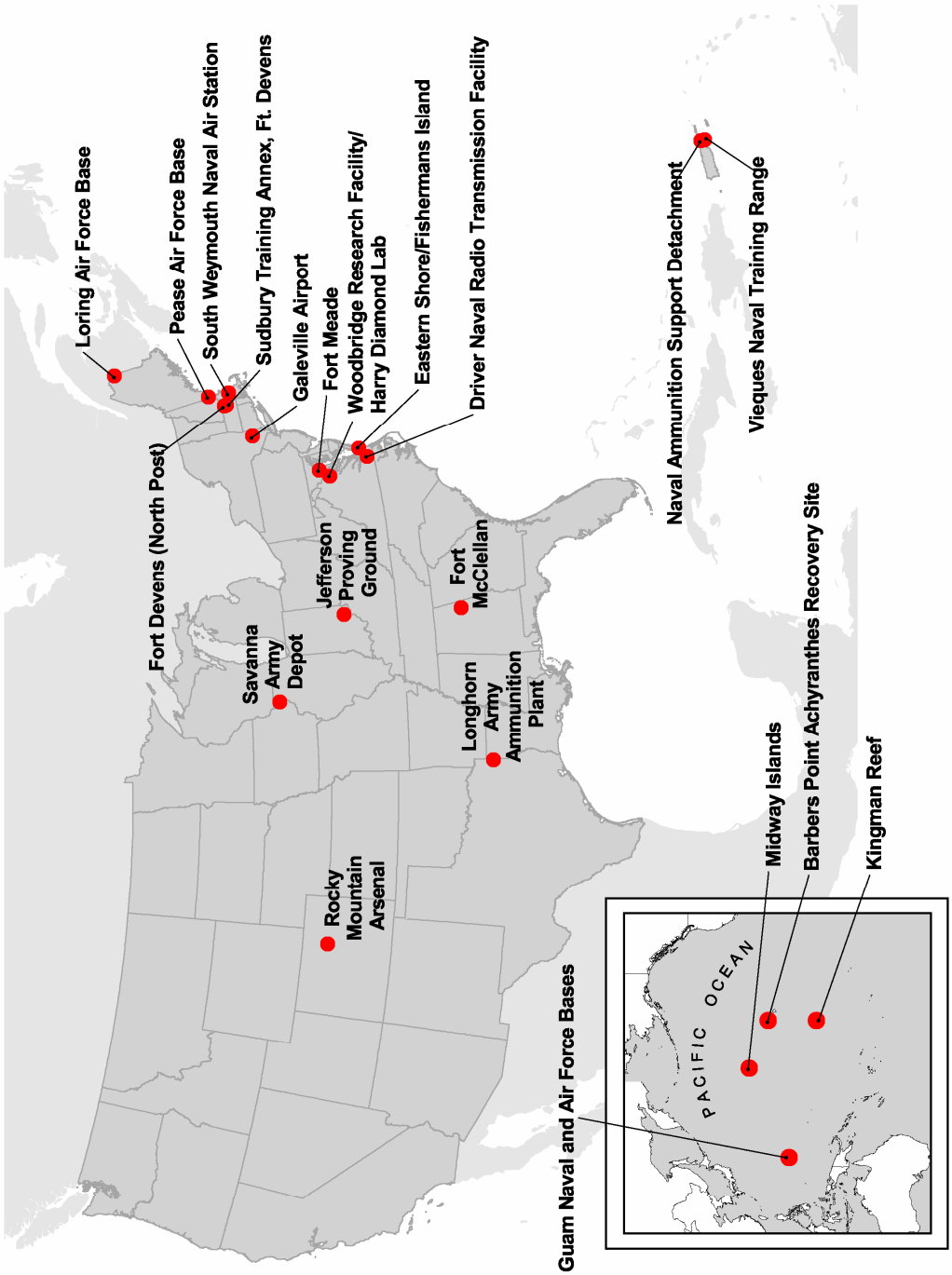
[39] Shulman 1992; Leslie et al. 1996; as Fischman, 2003, notes: "severe restrictions on public access to these [DOD] lands have preserved important wildlife habitat. On the other hand, secrecy enshrouding management of these lands has led to instances of appalling degradation and a collection of the most severely contaminated sites in the country" p. 22.

Figure 1.4: National Wildlife Refuge Conversions from Military Base Closures[40]



[40] Map credit: Bill Haskins, Big Sky Conservation Institute.

Figure 1.5: DOD Lands Closed and Later Reclassified as National Wildlife Refuges[41]



[41] Map credit: Bill Haskins, Big Sky Conservation Institute.

Table 1.2: Inventory of Military-to-Wildlife Conversion Locations in the United States[42]

Base Name	Refuge Name	State	Acres
Loring Air Force Base	Aroostook NWR	ME	4,510
Woodbridge Research Facility/Harry Diamond Lab	Occoquan Bay NWR	VA	642
Fort Devens (North Post)	Oxbow NWR[2]	MA	850
South Weymouth Naval Air Station	Nomans Land Island NWR[2]	MA	620
Jefferson Proving Ground[1]	Big Oaks NWR	IN	51,000
Driver Naval Radio Transmission Facility	Nansemond NWR[2]	VA	208
Barbers Point Achyranthes Recovery Site	Pearl Harbor NWR[2]	HI	37
Sudbury Training Annex, Ft. Devens	Assabet River NWR	MA	2,292
Pease Air Force Base	Great Bay NWR	NH	1,054
Fort McClellan	Mountain Longleaf NWR	AL	7,632
Savanna Army Depot[1]	Upper Mississippi River NW & Fish Refuge[2]	IL	9,404
Guam Naval and Air Force bases	Guam NWR	PI	23,228
Midway Islands	Midway Atoll NWR[3]	PI	581,864
Galeville Airport	Shawangunk Grasslands NWR	NY	575
Kingman Reef	Kingman Reef NWR[4]	PI	426,392
Rocky Mountain Arsenal[1]	Rocky Mountain NWR	CO	17,000
Longhorn Army Ammunition Plant[1]	Caddo Lake NWR	TX	8,500
Naval Ammunition Support Detachment	Vieques NWR	PR	3,100
Vieques Naval Training Range	Vieques NWR	PR	15,587
Fort Meade	Patuxent Research Refuge	MD	12,841
Eastern Shore/Fishermans Island	Fishermans Island NWR	VA	1,896
TOTAL			**1,169,232**

[1] Some or all of base ownership has not transferred, and/or managed as a U.S. FWS overlay property.
[2] Addition to an existing national wildlife refuge.
[3] Authorized by Executive Order 13022. Includes marine holdings within 12 miles of emergent land/barrier reef.
[4] Authorized by Special Order 3223

served as the fish and wildlife administrator for the Department of the Army, a job that required me, among other things, to look at how military training exercises could be made

[42] Wyman, Barbara, personal communication with U.S. FWS Realty Division program manager for base conversion lands, 6 October 2003; Osugi, Cathy, personal communication with U.S. FWS Division of Refuge Planning BRAC Coordinator, 25 February 2004; and Vandegraft, Doug, U.S. FWS Chief Cartographer, 13 September 2006.

wildlife-friendly. It was not as difficult a job as you might think, and so it is not surprising to me that right here on this former military range, we've got an amazing array of wildlife."[43]

Clark's comments, as with Secretary Cheney's from a decade earlier, suggest that top officials at both the DOD and FWS have sought to cast the relationship between defense and the environment in a certain light. There could be many reasons for this effort, including the simple point that military land restrictions do seem to generate certain kinds of floral and faunal flourishing, but one outcome of this discursive "greening" of the military is to obscure some of the damaging effects of military activities.[44] Given this cloaking tendency it becomes increasingly important to evaluate such official pronouncements of compatibility by asking how easy the coexistence is between military activity and habitat production. How apt is this depiction and whose interests does it serve to encourage it?

There are, of course, both politics and values built into this discourse and to conversions themselves. Identifying what M2W conversions represent, then, as political and ethical landscapes represents a core interest of my research. As Woodward frames this type of work, "the study of military geographies involves a moral decision. If we study the ways

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[43] The new refuge is managed as an overlay with Army ownership still in place with FWS management. "Former Bombing Range Becomes National Wildlife Refuge," U.S. Fish and Wildlife Service, reprint from July/August 2000 issue of *Fish and Wildlife News*, online at http://news.fws.gov/articles/FormerBombing.html [3 December 2002]. This quote and the earlier remarks from Cheney are but two examples of this. See also broader treatments such as Lillie, Thomas H. and J. Douglas Ripley. 1998. "A Strategy for Implementing Ecosystem Management in the United States Air Force," *Natural Areas Journal* 18(1): 73-80; and Hoffecker, John F. *Twenty-Seven Square Miles*. (Colorado: U.S. Fish and Wildlife Service, Rocky Mountain Arsenal National Wildlife Refuge, 2001).

[44] Woodward makes a similar point on p. 102.

in which military activities inscribe themselves onto space, place, environment and landscape, should we ignore or accept unquestioned the politics of that process?"[45] My answer, of course, is "no," and in the pages that follow I undertake a critical inquiry of how M2W conversions are taking place and what their consequences may be to nature and society, and how this extends into new formulations for democratic politics and public space.

Research Questions and Methods

As locations of both military *and* environmental activity, M2W lands challenge us to reconsider traditional views of landscapes as primarily social *or* natural constructions. The emergent geographies of M2W conversions also call for a careful examination of how lands long known for their hazardous materials and secretive practices may be opened as public spaces dedicated to conservation. Environmentalists and government officials alike seem uncertain whether these conversions are simply an example of military greenwashing, as the Department of Defense seeks to dispose of contaminated or obsolete facilities, or if there is an overriding environmental or public interest in converting these lands to new conservation-focused uses. My research will demonstrate that neither of these stark positions adequately embraces the complexity of the changes taking place, or their many effects.

In order to address and understand the contrasting qualities of military lands as they become national wildlife refuges, I frame my study with two broad questions in mind: First, how have military-to-wildlife landscapes been produced? And second, how do they then

[45] Woodward, p. 9.

function or *work* as public lands in the United States?[46] I approach the first of these, the *production* of M2W lands, by examining how these sites have been cast politically, scientifically, and discursively to effect their conversion. This inquiry rests, in turn, upon a critical interpretation of landscapes as not merely an array of physical objects but as dynamic places built through social activities, economies, and values.[47]

Research Design and Methods

The politics and science of military-to-wildlife conversions do not operate in the same ways across disparate settings so it may come as little surprise that M2W conversions have occurred for different reasons in different places by a number of different processes. In order to understand these processes, my research relies primarily upon content and discourse analysis of documents and reports that guide base closures and conversion, documents that describe the conditions of the particular conversion sites, and public accounts of the conversions such as media reports and newsletters. I also conducted site visits of my principal case study locations and four other M2W refuges, and completed thirty-two interviews with key actors in M2W conversions.

For my document analysis I visited the three principal archives that store materials for my case study locations: the Rocky Mountain Arsenal's Joint Administrative Record and

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[46] These questions reflect Mitchell's 1996 framing of landscape theory. See supra 5, above.

[47] See Mitchell, 1996 and Mitchell, Don, "Writing the Western: New Western History's Encounter with Landscape," *Ecumene* 5:1(1998): 7-29; Olwig, Kenneth Robert, *Landscape, Nature, and the Body Politic: From Britain's Renaissance to America's New World*, (Madison, WI: University of Wisconsin Press, 2002); Woodward, 2004.

Document Facility (JARDF); Hanover College's Duggan Library archives in Hanover, IN; and the refuge manager's files stored in the Visitor Contact Office at Big Oaks National Wildlife Refuge. From these sources I was able to retrieve and read thousands of pages from environmental analyses, management plans, legislative records, agency correspondence, scientific studies, media reports, transcripts of oral histories, visitor guides, and other primary and secondary sources spanning more than seventy years.

In addition to researching archival materials at my case study sites, I also completed, recorded, and later transcribed semi-structured interviews of refuge managers, FWS biologists and other agency staff, Army personnel coordinating base closure and transfer, representatives from state and local regulatory agencies, and representatives from citizen groups involved in base closure and conversion. Interview questions focused on why the Fish and Wildlife Service is taking over management of former DOD sites, what principal challenges are associated with these changes, the degree and character of public involvement in M2W conversions, and how M2W refuges differed from or resembled other refuge units (these questions are included as Appendix A: Questions Used in Semi-Structured Interviews).

Beyond my research at the two case sites, I conducted somewhat shorter visits to four additional M2W conversion locations: Assabet River NWR and Oxbow NWR in eastern Massachusetts; Shawangunk Grasslands NWR in upstate New York; and the Lost Mound unit of the Upper Mississippi River National Wildlife and Fish Refuge in Illinois. I also corresponded either by telephone or electronically with refuge managers (or equivalent personnel) at all remaining M2W locations to discuss public access, current management issues, and transition status at these sites.

Working from the information I compiled and assessed through this combined process of content analysis and interviewing, I then identified and analyzed dominant discourses that continue to build from and promote M2W conversions. This discourse identification derived from iterative analyses and comparisons as certain themes emerged and converged from multiple sources at multiple sites. Discourse analysis, as I apply the term, involves both this identification process and the subsequent consideration of how certain narratives fit different base closure contexts and help produce political changes, shape public opinions, and articulate with scientific information and regulatory constraints. In other words, I examine both what discourses exist and what work these discourses do in the context of M2W conversions and my conceptual questions. Extending from both the content and discourse analysis, I develop a set of theories that respond to my principal research questions.

I selected two case sites for three main reasons. First, they are clearly established as new national wildlife refuges – with dedicated Fish and Wildlife Service staff, visitor centers or "visitor contact stations" in place, public outreach programs, wildlife conservation programs, new signage, and other facilities or policies that shift at least some portion of control from DOD to FWS managers. These transitions have also been well-documented through legislation, inter-agency agreements, National Environmental Policy Act (NEPA) publications such as environmental impact statements and assessments, and by local and national media reports. Second, these sites represent *critical cases* with characteristics dramatic enough to warrant particular attention and concern, and prominent enough due to size and notoriety to highlight important aspects of military conversions.[48] Third, the

[48] On critical cases, see Patton, M.Q. *Qualitative Evaluation and Research Methods*, 2nd edition, (Newbury Park, CA: Sage, 1990).

physical, political, and social characteristics of the two sites are different enough that they provide useful information for cross-case analysis and illustrate the breadth of issues, habitats, and human communities that are affected by military-to-wildlife conversions.[49]

Organization of Chapters

Despite the heterogeneity of M2W conversions (see Table 1.3: Characteristics of Selected M2W Conversions), my research acknowledges the broader processes of production affecting these lands generally. Toward this end, following the next chapter's attention to theoretical considerations, Chapter Three provides a genealogical treatment of the two land use categories under consideration here – military lands and national wildlife refuges – and works through their respective historical geographies as they angle toward a particular convergence in the form of M2W refuges.

In the next two chapters my focus tightens to look at how such conversions have been produced at two specific locations: Colorado's Rocky Mountain Arsenal National Wildlife Refuge (NWR) in Chapter Four and in Chapter Five the Big Oaks NWR (formerly the Jefferson Proving Ground) in Indiana. Although politics, science, and discourse play important roles in any M2W conversion – or most any land use determination, for that matter – I foreground the political character of the changes at the Rocky Mountain Arsenal. As a new *political* geography where the control of territory, research, and information resides in

[49] See Stake, Robert E., *The Art of Case Study Research* (Thousand Oaks, CA: Sage Publications, 1995); Creswell, John W., *Qualitative Inquiry and Research Design: Choosing Among Five Traditions* (Thousand Oaks, CA: Sage Publications, 1998). For an illustration of some of the differences between M2W sites, see Table 1-3.

Table 1.3: Characteristics of Selected M2W Conversions

	Rocky Mtn Arsenal NWR	Big Oaks NWR	Assabet River NWR
size and location	17,000 acres, Colorado	50,000 acres, Indiana	2,205 acres, Massachusetts
land title	FWS: 12,000 acres; DOD: 5,000 acres pending cleanup	DOD: 50,000 acres, but managed as FWS overlay	FWS: 2,205 acres
type of transfer	1992 legislation; non-BRAC	1988 BRAC; administrative	1995 BRAC; administrative
open to public	limited area; weekends only year-around	limited area; M, F, alternate Saturdays April-November with signed liability release	year-around, some areas posted "no pedestrians"
primary public activities	catch-and-release fishing, environmental education, watchable wildlife, trolley and other guided tours	deer, squirrel, and turkey hunting; fishing; annual bird count; guided tours	hiking, x-c skiing, birdwatching, hunting, fishing
known hazards	toxic military and commercial chemicals, contaminated soils	unexploded ordnance, depleted uranium, abandoned wells and cisterns	ammunition bunkers, abandoned wells
surrounding land uses	urban, suburban, industrial, agricultural	rural, agricultural, Air National Guard	exurban, forestry, state park
habitat type	shortgrass prairie	mixed hardwoods, cypress bald, grasslands, oak savannah, wetlands	mixed hardwood and evergreen forest, wetlands
key management activities	soil and groundwater remediation, landfill improvements, prairie restoration	prescribed burning, grassland maintenance, UXO and DU cleanup	removal of fences, cleanup of ammunition bunkers, covering wells

the federal government and a military-corporate alliance, the Arsenal continues to be (re)produced in a deeply and often explicitly politicized manner. From the legislation that first established the Rocky Mountain Arsenal NWR in 1992 to conflicts between different jurisdictions (e.g. federal, state, county) to protracted rounds of litigation to the current efforts to recast the Arsenal as an amenity to neighboring communities, we find that by understanding the place in terms of its political construction – built by legislation, lawsuits, remediation, regulations, media reports, citizen activism, and bureaucratic design – we may finally start to understand the place as it exists as a dynamic representation of nature and society.

In Chapter Five, I turn to the creation of the Big Oaks NWR from the Army's Jefferson Proving Ground. Initiated by the intentionally depoliticized BRAC process, the closure of the Jefferson Proving Ground and its subsequent conversion to the Big Oaks NWR seems to rest most significantly upon a mobilization of science, and in particular, science that supports biological conservation. It is through this admittedly politicized scientific lens and efforts largely supported by scientific studies that I analyze Big Oaks as a new type of landscape. With aggressive remediation of unexploded ordnance hazards largely discounted from the outset at Big Oaks due to the cost and physical impracticality, what we find is a management approach constrained by the limits of technology and encouraged by a constituency of wildlife and environmental advocates who have been able to promote arguments based in fire ecology, conservation biology, and (a certain kind of) restoration ecology to effect a dramatic re-orientation of purposes across 50,000 acres. As a result, Big Oaks has become a new kind of proving ground – from one centered upon munitions testing to one centered upon certain natural sciences and the restoration of military landscapes. As the sign above the JPG's Site Management Team's offices importunes, *Cum Scientia Defendimus*.

Following these case-based examinations, in Chapter Six I turn more directly to my second major research question and assess the *work* of these new M2W geographies.[50] For this, I ask how military conversion sites act as public places that include a suite of particular characteristics – harboring qualities of national wildlife refuges, of former military lands, and of the compatibility featured in Clark's and Cheney's speeches. I devote Chapter Six to an

[50] To describe a similar objective, Mitchell, 1996, p. 30, uses the term *function*: "Finally, landscape theory must specify the processes by which material landscapes and their representations *function* in society."

inquiry of how M2W lands are managed as new geographies where histories of public exclusion mix with new directives that seek to open some of these spaces to the public. What, in fact, are the public uses of these new lands and what kinds of lessons, values, or hazards are brought to the public (or kept from view) along with this revival of accessibility? As public lands have come to signify and relate to core American principles of open democracy, the degree to which M2W lands enter into the public domain may be instructive of deeper national values and how we intend to navigate the increasingly narrow line between lands managed for military purposes and those designated for environmental conservation. When it comes to bringing the public to converted military lands, how genuine *is* the compatibility between military activities and environmental protection, and how democratically are these new M2W spaces being managed?

In Chapter Seven these questions become centrally important as I evaluate how military-to-wildlife conversions represent instances of what I call "ecological militarization." This term as I present it extends from the concept of ecological *modernization*.[51] Put simply, this is the compatibility of economic growth with environmental protections through improvements in technology and efficiency.[52] Reframed and refined as ecological militarization, this taps into one of the central ideas of military-environment discourse in recent years: the belief that military production and environmental protection are compatible and that, in fact, military activities *produce* ecological preserves. Much as Harvey and others

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[51] Hajer, Maarten, *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process* (Oxford: Clarendon, 1995).

[52] See also, Chrstoff, Peter, 1996, "Ecological Modernisation, Ecological Modernities," *Environmental Politics* 5(3): 476-500; and Dryzek, John, *The Politics of the Earth: Environmental Discourses* (Oxford: Oxford University Press, 1997).

have critiqued ecological modernization,[53] I also question the deeper implications of embracing ecological militarization as a model for land management, social change, environmental ethics, or conservation.

[53] See Harvey, David, *Justice, Nature and the Geography of Difference* (Cambridge, MA: Blackwell, 1996), pp. 382-401; also Christoff, 1996; Hajer, 1996.

CHAPTER TWO

CONSIDERING NEW GEOGRAPHIES

The new geographies that emerge from military-to-wildlife conversions are both material places – the new wildlife refuges designated from converted military lands – and new conceptions of places developed through an integration of history, science, politics, and discourse. In order to capture the nature of the change occurring on converted military lands, and to understand militarism and conservation amid a new set of practices, we need to attend not only to the histories and stories of these places but also to the politics, policies, and a set of scientific and technological practices that have affected them for more than six decades. In this chapter I describe the theoretical contexts for my work and how these relate to issues of militarism and environmental conservation.

The issues I consider involve at once military problems and environmental problems. This can present difficulties, as Dryzek has pointed out, "Environmental problems by definition are found at the intersection of ecosystems and human social systems, so one should expect them to be doubly complex."[54] Geography is in many ways the perfect discipline from which to approach the task of understanding M2W conversions as it accommodates multiple research perspectives with its traditional emphases on nature and society, spatiality, and human-environment interactions. Within these fields, I locate my

[54] Dryzek, p. 8.

work as an historical geography that interrogates environmental politics and policy, and nature-society relations. My research also articulates with more recent traditions of critical military geographies and science and technology studies.

Studies of Base Conversion and Environmental Conservation

Few scholarly works specifically address the conversion of DOD installations to become national wildlife refuges. Of those that do, both Williams (1999) and Tierney (2001) attend to these changes not in terms of meaning or theoretical questions concerning landscape production, but rather by examining how conservation objectives advanced by such base conversions may be facilitated and promoted.[55] Williams compares two Air Force base closures and assesses what factors most contributed to the protection of wildlife habitat. Looking primarily at local-scale processes, he found that environmental activism, community cohesion, and public participation were closely associated with greater habitat protection, while social isolation and political apathy were evident where commercial development prevailed over habitat protection.

In contrast, I seek to provide a deeply contextualized study that examines how reclassifications are produced. For example, most M2W conversions occur as a result of federal legislation or administrative agreements. Are these promulgated laterally at the

[55] Williams, T.N., *Pave It or Save It: Wildlife Protection Planning under the Base Closure and Realignment Acts*, Ph.D. dissertation (University of Colorado-Denver, 1999); and Tierney, John R., 2001, *Case Study of the Establishment of Great Bay National Wildlife Refuge at the Former Pease Air Force Base, New Hampshire*, (Durham, NH: University of New Hampshire, Natural Resources, Environmental Conservation Master's Thesis).

request of the DOD or FWS, from the top down via legislation, or from grassroots through citizens or NGO activism? By integrating lay knowledge and processes for a public role in decision-making, it may be possible to create both a more humane science and one better able to respond to the complexities inherent in military-to-wildlife conversions. The traditional top-down approach, by contrast, lends itself more toward technicization and reductionism.[56] These processes and questions are important since they will help clarify whether conversions are occurring because citizens, conservationists or the FWS perceive habitat conditions to merit protection as a wildlife refuge, or for reasons of economic, military, or political expedience. As I suggested earlier, such questions may in fact lend themselves not to either-or constructions but rather to more inclusive formulations.

Tierney attends to the conversion of Pease Air Force Base in New Hampshire to Great Bay National Wildlife Refuge as a case study with an explicit goal: to develop a template that will encourage similar M2W conversions. He views this as a means to expand conservation acreage nationwide.[57] While this is a project with which I am in many ways sympathetic, if we approach M2W conversions without an attempt to explain their underlying motivations, processes, and assertions of authority than we likely will fail to

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[56] See Wynne, Brian, "May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide," pp. 44-83, in: Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996); Jamison, Andrew, "The Shaping of the Global Environmental Agenda: The Role of Non-Governmental Organisations," pp. 224-245, in: Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996); Grove-White, Robin, "Environmental Knowledge and Public Policy Needs: On Humanizing the Research Agenda," pp. 269-286, in: Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996).

address critical questions of whether such conversions *should* occur, and if so how, where, and by what means. My study seeks to provide substantial context and analysis so that federal officials, state and local regulators, elected representatives, conservationists, and other citizens may more fully understand the implications of M2W conversions as material places, as representations of both militarism and environmentalism, and as emergent public spaces.

As I indicated in the previous chapter, I turn first to a broad historical geography of military lands and wildlife refuges. I also introduce the site-specific cases in Chapters Four and Five with brief histories of particular places. With each of these treatments, however, my intent is not simply to cast history in a static form, but to provide a sense of the shifting genealogies of these landscapes – where they came from, by whose hand, and why. This is not to suggest a new standard of history that should necessarily apply to all places or events, but as extraordinary places implicated in significant environmental and political debates, M2W places stand out and deserve particular critical attention.

Most historical treatments of military lands focus upon the designation and construction of bases, or the military practices that subsequently occurred on these lands.[58] Other political science and military accounts document the history and politics of military lands following the Cold War,[59] but few attend directly to the environmental impacts of

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[57] Tierney, 2001.

[58] e.g. Nye, Ltn. Wilbur S., *The History of Fort Bragg* (UNC-Chapel Hill, NC: typewritten manuscript in North Carolina Collection, n/d [1932?]); *Fort Bragg at War* (Atlanta: Foote & Davis, 1945).

[59] Childs, John, *The Military Use of Land: A History of the Defence Estate* (Bern, Switzerland: Peter Lang, 1998); Dycus 1996; Loomis, David, *Combat Zoning: Military Land-Use Planning in Nevada* (Reno, NV:

military activities. Of those that do address environmental impacts at length, Lanier-Graham and Shulman focus upon the negative consequences of military management and do not fully capture the paradox that military land practices have also produced some of the nation's richest de facto biological preserves.[60] Kuletz geographically limits her excellent work on militarized landscapes and nuclear waste to portions of the U.S. Southwest.[61] Kirsch's explication of the effort to apply nuclear warheads to civilian purposes offers a thoroughly contextualized account that is sensitive to questions of science, technology, and authority – much as I intend here – but orients primarily around Project Plowshare and related tasks of "geographical engineering," as opposed to my focus upon base closures, public lands, and conservation.[62]

Traditional military geographies, meanwhile, tend to describe the spatial distribution and scope of military lands, or the strategic implications of military activities on the environment and vice versa,[63] but such publications rarely engage qualitative or critical analyses of how or why these lands produce different "natures" that are both highly dangerous and rigorously protected. Much of Woodward's recent work does pry military geographies open in provocative and critically important directions, but her empirical

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University of Nevada Press, 1993); Sorenson, David S., *Shutting Down the Cold War: The Politics of Military Base Closure* (NY: St. Martin's Press, 1998).

[60] Lanier-Graham, 1993; and Shulman, 1992.

[61] Kuletz, Valerie L., *The Tainted Desert: Environmental Ruin in the American West* (NY: Routledge, 1998).

[62] See, for example, Kirsch, Scott, *Proving Grounds: Project Plowshare and the Unrealized Dream of Nuclear Earthmoving* (New Brunswick, NJ: Rutgers University Press, 2005).

[63] See Evinger 1995; Collins, John M., *Military Geography for Professionals and the Public* (Washington, D.C.: National Defense University Press, 1998); Palka and Galgano, 2000; DOD Base Structure Report, 2002.

emphasis is largely based in the U.K. whereas I focus upon policies and lands in the United States.[64]

In 1998, Braun and Castree declared, "there is a need to identify and detail new and emerging sites at which social productions of nature occur or are contested, while attending to the social, ecological and political consequences of each."[65] M2W lands exemplify some of these new sites of contested associations and my research works through a tension that has developed between environmental advocacy and conservation goals on one side and views of nature as socially constructed on the other. Although many environmentalists and social constructivists may support a similarly progressive politics broadly, environmentalists tend to distrust the specific policy ramifications of constructivists' efforts toward nature, or dismiss them as merely academic.[66] For their part, constructivists often discredit environmentalists' positions as naïve romanticizations of nature, neocolonial claims, or shrill and unsophisticated responses to complex human-environment interactions.[67] Because military

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[64] See for example, Woodward, 2004; Woodward, Rachel, 2001, "Khaki Conservation: An Examination of Military Environmentalist Discourses in the British Army," *Journal of Rural Studies*, 17(2) 201-217; and Woodward, Rachel, 2005, "From Military Geography to Militarism's Geographies: Disciplinary Engagements with the Geographies of Militarism and Military Activities," *Progress in Human Geography* 29(6): 718-740.

[65] Braun, B. and N. Castree, eds., *Remaking Reality: Nature at the Millenium* (London: Routledge, 1998), p. 5.

[66] e.g. Soulé, Michael E. and Gary Lease, eds., *Reinventing Nature? Responses to Postmodern Deconstruction* (Washington, D.C.: Island Press, 1995).

[67] See Cronon, W., ed., *Uncommon Ground: Toward Reinventing Nature* (New York: W.W. Norton, 1995); Willems-Braun, Bruce, "Buried Epistemologies: The Politics of Nature in (Post)colonial British Columbia," *Annals of the Association of American Geographers* 87(1997): 3-31; Proctor, James D., "The Social Construction of Nature: Relativist Accusations, Pragmatist and Critical Realist Responses," *Annals of the Association of American Geographers* 88, 3(1998): 352-376.

lands simultaneously produce natural and social attributes, sites of military conversion present an opportunity to examine environmental conservation bundled together with social constructivism in productive new ways.

Military Realignments and Closures

Even before the collapse of the Soviet Union and the end to the Cold War, the United States recognized a need to "realign" its Department of Defense holdings to respond more efficiently to current military technologies, strategic alliances, and shifts in geopolitics.[68] Although military-to-wildlife conversions specifically have not received considerable research attention, military closures more broadly generate tremendous local and political attention and have been studied by political scientists[69] and economists,[70] as well as ecologists interested specifically in the conservation potential of these lands.[71] The U.S. Congress has also scrutinized base closures repeatedly through its research arm, the U.S. Government Accountability (formerly "Accounting") Office, which has published a number

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[68] BRAC Cleanup Plan Abstract Analysis FY 99 (Washington, D.C.: U.S. Department of Defense, 2000).

[69] Dering, Robert S., "The Politics of Military Base Closures: 1988-1995," Ph.D. dissertation (University of Kansas, 1996); Sorenson 1998; Goren, Lilly, 2003, *The Politics of Military Base Closings* (NY: Peter Lang).

[70] Cassidy, Kevin J. and Gregory Bischak, *Real Security: Converting the Defense Economy and Building Peace* (NY: SUNY Press, 1993); Bradshaw, Ted K., "Communities Not Fazed: Why Military Base Closure May Not Be Catastrophic" *Journal of the American Planning Association* 65(spring): 193-206.

[71] Leslie et al. 1996; Cooper, Daniel S. and Dan L. Perlman, "Habitat Conservation on Military Installations," *Fremontia* 25(January 1997): 3-8.

of GAO blue papers.[72] Many of these GAO reports include detailed descriptions of military conversions, including transfers to the U.S. Fish and Wildlife service for refuges and other uses. The goal of the reports, however, is typically to analyze how successful BRAC closures have been in terms of government efficiency and economic redevelopment, with relatively little attention to the meaning of these conversions as a shift in public land uses or their deeper social and environmental implications.

A similar post-Cold War phenomenon, the reclassification of Department of Energy (DOE) weapons production sites, *has* been the focus of several broad investigations and these studies have highlighted the complex array of features and hazards such lands present as they are opened to new uses.[73] While DOE and DOD lands share certain characteristics –

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[72] *Military Bases: Review of DOD's 1998 Report on Base Realignment and Closure*, GAO/NSIAD 99-17 (Washington, D.C.: Government Accounting Office, November 1998); *Military Bases: Lessons Learned from Prior Base Closure Rounds*, GAO/NSIAD 99-151 (Washington, D.C.: Government Accounting Office, July 1997); *Military Bases: Case Studies on Selected Bases Closed in 1988 and 1991*, GAO/NSIAD 95-139 (Washington, D.C.: Government Accounting Office, August 1995); *Military Base Closures: Reducing High Costs of Environmental Cleanup Requires Difficult Choices,* GAO/NSIAD 96-172 (Washington, D.C.: Government Accounting Office, September 1996); *Military Bases: Update on the Status of Bases Closed in 1988, 1991, and 1993*, GAO/NSIAD 96-149 (Washington, D.C.: Government Accounting Office, August 1996; *Military Base Closures: Updated Status of Prior Base Realignments and Closures*, GAO 05-138 (Washington, D.C.: Government Accountability Office, January 2005).

[73] See Mann, Linda K., Patricia D. Parr, Larry R. Pounds and Robin L. Graham, "Protection of Biota on Nonpark Public Lands: Examples from the US Department of Energy Oak Ridge Reservation," *Environmental Management* 20(1996): 207-218; Brown 1998; Burger, Joanna, (2000) "Integrating Environmental Restoration and Ecological Restoration: Long-Term Stewardship at the Department of Energy," *Environmental Management* 26(5): 469-578; Burger, Joanna, Thomas M. Leschine, Michael Greenberg, James R. Karr,

including restricted access and contamination coupled with high biodiversity – DOD lands are more widespread, greater in number and acreage, and have different forms of pollution (primarily explosives and toxic chemicals) than the Department of Energy's sites of nuclear production. Both categories of land remain linked by their association with military production or testing, however, and shared in the kinds of risks that were accepted (or overlooked) in the pursuit of technological production in the national interest. DOE and DOD lands are also both implicated in discourses of military-environmental compatibility (i.e. ecological militarization) that I address in more depth in Chapter Seven.

Environmental Politics of Federal Lands

One important question that an examination of environmental politics helps address is whether existing environmental laws and management approaches can adequately accommodate the new kinds of lands created by military-to-wildlife conversions. The Fish and Wildlife Service did not receive its "organic act" prescribing clear management direction, or consolidate its landbase as the National Wildlife Refuge System, until Congress passed the National Wildlife Refuge System Administration Act in 1966. Thirty years later, in 1996 President Clinton further defined the mission of this system to "preserve a national network of lands and waters for the conservation and management of fish, wildlife and plant resources of the United States for the benefit of future generations."[74] In 1997, Congress

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Michael Gochfeld and Charles W. Powers, (2003), "Shifting Priorities at the Department of Energy's Bomb Factories: Protecting Human and Ecological Health," *Environmental Management* 31(2): 157-167.

[74] Executive Order 12996, 25 March 1996.

affirmed this in law.[75] Secondary uses such as grazing, hunting, military overflights, and recreation on wildlife refuges have long presented challenges that disrupted the integrity of the system;[76] unlike these largely external pressures on many refuges, M2W refuges effectively come with an array of secondary uses physically and historically embedded in them.

Policy questions remain about how restrictions placed on refuges that come from military conversions may need to differ from policies elsewhere in the National Wildlife Refuge System or public lands more generally. For example, Fish and Wildlife Service officials charged with managing these new refuges for public use need to consider not just how the public may affect plant and wildlife populations – the agency's usual charge on refuges – but also how military hazards may jeopardize the public's safety or that of FWS personnel. This potentially recasts and inverts some of the basic objectives for the managers, and presses them to carefully consider how they balance levels of uncertainty and risk with goals of managing lands as a public good.[77]

There is also a question of "purity." Much as wilderness advocates fight against statutes that might undermine the high standards of the National Wilderness Preservation System, or national park defenders opposed legislation to create a looser "National Preserve"

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[75] PL 105-57, National Wildlife Refuge System Improvement Act of 1997, 9 October 1997. See Fischman, 2003.

[76] *National Wildlife Refuges: Continuing Problems with Incompatible Uses Call for Bold Action*, GAO/RCED-89-196 (Washington, D.C.: Government Accounting Office, 1989).

[77] See Harmon, Jay R., John A. Harrington, Jr. and Randall S. Cerveny, "Science, Policy, and Ethics: Balancing Scientific and Ethical Values in Environmental Science," *Annals of the Association of American Geographers* 88:2(1998): 277-286.

category within the National Park Service, so do some supporters of existing wildlife refuges fear that the inclusion of heavily impacted military lands could adversely affect the integrity and perception of the refuge system overall. If deer face chronic maladies from toxic chemicals or the possibility of stepping on live ordnance, does that jeopardize our conception of what these lands represent as safe havens?[78]

The shifting approaches to preservation of these public lands can also suggest a more sweeping land management question highlighted by military-to-wildlife conversions: whether we may now be entering an era notable for its emphasis on ecological restoration. Legal scholars and historians have mapped out several overlapping phases of federal land policy in the United States that, like other cultural projects, typically supported broader national objectives. These phases – acquisition, dispensation, retention, management, and preservation – overlap and falter at times, but provide useful structure for considering current land use trends.[79] In fact, proponents of the "New West" suggest that public land management is moving into a new phase, this time characterized by the decline of extractive industry and a turn toward recreation or restoration priorities.[80] While this shift is far from

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[78] Deer, waterfowl, and other wildlife are already subject to hunting on many refuges, so the prospect of resident species' violent death is not altogether new, but the specter of such unintentional violence raises new questions of risk and uncertainty for land managers and the public.

[79] e.g. Laitos, J.G., and T.A. Carr. 1999. "The Transformation on Public Lands," *Ecology Law Quarterly*: 26(2): 140-242.

[80] Wilkinson, C.F. *Crossing the Next Meridian: Land, Water, and the Future of the West* (Washington, D.C.: Island Press, 1992); Flores, 2001; Riebsame, William E. and Hannah Gosnell, eds., *Atlas of the New West: Portrait of a Changing Region* (NY: Norton and Co., 1997); Dombeck, Michael, Chris Wood and Jack Williams, *From Conquest to Conservation* (Washington, D.C.: Island Press, 2003).

pronounced in many cases, where logging, grazing, or mining operations continue apace – and like the earlier phases may be prone to slippage as new administrations influence policy – military-to-wildlife conversions may be seen as one of the land use changes that supports such a restoration-oriented vision.

Each of these stages and their accompanying laws reflected certain political and social processes at work in a changing nation. Historian Dan Flores' proposition that the 21st century may be characterized by a land management policy of restoration is illuminating, both for what it implies about previous actions necessitating such measures and for its bearing upon military-to-wildlife conversions.[81] In fact, these land use changes and reclassifications may fit with other growing trends of dam removal and road removal as signs of an increasing emphasis on restoration actions, economies, and environmental policies.[82] But such a move toward restoration can be overstated and my attention to the production of M2W conversions helps illuminate the underlying processes that generate some of these landscapes of restoration.

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[81] Flores, Dan, "The West that Was, and the West that Can Be," *High Country News* (18 August 1997); Flores, 2001.

[82] On dam removal see Graf, William L., "Dam Nation: A Geographic Census of American Dams and their Large-Scale Hydrologic Impacts," *Water Resources Research* 35, 4 (1999): 1305-1311; Doyle, M.W., E.H. Stanley, J.M. Harbor, and G.S. Grant, "Dam Removal in the U.S.: Emerging Needs for Science and Policy," Eos 84(2003): 29-33; on road removal see Havlick, David, "Removing Roads: The Redwood Experience," *Conservation in Practice* 3, 4 (2002): 28-34; Switalski, T.A., J.A. Bissonette, T.H. DeLuca, C.H. Luce, and M.A. Madej, "Benefits and Impacts of Road Removal," *Frontiers in Ecology and the Environment* 2:1(2004): 21-28. Broadly, see Cunningham, G. Storm, *The Restoration Economy* (San Francisco: Berrett-Koehler Publishers, 2002).

Science, Technology, Nature, and Society

In her (1992) examination of science and politics at the U.S. Environmental Protection Agency (EPA), Jasanoff poses a number of important questions on how science operates within and for a federal agency.[83] Though focused on a sibling federal agency, Jasanoff's inquiries contribute to understanding the operations of the DOD and FWS in the context of military-to-wildlife conversions. For example, Jasanoff explores how the EPA has balanced the need for scientific credibility with scrutiny of its research and risk assessment activities, asks how EPA's scientific findings support its policy recommendations, and illustrates how EPA has learned from its experiences relating science to political authority.[84] She also focuses on changing strategies of managing risk, and the intersections between political and policy analysis with social studies of science. What she finds is that science as it has been conducted at the EPA is a thoroughly politicized set of practices intricately linked to policy determinations.

Jasanoff's inquiries about science and policy at the EPA encourage a further question for my own studies of environmental politics: How are science and policy usefully or credibly linked in military conversions? Science is often used to legitimate policy, but if the public loses confidence in scientists' ability to function objectively or with transparency, then the credibility of both science and policy will erode. As I consider how legislative and administrative strategies are being employed to produce and promote conversions from

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[83] Jasanoff, Sheila, "Science, Politics, and the Renegotiation of Expertise at EPA," *Osiris* 2nd Series, vol. 7(1992): 194-217.

[84] Jasanoff, 1992: 196-197.

military uses to wildlife conservation, I document the work of science as an authoritative, integrated component of agency programs.

The renaming of land that accompanies military-to-wildlife conversions, changing the Jefferson Proving Grounds in Indiana to the Big Oaks National Wildlife Refuge, for example, calls for a deeper ontological inquiry as well. Are there particular characteristics that distinguish a military base from a national wildlife refuge? Are former military bases being transformed nominally or in fundamental ways? Bald eagles deemed the Rocky Mountain Arsenal a good enough "refuge" in 1986 to establish breeding sites and hunting grounds, even as land managers dictated a policy of catch-and-release for human anglers due to contamination concerns. In this respect, is it possible for scientists to establish the essential identities of a place and its qualities? For example, is this place fit to be considered a "refuge," and if so (or not), is this a determination made by ecologists, colonizing plant and animal species, regulatory policies, quantities of heavy metals in the fatty tissue of largemouth bass, or some other array of factors?

Working to understand these new geographies is important both for what this project can (or cannot) reveal about hazards and risk,[85] as well as for how it illustrates how problematic science can be – contributing to the creation of toxic residues, for example, as

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[85] Beck, Ulrich, "Risk Society and the Provident State," pp. 27-43, in Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996); Grove-White, Robin, "Environmental Knowledge and Public Policy Needs: On Humanizing the Research Agenda," pp. 269-286, in Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996); Kirsch, Scott. "Harold Knapp and the Geography of Normal Controversy: Radioiodine in the Historical Environment. *Osiris* Vol. 19, Second series (2004): 167-181.

well as providing the explanations for how these contaminants adversely affect us.[86] Castree's consideration of non-essentialist ontologies offers some useful ideas about how we may view lands such as the Rocky Mountain Arsenal that appear as both refuge and hazard.[87] Castree distinguishes between "materialist essentialist" views that rely upon and delineate fixed ontologies, and contrasts these with the more dynamic networks described by theorists such as Haraway, Latour, and Law.[88] In the absence of rigidly fixed ontologies, we may then more fully consider the multiple viewpoints and complex relations that contribute to our understanding of places such as the Rocky Mountain Arsenal.

Science, in this view, plays an important role, but one tempered by information from many other sources of knowledge as well. At many of the sites of DOD conversion, the relatively new sciences of restoration ecology and conservation biology hold prominent positions, the first for its role in cleaning up military hazards, the second for its documentation of biodiversity and subsequent bolstering of a conservation agenda. Both of

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[86] Yearley, Steven, "Nature's Advocates: Putting Science to Work in Environmental Organisations," pp. 172-190, in Alan Irwin and Brian Wynne, eds., *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996); Irwin, Alan and Brian Wynne, "Introduction," pp. 1-17, in Alan Irwin and Brian Wynne, eds., *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996); Kirsch, Scott. (2000), Peaceful nuclear explosions and the geography of scientific authority. *The Professional Geographer* 52(2):179-192. It is also through ecological science that we have learned to value these same lands as wildlife habitat or reserves of biodiversity.

[87] Castree, N., "A Post-Environmental Ethics?" *Ethics, Place and Environment* 6, 1(March 2003): 3-12.

[88] Castree, 2003. These latter represent non-essentialist views that can better accommodate entities such as cyborgs, genetically modified organisms, zoo elephants – or presumably converted military bases-turned-wildlife refuges – whose constituent parts are ontologically unstable.

these fields merit critical consideration in looking into the processes and implications of military conversions, as the premises upon which they are based can be problematic historically,[89] ethically,[90] and politically,[91] but both also carry real potential to increase safety and improve environmental conditions at severely degraded sites. As we examine science and how it articulates with conservation planning, we will also need to grapple with the fundamentally dualistic view of nature and society that undergirds it – what Margaret Fitzsimmons called one of the three "Great Schisms" or ontological ruptures in geography.[92]

Another approach to how science contributes to the production of M2W lands comes from questioning its work in creating military technologies and structuring management programs applied at these bases and refuges. How, that is, have technologies participated in the production of these landscapes? As Beck has pointed out, many of the hazards now incorporated into military lands came from certain forms of production integral to the growth of modern military-industrial societies.[93] Here, the millions of rounds of explosives still cluttering the surface of the Big Oaks NWR can be seen as a logical outcome from the kinds of activities, policies, and decisions that were implemented at the Jefferson Proving Ground during more than four decades of testing weapons. This landscape continues to be produced (and reproduced) scientifically, as biologists have come to study and describe the grassland

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[89] Pollan, Michael, *Second Nature: A Gardener's Education* (NY: Atlantic Monthly Press, 1991); Flores, 2001.

[90] Whatmore, Sarah, *Hybrid Geographies: Natures, Cultures, Spaces* (London: Sage Publications, 2002).

[91] Takacs, David, *The Idea of Biodiversity* (Baltimore, MD: Johns Hopkins Press, 1996); Hollander, Gail M. (1995), "Agroenvironmental Conflict and World Food System Theory: Sugarcane in the Everglades Agricultural Area," *Journal of Rural Studies* 11:3: 309-318.

[92] Fitzsimmons, Margaret, "The Matter of Nature," *Antipode* 21:2(1989): 106-120.

[93] Beck, 1996.

and savanna forest communities resulting from frequent fires and explosives testing. The biodiversity of these sites has itself become valued, leading to current efforts to maintain fire as a "natural" disturbance at the Big Oaks refuge through prescribed burns.

A number of geographers and other scholars have already worked to consider the ramifications of a dualistic view of nature and society, or what is often cast as a conflict between realist views of a world that actually exists "out there" versus those of social constructivists who emphasize the role of humans in constructing nature.[94] I seek to build upon this debate in a way that fosters both an attentiveness to the reality of environmental problems and attends to the way we construct and/or respond to them.

Demeritt points to some constructivist accounts' weak link to policy and works to find new, more effective approaches.[95] Noting that sociology of scientific knowledge (SSK) constructivists tend to focus more on "telling the stories of how science works" than in working to influence scientific practices, Demeritt tries to redirect the attention of science studies and social constructivists to some of the practices of science/scientists and their impacts. Following Latour (1993), he suggests an approach of "articulation" that considers nature and society as "feats and co-constructions" that should never have been rendered into a dualistic relationship.[96] With this, Demeritt relates to Latour's assertions that nature and society have always been mixed and intertwined.[97] This amodern perspective works to expand conceptions of the social to include "other earthlings, humans, non-humans and even

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[94] See, for example, Demeritt, David, "Social Theory and the Reconstruction of Science and Geography," *Transactions of the Institute of British Geographers* 21(1996): 484-503; Takacs, 1996; Proctor, 1998.

[95] Demeritt, 1996.

[96] Demeritt, 1996: 498.

[97] See Latour, 1993.

machines and other non-organic actors,"[98] perhaps suggesting a non-anthropocentric environmental ethics, but effectively folds the realm of nature (as it has been traditionally conceived) *into* the social.

Although Demeritt's notion of articulation grants nature and society roughly equal ontological standing as "co-constructions," this maneuver holds little promise for assuaging environmentalists' continued distrust of constructivist projects. For activists or scholars who hold nature as a realm worth protecting *from* an array of human activities, recasting nature into "social nature" still comes as a reductionistic move that effectively demotes nature conceptually, practically, and syntactically. According to Crist, constructivist perspectives also presuppose an anthropocentric worldview "that grants human cognitive sovereignty over everything."[99] While this critique grants environmentalists' resistance to constructivism more depth, it fails to bring us much closer to resolving the Cartesian nature-society dualism. Whiteside presents a view of French ecologism as "noncentered," suggesting that efforts to protect nature in France manage to avoid the protracted debates over nonanthropocentric and anthropocentric environmental ethics – or more broadly, the nature-society dualism – and instead conceive of such projects as an interweaving of human design and biophysical processes.[100]

What much of the nature-society debates focus upon is to find a way forward that commits neither an ontic nor an epistemic fallacy – they seek to avoid both the

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[98] Demeritt 1996: 498.

[99] Crist, Eileen, "Against the Social Construction of Nature and Wilderness," *Environmental Ethics* 26 (Spring 2004): 9.

[100] Whiteside, Kerry H., *Divided Natures: French Contributions to Political Ecology* (Cambridge, MA: MIT Press, 2002).

oversimplified realist view that reality exists and we can fully know it (through scientific research, remote sensing, or other means), and the excessively constructivist perspective that reduces reality *only* to our knowledge of it.[101] Eden addresses this challenge explicitly in her treatment of how wilderness has been critiqued and defended,[102] and how scientists have responded defensively to some of the work in SSK:

> Both concerns arise from presuming that epistemology must lead to ontology, when this is not necessarily so: if we analyse how we understand or relate to natural things such as trees, animals or floods…, this does not mean that those things do not exist or matter. It does mean that we can only ever know them through (imperfect and changing) cultural and social ways, although we tend to forget this because of the ease of denominating them as 'natural'. Exploding the rubric of 'nature' thus allows us to examine its power to move us to use, value or protect it but does not negate the noncultural.[103]

In this way, Eden seeks to chart a course – akin to my own – that recognizes that our views of the environment are culturally received, mediated, and interpreted, but that this "construction" of nature need not undermine efforts to protect the environment.[104]

Part of what is required in this effort is to liberate nature from its associations with stasis and theoretical conservativism. Castree has called for just such a move, critiquing the dual assumptions held by many critical geographers that "ideas of nature are typically about fixity and permanence…[and] that these ideas are, in political and moral terms, typically

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[101] e.g. Proctor 1998: 367.

[102] e.g. Cronon, W., "The Trouble with Wilderness; Or, Getting Back to the Wrong Nature," In: *Uncommon Ground: Toward Reinventing Nature,* William Cronon, ed. (New York: W.W. Norton, 1995); Foreman, Dave, "All Kinds of Wilderness Foes," *Wild Earth* 6(1996): 1-4.

[103] Eden, Sally, "Environmental Issues: Nature Versus the Environment?" *Progress in Human Geography* 25, 1(2001): 82-83.

[104] Eden 2001: 83.

conservative."[105] Much as Cronon and other critics of "wilderness" portray this constellation of ideas and places as something oppressively fixed in its cultural meaning and effect, so has "nature" and a wide array of environmentalist projects been oddly essentialized by constructivist critics.[106] In this respect, the "postmodern deconstructionists" who have invoked environmentalists' wrath may not be postmodern *enough*. The point here should not be to vilify or recategorize either the constructivists or the realists, but rather to continue to question the assumptions that go with these positions and work to make them more accurate and productive as agents of change.

In the next chapter I extend from these theoretical considerations to the converging genealogies of the two principal land categories implicated in military-to-wildlife conversions: lands managed by the U.S. Department of Defense and those included in the U.S. Fish and Wildlife Service's National Wildlife Refuge System.

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[105] Castree, Noel, "Nature is Dead! Long Live Nature!" *Environment and Planning A* 36, 4(2004): 192.

[106] Castree, 2004 on pp. 193-194 makes a similar point on essentialism, citing Fuss. See also, Havlick, D., 2006, "Reconsidering Wilderness: Prospective Ethics for Nature, Technology, and Society," *Ethics, Place and Environment* 9(1): 47-62.

CHAPTER THREE

HISTORICAL GEOGRAPHIES OF DOD AND FWS LANDS IN THE U.S.

When President Ulysses S. Grant signed into law the 1872 bill for the designation of a Yellowstone National Park, he initiated what would become one of the most lasting environmental characteristics of the United States: the demarcation of a vast public domain kept in ownership by the federal government.[107] U.S. federal lands today cover an expanse that, if consolidated into a single territory, would rank as the tenth largest country in the world.

These lands are managed by a number of agencies, each with its particular mandates for priority uses, from the generally conservative charge of the National Park Service—steward of Yellowstone and other treasured sites such as the Grand Canyon, Great Smoky Mountains, and Yosemite—to the U.S. Forest Service's more utilitarian pledge to provide a sustainable supply of timber and water resources to the nation. Despite their many contrasts, the 92 million acres of the National Wildlife Refuge System and approximately 25 million acres controlled by the U.S Department of Defense contain a number of important convergences, some of which have been promoted and highlighted with increasing persistence in the past two decades.

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[107] Zaslowsky, Dyan and T.H. Watkins, *These American Lands: Parks, Wilderness, and the Public Lands* (Washington, D.C.: The Wilderness Society and Island Press, 1994), p. xi.

In this chapter, I explore the disparate yet increasingly intertwined geographies of military bases and national wildlife refuges in the U.S., as they have evolved from scattered patches of federal land to more broadly unified systems managed for certain purposes. In particular, I attend to questions of how and why these lands were set aside for purposes of military production or wildlife protection, and how it is that these two causes have found expanding spaces of overlap and seeming compatibility.

For military lands, several key phases appeared during the past century: establishment, active base management, closure, and reclassification. I provide examples from the early twentieth century to highlight the first modern period of base expansions, and in Chapter Five will look at the Jefferson Proving Ground in Indiana as one of the more recent base closures. In each of these, we can glimpse some of the inherent challenges of these processes, and how recent military reclassifications permit a turn toward environmental conservation and inclusion in the National Wildlife Refuge System.

For this second subject, the creation of the National Wildlife Refuge System, I focus upon the historical contexts for why such designations were deemed necessary and desirable, where and how such refuges could be made, and how scattered patches of refuges have increasingly been stitched into a network for wildlife conservation and habitat protection. Probing beyond the explicit conservation focus of these lands, I also examine how refuge lands were actively made into something new and different out of their prior uses, and how the mixed histories of these places relate to the addition of new refuge lands from closing military bases.

As we increase our understanding of the historical and geographical contexts for both military and wildlife reservations, we can then more adequately assess the current

phenomenon of military-to-wildlife conversions. Working through these historical geographies provides useful foundations by which we can frame the contemporary processes at work and evaluate the on-going debates these M2W changes engender.

Establishing Military Bases in the United States

Military lands have been established by different means in a variety of social, political, and physical settings. Many former bases were abandoned or redeveloped long before the systematic closures and realignment that began formally in 1988, and the total acreage of military lands now managed by the Department of Defense is barely half what it was fifty years ago.[108] Acknowledging that the pattern of base acquisition and abandonment has been somewhat erratic, I highlight three main phases of creation and expansion in U.S. history. The first of these lasted through the first one and a half centuries of the nation, most prominently with the westward push by European Americans in the mid- to late-19th century. The second and third major expansions came in conjunction with the two world wars of the 20th century. The actual process of designating military lands has also changed over time, most notably by the passage in 1958 of the Engle Act, which transferred authority from the executive to legislative branch.

The Early Years

[108] According to Palka and Galgano, p. 377, at the end of WWII the DOD managed 46 million acres.

Early military bases were sited, predictably, with strategic concerns foremost, whether to defend against potential attacks by Britain, France and Spain, or in support of western incursions and positions against indigenous populations. For example, at the confluence of the Potomac and Anacostia Rivers in Washington, D.C., Fort McNair first opened in 1794 as part of the (unsuccessful) American effort to defend the capital against the British.[109] Fort McNair remains a small, active installation to this day, but most bases that were originally established near large East Coast cities have either been significantly downsized or have given way entirely to other uses and developments. Philadelphia's once-prominent quartermaster center, naval base, and shipyard have all been closed or converted to non-military uses.[110]

A number of forts developed at the western margins of the expanding nation, initially to combat American Indians or serve as centers of early commerce. Many of these sites are now of primarily historical interest and no longer provide an active military function. The Army's Office of Military History records more than 9,000 installations,[111] though a recent attempt to provide a comprehensive list of all active sites of the U.S. military and National Guard counted just 1113 worldwide.[112]

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[109] Sorenson, David S. *Shutting Down the Cold War: The Politics of Military Base Closure* (NY: St. Martin's Press, 1998), p. 14; Evinger, William R., ed., *Directory of U.S. Military Bases Worldwide* (Phoenix, AZ: Oryx Press, 1995), p. 51; *Army Times Guide*, pp. 142-143, points out that the British leveled the fort in 1814 and it was subsequently rebuilt.

[110] Evinger, pp. 176-177; *Army Times Guide*, p. 180.

[111] *Army Times Guide*, p. 7.

[112] Evinger, p. vii.

Of course, some early forts remain. Oklahoma's Fort Sill was built in 1869 in order to "pacify" the remaining Comanche and Kiowa people of the central plains.[113] Fort Leavenworth, in Kansas, was established in 1827 as a protective outpost for the Sante Fe and Oregon Trails westward.[114] Due to their ability to expand territorially and retain support politically, both these bases have persisted over the years.[115]

The means of acquisition for early forts varied. Some lands and buildings were inherited from the departing European nations who had built and occupied early fortifications.[116] Naval bases, then as now, were generally restricted for obvious reasons to the coastal periphery of the country, and particularly to sites that had protected, year-round, deep-water ports. Although many forts cropped up along the expanding western frontier as hastily-constructed stockades, some sites for early western forts, such as Leavenworth, Sill, and Riley, were carefully selected as permanent installations for reasons of commerce, strategic advantage, or geographic significance, respectively.[117]

Since land was plentiful in the eyes of the U.S. Government throughout most of the 19th Century, military reservations were most often made through executive fiat and carved

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[113] Evinger, p. 168.

[114] Evinger, p. 91; *Army Times Guide*, pp. 122-126.

[115] Fort Sill now hosts more than 15,000 field artillery officers and students each year on 94,000 acres, while Leavenworth maintains an Army command college on 5,400 acres. See Sorenson, p. 14; Evinger, p. 91.

[116] Examples here include New York City's Fort Wadsworth, vacated by the British in 1783, and the San Francisco Presidio, which was originally built by the Spanish in 1776 and passed from Mexican to U.S. control in 1846. *Army Times Guide*, p. 251 (Ft. Wadsworth) and p. 188 (Presidio).

[117] Fort Riley, in Kansas, was first named "Camp Center" as planners thought it was located in the geographic center of the United States. *Army Times Guide*, p. 203.

out of the existing federal domain (so-called Reserved Lands). This process often rested upon a prior acquisition of the lands by force and/or treaty from indigenous Americans, England, Spain, France, Russia, or Mexico. In an era characterized more generally by a federal policy of land acquisition and disposal – as the United States added to its territorial boundaries, but within these expanding borders steadily dispensed lands to states, individuals, and corporate interests – military lands proved to have staying power so long as national security interests could somehow be tied to the base in question. As we will see in the next section, the tendency of the U.S. to maintain, expand, or contract military holdings often matched national perceptions of domestic and international security.

World War I Expansions

One decade into the twentieth century, the U.S. Army still maintained forty-nine posts activated during the national push westward.[118] Following America's engagement in World War I in 1917, the government quickly opened thirty-two new Army and National Guard bases, including a number of major facilities that remain active today.[119] Acquired primarily through purchases by the federal War Department (the Department of Defense's predecessor),[120] these new bases represented the first cohort of military lands designated and developed with a long-term strategic vision for a modern military.

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[118] Palka and Galgano, pp. 376-377.

[119] These include Forts Lewis, Benning, Knox, and Bragg. Palka and Galgano, pp. 376-377.

[120] Childs, John, *The Military Use of Land: A History of the Defence Estate* (Bern, Switzerland: Peter Lang, 1998), p. 229.

With the advent of World War I, the federal government for the first time found itself with a need for dramatic expansions in military facilities in a land that lacked a frontier. Lands purchased for these twentieth-century bases therefore faced new constraints and typically needed to meet a number of sociopolitical and geographic characteristics. It was no longer as politically or strategically tenable for the War Department to simply stake its claim to land by force and set up a garrison. With a broader shift in federal land policy from disposal to retention and management already well underway – evidenced by the establishment of Yellowstone and thirteen more national parks by 1916, as well as the increasingly stolid bureaucracy of the Forest Service – hundreds of millions of acres of public domain were also less available for military appropriation than they had been in previous decades.[121]

War Department planners came up with a short list of criteria to direct their search for new base locations.[122] The lands in question should possess low agricultural, commercial, or cultural value. Current federal ownership was desirable and the fewer existing residential or industrial occupants, the better. Bases needed to be accessible by road, rail, and/or sea. Modern bases needed acreage enough to permit large troop exercises, including artillery practice for increasingly long-range weaponry. Bases should also be remote enough to maximize military security. In the effort to create essentially self-contained reservations, these sites also needed water and other natural resources to provision bases and facilitate infrastructural developments.

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[121] See for example, Flores, 1997; Dombeck et al., 2003.

[122] The following list is culled from several sources: Childs, p. 230; Nye, pp. 76-77; and *History of Camp Lejeune: The East Coast Training Center of the United States Marine Corps* (Wilmington, NC: Wilmington Printing Co., June 1950), p. 12.

World War II Expansions

With the next wartime expansion, U.S. military planners again faced a set of siting priorities similar to those they had tendered in 1917, but the changing technology of weaponry increased the scale of bases needed by an order of magnitude.[123] Most of today's largest Army sites were created in the period from 1942-1945 as missile and other programs required extensive ranges for testing. Just one week after its acquisition (in part from the privately-owned San Augustin Ranch), White Sands Missile Range (née Proving Ground) was the site of the world's first atomic bomb test at the Trinity Site on the 16 July 1945.[124] At 3.2 million acres, White Sands and a contiguous tract of Fort Bliss remain the largest military installation in the country.[125]

The increasing importance of the Army's air forces by the 1940s – a shift that would lead to the creation of the Air Force as a new branch of the military in 1947 – also added significantly to the number and acreage of military installations. Air base additions also changed the geography of military locations as they no longer needed to meet the same terms of land- or water-based accessibility. Sites in the remote interior of the western U.S. and throughout Alaska proved the most consistently desirable and available. Land for major air bases in most western states was purchased during this era from private ownership or

[123] Lanier-Graham, p. 88, describes a twenty-fold increase in base areas.

[124] *Army Times Guide*, p. 262; Evinger, p. 146.

[125] Palka and Galgano, p. 363.

appropriated from the public domain by executive decree.[126] By 1945, military land holdings crested at 55.2 million acres, including more than 34 million acres in the territory of Alaska.[127] By the mid-1980s, more than 70 percent of Department of Defense lands, by acreage, could be found in ten western states.[128]

One other class of military installations also became more prominent during the World War II expansion, as chemical and biological weapons facilities started in 1941 at the 38,000-acre Redstone Arsenal in Alabama;[129] and in 1942 at the 841,000-acre Dugway Proving Ground in Utah,[130] and the 17,000-acre Rocky Mountain Arsenal just north of Denver.[131] As we will see in Chapter Four with the case of the Rocky Mountain Arsenal, during this period the federal government also applied its power of eminent domain to gain title to lands converting to military use. This brings us to the question of how federal authority has been applied to designate new military sites from the existing landbase.

Designating Authority and the Engle Act of 1958

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[126] Bases included Lowry, in Colorado (1937); Kirtland, in New Mexico (1939); Elmendorf, in Alaska (1940); Nellis, in Nevada (1941); Vandenberg, in California (1941); and Malmstrom, in Montana (1942); among many others.

[127] Childs, p. 229.

[128] Palka and Galgano, p. 377. The states included AK, AZ, CA, CO, NV, NM, OR, UT, WA, and WY.

[129] Evinger, p. 6; *Army Times Guide*, pp. 197-198.

[130] Evinger, p. 202; *Army Times Guide*, pp. 66-68.

[131] Evinger, p. 44; *Army Times Guide*, p. 212.

During the past century and a half, public land management has trended toward increasing Congressional direction and legislative control.[132] For example, the Executive's ability to set aside national forest reserves was halted in 1907 after President Theodore Roosevelt was widely viewed by Congress as having exceeded its intentions.[133] In recent decades, Congressional actions have further limited the relatively free license historically granted to land management agencies. This has perhaps been particularly clear with the U.S. Forest Service, as laws such as the Wilderness Act of 1964 and National Forest Management Act of 1976 applied increasingly specific constraints on agency decision-making.[134] Other laws including the National Environmental Policy Act of 1969; Endangered Species Act of 1973; Resource Conservation and Recovery Act of 1976 (RCRA); and Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); have similarly included prescriptive components that had typically been kept more loosely under Executive or agency control. As I address later in this chapter, many of these laws now play a role in governing how military sites must be managed as they close and convert to new uses.

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[132] See, for example, Wilkinson, Charles F. and H. Michael Anderson, *Land and Resource Planning in the National Forests* (Washington, D.C.: Island Press, 1987).

[133] Wilkinson, Charles F., *Crossing the Next Meridian: Land, Water, and the Future of the West* (Washington, D.C.: Island Press, 1992), pp. 126-127; Zaslowsky and Watkins, pp. 74-75.

[134] See Wilkinson and Anderson, pp. 3-4, 45, and passim for treatment of this increasingly specific Congressional role; see Steen, Harold K., *The U.S. Forest Service: A History* (Seattle, WA: University of Washington Press, 1976, 3rd Printing 1991), p. 313 for a description of Congressional intervention on behalf of wilderness. Other laws generally viewed as adding legislative constraints on the Forest Service include the Resources Planning Act of 1974 and Tongass Timber Reform Act of 1990.

Military land acquisitions generally fit within this historical trend toward Congressional oversight. In 1958, in response to a view that the Department of Defense had become "awful land hogs,"[135] Congress passed the Engle Act to limit the authority of the President and Secretary of the Interior from withdrawing lands for military purposes.[136] Prior to that time, Defense officials simply had to submit a request to the Department of the Interior for more land. During Congressional hearings for the Engle Act, military planners acknowledged that they could not recall ever having a land request turned down.[137]

As a consequence of this Act, and somewhat similar to the process for designating national forests or national parks, all military reservations larger than 5,000 acres can only be created by act of Congress. This provision has become increasingly significant in recent years, as military operations rely upon mobile units and ever-longer-range weapons.[138] With these new strategies and technologies, pressures persist for larger training areas, even as base closures grow more common. Because of the Engle Act, as well as increased public and scientific appreciation of remote desert lands, it is significantly more difficult than it was in either of the twentieth-century periods of expansion to establish large military bases from the

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[135] The words are Congressman Clair Engle's, as quoted in Loomis, David, *Combat Zoning: Military Land-Use Planning in Nevada* (Reno, NV: University of Nevada Press, 1993), p. 33.

[136] 72 Stat. 27; 43 U.S. Code 155-158.

[137] Loomis, p. 34.

[138] See Instruction Memorandum No. 2001-030, "Military Activities On and Over the Public Lands" (Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management, 8 November 2000), pp. 1-3, for an overview of new military pressures on public lands and the implications of the Engle Act.

existing public domain.[139] Although claims of national security still manage to trump all comers in most instances, U.S. military officials in recent years have also increasingly mobilized rhetorics of environmental protection to add to their justifications for space both domestically and abroad.

Military Lands as Conservation Lands

Department of Defense lands currently provide a wide range of uses for the planet's most heavily-equipped, richly-funded military. Approximately half of these lands, about 12.5 million acres, are managed by the U.S. Army; nine million acres are in the hands of the Air Force; and the remaining 3.5 million acres are managed by the Navy, including bases for the Marine Corps.[140] Training bases such as North Carolina's Camp Lejeune and Fort Bragg house tens of thousands of Marines and Army personnel respectively, but the million-acre expanses of the Yuma Proving Grounds or White Sands Missile Base have relatively small residential populations and visitors are practically excluded. As I described in Chapter One, while military bases have been used to prepare troops for war and for the testing of

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[139] This is evident in the controversy over the Army's plan to substantially expand Ft. Carson's training area in southeastern Colorado; see De Yoanna, "Targeting Paradise: Fort Carson Expansion Could Swallow History, Wildlife and a Way of Life," *Colorado Springs Independent*, 10-16 August 2006, pp. 14-17; Louden, Tamara, "Army Expansion Plans Have Ranchers on Edge," *The Denver Post*, 13 September 2006, p. 1-E.

[140] Leslie, Michele, Gary K. Meffe and Jeffrey L. Hardesty, *Conserving Biodiversity on Military Lands: A Handbook for Natural Resource Managers* (Washington, D.C.: The Department of Defense Biodiversity Initiative, U.S. Department of Defense, and The Nature Conservancy, 1996), section 1.2, p. 6, viewed online at https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation/Biodiv.… [30 March 2003].

munitions, federal management of large tracts of land in a strictly-regulated manner has, at the same time, led to the production of high ecological values for many areas.

Active Base Management

Military activities and materiel are often designed specifically to *destroy* opposing human and environmental subjects. This contributes to a tension inherent to the environmental management of military lands. The direct management intentions for these spaces, as well their material and philosophical by-products, are often antithetical to environmental protection. More than 17,000 contaminated sites at U.S. military installations bear witness to the fact that environmental degradation has been chronic and systemic in these places for decades.[141]

At the same time, some areas within many military reservations have also been spared from the common ecological hazards of logging, intensive agriculture, mining, road-building, or residential development. With these traditional sources of habitat fragmentation largely excluded, certain military lands have remained – or returned to – a physical condition unusual for its integrity. In a number of cases habitat remained largely intact even as it was being heavily contaminated by toxic chemicals or pounded by artillery. Often this occurs with a particular pattern, as the most intensive or dangerous uses take place in the core area of large bases, leaving the periphery relatively unscathed.

Contamination on military sites comes from an array of actions and materials ranging from the spectacular to the mundane. At the Naval Air Engineering Center near Lakehurst,

[141] Shulman, p. 14.

New Jersey, for example, investigators determined that Navy personnel dumped approximately three million gallons of fuel, solvents, hydraulic fluid, and other chemicals directly into the ground, despite the Center's location atop New Jersey's primary water supply, the shallow Cohansey aquifer.[142]

As citizens in the U.S. became increasingly informed of environmental hazards more generally during the 1960s, the condition of the environment on military lands began to receive some amount of interest. The suite of environmental laws that passed in the latter half of the twentieth century also subjected DOD lands to regulations that simply did not exist prior to the 1960s. Among these, the National Environmental Policy Act (NEPA) requires that significant federal actions include environmental analyses or impact statements, and opens subsequent decisions to a process of public participation. In order to fend off extinctions, the Endangered Species Act (ESA) prohibits takings – meaning direct mortality or less-directly, habitat destruction – of species that are severely imperiled. The Resource Conservation and Recovery Act (RCRA) prescribes management protocols for hazardous materials and solid waste cleanups; CERCLA clarifies the chain of financial liability for hazardously polluted sites and created the Superfund to pay for remediation costs at dozens of the nation's most contaminated locations. These and other laws now apply in most instances on military and other federal lands (the ESA also applies on private lands).

Even before Congress passed these wide-reaching pieces of legislation beginning in 1969, it had acted to promote environmental stewardship on military lands. The Sikes Act of 1960 required every installation managed by the DOD to create a plan that provided for the conservation of fish and wildlife, their habitats, and where necessary, rehabilitation

[142] Shulman, p. 66. See Shulman, pp. 172-173 for a map of major contaminated military sites across the U.S.

measures.[143] In many ways foreshadowing public lands legislation and executive orders that would come in the following decades, the Sikes Act also stipulated that threatened and endangered wildlife and plants be afforded protections, and that activities such as off-road vehicle use should be strictly controlled.[144]

Depending upon the location, there is both a rather proud tradition of environmental management on military bases and an astounding degree of environmental abuse. The military has, in fact, invested substantially in programs that protect certain environmental components of its training sites. When compared to the entire DOD budget, however, millions of dollars represent just a fraction of a percent.[145] Of some five million personnel and an annual budget that consumes approximately a fourth of all federal spending, the DOD dedicates 5,000 employees to work on environmental issues.[146]

Beginning in 1997, following amendments to the Sikes Act, Congress required the Department of Defense to prepare and implement detailed natural resource management plans for each of its U.S. installations.[147] The intent of these plans is to protect, improve, and restore natural resources on military bases, and they must be updated every five years, or sooner as dictated by significant changes in resources or mission requirements.[148] The first

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[143] Defense Environmental Quality Program Annual Report to Congress, FY 2001 (Washington, D.C.: U.S. General Printing Office), p. 107.

[144] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 107.

[145] See Shulman, p. 121.

[146] Shulman, pp. 120-121.

[147] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 107.

[148] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 108. The natural resource plans are akin to management plans required of every national forest.

round of Integrated Natural Resource Management Plans was due for completion by November 2001 and by that date the Defense Department reported that 90 percent of its 425 major installations had completed their documents;[149] by fiscal 2005, the DOD had completed revised resource management plans at 93 percent of its installations.[150]

The Department of Defense also must prepare cultural resource management plans for every installation with "significant cultural resources." These cultural plans are updated annually and often link to the natural resource plans for their respective bases.[151] In tandem, these documents represent a significant component of the Legacy Resource Management Program created by Congress in 1990 to balance military activities with a desire to protect natural and cultural resources on active sites.[152]

The U.S. Army applies $35 million annually to its Integrated Training Area Management program, which includes among its goals the controlling of "undesirable" environmental impacts caused by training and testing activities, as well as maintaining military operations at a level that does not exceed the carrying capacity of the land.[153] A two-fold motive for this approach is clearly articulated in a 1996 document drafted jointly by the

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[149] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 109.

[150] Defense Environmental Programs, Fiscal Year 2005, Annual Report to Congress, p. 8. Viewed online at https://www.denix.osd.mil/denix/Public/News/OSD/DEP2005/dep-body.pdf [15 September 2006].

[151] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 112. As of the DOD's FY 2005 report, only 68 percent of the integrated cultural management plans had been completed; see Defense Environmental Programs, FY 2005, p. 10.

[152] Defense Environmental Quality Program Annual Report to Congress, FY 2001, p. 113.

[153] Army Regulation 350-4, Integrated Training Area Management (ITAM) (Washington, D.C.: Department of the Army, 8 May 1998), p. 1; Palka and Galgano, p. 374. Of course, whether or not the concept of carrying capacity is outdated may be open for debate by ecologists, as may its definitions.

Department of Defense and The Nature Conservancy. Noting that "military lands include expanses of undeveloped coastline, native prairie, forests, and the great American deserts of the Southwest,"*Conserving Biodiversity on Military Lands* highlights that:

> Stewardship is not just a matter of altruism. As we all face the pressures of increasing demands and fewer resources to meet them, stewardship of the environment becomes a very practical issue. The lands available for military training and operations are limited. As our weaponry and tactics improve, we are challenged to meet new training and operations requirements with a declining land resource base. *We must protect the condition of our ranges, so we can meet training needs in the future. We also must demonstrate that we are responsible stewards to continue to warrant the trust and support of the American people*, who authorize our continued use of public lands.[154] (emphasis added)

Military planners' acknowledgement that there is no longer an endless supply of lands may reveal the effects of the Engle Act, Wilderness Act, Federal Lands Policy Management Act, and other laws that now constrain military land appropriations. The frank admission that despite their restricted qualities military lands remain very much a part of the public domain, in turn, reflects not only the impacts of NEPA, but the perspective of a military establishment that has seen its lands turned over to other public and private uses in increasing measures in the past three decades. It remains to be seen whether the military will find the ability to apply the nation's environmental regulations vigorously to itself, or if external pressure and enforcement will be sufficient to force policies that lead to meaningful change.

Base Realignment and Closure

[154] Leslie et al., p. 1.

As I noted earlier in this chapter, during the past century domestic military holdings increased abruptly during two major periods of conflict (1917-1919 and 1942-1945), then shifted or diminished thereafter.[155] Even during significant commitments to war in Southeast Asia and prior to the collapse of the Soviet Union and the end of the Cold War, DOD leaders and members of Congress recognized a need to close or "realign" defense holdings to streamline spending and respond more efficiently to modern military technologies, strategic alliances, and shifts in geopolitics.[156] By the late 1970s, Defense Secretary Harold Brown estimated that unneeded military bases were costing his department $1 billion annually to maintain.[157]

What started as a streamlining effort within the military in response to advances in technology and quick-strike capabilities, soon increased in scope as the end of the Cold War further altered geopolitical and strategic military considerations. Base closures proved problematic politically, however, as elected officials were loathe to see economic losses from closures in their districts attributed to votes they personally had cast.[158] Indeed, for most of the 1970s and 1980s the call to close military bases was doomed to failure. In response, Representative Richard Armey (R-TX) devised what amounted to a protective shield for

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[155] A number of dormant World War Two-era bases were reactivated during the Korean War and carried into the Cold War period.

[156] BRAC Cleanup Plan Abstract Analysis FY 99 (Washington, D.C.: U.S. Department of Defense, 2000).

[157] Sorenson, David S., *Shutting Down the Cold War: The Politics of Military Base Closure* (NY: St. Martin's Press, 1998), p. 27.

[158] See Sorenson, 1998; and Goren, 2003, for thorough treatments of how this has played out in Congress; it is also worth noting that Woodward, Rachel, 2004, pp. 43-50, as well as GAO reports and the DOD's own analysis casts into question the common assumption that military bases contribute positively to local economies.

Congress that displaced conversion decisions onto a non-legislative panel known as the Base Realignment and Closure Commission, or BRAC.

Base Realignment and Closure Commission: The BRAC Process

The first of five BRACs convened in 1988, with successive commissions in 1991, 1993, 1995, and 2005. Though not fully immune to political persuasion, the BRAC essentially created a layer of insulation that freed base closures from what had been more than a decade-long Congressional stalemate. Largely as a result of the systematic approach and political buffering of the BRAC process, since 1988 the DOD has closed or reclassified more than 400 military bases, including approximately 130 major installations.[159]

The first commission served in an *ad hoc* capacity, forming and disbanding rapidly on either side of its work. This made it relatively unaccountable to the public its decisions impacted. Later iterations of the commission stabilized its composition and accommodated public input. This in some ways made the BRAC a more overtly political body after 1988, but recommendations from the commission still had to be approved or rejected wholesale by both Congress and the President – a requirement that effectively freed individuals to vote for a broader public good without (as much of) the usual dedication to parochial interests.[160]

Although base closures come as a clear expression of military design and decision-making, the environmental condition of military lands has at times played an important role

[159] Department of Defense Base Structure Report Fiscal Year 2003 Baseline (Washington, D.C.: U.S. Department of Defense, 2002). The 2005 BRAC authorized the closure of 22 additional major bases. A "major installation" contains at least 10 acres or $1.5 billion in assets.

[160] Goren, 2003. Once submitted to Congress and the President, the BRAC slate has always been approved.

in closure decisions, both procedurally and materially. When Congress passed legislation in 1976 and 1982 that made base closures more difficult, it did so under a guise of concern for full environmental accountability.[161] Despite a view highlighted by the Defense Department and others that military lands included important ecological reserves, some members of Congress sought to emphasize the dangerous, contaminated character of these lands. In effect, they claimed that military bases were simply impacted beyond remediation and too dangerous to convert to other more public uses.[162] One result of such arguments was the passage of the O'Neill-Cohen Act in 1976, which stipulated that before closure, bases would first be subject to a full environmental analysis as directed by the National Environmental Policy Act (NEPA).

While NEPA has proven itself a vital means by which the public can have a voice in federal actions, it can also be used simply to bog down the implementation of proposed projects.[163] In the context of base closures, NEPA quickly began to serve precisely this role. As the Secretary of Defense at the time testified to Congress:

> NEPA is a mechanism that has been used by opponents of realignment or closure to gain lengthy delays in the closure process. For the Department to comply with NEPA, it must announce its intention to study the possible realignment or closure of a base, as well as similar alternatives, conduct public hearings in the local communities and perform environmental assessments and public impact analyses. These analyses by their very nature take an extraordinary amount of time and this offers the opportunity to join forces and

[161] Goren, p. 46; Sorenson, p. 31.

[162] While not at all a frivolous claim, such arguments often came from representatives of districts where closures were imminent. See Sorenson, pp. 30-31.

[163] This "legal trainwreck" approach remains one of NEPA's most potent attributes for environmental activists.

> bring enormous political pressure, quite frankly, on the Congress and on the Department for the purpose of stopping a base realignment or closure.[164]

In order for base closures to become practicable for the 1988 BRAC, Congress shuffled the NEPA process so that it came only *after* base closures were approved.[165] Environmental impact was one of nine criteria used to evaluate closures during the 1988 BRAC, but the necessary subversion of a formal environmental (NEPA) review until after sites had been committed to the closure list helped ensure that highly contaminated military sites would indeed become subject to conversion. In part as a response to this fact, later BRAC legislation included a requirement for an Environmental Restoration Program designed to identify key sites for preservation or restoration.[166] (This latter came nearly concurrently with a process of closure and remediation on Department of Energy lands that had been integral to nuclear production throughout the Cold War.[167]) By some estimates, the

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[164] Defense Secretary Frank Carlucci quoted in Goren, p. 47, from Congress, House, Subcommittee on Military Installations and Facilities, *Hearing on H.R. 1583 to Establish the Bipartisan Commission on the Consolidation of Military Bases*, 100th Congress, 2nd Session, March 17, 18, 19, and June 8, 1988, p. 96.

[165] Goren, pp. 51-52, considers this standard NEPA requirement the "most problematic" feature of any Defense Department procedure leading to base closure.

[166] Department of the Army, Pamphlet 200-1, Environmental Protection and Enhancement (Washington, D.C.: Department of the Army, 17 January 2002), p. 48.

[167] See, for example, Department of Energy, FM-0002, *Stewards of a National Resource* (1994); Burger, Joanna, "Integrating Environmental Restoration and Ecological Restoration: Long-Term Stewardship at the Department of Energy," *Environmental Management* 26(5): 469-578 (2000); Burger, Joanna, Thomas M. Leschine, Michael Greenberg, James R. Karr, Michael Gochfeld and Charles W. Powers, "Shifting Priorities at the Department of Energy's Bomb Factories: Protecting Human and Ecological Health," *Environmental Management* 31(2): 157-167 (2003).

conversion of military lands will require the largest environmental remediation project ever undertaken by the U.S. government.[168]

Unfortunately, dating back to the 1980s the Department of Defense has struggled to demonstrate an active commitment to clean-up efforts at its thousands of contaminated sites. Ten years into the DOD's first major remediation program, for instance, the Deputy Assistant Secretary of Defense for the Environment acknowledged that only seven "truly remedial actions" had been finished from a total of more than 4,500 sites.[169] Although some suggest that a leave-it-alone approach to environmental recovery of contaminated areas is actually desirable,[170] such inaction only saves money in the short-term and neither ensures that public lands remain in any real sense public – if, for instance, radiation or unexploded ordnance hazards remain – nor provides wildlife and plant communities any genuine form of refuge.

A converse environmental casting has also been evident in recent years as groups and individuals rally around military conversions *for* conservation purposes. As I develop later in this chapter when I turn to logics of conversion, this process usually begins only after bases have been identified for closure. Environmental groups and boosters of local communities then highlight the environmental amenities of military sites. As I noted earlier, Williams' study found that environmental activism, community cohesion, and public participation were closely associated with greater habitat protection (i.e. conversion to a national wildlife

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[168] Loeb, Vernon, "Old Bombs Pose Risks," *Raleigh News and Observer* (Washington Post), 25 November 2002.

[169] Shulman, pp. 13-15.

[170] Nelson, Robert H., "From Waste to Wilderness: Maintaining Biodiversity on Nuclear-Bomb-Building Sites," (Washington, D.C.: Competitive Enterprise Institute, April 2001).

refuge).[171] This is consistent with the NEPA analysis of the Jefferson Proving Ground's closure, where the record of public comments reveals local support for reclassifying the site as a national wildlife refuge.[172]

Unlike military lands, national wildlife refuges are managed with a different set of principal values and an express primary purpose of conserving wildlife and plants; in the next section, I examine how early refuges emerged, what types of prior uses came with these new designations, and how Congress, the Fish and Wildlife Service, and others have worked over time to bring together a disparate network of refuges into a system dedicated to conservation.

National Wildlife Refuges

When President Theodore Roosevelt created the first National Wildlife Refuge in 1903, he acted largely in response to citizen appeals against the devastation of bird populations along the Florida coast.[173] Prior to Roosevelt's executive order to establish the Pelican Island refuge in Florida, a local orange grower and part-time boat builder named Paul Kroegel for several years had rallied to protect the roseate spoonbills, egrets, ibises, and pelicans for which the island was known.[174] Kroegel enlisted the support of the Florida

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[171] Williams, 1999.

[172] JPG EIS, Appendix H, 1995.

[173] *Final Environmental Assessment and Land Protection Plan: Proposed Expansion of Pelican Island National Wildlife Refuge—Indian River and Brevard County, FL*. US Department of the Interior, Fish and Wildlife Service, Southeast Region, March 26, 1991, p. 3.

[174] *Fulfilling the Promise: The National Wildlife Refuge System*, (Department of Interior, U.S. Fish and Wildlife Service, National Wildlife Refuge System: Washington, D.C.), March 22, 1999, pp. x, 41, and 66.

Audubon Society and Ornithologists' Union, Inc., and in concert these non-governmental parties prevailed upon the President to make what would become a landmark stroke of his conservationist hand.

This initial entry for what more than a half-century later would become a National Wildlife Refuge System was fitting in many respects. First, created as it was by presidential order, Pelican Island like many later refuges was brought forth by executive action rather than Congressional statute or protracted deliberations between agencies.[175] Unlike most other federal land categories such as national parks and national forests, which since the early 1900s have been promulgated exclusively from legislative action, to this day wildlife refuges may be established by executive authority. More than six times as many national wildlife refuges have been established this way either by Presidential decree or administrative actions that trace directly back to the executive branch, rather than declared by act of Congress.[176]

This approach to designating national wildlife refuges has, from the outset, brought spontaneity and flexibility into the system at the expense of consistency and stability. In many respects, these different processes of creation have shaped the respective public land systems into their distinctive forms recognizable even today. When the first national parks were designated in the late 1800s, they came as stand-alone Congressional acts such as the 1860 statute that set Yosemite aside as a park for the State of California (this later returned to federal ownership with national park legislation in 1890), and the seminal 1872 law that

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[175] Afognak Island, which was declared a "forest and fish culture reservation" in 1892 by President Benjamin Harrison using his authority to create national forest reserves, is pointed to by some as the first federal move toward creating wildlife refuges since Harrison's act protected otters and sea lions, but this too was the result of executive action rather than statute; see Fischman, 2003, p. 34.

[176] Fischman 2003, p. 36.

created Yellowstone National Park. Though in many cases such designations were freighted with commercial aspirations and loaded with political self-interest, national parks from the outset have been renowned for and measured by standards of exceptional scenic quality, abundance of wildlife, and a subsequent marquee attraction for visitors from across the U.S. and beyond.[177]

In fact, a handful of early national parks – such as Sully's Hill in South Dakota – over time failed to meet such high standards and found themselves downgraded to other categories upon later Congressional reflection.[178] Moving in the opposite direction, some sites that first came into prominence through executive action as national monuments or wildlife refuges have managed to progress to higher profile classifications as their scenic qualities, plant or wildlife habitats gained recognition – elevating, for example, the Grand Canyon, California Desert Lands (Joshua Tree and Death Valley), and Colorado's Great Sand Dunes to national park status.

National forests, meanwhile, relied upon executive action initially for their establishment across the western U.S., but after a decade of dramatic expansion Congress reined in such executive decrees and since 1907 the creation or elimination of national forests has been the sole right of Congress.[179]

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[177] Park Service officials commonly refer to the "world class" aesthetic, historic, or ecological features present in national park units.

[178] Sully's Hill is now a national wildlife refuge.

[179] By the time Congress made this move, Presidents Harrison, Cleveland, McKinley, and Roosevelt had already managed to designate 151 million acres of national forests – just 40 million acres shy of the system's current extent.

With both the national parks and national forests, then, Congress ensured from an early stage that these categories of federal lands would be designated and managed systematically. Even prior to the 1916 Organic Act that clarified the purpose of the National Parks as a *system*, the enabling legislation for individual national park units was typically modeled after the Yellowstone legislation that prescribed management for the conservation of scenery and wildlife, and for the enjoyment of the visiting public.

Although the purposes and mission for the national forests are rather different from the national parks – focused on an array of uses including timber production, protection of water sources, recreation, wildlife, and grazing – these too have long been managed *as a system* and directed, with increasing degrees of oversight, by statute. Despite the diversity of locations, habitats, and features of the various units of these two categories of federal land, there is a certain amount of consistency within each system. A visit to one of the United States' scenic national parks reliably brings tourists to awe-inspiring vistas, scenes that fit our notions of what primeval America must have looked like, or living galleries of wildlife unlikely to be encountered in our daily lives.[180]

Despite their many critics, national forests also are relatively reliable in what they offer. Most national forests offer some mix of the multiple uses they are pledged to provide, even if these are sometimes heavily segregated spatially, lack apparent balance, or are continually contested. As their name would suggest, the national forests typically include extensive tracts of forested lands, and visitors to most units can find opportunities to camp,

[180] Note that there are now hundreds of "historic" national park units as well as paved "parkways" that are also managed by the National Park Service, thus the distinction for "scenic" national park units.

hike, or fish, even as they may also encounter commercial activities such as livestock grazing, mining, or logging.

Compared to either of these relatively well-consolidated systems of federal land, the National Wildlife Refuge System is by most measures rather different. As noted above, most wildlife refuge units come from executive or administrative action rather than Congressional statute, but refuges may be created by any one of these methods. With many coming relatively late in the public land designation timeline, wildlife refuges also exhibit a more diverse array of prior ownership than most other federal lands: the majority of refuge *acres* have come as transfers from other federally reserved lands, but the majority of refuge *units* have been either purchased from private landowners or negotiated through cooperative agreements with states. Other refuge lands are donated by individuals or non-profit land trusts.[181]

Described by one refuge scholar as a "crazy quilt" of different units,[182] the hundreds of national wildlife refuges were not even recognized as a "system" until Congress passed legislation in 1966. With units by that time already scattered across the country in a variety of sizes and settings, including an extraordinarily complex set of prior land use histories and management directives, the National Wildlife Refuge System continues to struggle to achieve cohesiveness and meaning as a particular form of federal land. A brief look now at the types of units that comprise the system, and from what prior uses these have come to be designated, provides important context for the current task of understanding the implications of military-to-wildlife conversions within the federal refuge system.

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[181] Fischman, p. 37.

[182] Fischman, p. 6.

Early Refuge Designations

Following his 1903 declaration that protected Pelican Island as a bird refuge, President Roosevelt proceeded to create fifty-five more wildlife reserves in the next six years using similar executive decrees. Congress also followed suit to a lesser degree, enacting legislation for wildlife refuges at Oklahoma's Wichita Mountain, the National Bison Range in Montana, and the National Elk Refuge near Jackson, Wyoming.[183] In a move that surely had greater overall effect than any single refuge designation, Congress also affirmed the presidential power to make such executive orders for national monuments and wildlife refuges when it passed the Antiquities Act in 1906.[184] This approbation of executive power for wildlife refuge designations seems particularly noteworthy considering Congress enacted a measure to *remove* the President's authority to designate national forests at nearly the same time.

The contrasting Congressional approach to executive authority over federal land designations is surprising considering that wildlife refuges represented a more protectionist approach to land management, while national forests from the outset advocated sustained use and utilitarian principles. Though environmental historians can now look back and identify two concurrent strains of thought toward federal land use during the early 1900s – *preservation*, and its spiritual and aesthetic values represented by John Muir and the national parks movement, compared against the more pragmatic *conservation* of Gifford Pinchot and

[183] Fischman, 2003, p. 35

[184] Fischman, p. 35.

the national forests – wildlife refuge designations may have come as a quieter third way that responded with a crisis mentality to wildlife depredations and the shocking decline of bison and other large ungulates, passenger pigeons, waterfowl, and "plume birds" such as egrets, herons, and cranes. The particular historical contexts of early wildlife refuge designations may explain, in part, why the public perception to this day assumes a standard of purity and protection on these lands that rarely actually exists.

These historical contexts and the fact that refuge designations have accreted over a span of decades also help explain why the current refuge system includes such a variety of units.[185] There is, for one, the issue of size. Refuges range from the massive to the miniscule, with Alaskan giants such as the 22 million-acre Yukon Delta NWR stacked against the backyard-sized 0.6 acre Mille Lacs NWR in Minnesota.[186] Locations vary from remote wilderness refuges in Montana or Alaska to urban refuges in New Orleans or San Francisco that sit almost wholly within the city limits. Wetlands and waterfowl areas may represent the quintessential wildlife refuge habitat – particularly in the form of Waterfowl Production Area refuges found across the northern plains and drawn exclusively from the Migratory Bird Hunting Stamp Act funds – but refuges can be found in an extremely wide range of climates and conditions. Arizona's Cabeza Prieta NWR covers more than 860,000 acres of America's hottest desert, the Sonoran, while the Arctic NWR sprawls across the muskeg and tundra of Alaska's North Slope; many Pacific island refuges include vast marine holdings and are closed to public use, while dozens of refuges along the East Coast sit less than an hour's drive from a hundred million people.

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[185] Fischman, p. 23.

[186] Zaslowsky and Watkins, p. 152; Fischman, p. 29.

Long before the current National Wildlife Refuge System took shape, Congress recognized that certain kinds of wildlife needed more consolidated forms of protection. In 1929, Congress passed the Migratory Bird Conservation Act, which provided the first overarching powers to acquire a *system* of refuges.[187] The 1929 act also gave explicit federal authority to buy state lands for bird refuges, a condition that gained import five years later when Congress approved the Migratory Bird Hunting Stamp Act of 1934.

More commonly known as the Duck Stamp Act, this 1934 legislation brought hunting interests more fully into both the funding and use of national wildlife refuges. The Act provided for the sale of a $1 annual duck hunting stamp – whose design has become a prestigious annual competition in its own right – from which the proceeds were dedicated to wildlife habitat purchases and refuge management in a 90-to-10 split. In the past seven decades, Duck Stamp prices have risen to $15 and sales have raised more than $670 million, making them the major source of reliable revenue for the acquisition and expansion of national wildlife refuge lands.[188] (The Land and Water Conservation Act has generated another large pool of federal money through revenues garnered from off-shore oil and gas leasing, but these funds have become routinely bound up by political in-fighting and only sporadically lead to conservation land purchases.)

As was the case with early national wildlife refuge designations, lands purchased using Duck Stamp funds typically came with complex land use histories that defied superficial notions of pristine or inviolate sanctuaries. For example, the majority of North Carolina's 50,000-acre Mattamuskeet National Wildlife Refuge was purchased in 1934 using

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[187] Fischman, p. 36.

[188] Fischman, 2003, p. 37-38; U.S. GAO, 1989, p. 8; U.S. FWS, 2005.

$312,000 of Duck Stamp funds. The centerpiece of the refuge, a 40,000-acre rain-filled lake, is renowned today for providing habitat for tens of thousands of wintering ducks and geese.[189] As a refuge biologist explained in one recent report, more than one thousand waterfowl hunters also make use of the refuge during hunting season: "What we try to do is to provide a quality hunting experience for a diversity of waterfowl. Just in the last couple days hunters brought in swan, a snow goose, teal, gadwall, widgeon, wood duck, pintail, black duck, mallard and ruddy duck."[190]

Visitors to Mattamuskeet in the 1800s could have encountered a somewhat similar scene, as private hunting clubs controlled access to the lake, but in the 1900s agricultural investors drained the lake to convert its bed to agricultural production.[191] Although 13,000 acres were subsequently converted, the project failed economically and by the time the Duck Stamp Act passed, the lakebed farming had been largely abandoned and water soon returned to the original site.

Despite the hundreds of millions of dollars generated by Duck Stamp revenues and more than five million acres of refuge habitat purchased with these funds,[192] the vast majority of national wildlife refuge acreage has come from designations from other federally reserved lands, or interagency transfers, not purchases or donations. Prior to the extensive Alaskan refuge additions established with the 1980 passage of the Alaska National Interest Lands

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[189] Smith, William Hovey, "Lake Mattamuskeet Draws Thousands of Ducks and Duck Hunters," *Raleigh News and Observer*, 22 January 2005: 9-10C.

[190] Quoted in Smith, 2005, p. 9-C.

[191] Smith, 2005; "Lake Mattamuskeet Yesteryear," The Mattamuskeet Foundation, viewed online at www.mattamuskeet.org/history [31 January 2005].

[192] U.S. FWS, 2005.

Conservation Act (ANILCA), this figure stood at 80 percent; since those additions that doubled the acreage of the refuge system, a whopping 97 percent of refuge lands have come from existing federal land sources.[193]

Although waterfowl and big game hunters had long been linked to wildlife conservation efforts in the U.S. – a role perhaps most visibly associated with the gun-wielding conservationist-President Theodore Roosevelt – early refuge set-asides often came with prohibitions against hunting. With hunters' Duck Stamp contributions coming as a major source of funding for refuge acquisition and management following the 1934 Act, refuges increasingly began to open up to this type of "secondary use." Congress, itself, took up hunters' interests directly in both 1949 and 1966 by expanding the percentage of Migratory Bird Conservation Areas – one subcategory among wildlife refuges – that were to be open to waterfowl hunting. This change, from zero to 25 percent in 1949, then up to 40 percent in 1966, essentially ensured that hunters would retain a secure presence in refuges. The increased access to hunters also corresponded to increases in Duck Stamp prices, one of several actions that some have linked to building an economic orientation into refuge management.[194]

This brings up a second point that would have lasting significance across the National Wildlife Refuge System and hold particular relevance for M2W conversions: as the number of wildlife refuges expanded throughout the second half of the twentieth century, so did the number and type of auxiliary uses that existed alongside the primary purpose of wildlife and

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[193] Fischman, pp. 38-39.

[194] Fischman, 38-39, citing Worster. The Refuge Revenue Sharing Act of 1935 created a Payment-in-lieu-of-Taxes (PILT) -like system for NWRs; according to Worster, *this* brought economic interest more broadly to bear most dramatically.

habitat conservation. Secondary uses of refuges such as mining, motorized recreation, military exercises, and livestock grazing raised concerns from many supporters of the refuge system, as well as from a majority of refuge managers, and eventually led to an important round of executive and legislative actions intended to reform and improve management of the refuge system as the twentieth century drew to a close.

Before turning to the changes that came with President Clinton's 1996 executive order and the National Wildlife Refuge Improvement Act it spawned in 1997, I first take a closer look at how secondary uses of refuges in various ways have been "grandfathered" into continuance, have been introduced after refuge designations, and may have expanded the federal government's conception of what activities befit a national wildlife refuge even as the general public clings to notions of refuges as unsullied places of sanctuary.

Secondary Uses of National Wildlife Refuges

Considering the standard definition of the word "refuge," the visiting public might well be forgiven for thinking that wildlife refuges at least offer "shelter from danger or trouble," "protection," or "a place of safety or security" for resident and visiting wildlife.[195] The conservation of wildlife, plants, and habitat is, in fact, the mandated primary purpose of the National Wildlife Refuge System and any additional uses of these lands are expressly prohibited from undermining this dominant objective. In wildlife laws and elsewhere, however, the terms of a statute and how it is implemented can lead to important gaps of difference. This explains, in part, why a 1989 GAO report determined that secondary or non-

[195] Definitions from the New Shorter OED, 1993.

wildlife related uses occurred "on virtually every refuge and include all manner of public, economic, and military activities."[196]

Secondary uses take many forms and come from an array of historical and contemporary sources. Refuge lands in virtually every instance have been either designated or purchased from prior federal or private properties; in many cases, the uses that pre-dated refuge establishment are simply allowed to continue when the land managers change. BLM lands that gain refuge designation, for example, rarely strip away existing grazing or mining leases, as the social disruptions and local antagonisms such moves would engender can be counterproductive both to refuge workers fitting in with their communities and with the management objectives of the refuge itself (e.g. if such antipathy increases vandalism, poaching, or other actions). At the more formal level, many elected officials are savvy enough to realize that the economic and political clout of ranching or mining interests is often potent enough to keep such activities "grandfathered" into the statutory refuge purposes.

At times such accommodation of pre-existing uses can seem rather incongruous. Crab Orchard NWR, in Illinois, explicitly provides for continued industrial production of military munitions on refuge grounds, a condition that contributes to some FWS employees' view that their agency "has been burned" by non-compatible uses being worked into refuge statutes.[197] This flexibility of individual refuge units adapting to local circumstances is also viewed by some as a strength of the system, however, and one that prevents the national wildlife refuges from positioning themselves outside of social processes in the way that, for example, the

[196] U.S. GAO, 1989, p. 16.

[197] Sattelberg, 2004.

National Wilderness Preservation System appears to and for which it has received some stinging critiques.[198]

Of course, the determination of whether a secondary refuge use undermines or highlights the features of the National Wildlife Refuge System often depends both upon the standpoint of the observer and the type of use that is occurring. Such judgments also tend to vary with proximity to the refuge in question, as locals who have convenient access to recreational activities such as boating or driving off-road vehicles seem more likely to support such uses, even when refuge managers or the more distant public considers them harmful to primary refuge purposes. This effect of local pressures to keep secondary uses available was cited in the 1989 GAO report in a number of instances.[199]

In other cases, the continuation of incompatible secondary uses is less a case of the FWS caving to local pressures as it is a lack of agency authority at higher levels. The DOD claims rights to the airspace above Arizona's Cabeza Prieta NWR and conducts supersonic overflights at low altitude, as well as artillery tests on the adjacent Yuma Proving Grounds and Luke Air Force Bombing Gunnery Range, despite the FWS's contention that such activity impairs efforts to recover the endangered desert bighorn sheep and Sonoran

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[198] See Fischman, 2003; for wilderness critiques, see Cronon, 1995.

[199] Among these, at the Des Lacs refuge in North Dakota, the FWS was maintaining unseasonally high water levels in order to provide power boating and water skiing opportunities, even though these activities were known to disrupt waterfowl and reduce bird production at the refuge by as much as 50 percent. In a similar case of local demands overriding, literally, the primary purposes of refuge management, at Chincoteague NWR in Virginia, off-road vehicle and other recreational uses of the area's beaches were allowed despite their adverse impacts on the reproduction of endangered piping plovers. See GAO, 1989, p. 22.

pronghorn.[200] Even with the legal hammer of Endangered Species Act protection for these populations, Cabeza Prieta's wildlife managers have had limited success influencing the military's operations.

Mining claims, grazing and mineral leasing, and other legal permits for activities within national wildlife refuges can also be difficult to influence or dislodge. Even after the FWS issued a biological opinion that natural gas drilling on the D'Arbonne NWR in Louisiana would jeopardize endangered red cockaded woodpecker populations, a federal district court judge asserted that the agency could not enforce constraints on the permitted operations.[201] In other cases, such as grazing leases, allotments can sometimes be reduced, fenced, or otherwise regulated, but even where reductions occur it may take years to restore damaged habitat and longer still to remove the activities entirely.

Not all secondary uses of national wildlife refuges create equivalent impacts, of course, and among both land managers and legislators there is widespread consensus that some forms of public activity on wildlife refuges should continue, even if these do not contribute *per se* to the primary purposes of wildlife and habitat conservation. For instance, the majority of refuge managers surveyed by the GAO did not consider camping, picnicking, horseback riding, or non-motorized boating as "harmful" secondary uses.[202] A number of other secondary uses that the general public might commonly view as having adverse impacts to refuge habitat and wildlife also find their way on most refuge managers' lists of

[200] GAO, 1989, pp. 22-23.

[201] GAO, 1989, p. 23.

[202] GAO, 1989, p. 20.

activities that are not harmful. (See Table 3.1: Frequency of a Secondary Use Being Considered Harmful.)

Table 3.1: Frequency of a Secondary Use Being Considered Harmful[203]

Use	# of Refuges where use occurs	Viewed as harmful by refuge manager	
		Number	Percent
Mining	26	22	85
Off-road vehicles	37	26	76
Airboats	36	25	69
Military air exercises	55	36	65
Waterskiing	53	31	58
Large power boats	114	59	52
Rights-of-way	211	101	48
Beach use/swimming	96	39	41
Small power boats	148	60	41
Grazing	151	55	36
Military ground exercises	29	10	34
Commercial fishing	76	26	34
Hunting dog field trials	56	18	32
Camping	83	22	27
Waterfowl hunting	163	41	25
Haying	132	30	23
Picnicking	192	36	20
Farming	150	26	17
Horseback riding	115	20	17
Logging	79	13	16
Recreational fishing	244	39	16
Nonmotorized boats	193	26	13
Small game hunting	162	18	11

Hunting, fishing, and logging, for instance, each rated 75 percent or better as not harmful, and in some cases these extractive activities fared better in managers' perspective than non-consumptive uses. By way of comparison, waterfowl hunting met with disapproval by 25 percent of refuge managers versus 27 percent who considered camping harmful; logging and fishing both came in at 16 percent disapproval, while 17 percent rated horseback riding harmful; and non-motorized boating was viewed by 13 percent as harmful, behind

[203] Modified from GAO, 1989, p. 20.

small game hunting, which at 11 percent met with the lowest harmful rating of any use considered.[204]

In response to the litany of problems highlighted by the 1989 GAO report and related documents, some measure of relief finally came in 1996 when President Clinton issued Executive Order 12996. Clinton moved to improve refuge management by creating a clear mission statement, guiding principles, and other directives for more systematic management of the nation's wildlife refuges.[205] While Clinton's executive order staked out a new ecological mission for the refuge system, its significance was perhaps greatest for spurring Congress to formalize guidelines for the National Wildlife Refuge System into statute. This move came less than nineteen months later when Congress passed the National Wildlife Refuge System Improvement Act of 1997, which Clinton then signed into law.

National Wildlife Refuge Improvement Act of 1997

Hailed by members of Congress and refuge scholars as landmark legislation, the Refuge Improvement Act may in fact help move the National Wildlife Refuge System to become the nation's "premier public land conservation network" and a role model for the rest of the world as its supporters suggest.[206] The Refuge Improvement Act formally established a mission statement for the National Wildlife Refuge System (NWRS); identified hunting, fishing, wildlife observation, photography, and environmental education as "generally

[204] GAO, 1989, p. 20.

[205] Fischman, 2003, p. 62.

[206] Fischman, 2003, pp. 209-210.

compatible uses" of the refuges; sought to clarify more generally the conditions by which secondary uses of refuges could occur; and required that that by 2012 (and every fifteen years thereafter) every national wildlife refuge prepare a Comprehensive Conservation Plan to guide unit management.[207]

This effort to provide more centralized guidance for the refuges emerged from concern over what law professor Robert Fischman calls the system's "centrifugal" qualities;[208] that is, the tendency of particular refuge units to translate their unique circumstances to management policies that do not necessarily mesh cleanly with other units in the system. The 1997 Act devotes considerable attention to questions of secondary uses in order to consolidate unit-by-unit management, but it remains to be seen how effectively this statutory push filters down to the unit level. In my interviews at the Rocky Mountain Arsenal NWR in 2004, for example, at least one upper-level staffmember seemed only dimly aware that new legislation had even been passed in 1997:

> DH: Subsequent to the 1997 reiteration under Clinton wasn't there an updating of the refuges' purpose?
> FWS Official: Oh, the [Arsenal] Refuge Act?
> DH: No, not specific to this base, but system wide.
> FWS: I don't know, that could be. It seems like it was about '96 or '97 that was all coming out.
> DH: Clinton issued an Executive Order in '96 and then Congress passed it in '97.
> FWS: That is ringing a bell. That sounds about right.
> DH: The National Wildlife Refuge Improvement Act or something like that.
> FWS: Oh, yeah yeah. Yeah that is about the time frame.[209]

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[207] PL 105-57.

[208] Fischman, 2003, p. 5.

[209] Interview with Sherry James, Rocky Mountain Arsenal, Colorado, 21 July 2004.

The Refuge Improvement Act's provisions to strip away non-compatible secondary refuge activities also does not apply to military activities or other actions by federal agencies that retain jurisdiction in some areas – this despite the fact that the GAO's 1989 report found military air and ground exercises ranked fourth and eleventh, respectively, among the uses considered most harmful by refuge managers (see Table 3.1).[210]

Two other limitations continue to plague the NWRS, even after the 1997 legislation: science and money. The Refuge Improvement Act directs the FWS to use "available science and resources" to justify management decisions. As part of a broader multi-agency shuffle in 1993, however, most FWS scientists were transferred to the National Biological Survey, and three years later to the U.S. Geological Survey. As a result, the agency no longer directly controls scientific studies at the same level it did prior to 1993.[211] The 1997 Act also did not address severe funding shortages that have afflicted the FWS for years. In 2002, the agency estimated its maintenance backlog at more than $650 million, approximately twice the level of its annual appropriation for operations and maintenance. At current levels, the FWS receives by far the lowest funding in dollars per acre of any of the federal public land management agencies.[212]

The pressure placed upon FWS land managers to maintain a premier conservation network grows all the more daunting when lands in need of major restoration or rigorous control of the visiting public come into their care. Both of these are serious concerns with the new M2W refuge additions and a number of FWS officials have expressed dismay over

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[210] Fischman, 2003: 114; GAO, 1989, pp. 20-21.

[211] see Fischman, 2003, pp. 118-119.

[212] Fischman, 2003, pp. 118-119.

Congressional actions that so clearly increase management burdens without seeming to recognize any costs.[213] Not only can these additions place a strain on the system overall, they also may displace funding from existing refuges to pay for more aggressive clean up activities at prominent, highly contaminated new refuge additions. The refuge manager at Rocky Mountain Arsenal NWR described this asymmetry of Congressional expectations, appropriations, and site-specific disbursements in my interview with him in July 2004:

> A lot of these little Camp Swampies out there, they got a little spill that has to be cleaned up, or they've got a range… we're going in and they're saying, 'Look, you want the land you take it the way it is. When we get some money later, maybe we'll be able to come back and clean up your forty microproblems.' …But my concern is that … it's going to take more to manage that 6,000 acres than if we bought 6,000 acres of shortgrass [prairie] out in Kiowa County. OK? At the same time that Congress, and the administration now, is telling the agency to curb your appetite for land, we don't have enough money to manage what you have…and then on the other hand they're turning around and giving us land that we didn't ask for that's going to cost more to manage. But no money with it. …So, FY '97, '98, '99, just about every new dollar – and those were good years for the refuge budget – just about every new dollar that came into Region 6 came to the Arsenal. So there were a lot of small working refuges out on the prairie that got jack diddly for those years. And there was a lot of hate directed here. They got screwed because of the Arsenal, which has no ducks. I mean really. So that stopped. And we haven't gotten any new money – the refuge budget has actually declined over the last three years.[214]

There is, of course, both a certain logic to military-to-wildlife conversions and a rather long history of such transitions. Though I do not intend to provide a comprehensive account of all of these, a brief historical overview of this phenomenon adds context to the systematic base closures and subsequent M2W redesignations that have occurred since 1988. In the sections that follow, I also turn to some of the logics of military-to-wildlife

[213] e.g. Wyman, 2003; Sattelberg, 2004; Rundle, 2004; Kolodnicki, 2006.

[214] Rundle, 2004.

conversions as well as how decisions are made to convert military lands to land uses that are *not* primarily dedicated to wildlife and habitat conservation.

M2W Lands

Military-to-wildlife conversions involve land use changes across the sweep of both a continent and more than two hundred years of inconsistently applied federal policy. With that in mind, it may still be useful to highlight certain differences between early transitions from military land management to designations as national wildlife refuges; even amidst these, we should find lessons for today's more rapid, systematic conversions.

Early Military-to-Wildlife Conversions

The accelerated pace of military-to-wildlife conversions is one of the first historical differences that emerges from a deeper look at this phenomenon. Whereas many of today's redesignations find active military bases sprouting new names and staffing as national wildlife refuges within a span of months, or in some cases essentially overnight, most M2W conversions in the previous two centuries occurred gradually, with considerable periods of down time between active military use and active management for wildlife.

Atsena Otie Key, for example, which is now part of Florida's Cedar Keys NWR, served as a military depot from 1839-1842, then developed into a town with more than three hundred residents before it was wiped out in 1896 by a hurricane. The town was never rebuilt and more than thirty years later in 1929 President Hoover designated several nearby keys part

of a national wildlife refuge. Atsena Otie was added to this cluster, the Cedar Keys NWR, in 1997.[215]

As early forts and bases became geographically or technologically obsolete, they often were simply abandoned and returned to the federal or other public domain. In this way, for example, Sully's Hill, North Dakota, went from an advance fort during the 19th century's Indian wars and westward push, to a strategically insignificant knoll in the northern plains. After several decades of relative anonymity, Sully's Hill gained new cachet in 1904 when President Roosevelt proclaimed it one of the nation's early national parks. By 1921 it had become clear that Sully's Hill did not harbor aesthetic or historic qualities sufficient to deserve such lofty title, and it was redesignated a national game preserve (it was later incorporated into the National Wildlife Refuge System).[216]

A closer look at Harris Neck NWR, in Georgia, reveals a typically complex land use history that many of today's refuge visitors might little encounter: the land was deeded to Scottish settlers in 1750 after millenia of residency and use by native Chickasaw; following the Civil War, liberated slaves settled the site until it was condemned for use as an air base in World War II. Following the war, the federal government gave the land to McIntosh County, only to take it back in 1962 with designation of 2,824 acres as a national wildlife refuge.[217]

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[215] "Historical Highlights of Atsena Otie Key," Cedar Keys National Wildlife Refuge website, viewed online at http://www.fws.gov/cedarkeys/atsenaotie.html [15 September 2006].

[216] Fischman, 2003, p. 247.

[217] See "Refuge History," Harris Neck NWR website, viewed online at http://www.fws.gov/harrisneck/history.htm [15 September 2006]. Acreage figures come from Fischman, 2003, p. 241.

An accelerated pace of conversion may have some benefits for today's conversions. Where military records have been carefully maintained (a key caveat, as the lack of careful record-keeping at many military sites is one of the biggest challenges for restoration efforts at toxic disposal sites or jet fuel dumps), the land use record may be fresh and provide clearer guidance for remediation work. In cases such as the Rocky Mountain Arsenal, the Army or DOD may be retained as a primary responsible party for Superfund-related cleanup and therefore contribute a considerable amount of funds and personnel toward the prerequisite remediation needed for conversion. A more rapid conversion from military use to wildlife refuge status may also increase the likelihood that the military history of such places will be retained and kept visible for public education and interpretation – a feature that I turn to in later chapters as holding considerable importance.

Of course, there are also problems that come with quick conversions. Toxic or explosive hazards often remain relatively potent at sites where recent military activities were conducted. With sophisticated military weapons and synthetic chemicals, the threat posed by the residues of modern bases can also far surpass the threats of buried Civil War-era munitions. At sites where interim land uses or periods of fallow occurred between military activity and wildlife refuge designation, hazards may also have been already treated, transported, buried, or otherwise rendered inert long before Fish and Wildlife Service staff arrive and assume management responsibilities. Whether such transport, assimilation, or neutralization occurs through biological or physical processes, the mitigating effect of time can provide considerable restoration value that the FWS otherwise has to assume.

The sum effect, then, is often that contemporary military-to-wildlife lands come with dramatically different qualities than their earlier counterparts. The on-going process of

transferring lands from the DOD to the FWS may appear to be simply the continuation of a centuries-old pattern, but in fact today often comes with novel complications that justify its consideration as an entirely new kind of phenomenon. Applying a superficial historical logic to explain M2W conversions neither accounts adequately for the actual characteristics of today's bases nor applies a useful rationale to explain why such changes ought to occur.

Logics of Conversion

If there is any single overriding message that emanates from military-to-wildlife conversions, it likely includes the phrase "win-win." Nearly all the parties involved in M2W conversions will at some point resort to the characterization that such transitions are both good for local economies and good for the environment, or good for a DOD looking to unload lands and good for a FWS looking to expand its refuge system. Although many times such rhetoric builds directly from the perspectives of ecological militarization that I develop in more depth in Chapter Seven, in some cases the "win-win" construction works simply because a conversion can be highlighted as a success by both elected officials from both major political parties.

In order to understand the processes of these conversions more genuinely – and to properly fathom their implications – we need to read the logics of change far more deeply than this. Running beneath the surface of the upbeat press releases of win-win conversions we commonly encounter at least three broad explanations why it "makes sense" to

redesignate military facilities to new uses as wildlife refuges.[218] I describe these below as Biodiversity, Brownfields, and Serendipity.

The first of these, the "Biodiversity" explanation, applies to places where certain wildlife or plant features were noted by scientists, military officials, or conservation advocates while the site was an active military base. Subsequent closures were broadly seen as an opportunity to shore up high quality environmental attributes. In order for the Biodiversity rationale to be effective, a conversion site must have drawn attention for its ecological characteristics before a BRAC determination or other closure plan was fully implemented – the environmental constituencies need to be present in advance in order to influence the conversion process toward the resolution they desire. The Biodiversity logic also applies primarily where conservation interests appeared to be actively threatened in the absence of military or similarly restrictive management.

New Hampshire's Pease Air Force base fit this logic as Williams' 1999 study demonstrated. He found that local environmental activism and community interest in preserving the environmental amenities of doomed bases led to the eventual protection of these qualities in new national wildlife refuge designations. Where such habitat characteristics had not been identified or publicly valued in advance, such as Denver's Lowry Air Force Base, closures tended to convert instead to commercial development.[219]

In order for a Biodiversity explanation to prevail, however, a site does not need to be free of all hazards or military residues. At the Jefferson Proving Grounds, for example, local and national environmental groups that lobbied for a national wildlife refuge designation

[218] See pp. 24-26 for a more detailed explanation of methods used to identify these logics of conversion.

[219] Williams, 1999.

were aware that millions of tons of explosives had been tested on site, with many remaining buried and unexploded, but they deemed the 50,000-acres so ecologically valuable that the threat of subdividing it or converting it to commercial uses outweighed any qualms they may have held about its risks or public hazards. As we will see in Chapter Five, part of this calculation came from an assumption that risks could be geographically bounded and public access effectively managed. The privileged positioning of ecological sciences and biodiversity protection also looms large here, as concerns about public health or socioeconomic disruptions were largely left out of comments contributed by environmental advocates of M2W conversion at this site.[220]

We can also see the Biodiversity rationale being mobilized in advance at places such as Florida's vast Eglin Air Force Base, which may never come to the BRAC chopping block but has already drawn attention in conservation-oriented publications for its ecological attributes.[221] In effect, environmental constituencies and conservation scientists work in advance to increase the chances that closures of such sites could be fast-tracked as M2W conversions. Examples of this effort paying off include redesignations at Alabama's Fort McClellan (now Mountain Longleaf NWR) and Vieques, Puerto Rico.

The second, or "Brownfields" explanation, harbors logics that are more multi-faceted, nuanced, and in many ways less stable than those of Biodiversity. The Brownfields rationale

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[220] See JPG EIS, Appendix H, 1995.

[221] e.g. Biondo, Brenda, "In Defense of the Longleaf Pine," *Nature Conservancy* (September/October 1997): 11-17; Jacobson, Susan K. and Susan B. Marynowski, June 1997, "Public Attitudes and Knowledge about Ecosystem Management on Department of Defense Land in Florida," *Conservation Biology* 11(3): 770-781; Lillie, Thomas H. and J. Douglas Ripley. 1998. "A Strategy for Implementing Ecosystem Management in the United States Air Force," *Natural Areas Journal* 18(1): 73-80.

is also less predictable in terms of its flow – a broad array of interests from the grassroots to political leaders may apply this logic to explain why it makes sense to turn military bases into refuges. The Brownfields response rests upon a view that military lands are highly contaminated, dangerous spaces destined to obsolescence in their current form. With closures imminent, the logic of Brownfields contends that nothing else redeeming will likely come of military lands so their highest, most practical "use" will be to dedicate these places to non-human priorities. Put somewhat less charitably, military managers recognize that certain DOD lands are too contaminated to ever bear more economically productive commercial or residential activities, so a wildlife refuge designation can present a positive public façade to an otherwise blighted venue.

This carries multiple benefits, as refuges with primary purposes dedicated to wildlife conservation (as opposed to more active human uses) often come with reduced remediation standards, thereby saving money and labor in the closure and clean-up process. The Brownfields logic also brings a compelling aesthetic case for residents of nearby towns: better to turn a contaminated base into a refuge for wildlife than to leave it as an eyesore, idle brownfield, or active Superfund site. Wildlife advocates can also be drawn in, if even *post facto,* to support M2W conversions regardless of contamination issues. Lacking other good options, the DOD may be more than happy to utilize Brownfields explanations to convert closing bases, as the administrative process to convey the land title to a sister federal agency is relatively simple and especially at small sites can be done with little fanfare.

At many large bases the range of conditions extends from severely degraded to the virtually untouched, often in a pattern that holds the greatest hazards to the core of the base with increasingly little-used buffer areas toward the periphery. In these sites, conservationists

may promote the Biodiversity of the outer edges of the base, while military officials leverage the Brownfields logic to include higher-risk, higher-cost core areas in wholesale M2W conversions. In conversion locations such as the Rocky Mountain Arsenal, Fort McClellan, and Vieques, potentially irreconcilable differences at the agency level (FWS vs. DOD) have been side-stepped by Congressional action, effectively conflating the logics of Brownfields and Biodiversity into one statutory package.

These categories, of course, are by no means exclusive or firm. A single site of conversion may be produced using some or all of these in concert, explanations may pulse and shift over time, and even within a single category there are inevitably shades of difference that vary how M2W conversions are negotiated and maintained. The structure provided by these broad logics of conversion, though, may help guide our understanding of these admittedly complex processes and spur us to probe beneath the neat wrapping that a "win-win" solution tries to present.

Finally, there is the logic of "Serendipity," which may be seen as the rarest and purest of explanations. It asserts that by happy twist of fate, nature dictates the trajectory of military-to-wildlife conversions. Rare and pure it may be, but this explanation is also the most problematic in many ways and will be the subject of a more thorough explication when I turn in the next chapter to the case of the Rocky Mountain Arsenal.

The concept of serendipity hearkens back to the Horace Walpole fairly tale, *Three Princes of Serendip*. The tale's heroes, like biologists at the Rocky Mountain Arsenal, evinced a happy talent for "making discoveries, by accidents and sagacity, of things they were not in quest of."[222] Guided naturally by fate and fortune, the logic of Serendipity is also

[222] Quoted in *New Shorter OED*, 1993, p. 2783.

by far the most potent: to argue against it is tantamount to going against nature itself. Thus we encounter narratives of M2W conversion that begin with phrases such as, "In a way, it was the eagles that made it happen,"[223] suggesting in clear terms that scientists, politicians, the U.S. Department of Defense, financial calculations, community leaders, FWS officials, and conservation advocates are merely bit players in the larger stage of what is fundamentally a *natural occurrence*.

Other Base Conversion "Destinations" (M2x lands)

Of the more than four hundred military base closures undertaken since 1988, approximately five percent have converted to new designations as national wildlife refuges. By acreage, M2W conversions comprise a much larger share of the recent transitions, but the majority of military closures do not become wildlife refuges. The many other kinds of transitions rest largely beyond the scope of this study, but it is worth noting briefly what other kinds of landscapes emerge from military facilities and how some of these determinations are made.

Existing statutes and planning documents guide the reclassification of closed bases, but the Department of Defense retains a degree of flexibility in deciding how to convert military lands. A decision matrix guides the DOD to consider lands for conversion along a progression, turning first to other DOD uses, then to other federal non-DOD uses, then on to state and local agencies, and finally to private organizations or commercial development.[224]

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[223] US FWS, 1999, p. 5.

[224] Guide to Assessing Reuse 1996; Williams 1999, p. 21; Tierney, 2001.

This places the FWS relatively high in the order as a potential recipient for DOD sites, but even if the agency passes over their early option to receive such lands they may end up with DOD holdings if Congress intervenes.

The presence of an active group of supporters for wildlife conservation can also tip the scales.[225] At base closure sites such as New Hampshire's Pease Air Force base, Savanna Depot in Illinois, and the Jefferson Proving Ground in Indiana, local citizens and conservation groups expressed both support for wildlife refuge designations and opposition to commercial or private developments.[226] The desire to preserve existing open space, wildlife habitat, or potential parklands undergirds much of this kind of support, but depending upon the character of each military complex and the ability of local citizens to access information about the environmental conditions of a closing base, such amenities may not even be widely perceived to exist.

In some cases it is not so much the attractiveness of open space or habitat conditions at closing military facilities, but rather their severe contamination that pushes them toward national wildlife refuge designations. Since EPA clean-up regulations vary depending upon the anticipated future uses of a site, remediation of heavily degraded bases may be infeasible for residential or commercial standards, but can be reached successfully to meet targets considered safe (enough) for wildlife. At the Rocky Mountain Arsenal, the EPA has pegged the clean-up to health standards for refuge workers and the visiting public – with neither group considered a "residential" population – as well as wildlife. Even in the periphery of the former Army property at the Arsenal, a small slice of which was ceded to neighboring

[225] Williams, 1999.

Commerce City, the Refuge legislation specifically precludes residential developments and a range of commercial activities; the area is currently projected to become a community sports complex and soccer stadium for Denver's professional team.

This bi-modal description of military lands that come to be reclassified as wildlife refuges – representing some of the DOD's most desirable conservation lands as well as its most burdened – ably reflects the dual natures that often exist at large military bases themselves. Core areas of these sites are often heavily impacted by munitions tests, tank or troop maneuvers, chemical manufacturing, or other intensive activities, while large regions of the perimeter are kept relatively untouched and "clean" from even ordinary human impacts.

Since 1949, the Federal Lands to Parks Program has made use of some of these qualities of military lands (and other federal holdings) by high-grading parcels slated for dispensation and giving them to local or state governments for parks and recreation facilities.[227] Under this program, for example, the DOD transferred 130 acres of Ft. McClellan, Alabama, to the City of Anniston for public parks and recreation facilities including gymnasiums, running tracks, and baseball fields.[228] Similar relatively small exchanges were granted in recent years at a Key West, Florida, naval site; the Broadneck

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[226] Williams, 1999; JPG EIS; personal communication with staff at Savanna Field Station/Lost Mound Unit of the Upper Mississippi NWFR, 30 May 2006.

[227] See PL 91-485 (sec. 203(k)(2).

[228] Federal Lands to Parks Program website, viewed online at http://www.nps.gov/ncrc/programs/flp/fy03.htm [15 September 2006]. The bulk of Ft. McClellan was transferred to Fish and Wildlife Service management with legislation in 2003 reclassifying the base as Mountain Longleaf Pine NWR.

Nike missile site near Annapolis, Maryland; Denver's Lowry AFB; and the Yellow Water Weapons Annex near Jacksonville, Florida.[229]

Military decommissionings to non-wildlife designations come out of a milieu of historical contexts, political and economic priorities, discursive framings, and other conditions – much as M2W conversions do – but in military-to-commercial conversions or other M2x redesignations the social elements tend to be more visibly worked into the decisions made than they are in M2W changes where rhetorics of nature often rise to the fore. In this way, M2x conversions are in most cases no *simpler* than their M2W counterparts, but the latter provide a more significant series of changes when viewed through the lens of nature-society relations. Because of this they may offer more profound lessons of how we may work to understand the interconnections between science, technology, and society that must be accounted for as public wildlife refuges emerge from the restricted settings of military lands.

In the following two chapters I bring these particular contexts into tighter focus as I turn to case studies of M2W conversions well underway at the Rocky Mountain Arsenal NWR and Big Oaks NWR. Looking more deeply at the processes taking place at these locations – which represent some of the most prominent and mature recent military-to-wildlife conversions – helps illustrate more clearly just how such redesignations are produced and what kinds of effects they may then have as they formally (re)enter a more public sphere.

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[229] See "Re-use of Closed Military Bases," on Federal Lands to Parks website, online at http://www.nps.gov/ncrc/programs/flp/brac.html [15 September 2006].

CHAPTER FOUR

THE ROCKY MOUNTAIN 'ARSENAL OF DEMOCRACY'

The Rocky Mountain Arsenal has long seemed a place of contrasts and paradoxes. In the course of a century, the lands of the Arsenal have been subjected to a shifting set of priorities from agriculture and rangeland to chemical weapons and pesticide production to wildlife refuge and tourist attraction. As a chemical weapons facility it was both highly secretive and widely publicized. Colorado newspapers announced the Army's creation of the Arsenal in bold headlines and maps of the region often identified the Arsenal and its location adjacent to Denver, Colorado, but access to its 18,000 acres was carefully controlled and restricted. The details of some projects conducted at the Arsenal remain classified to this day, even as the place itself opens to school groups and weekend visitors. The actions taken at the Arsenal have ranged from the overt, such as the systematic removal (twice) of nearly all buildings on the Arsenal grounds, to covert events such as the construction and operation of the North Plants nerve gas facility during the Cold War. Of the compounds manufactured inside the Arsenal, some were revealed only years after production ceased and many never saw military application. Others were among the most widely used weapons and commercial pesticides in the twentieth century.

The Arsenal's service as an Army chemical weapons plant lasted forty years, beginning with the rapid expulsion of farm families and round-the-clock construction of

chemical laboratories. For much of its time as an active arsenal, when the Army was producing or storing chemical weapons, the site also served as a commercial pesticide and herbicide manufacturing facility. By the 1980s the Arsenal began another transformation, from chemical production to wildlife conservation. This transition was announced formally in 1992 when the U.S. Congress passed legislation to approve the site for designation as a national wildlife refuge. Although this latest transformation is often characterized as simply a natural act, one dictated by the arrival of nesting bald eagles to the Arsenal grounds, a deeper look at its production reveals many layers of human activity that have been variously asserted, contested, and negotiated during the past six decades and more.

In this chapter I consider how the changes at the Arsenal were produced through a series of military and commercial activities, by executive and legislative decisions, promoted on the authoritative grounds of national security, supported by scientific studies, and introduced to the public in ways that encouraged local support and, in some cases, also sparked concern and opposition. Each of these actions has rested, ultimately, upon the control of certain spaces.

Military Authority and the Control of Space

Military power and its associated claims of protecting national security are founded upon a need to control different types of space.[230] At its most immediate level, the initial conversion of these lands into a working Arsenal required the assertion of U.S. Army control

[230] See Barnett, Jon, *The Meaning of Environmental Security: Ecological Politics and Policy in the New Security Era* (London: Zed Books, 2001), p. 31.

upon local, material space in the form of scattered farms and families that lived on the site in 1942. More broadly, the creation of the Arsenal itself was framed as a means to protect the domestic spaces of the United States against foreign attack. Throughout the operating period of the Arsenal and, more recently, its dismantling and conversion to new uses, there has also been a concerted effort to control the discursive and political spaces of public opinion, legislation, and environmental regulations. As long as these less tangible realms could be managed by the Army, then the physical spaces of the Arsenal itself remained more fully under Army control. Many of these spaces remain important and actively contested as efforts continue to pry nearly twenty-seven square miles of Colorado prairie into the public domain as a new wildlife refuge.

My focus here rests fundamentally upon questions of military control and how this control becomes visible, asserted, and contested in the particular instance of the Rocky Mountain Arsenal. Woodward contends that military control emerges from four distinct sources: physical presence, the control of information, governance and state/citizen relations, and the rhetoric of defense and national security.[231] Each of these surface during my consideration of the Arsenal and its production, though my own approach is structured chronologically rather than directly around these four themes. My goal is to build a deeper understanding of what is occurring at this particular site of (de)militarization and explore how, in turn, the changes taking place at the Rocky Mountain Arsenal articulate with

[231] Woodward, Rachel, 2004, *Military Geographies*, (Oxford, England: Blackwell Publishing, RGS-IBG Book Series), p. 153.

conceptions of public lands dedicated to the conservation of nature (e.g. a national wildlife refuge).[232]

As I investigate the historical production of the Rocky Mountain Arsenal in this chapter then, I will also highlight how throughout the various stages of activity the Rocky Mountain Arsenal has remained a public space. Even as the Army dedicated the Arsenal to restricted and tightly guarded activities of military weapons manufacturing, it also needed to manage the place as a site known to and accommodated by the public. The materials created on-site reached the public, both intentionally and inadvertently, and in its most recent decade the Arsenal's clean-up and remediation have been managed according to laws designed to protect the public.

The process of conversion itself, which now applies to more than one hundred major military sites across the U.S., plays no small part in making the Rocky Mountain Arsenal a more public space. As Foote describes more generally of places where violence or destructive activities have occurred, "The question of what to do with [a] site actually precipitates debate and forces competing interpretations into the open. Set in motion is a complex iterative process in which place spurs debate, debate leads to interpretation, and interpretation reshapes place over and over again."[233]

The longstanding tension between managing the Arsenal as a public as well as a highly restricted space continues with its addition to the National Wildlife Refuge System. The Arsenal now engages the public ever more actively, for educational and recreational

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[232] Woodward, p. 153, describes a similar project of "unpicking and laying bare the mechanics and politics of military control."

[233] Foote, Kenneth E., *Shadowed Ground: America's Landscapes of Violence and Tragedy* (Austin, TX: University of Texas Press, 1997, revised 2003), p. 6.

outings, as a site of scientific research, as an open space amenity that contributes to the economic and social prosperity of surrounding communities, and increasingly as an attraction for visitors to the Denver area. It will never simply be an open stretch of prairie with no hint of military presence. As the U.S. Fish and Wildlife Service refuge manager for the Arsenal frankly acknowledges: "The Army will always be here."[234]

As its name continues to reflect, the Rocky Mountain Arsenal National Wildlife Refuge first became widely known and delimited as a site for weapons production and storage. This chapter will focus primarily on that time period when the Rocky Mountain Arsenal developed *as* an arsenal and a distinct place managed and controlled by the U.S. Government, including, more recently, as an arsenal-turned-wildlife refuge. Before turning to the Army's initial conversion of the site to a chemical manufacturing facility, in the next section I introduce one of the weapons developed at the site, then look briefly at the contexts and setting from which the Arsenal emerged.

Prelude to the Rocky Mountain Arsenal

In 1917, amid the horrors of World War I, the U.S. Army assembled a group of scientists to develop a chemical weapon potent enough to end the war. Both the Allies and the Axis powers had been using chlorine and mustard gases by the ton, but American leaders

[234] Interview with Rocky Mountain Arsenal National Wildlife Refuge manager Dean Rundle, U.S. Fish and Wildlife Service, Commerce City, Colorado, 23 July 2004.

wanted a knock-out punch.[235] By 1918, the same year that U.S. President Woodrow Wilson created a national Chemical Warfare Service, Winford Lee Lewis led his team of scientists into what seemed a winning potion: a mix of acetylene, chlorine, and arsenic that became known thereafter as Lewisite.[236] The new concoction was hastily packed into warheads and shipped to the front in France, but never made it to the battlefield. Instead, arriving just after the Armistice was signed, the lot of it – more than 150 tons – was either dumped into the Atlantic Ocean or shuttled back to weapons depots for storage.[237] The story of Lewisite nearly ends there, somewhere off the Normandy coast.

Chemical warfare is designed to cripple enemies with fear as well as poison and Lewisite came with its requisite catalog of horrors. A blistering agent, Lewisite causes acute respiratory failure and death after doses as little as a teaspoonful.[238] As a liquid it could penetrate protective clothing and rubber suits, while also remaining stable across an impressive temperature range (one of the glaring defects of mustard gas and chlorine was their high freezing points, which made them seasonally impractical in the European

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[235] See Messenger, Janet G., "Local Chemist Invented Deadliest WWI Poison Gas," *Evanston Roundtable* (IL), 23 April 2003, vol. 6(9).This desire would surface again with the next world war and lead to the production and use of the world's first nuclear weapons.

[236] Vilensky, Joel A. and Pandy R. Sinish, "The Dew of Death," *Bulletin of Atomic Scientists*, March/April 2004, vol. 60(2): 54-60. According to the South Plants Fact Sheet, p. 3, www.pmrma.army.mil/site/s-plants.html [3 November 2003], Lewisite is produced by reacting arsenic trichloride with acetylene "in the presence of a hydrochloric acid solution of mercuric chloride."

[237] Messenger, 2003. Chemical weapons recovered from German storehouses at the end of World War Two were similarly disposed by oceanic dumping and continue to cause injuries to fishermen; see Glasby, G.P., 1997, "Disposal of Chemical Weapons in the Baltic Sea," *Science of the Total Environment* 206(2-3): 267-273.

[238] Vilensky and Sinish, 2004; Messenger, 2003.

theater).[239] Lewisite was relatively inexpensive and easy to manufacture, and its constituent parts were abundant and readily available in the U.S.[240] In a macabre twist that even military chemists likely could not have foreseen, it also gave off the pleasantly familiar aroma of geraniums. By 1919, an article in *Harper's Magazine* proclaimed Lewisite, "the most powerful weapon of war ever wielded."[241]

From the close of World War I to 1941, Lewisite played no visible role in U.S. military activities. When the U.S. drew itself into World War II, however, the Army once again determined that chemical weapon production should play a role as a deterrent against Germany and Japan. Having made the decision to begin full-scale production of chemical weapons, the U.S. Army turned to the question of where to locate such a facility. Much as we saw in the previous chapter with earlier military base sitings, geography was a matter of utmost concern.

The ideal location would need access to transportation networks such as highways, railroads, and an airport, yet be far enough inland to sit beyond the reach of long-distance bombers from either Germany or Japan. The site needed to be large enough to accommodate chemical production facilities and a buffer of land to surround the chemical plants. Access to gas, water, and electricity was essential, along with a ready source of labor, yet the site also needed to be remote enough from population centers to reduce risk in case of accidents. In

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[239] Vilensky and Sinish, 2004.

[240] This continues to be the case, so while Lewisite no longer has much military value (an effective antidote was developed by 1942) it remains a substance of considerable concern to anti-terrorism officials. See, for example, "Homeland Security Planning Scenarios," viewed online at www.globalsecurity.org/security/ops/hsc-scen-5.htm, which portrays an aerial spraying of a football stadium with a Lewisite-mustard mix.

[241] Quoted in Vilensky and Sinish, 2004.

the event that the chemical weapons caches would face protracted storage, a stable geology with a dry climate was important. And, finally, the land needed to be inexpensive enough politically and economically to allow rapid transfer to federal ownership.[242] Eight miles northeast (and downwind) of Colorado's state capitol building the U.S. Army found just the place.

Downstream from Denver

The lands of the Rocky Mountain Arsenal were first traversed and at least seasonally occupied by Archaic Indians dating back to at least 3,500 B.C.E. From about 1500 A.D. until the mid-1800s, Apache, Comanche, Arapahoe, and Cheyenne people used the lands of today's Arsenal site at various times for hunting, encampments, trading, and other activities, until they were successively pushed out, rounded up, or killed off by westward moving settlers and U.S. troops.[243]

Along its northwestern boundary, today's Arsenal sits less than two miles from the main channel of the South Platte River. (See Figure 4.1: Locator Map of Metro Denver and the Rocky Mountain Arsenal). From the earliest days of human occupation in the area, the river served as a travel corridor and critical source of water on the plains. This proved true for the first U.S.-sponsored explorations of the Great Plains and Rocky Mountains, as well as the trappers, miners, and other settlers who streamed west in ever-greater numbers through

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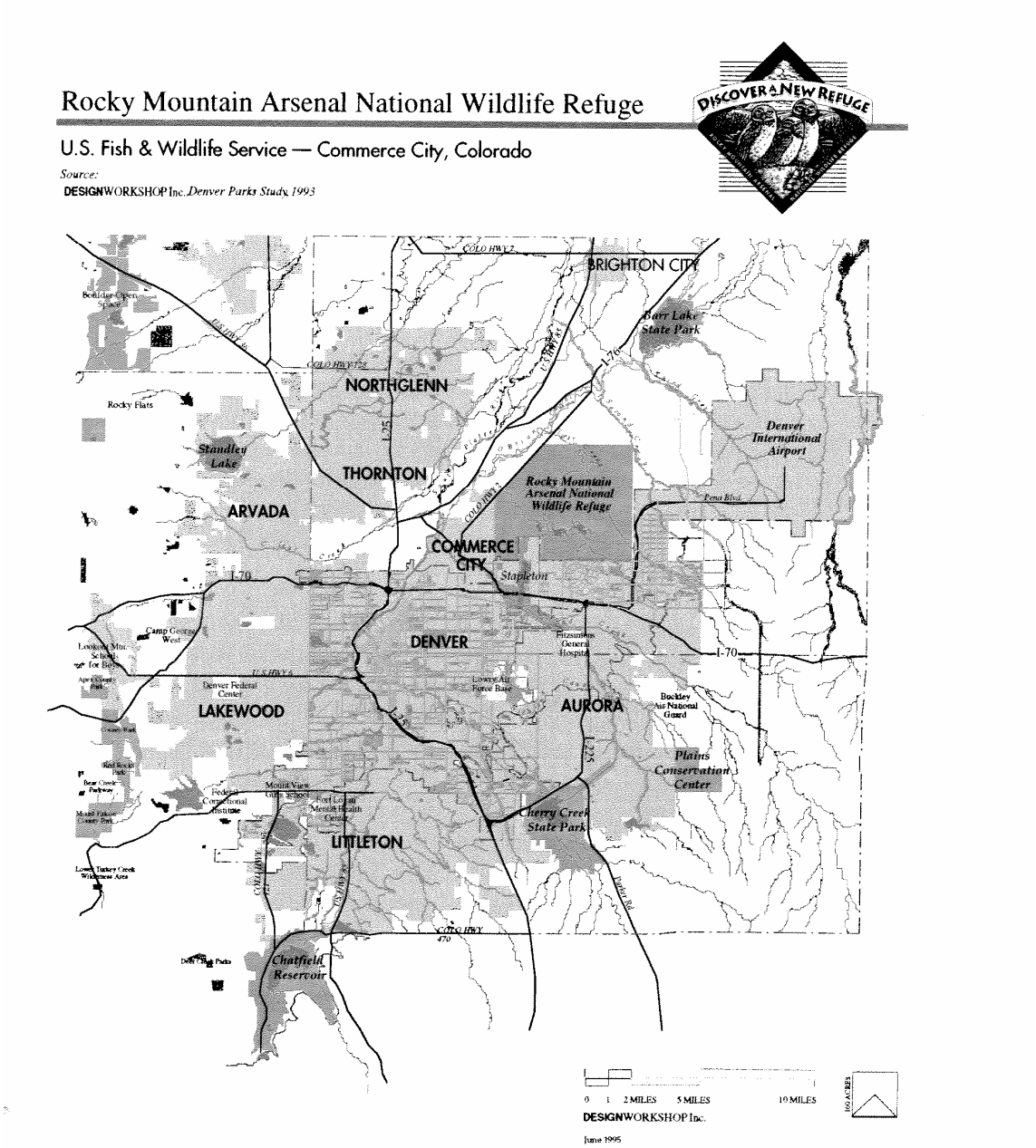
[242] Hoffecker, John F. 2001. *Twenty-Seven Square Miles*. Colorado: U.S. Fish and Wildlife Service, Rocky Mountain Arsenal National Wildlife Refuge, p. 54; *Eagle Watch*, vol. 4(8), August 1992, p. 6.

[243] *Eagle Watch*, p. 4.

Figure 4.1: Locator Map of Metro Denver and the Rocky Mountain Arsenal[244]



[244] From: *Rocky Mountain Arsenal National Wildlife Refuge, Draft Environmental Impact Statement* (Washington, D.C.: U.S. Fish and Wildlife Service, Department of the Interior, December 1995), p. S-2.

the 1800s. Though today's proponents of the Arsenal tend to emphasize the appeal of its acres of shortgrass prairie and abundant wildlife, early visitors to the area were not always so effusive in their praise.

Botanist Edwin James, who chronicled the United States' 1819-1820 expedition led by Major Stephen Long from Pittsburgh to the Rocky Mountains, expressed a common early view. He wrote on 19 June 1820, "The monotony of a vast unbroken plain, like that in which we now travelled, nearly one hundred and fifty miles, is little less tiresome to the eye, and fatiguing to the spirit, than the dreary solitude of the ocean."[245] His impression of the area of today's Arsenal, which the expedition encountered around 1 July 1820, was equally unenthusiastic: "a tract differing in no respect but its greater barrenness from that passed on the preceding day… many acres of this plain had not vegetation enough to communicate to the surface the least shade of green; a few dwarfish sunflowers and grasses…being now entirely withered and brown."[246] As for the wildlife that today might offer such a draw for visitors? James's sole mention of it that particular day was of, "innumerable ant heaps" scattered uniformly across the prairie.[247]

By the mid-nineteenth century Denver had become established as the South Platte's largest city and in 1865 it gained new status as the capital of Colorado Territory. Statehood

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[245] James, Edwin, 1823, *An Account of an Expedition from Pittsburgh to the Rocky Mountains, vol. I*, (Philadelphia: H.C. Carey and I. Lea, reprinted and copyrighted 1966 by University Microfilms, Ann Arbor, MI), p. 460.

[246] James, p. 493.

[247] More generally James described abundant wildlife in his journey up the Platte, including "immense herds of bisons, blackening the whole surface of the country" [23 June 1820, James, p. 470], as well as numerous pronghorn, deer, elk, wolves, and small mammals.

followed in 1876, and by the end of the century only San Francisco could boast a larger population for any city in the West. As the South Platte flowed north and east from the Rocky Mountains, its broad floodplain came to support a significant agricultural base for the miners, cattlemen, railroad tycoons, and thousands of other residents of Colorado's major hub. With Denver's growth into a modern, industrial city, the South Platte also provided a convenient, though seasonally lean, source of water – upstream as municipal water supply and downstream as an industrial coolant and for dispersal of residential and commercial effluent.

The land and settlements along the South Platte River northeast of Denver developed their own character reflecting their position downwind and downstream from the capital city. A handful of communities north of Denver spread across more than fifty square miles and gradually distinguished themselves as dominated by industry, commerce, and agriculture. Oil refineries, railroads, switching yards, freeways, Denver's major airports, chemical manufacturing plants, bulk mail sorting warehouses, and other space-extensive or noxious operations soon came to characterize the downstream region. Much of the landbase that remained free of heavy industry contained a sparse agricultural population. Eventually these plains communities would give themselves a collective label and incorporate as Commerce City.[248]

Ten years before that came to pass, however, in May 1942, the United States' War Board announced that it had selected a site for a new chemical weapons plant to be built on the plains downstream and north of Denver. The federal government planned to commit

[248] The five communities of Adams Heights, Derby, Dupont, Irondale, and Rose Hill incorporated as Commerce City in 1952, see www.ci.commerce-city.co.us/other/demographics.html [23 August 2005].

nearly 20,000 acres of land to the project. As the nation plunged itself quickly into the war effort, more than two hundred farm families in the area were given just thirty days' notice of eviction as their land was condemned.[249] Before the last families had even packed up or finished their early summer harvests, the Army was moving crews on site to begin building what would become the Rocky Mountain Arsenal.

Preparing for War

By 30 June 1942, the U.S. Army had begun construction of the Arsenal's first chemical production facility.[250] Within weeks, thousands of workers – primarily contracted by private firms from out-of-state – were working around-the-clock leveling cropland, pouring concrete, framing buildings and laying pipe. In just six months the weapons facility launched into production, churning out its first three chemical compounds for military

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[249] *Eagle Watch*, pp. 5-6; according to Hoffecker, p. 54, families were notified by mail and given just 13 days to move out. In fact, there may have been less than one week's notice for some, as condemnation proceedings took place on 15 June 1942 and, according to "Rocky Mountain Arsenal National Wildlife Refuge: A Place Like No Other," 1999 (Commerce City, CO: U.S. Fish and Wildlife Service, Department of the Interior), construction of Arsenal facilities began on 19 June 1942.

[250] There is some dispute over the date construction began at the Arsenal. The 30 June 1942 date is from *Eagle Watch*, an "unofficial" publication of the U.S. Army's Rocky Mountain Arsenal Public Affairs Office, p. 6. By Hoffecker's account, construction started on 22 June 1942. Both the Fish and Wildlife Service's "A Place Like No Other" and the RVO's "South Plants Fact Sheet" (www.pmrma.army.mil/site/s-plants.html [3 November 2003]) claim the date was 19 June 1942. Regardless, it should be clear that families were given short notice before eviction and that construction commenced almost immediately thereafter.

application: mustard and chlorine gases, and the brown, geranium-scented liquid named Lewisite.

In order for the Rocky Mountain Arsenal to become a central player in America's military buildup during and following World War II, the Army first needed to clear the land of its existing practices and people. Framed according to Woodward's typologies of military control, the Army needed to establish a physical presence at the site and summon the authority of national security in order to transform farmlands into an arsenal (essentially beating plowshares into swords). According to the stories shared by some who were residents of the area at the time, when the call went out from the U.S. Army in 1942 to vacate the Arsenal's location, patriotism in most cases trumped generations of farming and agricultural life. As former resident Gunnar Herskind recalled in the Army's informative, if also fundamentally "insider," history of the Arsenal, "War feelings were such that there was no resistance to the vacate order. We loved the farm and the land. It was beautiful farmland, very rich and flat. But we all remembered what happened at Pearl Harbor. We just wanted the war over, and when Uncle Sam said he needed our land, we were willing to help in any way we could."[251]

The families responded cooperatively, but they also were given only two choices: move their homes off the Arsenal site at their own expense, or sell out to the U.S. Government. Photos and oral histories from the time give a sense of the despair that many families felt as they left only reluctantly and with the promise that they were contributing to a larger, national duty. Some families who lacked phone service, such as the Herskinds, only

[251] Herskind quoted in *Eagle Watch*, p. 5. As an "insider" history, *Eagle Watch* was prepared, edited, and distributed as part of the Rocky Mountain Arsenal Army Program Manager's public relations.

learned of the eviction order indirectly from neighbors who shared the news after it was printed in the Denver papers. As Gunnar Herskind remembered, "I don't think we really believed it then, but once we drove down to our south field and saw the Army trucks dumping lumber in the middle of a ripe wheat field across the street, we realized how fast things were moving."[252]

To be sure, the Rocky Mountain Arsenal was not built upon vacant lots; the land was evacuated on the authority of the U.S. government's right of eminent domain. By the time the last family had fully departed from the Arsenal site, a new array of production facilities was already being constructed where only a season before fields had been readied for planting. In the place of pumpkins, wheat, and corn, what sprouted anew at the Rocky Mountain Arsenal were pipes and water towers, storage tanks and smokestacks, chemical labs, haul roads, and miles upon miles of security fencing. What had been part of the Denver area's base of farmland and food production the Army quickly reconfigured to provide the nation with some of its most dangerous non-nuclear weapons ever constructed.

As a matter of foreign policy, the United States today claims to take a principled stand against chemical weapons production or the potential for other nations to develop such weapons of mass destruction. When the Rocky Mountain Arsenal began its own productions, however, the news was featured in headlines suffused with glee. "Denver to Get Huge Chemical War Plant," broadcast the *Denver Post* in May 1942.[253] The front page of the

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[252] Herskind quoted in *Eagle Watch*, p. 5.

[253] Quoted in Hoffecker, p. 51. I was unable to find the original article described by Hoffecker, but on September 4, 1942, the Rocky Mountain News reported a possible addition to the Arsenal with the headline, "Colorado to Get Huge War Plant." See Rocky Mountain Arsenal Joint Administrative Records and Document Facility (JARDF) document # G9521350.

Rocky Mountain News later trumpeted, "Nerve Gas Made Here!"[254] Framed as the ultimate deterrent to chemical attacks from foreign enemies, the Arsenal's build-up was portrayed as a strictly defensive action, accommodated by a mix of patriotism and fear, and catalyzed by the threat of America's vulnerability to foreign aggression. It was the literal part of what President Franklin Roosevelt called for in making America, the "great arsenal of democracy."[255]

Chemical warfare also came with its open defenders at the time, a fact that can be lost in contemporary characterizations of its horrors. As the chief of the Army's Chemical Warfare Service proclaimed in a 1943 *Rocky Mountain News* interview:

> Oh, gas warfare isn't anything to dread so very much. Gas warfare is a lot more humane than explosive warfare, if you can talk about humanity in war… People keep saying, look at this man and that man – he was gassed in the war and his life is wrecked. It isn't true. This man and that man would have gone around coughing if he had never been in a war. Those are not the effects of gas. There are no permanent effects of gas, no permanent effects, except death… It's cheaper and easier to manufacture than explosives, especially for a highly industrialized nation, cheaper to transport, and cheaper to use.[256]

This belief in the relative beneficence of chemical products no doubt also played a role in the way materials were handled at the Arsenal during its early decades of production.

With the specter of the next Pearl Harbor firmly planted in the shadows of Americans' consciousness, the Army sought to produce great quantities of chemical and incendiary weapons. Lewisite, mustard and chlorine gas were but the first course in what

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[254] *Rocky Mountain News*, 20 March 1954, p. A1.

[255] Quoted in Hoffecker, p. 48.

[256] Stephenson, John, "Gas Warfare Near; Says Chemical Chief," *Rocky Mountain News*, 7 January 1943, see Rocky Mountain Arsenal JARDF document # G9521354.

would prove to be a rather long menu of weapons and other compounds produced, cached, or dismantled at the Arsenal. By the time it finished its forty-year manufacturing run, the Arsenal's products included napalm, sarin and VX nerve agent, white phosphorus grenades, the TX wheat rust pathogen, rice blast spores, the rocket fuels hydrazine and Aerozine 50, and a vast assortment of button bombs, cluster bombs, and other explosives.[257]

Keeping the Peace?

Although military production continued in various forms at the Arsenal for another four decades, after World War II the Army also began to lease part of its South Plants manufacturing center to private industry. In all, nine companies used the facilities for chemical manufacturing or other processing operations, but two lessees dominated the private sector's use of the Arsenal: Julius Hyman and Company, and Shell Chemical Company (later Shell Oil Corporation).[258] These private operators manufactured products dedicated to their own form of warfare as they developed a suite of pesticides and herbicides that would grow infamous with the publication of Rachel Carson's book *Silent Spring* in 1962. Carson, in fact, devoted several pages of her influential work to a description of the Arsenal's groundwater contamination problems.[259] Decades later, when Shell, the U.S. Army, concerned citizens, and government regulators and wildlife officials clashed over

[257] Rocky Mountain Arsenal Federal Facilities Agreement, Foster Wheeler Environmental Corporation, February 1989, pp. 2-1 – 2-2; Hoffecker, pp. 77-78

[258] RMA FFA, pp. 2-2.

[259] Carson, Rachel, *Silent Spring* (Boston: Houghton Mifflin Company, 1962), pp. 42-44.

chronic contamination problems emanating from the Arsenal's chemical sites, chemical compounds carried in hidden waterways would again rise into public view.

Revisited today, the products generated by the Arsenal's private lessees read like a Who's Who of pesticides. Between 1947 and 1952, Hyman manufactured aldrin, dieldrin, and chlordane, Lewisite's familiar components of acetylene and chlorine, as well as a number of other chlorinated chemicals for application to livestock feed.[260] From 1946 to 1948 a smaller lessee, named Colorado Fuel and Iron, made chlorinated benzenes, naphthalene, and dichlorodiphenyltrichloroethane, which remains far better known today by its initials, DDT.[261]

Shell Chemical bought Hyman in 1952 and continued for the next three decades as the primary private lessee of the Arsenal manufacturing plants. During this time Shell made an array of chlorinated hydrocarbon and organophosphate insecticides, herbicides, and soil fumigants including aldrin, ethyl and methyl parathion, dieldrin, endrin, and ravap.[262] It remains a point of some debate to this day whether the most serious problems of contamination at the Arsenal trace back not to the Army's chemical weapons production but to the private lessees' manufacturing of pesticides and other commercial products.

In many respects it does not much matter. As Wendell Berry pointedly suggests, there is often only a trifling distinction to be made between commercial production of chemical pesticides and military production of chemical weapons: "The difference is diminished to the point of insignificance. How would you describe the difference between modern war and

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[260] RMA FFA, pp. 2-2.

[261] RMA FFA, pp. 2-2; according to the South Plants Fact Sheet, p. 6, Colorado Fuel and Iron never successfully produced or marketed significant amounts of DDT.

[262] RMA FFA, 2-2 to 2-3.

modern industry – between, say, strip mining and bombing, or between chemical warfare and chemical manufacturing?"[263]

Indeed, the overlapping production of military and non-military chemical products at the Arsenal blurred the distinction between the two spheres in a number of ways. Even the workers at times moved seamlessly from producing chemical pesticides for Shell to making sarin nerve gas for the U.S. Department of Defense – in some cases without even needing to change to a different building at the Arsenal.[264] Although Shell and Army chemical production was usually conducted in separate buildings, from 1952-1954 Shell produced dichlor – an intermediate step in making sarin (GB) nerve gas – until the Army was able to get its own production facility operational.[265] This relatively porous membrane between Shell's and the Army's manufacturing contrasts markedly from the separation these entities sought to maintain from the public at the Arsenal site. In effect, the Army invited Shell to occupy a privileged enclosed space inside the Arsenal's borders where military and corporate authority could be little challenged or scrutinized – a glistening example of what President Eisenhower called the military-industrial complex.[266]

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[263] Wendell Berry, "Word and Flesh," in *Helping Nature Heal,* Richard Nilsen, ed., (Berkeley, CA: Ten Speed Press, 1991), p. 17.

[264] Hoffecker, p. 75.

[265] South Plants Fact Sheet, p. 7.

[266] Kirsch describes a similar creation of social and physical space for military and scientific "insiders." See Kirsch, Scott, *Proving Grounds: Project Plowshare and the Unrealized Dream of Nuclear Earthmoving* (New Brunswick, NJ: Rutgers University Press, 2005), pp. 13-16. And as Shaw points out, quoting E.P. Thompson in 1982, "The USA and USSR do not *have* military-industrial complexes: they *are* such complexes. The 'leading sector' [weapons systems and their supports] does not occupy a vast societal space, and official secrecy encourages low visibility; but it stamps its priorities on the society as a whole;" see Shaw, Martin. *Post-Military*

Questions of Responsibility

There were, of course, other ways in which it became resoundingly important to determine whether Shell or the U.S. Army bore the major share of responsibility for the Arsenal's contamination problems. When it came time to pay for the costs of remediation, neither party was interested in having the work of the military and commercial spheres conflated to a single strand of culpability. Perhaps not surprisingly, this point led to one of the most costly legal settlements ever pursued by the U.S. Government against a private corporation.[267]

Though Shell was ultimately found responsible to the tune of hundreds of millions of dollars, the Army staked at least an even claim to the toxic hazards that remain present today. Army activities continued at the Arsenal throughout the three and a half decades of private leasing, and production and disposal standards were often not maintained with public or environmental safety as a foremost concern. In some instances the hazards may simply have not been fully understood, but manufacturers of deadly chemical weapons ought to be granted only a metered dose of innocence on this count. However culpable individual actors and agencies may have been, the problems that surfaced at the Rocky Mountain Arsenal fit

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Society: Militarism, Demilitarization and War at the End of the Twentieth Century (Philadelphia: Temle University Press, 1991), p. 69.

[267] Crenshaw, Albert B., "Ruling Against Shell May be Pollution Case Landmark," *The Washington Post* 21 December 1988, p. G1.

neatly into what Beck has described as "risk society."[268] As I explain more fully in Chapter Six, risk societies develop when individuals and institutions systematically take risks or introduce technologies whose consequences cannot fully be fathomed during their "first phase," during which they invariably produce hazards. In Beck's second phase, which can be seen today at the Arsenal, the earlier risks and hazardous outcomes surface to dominate public and political considerations.[269]

The U.S. Department of Defense, for its part, has one of the worst records for environmental degradation of any institution on the planet. The DOD reported to Congress in 1994 that it controlled more than 10,000 sites with active contamination problems, thirty percent of which held hazardous toxic wastes,[270] though by other accounts more than two times that number of DOD sites are in need of cleanup.[271] At least twenty-five DOD bases are included in the National Priorities List for Superfund cleanup.[272] Measured slightly differently, the DOD's demand on the environment is similarly impressive: the military uses 2-3 percent of all the energy consumed in the United States, approximately one-fourth of all

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[268] See Beck, Ulrich, "Risk Society and the Provident State," pp. 27-43, in Lash, Scott, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996).

[269] Beck, p. 27.

[270] Woodward, pp. 76-77, citing Wegman and Bailey, 1994, "The Challenge of Cleaning Up Military Wastes When U.S. Bases Are Closed," *Ecology Law Quarterly*, 21(4): 865-945.

[271] Barnett, p. 95, cites L. Siegel, p. 15 (1996, "Overseas contamination: the Pentagon's record," *Environmental Change and Security Project Report*, No. 2: 15-17) who says number of DOD sites in some need of cleanup is 25,000.

[272] Woodward, p. 77.

jet fuel worldwide, and generates more than 10 percent of the United States' CO2 emissions – an amount equivalent to 2-3 percent of the global total.[273]

The Rocky Mountain Arsenal is sadly representative in this respect. Lewisite was stored in bulk 55-gallon drums, which workers then drained into unlined storage yards scattered across three square miles of the Arsenal.[274] Until 1969, open burning and "controlled detonation" were a common Army practice to dispose of chemical and incendiary products. In the years from 1957 to 1959, alone, the Army detonated and burned more than 22,000 500-pound incendiary bombs at the Arsenal with no outside regulations or perimeter monitoring systems in place.[275]

Burn trenches at the Arsenal ran eight to ten feet deep and one hundred to two hundred feet long. Standard protocol found workers loading several tons of lumber along the bottom of each pit, then dumping contaminated materials – including obsolete chemicals and munitions, bomb casings, waste containers, contaminated tools, and other combustibles – on top of it before igniting the lot with rejected batches of napalm or hundreds of gallons of fuel oil.[276]

The Army also tried to consolidate contaminants in evaporation basins, which were unlined natural depressions found on site. The Army labeled these basins alphabetically and filled them sequentially moving generally from southeast to northwest from the Arsenal's

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[273] See Woodward, p. 73; Shulman, Seth, *The Threat at Home: Confronting the Toxic Legacy of the U.S. Militar*y (Boston: Beacon Press, 1992); Barnett, p. 95; and Renner, M., "Assessing the Military's War on the Environment," in L. Brown (ed.) *State of the World 1991* (NY: Norton, NY, 1991), pp. 132-152.

[274] RMA FFA, 2-1.

[275] RMA FFA, 2-1.

[276] RMA FFA, 2-3.

main production facilities. By 1956 the capacity of these natural basins was overwhelmed, however, so the Army scraped out a "leakproof" asphalt-lined reservoir large enough to hold 243 million gallons of toxic sludge and named it Basin F (see Figure 4.2: Site Map of the Rocky Mountain Arsenal Including Access Areas).[277] This site, after being filled with the offal from nerve agent, rocket fuel, and a host of other chemicals, would ultimately leach toxins into underlying groundwater and earn a reputation as the most contaminated square mile on Earth. (See Figure 4.3: Rocky Mountain Arsenal Groundwater Contamination Areas.) Its aftermath and cleanup continue to stir controversy to this day.

As military needs changed over time so did the focus of the DOD's manufacturing efforts at the Arsenal. The character of the chemical weapons produced on-site shifted from relatively simple respiratory agents (such as the easily-counteracted Lewisite) to more complex and lethal nerve agents after World War Two. By the late 1960s as the U.S. moved toward abandoning its chemical weapons program, the Arsenal shifted its focus to making incendiaries such as napalm and experimenting with quieter Cold War tactics such as wheat and rice pathogens.

The Rocky Mountain Arsenal added further to its array of projects when in its latter decades the site was refurbished to manufacture fuels for intercontinental ballistic missiles and rockets for the space program.[278] During an era when the military applications of the

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[277] Articles at the time marveled at the foolproof design to Basin F's liner. See, for example, "Asphaltic Membrane is Used to Leakproof a Lake," *Engineering News Record*, 22 November 1956, pp. 40-41 (Rocky Mountain Arsenal JARDF document # B5600033); and "Leakproof Bottom Underlies 100-acre Lake Near Denver," *Omaha* (Nebraska) *World-Herald*, 11 November 1956 (Rocky Mountain Arsenal JARDF document # B5600032).

[278] RMA FFA, 2-2.

Arsenal were attracting increasingly hostile responses from a concerned public, the Arsenal's contributions to the space program garnered a welcome dose of favorable press. Particularly as the Apollo launches brought Americans successfully to the moon and back, local news reports were keen to acknowledge the Arsenal's role. An article in the 28 July 1969 *Rocky Mountain News* highlighted, for example, that the Arsenal labs had "mixed the liquid propellants which lifted the landing module, Eagle, off the moon, and returned the command module, Columbia, back to earth."[279] This came, no doubt, as a needed salve to Arsenal supporters who in the previous four months had endured a major protest at the gates of the Arsenal and an editorial in one of Denver's major newspapers calling for the facility's closure.[280]

Public Concerns

Such glowing accounts of the Arsenal's contributions became increasingly rare as new environmental regulations and a heightened ecological awareness took hold in the 1970s. Reports that the Arsenal harbored enough nerve gas "to kill every man, woman and child in the world"[281] no longer sounded like a glowing statement of defense capability as much as

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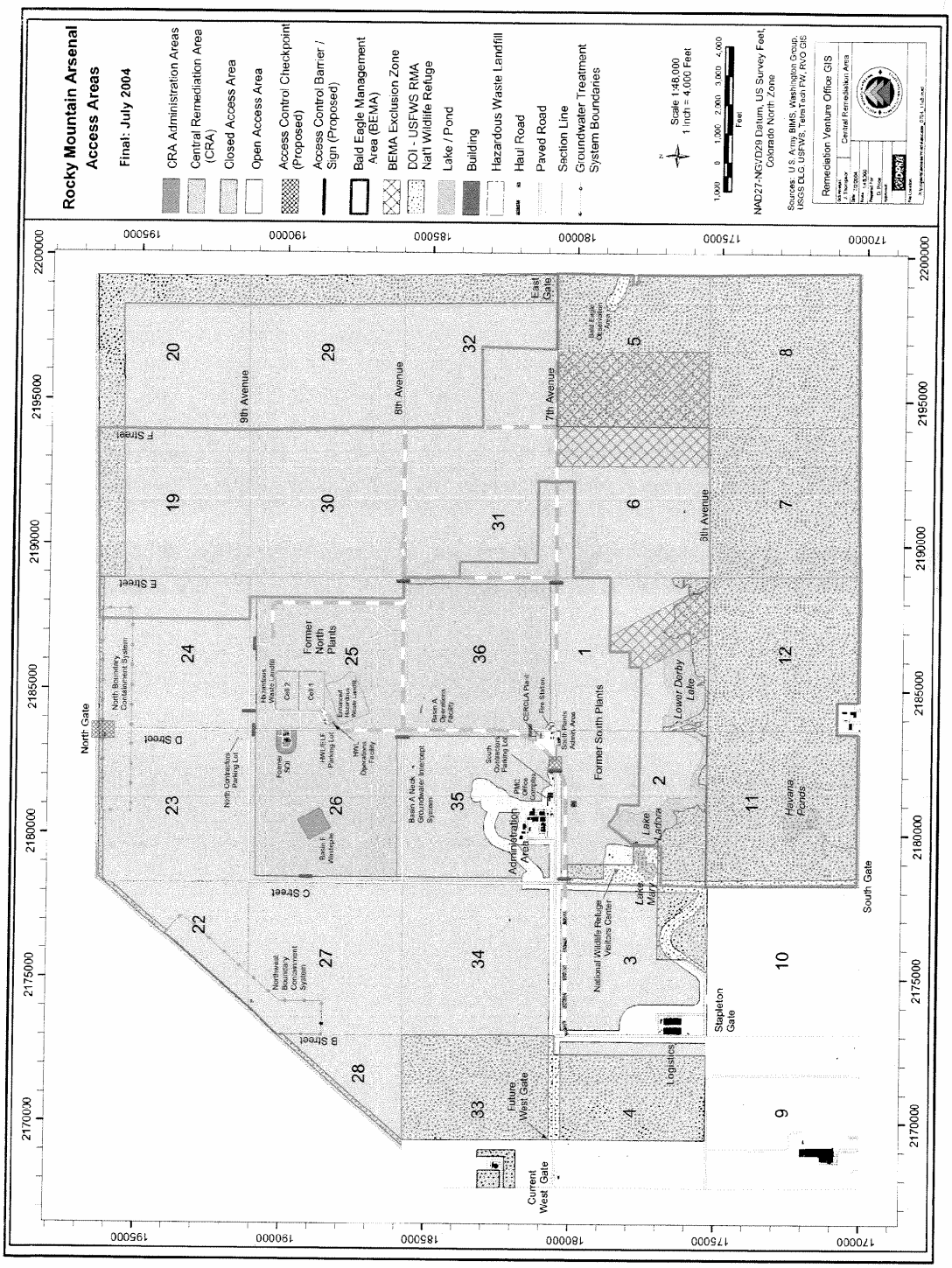
[279] "Rocky Mountain Arsenal Gave Apollo 11 a Boost," *Rocky Mountain News*, 28 July 1969, as filed in Rocky Mountain Arsenal JARDF, document # G9522167.

[280] See Jain, Bob, "Protesters Gather at Arsenal," *Denver Post*, 6 April 1969, on Arsenal protest; see "Arsenal Should be Closed," *Denver Post*, 15 May 1969, p A26, for editorial.

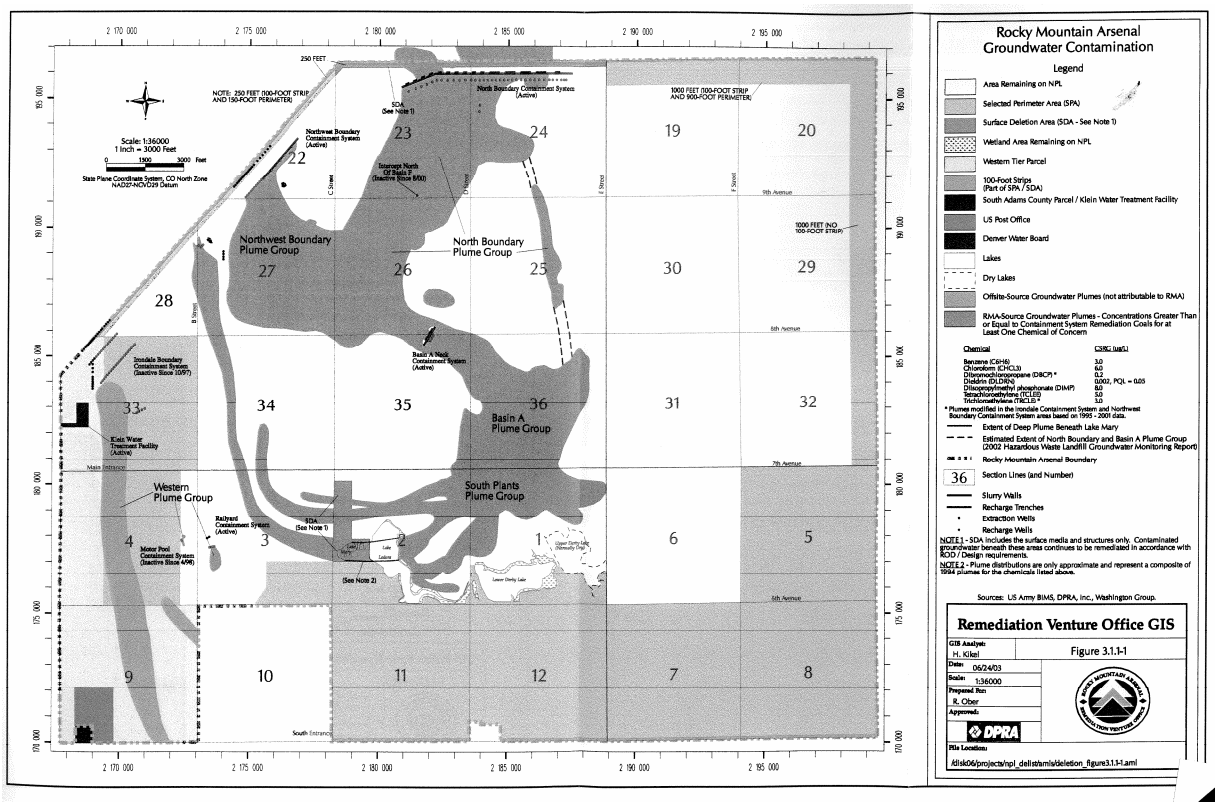
[281] *Eagle Watch*, p. 11.

Figure 4.2: Site Map of the Rocky Mountain Arsenal Including Access Areas[282]



[282] Source: Rocky Mountain Arsenal Remediation Venture Office, Commerce City, CO.

Figure 4.3: Rocky Mountain Arsenal Groundwater Contamination Areas[283]



they did a threat to residents of an increasingly apprehensive Front Range populace. Even in the first decade of the Arsenal's chemical operations, local farmers began to complain of sickened livestock and dying crops.[284] Well water testing conducted near the Arsenal's boundaries in 1959 turned up concentrations of chemicals known to have been manufactured

[283] Final Technical Memorandum in Support of Partial Deletion of Selected Perimeter and Surface Deletion Areas, Rocky Mountain Arsenal, Department of the Army, Base Realignment and Closure (Prepared for the Department of the Army by The Rocky Mountain Arsenal Remediation Venture Office, Commerce City, CO, July 2003), fig. 3.1.1-1.

[284] Record of Decision, p. 2-4; interview with Dan Collins, 2004; see also Carson, p. 43.

at the site's South Plants facility, including chlorates, fluorides, and arsenic.[285] Groundwater contamination along the west and north perimeter of the Arsenal spurred a number of local residents to file claims for damages, which ultimately led to the widespread, permanent replacement of well water with water from Denver's municipal supply.

In addition to groundwater contamination, the Arsenal's lakes also proved to be laced with toxic chemicals. Thousands of waterfowl and other birds died in and around these lakes in the 1950s and 1960s, prompting the Colorado Game, Fish and Parks Commission in April 1964 to file objections with the U.S. Secretary of Defense and Shell Chemical.[286] Within months of the State's complaint, the Army had drained and dredged the lakes and replaced more than a foot of contaminated mud with clean soil.[287]

In the 1960s, public concern over air pollution from the Arsenal's open burning, and groundwater contamination from landfilling toxic chemicals in evaporation basins, moved the Army to explore new approaches to chemical and incendiary disposal. By this time, particularly after the U.S. agreed to a chemical weapons ban in 1972, the demilitarization of chemical and incendiary weapons had become a major effort at the Arsenal.[288] In many cases

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[285] Record of Decision, p. 5-1; Carson, p. 43; citing March 1960 Congressional Hearings, 86th Congress, Subcommittee of Committee on Appropriations, "Report on Environmental Health Problems," p. 78; and: Walton, Graham, "Public Health Aspects of the Contamination of Ground Water in South Platte River Basin in Vicinity of Henderson, Colorado, August, 1959: US Public Health Service, mimeo, Nov. 2, 1959.

[286] *Eagle Watch*, p. 10; Hoffecker, p. 79; RMA FFA, p. 2-4.

[287] *Eagle Watch*, p. 11.

[288] The ban was not ratified by the U.S. Senate until 1974 and went into effect in 1975.

this deconstituting or relocating of chemical armaments proved more difficult to contain geographically or politically than chemical weapon production itself.[289]

A few numbers illustrate the size of the chemical demilitarization projects: from 1955 to 1970, more than 204,000 sarin-filled munitions were neutralized or recovered for possible reuse; VX nerve agent, which like the sarin had been stored in ton-sized containers located on-site, was also deconstituted; in just six months between 1965 and 1966, more than 33,000 500-pound phosgene/adamsite bombs were dismantled (or detonated); during another period, more than 850 tons of small arms were incinerated after they returned from Vietnam contaminated with DDT.[290] As the luster of the Arsenal's mission to defend national security faded to the more mundane tasks of storing and destroying munitions, the ability of the Army to control the reputation and territory of the place itself also began to wane.

Deep Well Injection

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[289] See, for example, Partner, Dan, "Shutdown of Facility Possible," *Denver Post*, undated [1969], pp. A1, A3, in Rocky Mountain Arsenal JARDF document # G9521318; Shearer, Lloyd, "Intelligence Report: Nerve Gas," *Parade Magazine*, undated [ca. 1969], in Rocky Mountain Arsenal JARDF document # G9521309; Colorado Congresswoman Patricia Schroeder also highlighted a series of these problems at the Arsenal in critical op-ed pieces she wrote for the *Denver Post* (e.g. Schroeder, Patricia, "Obstacles to Arsenal Cleanup," *Denver Post*, 15 February 1986, p. 4B). Schroeder would later become the major sponsor of legislation to designate the Arsenal for conversion to a wildlife refuge.

[290] North Plants Area Fact Sheet, Commerce City, CO: Rocky Mountain Arsenal Remediation Venture Office, 2003 (photocopy supplied from www.pmrma.army.mil/site/n-plants.html), pp. 3-5; see also "Arsenal to Destroy Bullets," 4 July 1982, *New York Times*, p. A19.

When landfilled chemicals from the Arsenal's Basin F and other locations were shown to be contaminating groundwater off-site, the Army sought alternative strategies to disposing its wastes. One solution the Army devised in this effort to was a Pressure Injection Disposal Well – a system that would inject some 175 million gallons of liquid waste to a depth of more than 12,000 feet into bedrock.[291] The well was drilled and pumped full of waste, but shortly thereafter the Denver area was hit by its first earthquakes since 1882, including its strongest tremors ever recorded (two in 1965 registered 4.0 on the Richter Scale).[292] In November 1965 an independent Denver geologist named David Evans publicized a theory that the quakes were caused by the Arsenal's deep well activity.[293] Though Army officials initially scoffed at the idea that seismic activity could be induced in such a manner, the *Denver Post* responded to Evans' theory with an editorial calling for a thorough, independent investigation and an immediate halt to all deep well pumping.[294] Denver's Congressman, Representative Roy McVicker, promptly called for scientists from the U.S. Geological Survey, Colorado School of Mines, and other area universities to investigate. By March 1966, McVicker was able to report that data, "tends to confirm [the earthquakes] were caused by a waste disposal well at the Arsenal."[295]

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[291] *Eagle Watch*, p. 10; Larsen, Leonard, "Study Supports Arsenal Well Quake Theory," *Denver Post*, 17 March 1966, pp. A1, A3.

[292] "Denver Region Shaken By 5 Recorded Quakes," *Denver Post*, 30 September 1965, p. A1.

[293] See Larsen, p. A1.

[294] "The Well and the Quakes: Linked?" *Denver Post*, 25 November 1965, in Rocky Mountain Arsenal JARDF document # G9521733.

[295] Larsen, p. A1.

According to geologists who studied the rash of tremors, the deep well injection had likely, in essence, lubricated an underlying fault – or at least large blocks of stone – and caused the quakes.[296] Although the Army initially denied responsibility for what they deemed natural geologic activity, it also stopped the injections within three months of Evans' study.[297] It remains impossible to prove a direct correlation between the deep well injection and the earthquakes, but most Denver area residents at the time were convinced that the Army's subterranean waste disposal was to blame.[298] For very obvious reasons the Denver quakes attracted public attention (for the first time in generations the ground beneath them was shaking), but the effective interventions of an independent scientist and an elected official demonstrated that even at the Rocky Mountain Arsenal it was impossible to maintain a space entirely closed to public oversight. The Denver earthquakes stopped within a few years after the deep well injections ceased, though only after quakes as large as 5.5 on the Richter scale prompted fears of a devastating major quake akin to the 1964 jolt that ripped Anchorage, Alaska. The deep well-earthquake problem eventually reached all the way to President Lyndon Johnson, who weighed in on the final disposition of the well.[299] Army

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[296] See Hollister, John C. and Robert J. Weimer, *Geophysical and Geological Studies of the Relationships Between the Denver Earthquakes and the Rocky Mountain Arsenal Well* (Golden, CO: Colorado School of Mines, 1968).

[297] According to *Eagle Watch*, p. 11, the Army stopped its deep well injections by February 1966.

[298] My own first impression of the Rocky Mountain Arsenal came from my fifth grade teacher in nearby Boulder, Colorado, explaining that the Army had been to blame for a series of earthquakes in the previous decade.

[299] Nover, Naomi, "Arsenal Well: LBJ to Face Quake Report," *Denver Post*, 15 March 1968, p. A21 (Rocky Mountain Arsenal JARDF document # G9521859).

publications now acknowledge the "possibility that the fluid injection was triggering earthquakes in the area."[300]

Litigation and Cleanup

In 1974, Colorado Health Department tests turned up dangerous levels of diisopropylmethlyphosphanate (DIMP) – a known by-product of sarin nerve gas manufacturing – and dicyclopentadiene (DCPD) in off-post groundwater north of the Arsenal. To press for a thorough response, the State turned to legal action. Colorado ordered Shell and the Army "to stop polluting ground and surface waters north of RMA with unauthorized discharges…"[301] With the 1972 Federal Water Pollution Control Act (Clean Water Act) and similar state-level regulations in place, the primary actors at the Arsenal had to sit up and take notice. The Arsenal site that for years had been virtually opaque to outside observers grew gradually more transparent with every leak and regulatory intervention.

By the time Shell and the U.S. Army each called a halt to their operations at the Rocky Mountain Arsenal, in 1982, the facility was already the focus of legal battles that would range as high as the U.S. Supreme Court. Shell and the Army, after working side-by-side at the Arsenal for decades, joined as co-defendants against the State of Colorado and the U.S. EPA, but fought each other bitterly in other cases that sought to determine who would bear the costs of a massive environmental cleanup.

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[300] "RVO Deep Well Injection Fact Sheet," online at www.pmrma.army.mil/cleanup/clnfrm.html [9 September 2005].

[301] *Eagle Watch*, p. 13.

The designation of the Rocky Mountain Arsenal as a national wildlife refuge triggered a flurry of public documents and hearings. As I noted earlier, the base conversion process often carries this very useful function of leveraging formerly hidden military practices and spaces into a more open purview.[302] In some instances, the form that public exposure takes is not necessarily limited to the usual array of environmental impact statements associated with base closure and reuse. At the Arsenal, a series of major lawsuits between several of the principal parties thrust many of the site's past practices and ongoing contamination problems into a more public forum than most military bases ever experience.

When the Army filed suit against Shell on 3 October 1983, it marked the first time a federal agency had tried to compel a private corporation to cover cleanup costs on federally owned public lands.[303] Not only that, the amount of money that the parties eventually agreed would be required to clean the site adequately – approximately $1.9 billion – set a new high mark for a settlement on damages to natural resources.[304] This vast sum was not exactly what either party originally had in mind for the cleanup. After the Army filed its claim, Shell recognized that it had contributed to some of the contamination problems at the Arsenal, but

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[302] See Foote, 1997; and Woodward, 2004.

[303] See Russakoff, Dale, "Army Wants to Force Shell to Share Toxic Cleanup Tab," 5 October 1983, *Washington Post*, p. A14.

[304] Thornton, Mary and Dale Russakoff, "U.S. Sues Companies Over Toxic Waste Cleanup," 10 December 1983, *Washington Post*, p. A1; Weisskopf, Michael, "Army, Shell Agree to Pay for Waste Cleanup," 2 February 1988, *Washington Post*, p. A6; Shabecoff, Philip, "Settlement is Set in Vast Cleanup of Toxic Waste," 2 February 1988, *New York Times*, p. A10; Peterson, Iver, "Development at Arsenal Tied to Shell Cleanup Suit," 11 December 1983, *New York Times*, p. A31; Pringle, Peter, "Out of the West: Lest We Forget the Days of Gas and Poison," 13 April 1989, *The Independent* (London), p. 12. The original settlement of $1 billion was nearly doubled following a lawsuit by insurance companies against Shell.

it vowed to "vigorously oppose" the price tag set by the Army for cleanup. As a Shell official commented, "We are surprised that the Army would propose a number of this magnitude since, realistically, cost-effective remedial measures and damages, if any, should cost only a small fraction of the Army's estimate."[305]

On behalf of the Army, the U.S. Department of Justice spelled out in grim detail a list of contaminants and actions by Shell that called for remedy. Chemicals found at the site included aldrin and dieldrin, pesticides that had been banned in 1974 due to their carcinogenic qualities, along with vinyl chloride, benzene, toluene, and chloroform.[306] According to the government, these chemicals, "are extremely toxic and hazardous to human, plant and animal life" and had been "spilled, leaked, pumped, poured . . . , dumped and released into the environment, including the air, land, ground water and surface waters, on and off Shell's leased property on the arsenal."[307] The government claimed that in addition to the risks to human health, which included leukemia, genetic damage, sterility, and central nervous system maladies, Shell's actions had damaged or destroyed land, air, and water at the Arsenal, as well as birds, fish, and other wildlife.

Only hours after the U.S. Government sued Shell to share the cost of cleaning up the Arsenal, the State of Colorado filed its own suit against both the Army and Shell in order to stake its own claim to ensure proper cleanup of the environment at the Arsenal.[308] When the legal dust had finally settled, more than four years and dozens of scientific reports later, Shell was required to share the costs of the Arsenal cleanup and the State had prevailed in retaining

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[305] Russakoff, "Army Wants to Force Shell to Share Toxic Cleanup Tab."

[306] Thornton and Russakoff, "U.S. Sues Companies Over Toxic Waste Cleanup."

[307] Quoted in Thornton and Russakoff, "U.S. Sues Companies Over Toxic Waste Cleanup."

[308] "Cleanup Governs Arsenal's Future," 21 December 1983, *New York Times*, p. A11.

a say in how clean the site needed to be. Shell's financial obligation was set on a sliding scale: the first $500 million of the costs would be split evenly, for the next $200 million the Army would pay 65 percent and Shell 35 percent, and for any amount beyond $700 million the Army would cover 80 percent and Shell the remaining 20 percent.[309]

Shell officials today are rather circumspect about the situation that led to their ongoing financial responsibilities at the Arsenal. As Shell's Rocky Mountain Arsenal project manager told me, "I kind of term the '80s the decade of litigation where, you know the State sued – that was just after CERCLA was passed – and the State sued the Army and Shell, and the Army sued Shell, and Shell sued the insurance companies and the Army, you know it was a … it was quite a list of litigation and things that went on."[310]

The point I wish to emphasize here is not who the winners and losers were from the rounds of litigation, but rather how the character of the space within the Arsenal grounds changed as a result of the lawsuits. Incrementally, brief by brief, the Rocky Mountain Arsenal moved in a direction from invisible and military/private space to one that increasingly has become visible and public. This was one intangible yet very important consequence of the lawsuits, beyond the more material determinations of who was going to have to pay how much.

Co-Productions of the Rocky Mountain Arsenal

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[309] Interview with Roger Shakely, Shell Oil Company, Rocky Mountain Arsenal Project Manager, 21 July 2004, Commerce City, Colorado; see also Shabecoff, "Settlement Is Set In Vast Cleanup Of Toxic Waste."

[310] Shakely interview, 21 July 2004.

While chemical weapons, incendiaries, rocket fuel, and pesticides were the intentional products of the Rocky Mountain Arsenal during its forty years of service, a number of other products – some intentional and some inadvertent – continue to emerge from it. One of the most recent of these is the new national wildlife refuge whose acreage is steadily increasing as the FWS assumes title to the land as the Army and Shell advance their remediation work. But the Arsenal has also managed to produce a suite of conditions along other lines: groundwater, soil, and air pollution; habitat for fish, wildlife, and new assemblages of native and introduced plants; a sizable tract of open space at the edge of a metropolitan area; and a landscape that inspires responses from society that range from scorn and fear to pride, pleasure, or profit-making.

Though some of these might be considered tangential to the primary project of creating a national wildlife refuge out of a chemical weapons plant, by turning to some of these co-productions of the Rocky Mountain Arsenal here, at least briefly, we can gain a deeper appreciation of the wide-ranging implications of the site as an arsenal, as a wildlife refuge, and as new type of place that is both of these at once. In short, we can gain important insights about the new geographies being produced at M2W sites such as the Rocky Mountain Arsenal NWR.

Habitat Production

Military bases today routinely employ environmental specialists to manage endangered species habitat, conduct research, direct cleanup operations, or ensure compliance with environmental regulations. This attention to the environmental management

of military lands continues even as the George W. Bush administration has worked to exempt the military from some of the constraints of bedrock wildlife protection laws such as the Endangered Species Act, Migratory Bird Treaty Act, and Marine Mammal Protection Act.[311] These laws have proven essential in the past to advance conservation on military lands and have played an important role in a number of M2W conversions. At the Rocky Mountain Arsenal it was the legal mandate of the Endangered Species Act that first brought the U.S. Fish and Wildlife Service on site in 1986 after an Army biologist discovered a population of endangered bald eagles roosting on site. The question still remains, of course: what circumstances led to there being suitable habitat for eagles at the Arsenal in the first place?

Congresswoman Patricia Schroeder, one of the key Colorado sponsors of the successful refuge legislation, described the process as follows, "Rocky Mountain Arsenal, because so much buffer land was required for its dangerous mission, became home to an astonishingly diverse and healthy ecosystem of indigenous wildlife. Deer, bald eagle, hawk, coyote, badger, rabbit, fish, waterfowl all thrive within a major metropolitan area."[312] The U.S. Fish and Wildlife Service promotes a very similar explanation for how such a seeming paradox could develop, "While the industrial core of the site was contaminated, deer, prairie dogs, coyotes, and many species of hawks, owls, and other birds thrived in the abandoned

[311] "W Watch: Keeping Tabs on Washington," September/October 2005, *Sierra Magazine*, p. 13.

[312] Congressional Record – Extension of Remarks, 14 March 1991, 102nd Congress, 1st Session, 137 Cong. Rec. E944.

fields, grasslands and wood lots that had been protected from forty years of urban sprawl and development."[313]

A critical examination of this typecasting of the military's compatibility with the environment raises several questions. There is, for one, a considerable degree of subjectivity in terms such as "healthy ecosystem" or "thrive" in this particular context. Deer grow to impressive stature within the Arsenal's fences and face few natural predators (coyotes take a number of fawns each year), but does this isolation and longevity truly point to ecosystem health? If the fatty tissue of kestrels at the Arsenal contains elevated levels of heavy metals, should we consider them to be thriving?

Examining the portrayal of military-environmental compatibility more systemically, we encounter a fundamental clash between the violence and destructiveness to which militaries intentionally dedicate themselves and the refuges for nature that military buffer zones seem to offer. As Woodward points out, military landscapes are not simply collections of physical attributes (e.g. a shortgrass prairie that sprouts around the edges of a chemical weapons plant), "they have a politics [and] the task of landscape interpretation means a reading of these landscapes guided explicitly by questions about power, domination and control."[314] I explore this type of critique in depth in Chapter Seven. For now, the task at hand is more descriptive.

Assuming that we read the landscape from a perspective informed by ecological studies and scientific monitoring of wildlife populations, there is clearly a sizable community

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[313] "Rocky Mountain Arsenal Overview," U.S. Fish and Wildlife Service, Rocky Mountain Arsenal National Wildlife Refuge website viewed online at www.fws.gov/rockymountainarsenal/overview/overview.htm [5 October 2005].

[314] Woodward, p. 124.

of wildlife now at the Arsenal. This material presence remains an important feature as we seek to understand how conservation and militarism fit together in this place and at other M2W sites.

The deer population at the Arsenal now numbers more than seven hundred individuals (approximately 500 mule deer and 200 white-tailed).[315] Protected by a fenced enclosure, a number of the Arsenal's deer have also grown in stature to trophy-sized animals. The lakes at the Arsenal are open to limited catch-and-release fishing and these now support a warmwater fishery abundant in bluegill and catfish, and renowned for some of the largest bass and northern pike in Colorado. Black-tailed prairie dogs, a keystone species of the plains now in serious decline thanks to the combined threats of systematic poisoning, habitat loss, recreational shooting, and sylvatic plague, enjoy some of the most secure habitat at the Arsenal of any found along the entire Front Range of the Rocky Mountains. Though the Arsenal's prairie dogs have endured several large die-offs attributed to the plague, they currently range freely across more than 3,500 acres.[316]

At times, the array of fauna at the Arsenal has been impressive enough to prompt comparisons to some of North America's most treasured national parks. When U.S. Fish and Wildlife Service biologist Mike Lockhart first came to the site to check on the early reports of roosting bald eagles, he was astonished at what he found, "I'll never forget that day. It rivaled going to Denali National Park [in Alaska] for the first time."[317] Another early visitor

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[315] Rocky Mountain Arsenal Comprehensive Management Plan, March 1996, Commerce City, CO: U.S. Fish and Wildlife Service, Department of the Interior, p. 103.

[316] Comprehensive Management Plan, p. 114.

[317] "Rocky Mountain Arsenal National Wildlife Refuge: A Place Like No Other," (Commerce City, CO: U.S. Fish and Wildlife Service, Department of the Interior, 1999), p. 5.

to the Arsenal, wildlife photographer Wendy Shattil, likened the place to the nation's first national park, "When I first came here, I half expected to find birds that glowed in the dark. For public viewing and diversity and quantity of wildlife, I don't think there is anything that compares to this, outside of Yellowstone National Park."[318]

Exaggerated though these claims may seem to some, even a short tour can present refuge visitors with a sizable array of plains fauna. On a 90-minute tram ride I joined in July 2004 (see Figure 4.4: Rocky Mountain Arsenal Tram) we saw dozens of burrowing owls and prairie dogs, mule and white-tailed deer (some with five-point antlers still in velvet), coyotes, jackrabbits, and a host of birds including northern harrier, red-tailed hawks, white pelicans, blue heron, and various songbirds. By official counts, there are more than 330 vertebrate species that reside either yearlong or seasonally at the Arsenal.[319]

The fact that visitors to the refuge must take a tram ride to interact with most of these Arsenal residents has a backstory of its own that helps illuminate the continued extent of military control at the site. At the 1991 Congressional hearings on the proposal to convert the Arsenal to become a national wildlife refuge, Colorado Governor Roy Romer was adamant that he did not want refuge visitors restricted to meeting wildlife from the remove of a bus. To limit interactions in this way would, in Romer's view:

> …squander our opportunity at the arsenal. The arsenal's proximity to millions of people is what makes it unique. We should push to guarantee the arsenal is managed in a way that recognizes its tremendous outdoor recreation opportunities. The refuge should focus equally on wildlife and people; it should be restored with both these uses in mind. I don't mean we should build

[318] "Schmidt, William E., "Nature Sows Life Where Man Brewed Death," *New York Times*, 12 March 1989, sec. 1, part 1, page 1.

[319] "Rocky Mountain Arsenal National Wildlife Refuge," September 2003 brochure, Commerce City, CO: U.S. Fish and Wildlife Service, Department of the Interior, p. 6.

> volleyball courts and soccer fields – in fact, I think these uses should be specifically prohibited at the site. What I mean is managing the open space there in a way that provides the greatest enjoyment of wildlife and access to the site – while, of course, protecting the health of wildlife and wildlife habitat.
>
> Not only do we want our children who visit this refuge to be safe, but we want them to enjoy themselves and learn something. My vision of this recreation and wildlife area is not of school children peering through chain link fences or riding around on school buses. It's of children hiking near deer and pronghorn antelope, learning the names of insects and flowers they may encounter, and watching eagles roost. This vision means we push for a thorough cleanup, don't allow the site to be fenced off except where absolutely essential, and permit and encourage access throughout the entire site through bike paths, hiking trails, picnic tables, and interpretive facilities. We shouldn't be vague and take chances about how we want this refuge managed – not with some Federal agencies already conceding that bus tours are the best we can do.[320]

The tram ride itself is pleasant and informative; to some, no doubt, it's vastly superior than having to walk. The fact that visitors can only see much of the interior of the refuge from the windows of a tram, however, suggests that the Governor of the State of Colorado wields little authority in this place. Compared to the assembled voices of the U.S. Army, Shell, the Fish and Wildlife Service, federal and state regulators, scientists, and lawyers advising the principal parties on their potential liabilities, the Governor's instructions to keep the refuge a wide open public place carried little weight.

Scientific Authority and Wildlife Health

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[320] "Rocky Mountain Arsenal National Wildlife Refuge Act of 1991," transcript of hearings by the House of Representatives, Military Installations and Facilities Subcommittee of the Committee on Armed Services and the Fisheries and Wildlife Conservation and the Environment Subcommittee of the Committee on Merchant Marine and Fisheries, Denver, CO, 9 September 1991, prepared comments submitted by Gov. Roy Romer, pp. 9-10.

Figure 4.4: Rocky Mountain Arsenal Tram

Whether the public's safety would actually be jeopardized by interacting more intimately with the Arsenal's denizens seems unlikely, but the qualitative condition of the wildlife there remains a matter of some dispute. Dozens of studies have been conducted on Arsenal wildlife and their habitats, measuring details ranging from the dieldrin (pesticide) content of badgers to soil and water contamination levels to population effects on the Arsenal's deer.[321]

[321] See for example: Henriques, William Douglas, 1996, *A Model of Spatial and Temporal Exposure and Effect of Dieldrin on Badgers at the Rocky Mountain Arsenal*, Ph.D. Dissertation, Clemson, SC: Clemson University, 164 pp; Bricke, R. Mark and Michael G. Channell, 1995, *Evaluation of Solidification/Stabilization for Treating Contaminated Soils from the Rocky Mountain Arsenal*, (Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station), 435 pp.; Creekmore, T.E., D.G. Whittaker, R.R. Roy, J.C. Franson, and D.L. Baker, 1999, "Health Status and Relative Exposure of Mule Deer and White-Tailed Deer to Soil Contaminants at Rocky Mountain Arsenal," *Environmental Toxicology and Chemistry* 18(2): 272-278.

Much of this research indicates that Arsenal biota generally do not suffer chronic health problems simply by virtue of their residency.[322] Studies have at times come up with unexpected results. For example, populations of bald eagles, coyotes, and badgers that feed heavily on prairie dogs have shown little accumulation of toxins in their tissues, contrary to expectations, while kestrels that rely upon a staple of smaller mammals have shown very high levels of bioaccumulation.[323] Small mammal communities have shown the most dramatic responses to contamination, as the percentage of deer mice increased and other species such as grasshopper mice, pocket mice, and ground squirrels dropped away.[324]

It is worth making a distinction here between chronic effects on wildlife and acute events that have been quite deadly. There have been many episodes of acute mortality among Arsenal wildlife. In 1959, one official estimated that at least 20,000 ducks had died in the previous decade on the Arsenal's lakes from "unknown causes."[325] A 1973 event virtually scoured the lower lakes of all aquatic life.[326] Tissue analyses of dead animals at the Arsenal have found high levels of pesticides in many of the victims, from coyotes and amphibians to

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[322] For example, Creekmore et al., 1999; see also Rocky Mountain Arsenal Record of Decision; Rocky Mountain Arsenal Final Environmental Impact Statement, December 1995.

[323] Cohn, Jeffrey P., "A Makeover for the Rocky Mountain Arsenal," *BioScience* 49(4): 273-277.

[324] Allen, D.L. and D.L. Otis, "Relationship Between Deer Mouse Population Parameters and Dieldrin Contamination in the Rocky Mountain Arsenal National Wildlife Refuge," *Canadian Journal of Zoology* 76(1998): 243-250.

[325] Quoted in Shattil, Wendy and Bob Rozinski (photos), Chris Madson (essay), *When Nature Heals: The Greening of the Rocky Mountain Arsenal* (Boulder, CO: Roberts Rinehard Inc., in cooperation with the National Fish and Wildlife Foundation, 1990), p. 43.

[326] Shattil et al., pp. 43-45.

songbirds and raptors.[327] Eruptions of sylvatic plague in the Arsenal's prairie dogs have also periodically decimated the resident population, but as one National Wildlife Federation-sponsored publication optimistically reported, "if these dogs follow the pattern of the breed in other parts of the West, it's unlikely that the losses will have any long-term effect on their numbers."[328]

While some of the more dramatic events earn media coverage and have at times affirmed in a suspicious public the dangerous nature of the Arsenal, they have rarely endangered entire populations of organisms.[329] Much more common are incidents of burrowing mammals or migratory birds making their way into sites that were far too toxic to survive even briefly. As one EPA official commented wryly, "A duck that lands on Basin F does not fly away."[330]

This leads to one critique of the science conducted at the Arsenal: it privileges broad scale effects at the expense of finer scale responses. This can be seen as a characteristic of wildlife management and endangered species policy generally, where the sacrifice of individuals or certain habitat areas has become routine. Applying such standard approaches to the unique conditions of the Rocky Mountain Arsenal, however, may be ill-advised. Moral philosophers highlight the lack of attention to individual suffering that such an approach

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[327] Shattil, et al., pp. 43-45.

[328] Shattil et al., pp. 18-19; see also Comprehensive Management Plan, passim. The comment is ironic considering that prairie dog numbers across the West have fallen to just 1-2 percent of their historic levels.

[329] The aquatic die-offs are an exception here, such as the 1964 events described earlier. Sylvatic plague has also drastically reduced prairie dog numbers at the Arsenal on several occasions, but never to the point of extirpation.

[330] Bunker, Nick, "War of Words Over the Wasteland," *London Financial Times*, 12 October 1987, sec. 1, p. 23.

entails – an argument popularized by animal rights groups – but there is also the pragmatic question of whether traditional wildlife management approaches can account for the complexity of the Arsenal's contamination.[331] Since the field of wildlife biology was founded upon work with populations living in relatively clean settings, scientists trained in this tradition have rarely needed to attend to the physiological or chemical changes that toxic environments can effect. Investigators at the Arsenal who pose questions that do not (or cannot) accommodate the effects of synergistic chemical reactions or multi-level changes simply generate data as a positive feedback loop that affirms the Arsenal's clean bill of health as wildlife habitat.

This type of critique challenges the view of science as an objective form of knowledge production and instead casts it as a process intimately (and often inadvertently) linked to the standpoint of the researcher. My intent here is not to examine debates of scientific construction versus realism, but to look at how the privileging of scientific realism influences the ongoing management of places such as the Rocky Mountain Arsenal.[332] With

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[331] Two classic works on animal rights are Peter Singer's *Animal Liberation*, (NY: HarperCollins, 1975); and also Tom Regan's *The Case for Animal Rights* (Berkeley, CA: University of California Press, 1985); see also advocacy groups' position statements, for example, People for the Ethical Treatment of Animals, www.peta.org.

[332] For more direct treatments of the epistemological debate itself, see for example: Castree, Noel, "Nature is Dead! Long Live Nature!" *Environment and Planning A* 36, 4(2004a): 191-194; Crist, Eileen, "Against the Social Construction of Nature and Wilderness," *Environmental Ethics* 26 (Spring 2004): 5-24; Demeritt, David, "Social Theory and the Reconstruction of Science and Geography," *Transactions of the Institute of British Geographers* 21(1996): 484-503; Eden, Sally, "Environmental Issues: Nature Versus the Environment?" *Progress in Human Geography* 25, 1(2001): 79-85; and Proctor, James D., "The Social Construction of Nature: Relativist Accusations, Pragmatist and Critical Realist Responses," *Annals of the Association of American*

the authority of a certain kind of science firmly in place at the Arsenal, dissenting views are easily marginalized and kept out of the decision-making process. One of the risks of this approach is akin to the proverbial fox guarding the henhouse: the institutions and epistemologies that created the Rocky Mountain Arsenal and its immense problems of contamination are now vested with the authority to study, design and implement its restitution. In some cases, such as the central involvement of the U.S. Army and Shell, they are the exact same parties that produced the chemicals in the first place.[333] At times the irony of this relationship is unmistakable, such as when Fish and Wildlife Service literature describes how organochloride pesticides were manufactured at the same Rocky Mountain Arsenal site which later provided important habitat for bald eagles that had become endangered in large measure due to exposure to these pesticides.[334] In part, the unblinking presentation of this type of information may be attributed to that fact that even such "outside" authorities as the U.S. Fish and Wildlife Service and Environmental Protection Agency come from within the nearby fold of the federal government's Executive Branch.

Institutional Control

The creation of the Remediation Venture Office (RVO) at the Rocky Mountain Arsenal has drawn the Fish and Wildlife Service into even closer association with the Army

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Geographers 88, 3(1998): 352-376. See also Kuletz, 1998, on the development of contemporary theories of ecosystems science.

[333] This resembles what Beck calls, "the hazard technocracy" that relies upon experts' decisions made beyond public perception; see Beck, *World Risk Society*, 1999, p. 55.

[334] RMA Comprehensive Management Plan, p. 33.

and Shell. These three parties work together under the auspices of the RVO as the guiding authorities charged most directly with the responsibility to convert the site from arsenal to wildlife refuge. Even here, however, each party is not of equal standing. The Fish and Wildlife Service has been almost entirely dependent upon Army funding to maintain its staff at the Arsenal, a fact that grows increasingly apparent as the Army's obligation to the FWS diminishes. The Arsenal's refuge manager has had to reduce his workforce from 60 to just 14 in the past six years, though his long-term plan is to keep a staff of twenty-six at the Arsenal refuge.[335] From its court-apportioned payment plan, Shell now covers just twenty percent of the costs of remediation, down from an initial 50-50 split with the Army.[336]

One simple illustration of the ultimate authority that the Army still wields even within the ostensibly collaborative RVO comes from my own efforts to access documents from the Arsenal's primary archive, the Joint Administrative Records and Document Facility (JARDF). When I sought a fee waiver for documents, the JARDF's librarian instructed me to seek permission from one of the three principal managers of the RVO. However, when I contacted the Arsenal's Refuge Manager, the highest authority on-site for the Fish and Wildlife Service, he informed me that my request could only be granted by the Army's top manager at the Arsenal. In this way, the Army exerts control not just over the Arsenal's cleanup operations but also, at least for those of limited financial means, to the vast archive of information about the Arsenal that is held for purposes of public accessibility in the

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[335] Interview with Rocky Mountain Arsenal National Wildlife Refuge Manager Dean Rundle, Commerce City, Colorado, 23 July 2004.

[336] Interview with Roger Shakely, Shell Oil Company, Rocky Mountain Arsenal Project Manager, 21 July 2004, Commerce City, Colorado.

JARDF.[337] To be clear, my point here is not that anyone sought to obstruct my right to access to Arsenal's documents, but rather to note where the authority lay to grant free (i.e. without charge) access to these materials.[338]

Institutional proximity of course does not guarantee unanimity of perspective. Lawsuits pitting the U.S. Department of Justice (on behalf of the EPA) against the Department of Defense give ample evidence of acrimony even between sibling federal departments in the case of the Rocky Mountain Arsenal. But such tightly knit institutional arrangements as that found with the RVO, or even with the EPA, point to a consolidation of power and authority that is difficult for less-empowered groups or citizens to pierce.

Contesting Science

Within this hierarchy, elected representatives and state and local health officials occupy an interesting, and at times very potent, middle stratum. The State of Colorado has played an active role in the conversion of the Rocky Mountain Arsenal, but not always in concert with the other responsible parties. In 1989, the state refused to sign the Federal Facility Agreement that established the terms of remediation at the Arsenal.[339] The state

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[337] The JARDF was created to meet the requirements for public disclosure included in CERCLA.

[338] As it turned out, the JARDF librarian and both FWS and Army managers were, in fact, quite gracious and accommodating of my various requests. Had they been otherwise, both CERCLA and the Freedom of Information Act include provisions for public access and fee waivers.

[339] See "Federal Facility Agreement," U.S. Army Materiel Command, Program Manager Rocky Mountain Arsenal, 2 pp, n/d; also from interview with Barbara Nabors, Rocky Mountain Arsenal Project Manager,

continues to point to two related areas of disagreement. In the first of these, the state asserts its rights according to the Resource Conservation Recovery Act (RCRA) to maintain jurisdiction over the Army's Basin F cleanup. According to this view, the Army must abide by all state hazardous waste laws as it remedies the severe contamination problems at the site. Although the Army initially submitted a RCRA closure plan to the state, it later withdrew the plan and informed the Colorado Department of Health (now Colorado Department of Public Health and Environment) that Basin F was not subject to state rules. The state contested this in court and the subsequent lawsuit carried all the way to the U.S. Supreme Court, which upheld the state's authority to enforce its hazardous waste laws at Basin F. As a result, the Army must continue to submit closure and cleanup plans to the state for approval.[340]

The second significant point of disagreement between the state and other players in the Rocky Mountain Arsenal cleanup hinges upon what public health standards to apply for DIMP levels in Adams County's groundwater. In a case that again highlights how science often does not simply *exist* or reveal objective facts, but rather must be interpreted and contested, the state and Army have failed to agree upon what the appropriate standard should be in limiting public exposure to DIMP. As I described in brief earlier in this chapter, diisopropylmethlyphosphanate, or DIMP, is a known carcinogen associated with the production of sarin nerve gas. For more than thirty years Colorado health officials have monitored DIMP levels in groundwater plumes downgradient of the Arsenal and there has

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Federal Facilities Program, Colorado Department of Public Health and Environment, 22 July 2004, Denver, Colorado.

[340] Nabors interview; see also "History of Basin F" photocopied fact sheet, n/d, no author, provided by Barbara Nabors, Colorado Department of Public Health and Environment, 28 July 2004.

been little dispute over the broad dangers the substance poses to public health. This explains, in part, why area residents have had their groundwater supplies replaced with treated municipal water at Shell and the Army's expense.

The disagreement over DIMP rides specifically upon what levels of risk are acceptable for the public to bear. Although the Army initially agreed with the state on a level of eight parts per billion for DIMP in groundwater, after signing the conversion plan's Record of Decision the Army tried to soften the DIMP standards by pointing to a new study that suggested that 400 parts per billion was an acceptable standard to ensure public safety.[341] As a Colorado health department official who works on the Rocky Mountain Arsenal project told me, "Issues relating to DIMP groundwater standards have created some hard feelings between the Army, Shell, and the state."[342] Not only are there differences of interpretation for the toxicological data, the various parties also disagree over how DIMP studies have been conducted and what types of assumptions are built into the risk models.

The State of Colorado has not been the only body willing at times to try to lift the customary veil covering military (and corporate) practices at the Arsenal. The Tri-County Health Department (serving Adams, Arapahoe, and Douglas Counties) first got involved in health issues relating to the Rocky Mountain Arsenal in the 1950s when farmers reported that their irrigation water (pumped to the surface from groundwater) was killing their crops. For more than thirty years the county health department has worked as the lead agency to monitor the residential and agricultural water quality adjacent to the Arsenal.[343] These data

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[341] Rocky Mountain Arsenal Record of Decision, p. D-7; Interview with Major Wesley Erickson, U.S. Army Chief Counsel, Rocky Mountain Arsenal, 22 July 2004, Commerce City, Colorado.

[342] Nabors interview.

[343] Dan Collins interview.

have increased public understanding of what flows, often invisibly, from the Arsenal grounds and spurred closer scrutiny of other forms of drift, including airborne dust and odors, that now are monitored routinely.

Perhaps the most dramatic intervention into the RVO's triumvirate came in 1992 when Congress passed the Rocky Mountain Arsenal National Wildlife Refuge Act. Although this was far from a hostile power grab – Shell and the Army worked actively in advance to highlight the Arsenal's wildlife and open space amenities – it served as an example of how a public process could enter a very restricted military space.[344] Through Congressional committee investigations, hearings, public meetings, comment periods, extensive media coverage, and not least the Arsenal's Congressionally-directed shift from closed military base to national wildlife refuge, the actions of elected officials ultimately launched thousands of pages of information into the public purview.

These actions and the subsequent body of information have, however marginally, opened spaces for citizen participation in decisions being made at the Arsenal. This uneasy transition of military sites such as the Rocky Mountain Arsenal to a more public state will be the major focus of Chapter Six, but in this chapter's treatment of science and authority it is worth mentioning here that some long-time observers of the Arsenal simply believe that the wrong *kind* of science is being done. On this (more constructivist) view, if other kinds of questions were researched then the suite of relatively benign scientific assessments might pale in light of studies that accounted for synergistic effects of chemicals on the body,

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[344] Some citizen activists contend that the conversion to a wildlife refuge was orchestrated from the outset by Shell as a means of reducing the corporation's cleanup costs and long-term liability at the site; see "Rocky Mountain Arsenal Wildlife Refuge Communication Audit for Shell Oil Company," [marked "Confidential"], MGA Communications, December 1991.

multiple chemical sensitivity responses, or suppressed immune systems due to chemical exposure that then led to secondary causes of death. As one citizen activist explained of the research being done at the Arsenal:

> It's warped science I think. They'll look at a dead body and if the animal has microbes in its stomach or parasites, that's the cause of death. They never do any sort of tissue analysis or any sort of analysis to see what the problem is. If the animals hit an electric wire and die, that's the cause of death. It isn't because they're disoriented by exposure to pesticides… I don't know how many times all the prairie dogs out there have died off due to bubonic [sic] plague, and of course everybody else has bubonic plague so it's not something that's specific, it's not weakened immune systems…
>
> I would have liked to have seen increased cleanup technology and testing for pollutants in the soil and air. I'm not sure that they have furthered the science of soil cleanup and air pollution analysis in this process. They've just gone with what is out there. They haven't put forth an effort to really change the technology. Now if this were a bomber that they were doing out there, we would have lots of money spent in advancing the science and research. I would have liked to have seen that out there… It isn't a double-blind, triple-replicated, statistically significant science that we need, it's more an individualized science. Why is this animal dying? Why is this so susceptible to parasites? Why are their immune systems so susceptible to bubonic plague? Is the testicular atrophy in the deer out there really insignificant, or could it be related to the pesticides?[345]

Such critiques notwithstanding, the scientific studies completed at the Rocky Mountain Arsenal have succeeded in assuaging the concerns of many of the local officials charged with public health and safety. Groundwater plumes and airborne particulates migrating off the Arsenal are tracked meticulously, longitudinal studies of cancer and other illnesses in nearby residential populations have not found any spikes of incidence, and contaminated wells have been systematically supplanted by Denver's municipal water supply. In some cases, the contaminated plumes of groundwater flowing from the Arsenal seem to have been effectively corralled by the Army's groundwater intercept-and-treat

[345] Interview with Angela Medberry, Pesticides Chair, Sierra Club, 27 July 2004, Boulder, Colorado.

systems, which trap groundwater with subterranean dams, pump it to the surface where it is chemically treated, then return it below ground.[346] (See Figure 4.3: Rocky Mountain Arsenal Groundwater Contamination Areas.)

The fact that most county and state-level full-time positions dedicated to monitoring the Arsenal are contracted and paid for by the U.S. Army has led to accusations by some of conflicts of interest, but those involved see themselves as better positioned players in the process.[347] By working more on the inside of the Arsenal project, the Tri-County Health Department's Rocky Mountain Arsenal team leader considers his heightened access a benefit to the populace whose health he is chartered to protect: "Working with the Rocky Mountain Arsenal got people off of contaminated water much faster than it would have otherwise. We've made the cleanup better than it would have been without us."[348]

The vast majority of research conducted at the Arsenal in the past forty years has been contracted and managed by the Army. *All* studies that rely upon Arsenal-based research need to get the permission of the Army for access to research sites. In this way the DOD acts quite literally as the gatekeeper of scientific knowledge production at the site. Even if the Army never directly interferes with the information coming out of this research, the types of questions posed by scientists at the Arsenal can be routinely shaped by the institutions controlling the physical grounds. As one citizen activist recalled, "They take a wonderful dioxin study (because we insisted that they do dioxins), and so spent gobs and gobs of money and showed essentially less dioxin in the upper one or two inches of soil out there than in

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[346] Comprehensive Management Plan, p. 18. See also, U.S. EPA website on successful remediation actions at Rocky Mountain Arsenal, viewed online at www.epa.gov/superfund/accomp/success/rma.htm [5 October 2005].

[347] Dan Collins interview.

[348] Dan Colllins interview.

other parks and covered lands in the metro area. But they would only go one or two inches, they wouldn't go any deeper."[349]

Open Space

The growing perception that the Arsenal no longer poses a public health hazard has no doubt been an essential component to the site's refurbished reputation more broadly. Rather than earning national headlines as it did throughout the 1970s and 1980s for leaking canisters of nerve gas, ailing workers, or dying wildlife, the Rocky Mountain Arsenal as a wildlife refuge now gains acclaim for creating open space for human enjoyment as well as habitat for wildlife or a site for research. The turn in fortunes promises to expand beyond the fenced boundaries of the refuge/arsenal itself, at least if local civic boosters and developers have their way.

Prairie Gateway

One year before the Rocky Mountain Arsenal National Wildlife Refuge Act was signed into law, the City and County of Denver prepared its "Gateway Plan" for

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[349] Angela Medberry Interview; see *Denver Front Range Study, Dioxins in Surface Soil, Study 2: Characterization of Dioxins, Furans and PCBs In Random Soil Samples Collected from the Rocky Mountain Arsenal* (Prepared for and jointly by U.S. Environmental Protection Agency, Region 8, Denver, Colorado, working in cooperation with:
Remediation Venture Office of the Rocky Mountain Arsenal and Colorado Department of Public Health and Environment, July 2001).

developments lying immediately east of the Arsenal and adjacent to the new Denver International Airport.[350] (See Figure 4.5: The Rocky Mountain Arsenal and Vicinity.) The long-suffering industrial burg of Commerce City prepared similarly for the opportunities that a recasting of the Arsenal might bring. While the Arsenal has had relatively dense development along its southern and western boundaries for decades, open agricultural lands have long characterized its northern and eastern sides. That is about to change. The same year that the Arsenal legislation was passed by Congress, Commerce City released a comprehensive plan for what it calls the "New Lands," which includes extensive annexations around the perimeter of the Arsenal and tens of thousands of new homes.[351] For its part, the U.S. EPA signaled its approval of the residential boom, noting on its Rocky Mountain Arsenal cleanup "success stories" website, "Since the cleanup began, 43,000 new households have either been planned or constructed immediately north of the site. These are the first housing developments planned by Commerce City in 40 years."[352]

Commerce City also successfully brokered a deal, included in the Rocky Mountain Arsenal National Wildlife Refuge Act, to purchase and annex 815 acres of relatively uncontaminated land in the southwest corner of the Arsenal property from the Army. The proceeds from this purchase were earmarked for the U.S. Fish and Wildlife Service to fund

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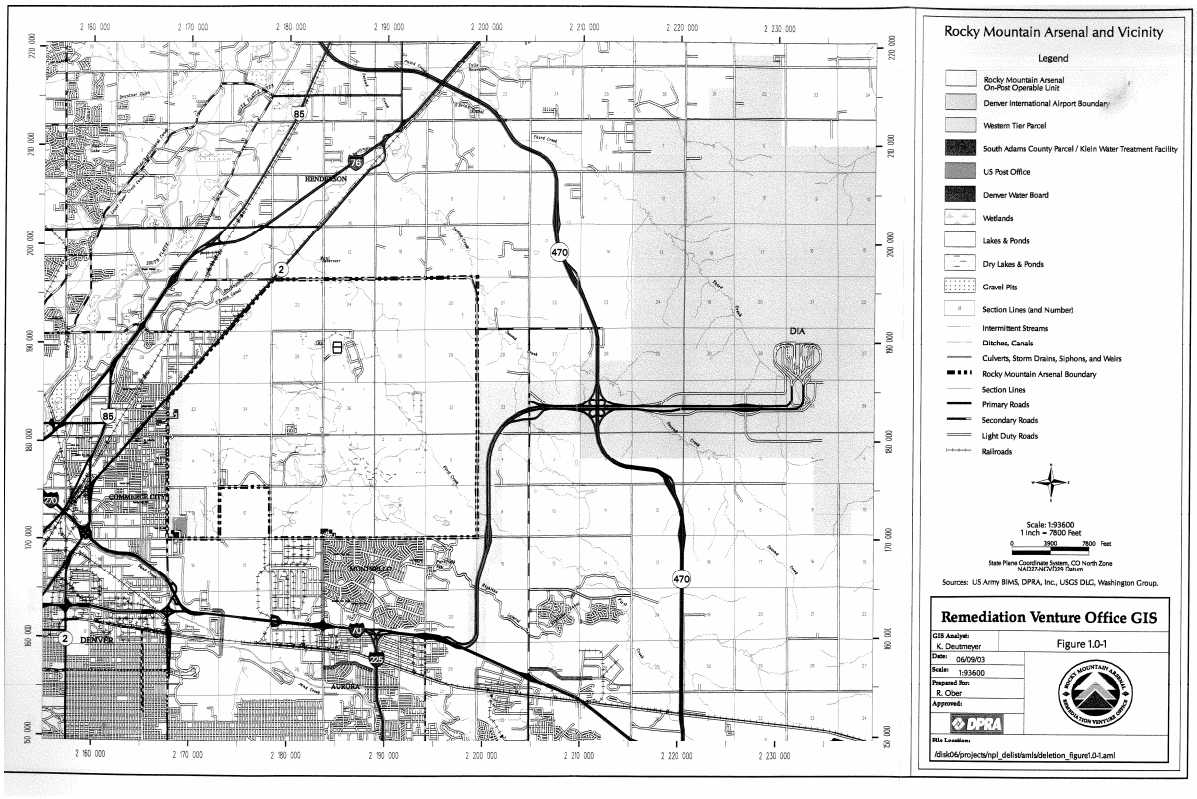
[350] City and County of Denver, The Gateway Plan, October 1991, prepared by the Gateway/Stapleton Office, Denver, CO.

[351] Commerce City, New Lands Comprehensive Management Plan, April 1992, prepared by BRW, Inc. (Denver, CO).

[352] U.S. EPA Rocky Mountain Arsenal cleanup website, viewed online at www.epa.gov/superfund/accomp/success/rma.htm [5 October 2005].

Figure 4.5: Rocky Mountain Arsenal and Vicinity[353]



construction of a visitor and education center for its new refuge.[354] As a front-page story in *The Denver Post* touted:

> It is Commerce City's big leap. This city of nearly 30,000, stereotyped as the industrial black hole of metro Denver, is about to embark on its biggest development project ever. The plan is to take about 1,000 acres of former Rocky Mountain Arsenal land and create a municipal treasure chest called Prairie Gateway. It will have a new 20,000-seat soccer stadium for the Colorado Rapids. It will have a new city hall, youth ball fields and acres of park space. It will have attractive shops, restaurants and hotels. And if all goes to plan, city officials say, Prairie Gateway will bring reinvestment and a different attitude. A redeveloped piece of former Superfund land will transform the city long known for its oil refineries and gritty image.[355]

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[353] Final Technical Memorandum, figure 1.0-1.

[354] PL 102-402, sec. 5(a). The actual purchase, completed in 2004, was 917 acres.

[355] Ingold, John, "Commerce City Pins Hopes on Developing Arsenal Land," *The Denver Post*, 21 September 2004, p. A1.

Once fully realized, Denver's Gateway project and Commerce City's New Lands and Prairie Gateway will nearly encircle the existing Arsenal site with residential and commercial developments. Not only will these projects transform the character of the Arsenal as they isolate the site from the less developed agricultural lands and plains to the north, but they also promise to reshape the character of Commerce City and north Denver's Montbello neighborhood. As Commerce City's city manager noted of the development plan, "It changes the image of Commerce City."[356]

In my interview with the Rocky Mountain Arsenal's refuge manager, he was a bit more colorful in his assessment of how the Prairie Gateway and New Lands projects could transform Commerce City:

> The Prairie Gateway project, I think the city council here at Commerce City understands that's their one, their last opportunity to really keep Commerce City from having a literal definition of the wrong side of the tracks. You know, the core city, the old Commerce City, which saw the Arsenal as this big black cloud of pollution next to them that kept all their property values low and everything like that, the developers to the north are marketing this 17,000[-acre] open space wildlife refuge as an amenity to the community. [*And does that work, in terms of selling that land up there?*] They sold them like hotcakes. [*I mean, that's the historical, the (toxic groundwater) plume was sort of heading that direction historically.*] Yeah, yeah. It's under them. It doesn't seem to bother those folks. They can buy a new house for less money than they can get one in other parts of town. They've already approved, I think, 26,000 single-family homes in that north portion. And this is a city that only has 17,000 people in it [sic].[357] It's going to drastically change the political, I mean, Commerce City is the industrious, it's what National City was in San Diego. Heavy industry. It's the illegal immigrant community. High, I don't know what the percentages are, but if

[356] Ingold, John, "Commerce City's Oasis Takes Shape," *The Denver Post*, 27 March 2005, p. C1, quoting Perry VanDeventer.

[357] According to the 2000 U.S. Census, the population of Commerce City was 21,000.

> you want a fake Green Card, Commerce City is where you get it. So, yeah, it's changing a lot.[358]

Shell Oil Company's Rocky Mountain Arsenal manager also highlighted the shift in public perception that conversion to a wildlife refuge has wrought:

> And then, you know, it's one of those things where it is a refuge now, and there's still some cleanup that needs to go on. But it really has changed the perspective of not living beside a hazardous waste site anymore, you're living beside a wildlife refuge. It has some real benefits, I think, not only to property values, but also to the mindset.[359]

Commerce City's effort to distance itself from an industrial past seems particularly bold, if also rather transparent. Visitors arriving at Denver's old Stapleton International Airport and bound for points northwestward (e.g. Rocky Mountain National Park, Fort Collins, or Boulder) had to drive through Commerce City and for years could recognize it by day from the smell of its oil refineries and chemical plants and by night from the sight of natural gas flares. Commerce City and its overarching jurisdiction, Adams County, now claim at least six Superfund sites listed on the national priorities list.[360] Much as Hong Kong once highlighted its rural "New Territories" in contrast to the squalor of its burgeoning cardboard and tin slums, Commerce City's New Lands now hold out the promise of a different kind of place for a different type of resident.

The Arsenal as Amenity?

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[358] Interview with Dean Rundle.

[359] Interview with Roger Shakely.

[360] Interview with Dan Collins, Tri-County Health Department, 23 July 2004, Commerce City, Colorado, listed seven sites. According to the EPA, there are six sites in Adams County on the National Priorities List.

Residential complexes slated to rim the Arsenal come with enticing names such as "Eagle Creek" and "Aspen Hills," but at prices that are scarcely affordable to Commerce City's current residents. Eagle Creek homes are priced from $194,00-$213,000, nearly double the $113,000 median value of Commerce City's existing homes and a risky stretch of the purchasing power for the average Commerce City household's median income of less than $34,000.[361] At the slightly more affordable Aspen Hills ($150,000-$160,000 list price), the developer's promotional materials emphasize that residents will find themselves "located in a beautiful country setting in the NEW Commerce City"[362] (emphasis in original)

The fact that new developments highlight the amenity of the Arsenal's Refuge status while longtime residents of lower income areas of Montbello and Commerce City remain either left behind or simply uninvolved in the place also invites a number of questions of environmental and racial injustices. The traditionally African-American neighborhood of Montbello and predominantly Hispanic east side of Commerce City have long been subjected to contaminated dust, odors, and a diminished reputation from the Arsenal when it was actively producing chemical weapons and pesticides.[363] One troubling study of Commerce

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[361] Commerce City data from 2000 U.S. Census fact sheet, http://factfinder.census.gov [20 September 2005]; Eagle Creek home prices from www.amberhomes.com/ah_info/shtml [9 September 2005].

[362] www.amberhomes.com/ah_info/shtml [9 September 2005].

[363] See, Reid, T.R., "Coloradans Ask: Is Toxic-Waste Cleanup Dangerous to Our Health?" The Washington Post, 24 December 1988, p. A5; Zaslowsky, Dyan, "Toxic Issue at Arsenal Stirs Furor in Colorado," New York Times, 5 January 1989, p. A16; Coates, James, Arsenal Cleanup Creates Hazards, Residents Say," *Journal of Commerce*, 11 January 1989, p. 9B.

City residents, for example, found that Hispanics and non-whites were disproportionately more likely to have elevated blood arsenic levels from Arsenal pollutants than whites.[364]

With the exception of groundwater contamination, health effects were little quantified or studied by county, state, or Army officials until chemical production at the site had ceased. The cleanup activities themselves have raised concerns among nearby residents, as on several occasions noxious fumes drifted off-base into residential areas. One episode during the Basin F cleanup in 1988 lasted for several months and spurred residents of a nearby trailer park to form a group they named PANIC, for Poisoned Arsenal Neighbors of Irondale Community.[365] In addition to complaining of ammonia-like smells and burning sensations in their mucous membranes, a number of Arsenal neighbors reported symptoms that included coughing spells, chronic headaches, chest pains, and nausea.[366] When PANIC members asked to be evacuated to safer locations, their request was denied by Colorado Governor Roy Romer, but Shell subsequently agreed to cover the costs of health exams for affected residents.[367] The Army denied the presence of any dangerous pollutants drifting beyond the

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[364] Reif, J.S., T.A. Tsongas, J. Mitchell, T.J. Keefe, J.D. Tessari, L. Metzger, and R. Amler, 1993, "Risk Factors for Exposure to Arsenic at a Hazardous-Waste Site," *Journal of Exposure Analysis and Environmental Epidemiology* 3: 73-86, Suppl. 1.

[365] See Reid, 1988; "Fact Sheet on Basin F Odor," 27 September 1988 (photocopied document, no author), JARDF # G9720684.

[366] Letter to Colorado Governor Roy Romer from Poisoned Arsenal Neighbors of Irondale Community (PANIC), dated 19 December 1988, JARDF # G8800136; Zaslowsky, 1989.

[367] Letter from PANIC to Governor Romer, 1988; response from Governor Romer to Beth Gallegos, Chairperson Citizens Against Contamination, dated 23 December 1988, JARDF # G9720927.

Arsenal boundaries, yet acknowledged that workers at Basin F had, on occasion, been evacuated due to the acrid fumes.[368]

In addition to the serious questions surrounding public health impacts, it is easy to imagine the suppressing effect on land values that bordering an active chemical munitions plant might generate. Most families with the means enough to move did so rather than live just blocks from a site that was incinerating napalm shells, mustard gas, and other chemical compounds. Army records now show that such materials were commonly burned in open trenches with little heed to wind direction or other aggravating atmospheric conditions that could put nearby populations at risk.[369] Meanwhile, a number of Montbello and Commerce City residents seemed little aware even of the presence of their near-neighbor.

One teacher with whom I spoke taught at a Montbello grade school in the mid-1980s, barely one mile from the Arsenal's south boundary. She recounted that she knew that the Rocky Mountain Arsenal "was up there somewhere," but that she never visited or even once remembered discussing the site with either her students or colleagues.[370]

With more rigorous monitoring of groundwater conditions and air quality now in place, and no more chemical production on site, the actual danger of the Arsenal is likely diminishing for neighboring residents. As Commerce City works to renovate itself with developments such as the New Lands and Prairie Gateway, both of which make use of the Arsenal-turned-refuge as an amenity, it would be cruelly ironic however if people long subjected to the hazards of the Arsenal could no longer afford to maintain their same

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[368] Reid, 1988.

[369] See RMA FFA.

[370] Personal communication with Jenny Havlick-Platt, 25 July 2004, Boulder, Colorado.

residences due to escalating land values, property taxes, or other more aggressive effects of gentrification.

Representations of the Rocky Mountain Arsenal

The New Lands residential developments platted and under construction along the north and west of the Arsenal boundaries tout the cleaner air, wildlife amenities, and open spaces of the wildlife refuge as selling points for new subdivisions – a shift that promises to change the demographics, tax base, and, perhaps, reputation of Commerce City in the years ahead. Commerce City publications now describe its location, "amid some of Colorado's greatest natural resources, including the Rocky Mountain National Wildlife Refuge [sic], Barr Lake State Park, the Prairie Gateway area, and numerous trails, open spaces and wildlife preserves."[371]

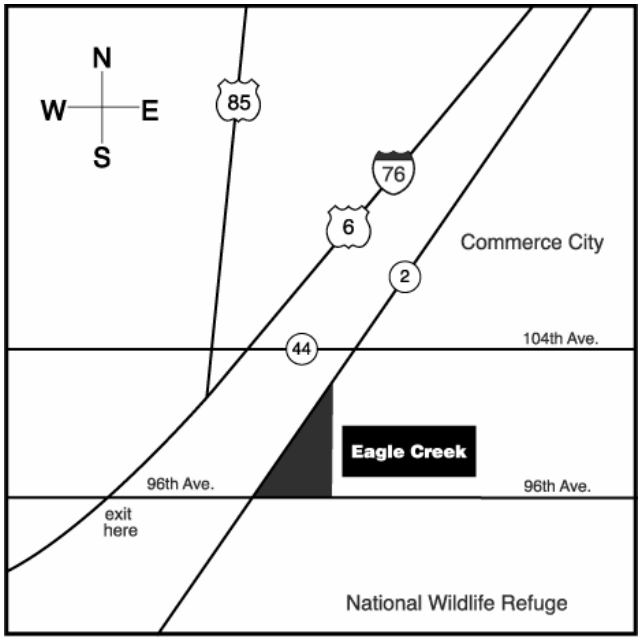
Commerce City officials are not alone in omitting the "Arsenal" from the new refuge's name. Amber Homes, one of the primary developers of residential construction surrounding the Rocky Mountain Arsenal, consistently drops any mention of the "Arsenal" in describing its neighbor. A locator map accompanying Amber Homes' Commerce City developments shows principal roads and a large blank space labeled simply, "National Wildlife Refuge." (Figure 4.6: Amber Homes' Website Map of Eagle Creek Development and Vicinity.)

Capitalizing upon some of the Arsenal's most lauded part-time residents, Amber Homes describes one of its new developments as follows, "Eagle Creek is a covenant controlled,

[371] www.ci.commerce-city.co.us/other/demographics.html [23 August 2005].

master-planned community located in the New Lands. This newly developed area of Commerce City is located directly north of one of the nations' [sic] largest designated wildlife refuges with views of both the mountains and open range." Included in a list of parks and recreation amenities for Eagle Creek and its sister development, Aspen Hills, one finds, "Rocky Mountain National Wildlife Refuge… Over 27 square miles of acreage devoted to preserving local and migrating wildlife. Hiking trails, fishing, and seasonal tours are available through the U.S. Fish and Wildlife Service."[372]

Figure 4.6: Amber Homes' Website Map of Eagle Creek Development and Vicinity[373]



The representations of place provided by Amber Homes differ sharply here from those made by the principal agents responsible for the Arsenal's cleanup and management. A

[372] www.amberhomes.com/ec_info.shtml [9 September 2005].

[373] http://www.amberhomes.com/ec_info.html#location [15 September 2006]

fact sheet produced by the EPA, Shell, Army, Fish and Wildlife Service, and State of Colorado, for example, states that, "The Arsenal's only mission is environmental cleanup."[374] The Rocky Mountain Arsenal National Wildlife Refuge Act of 1992, for its part, offers a list of eight purposes for the refuge centering upon environmental conservation, education, and research, but predicates the formal creation of the refuge itself upon compliance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA, the law that established the Superfund), and other necessary cleanup responsibilities.[375] In other words, until the Army and Shell clean the Arsenal to an acceptable standard, the bulk of the national wildlife refuge exists in name alone – with the prescription that the Fish and Wildlife Service manage that "real property *as if it were* a unit of the National Wildlife Refuge System"[376] (emphasis added).

The materiality of the Arsenal as national wildlife refuge seems in these cases rather contested and unstable. Legally, the Rocky Mountain Arsenal National Wildlife Refuge includes approximately nineteen square miles (slightly more than 12,000 acres) at present until additional areas are approved by the state and EPA as remediated.[377] Even including its entire acreage, the Arsenal property is nowhere near the nation's largest, standing at only about 0.1 percent the size of Alaska's 22 million-acre Yukon Delta National Wildlife Refuge.

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[374] "Onpost Contamination," RMA Fact Sheet, MDG 0795, p. 13.

[375] PL 102-402, Secs. 2(a), 4(c) and 5(a).

[376] PL 102-402, Sec. 2(a).

[377] See "EPA Removes Rocky Mountain Arsenal's Internal Parcel from Superfund List," U.S. Environmental Protection Agency press release, 31 July 2006, viewed online at http://yosemite.epa.gov/opa/admpress.nsf/7c02ca8c86062a0f85257018004118a6/9ae33b724fceb89f852571bc00705551!OpenDocument [15 September 2006].

But for the proud new owner of an Eagle Creek home, it is perhaps easy enough to gaze across 96th Avenue at the full 18,000 acres of open space within the Arsenal's chainlink fence and feel assured that a vast refuge does, in fact, exist.

Others, such as members of the Arsenal's Site Specific Advisory Board, commonly dispute the site's safety, whether it is designated as a refuge or not. As one member commented, "We really don't believe enough testing has been done on the soil there. We're really concerned about unexploded ordnance."[378] As the discovery in 2000 of live sarin bomblets revealed (discussed in more detail below), some added caution may well be justified.

Reframing and Renaming Military Sites

The discursive framing of places such as the Rocky Mountain Arsenal can dramatically shape both public opinion and lasting perceptions of what actually exists.[379] The dropping of the "Arsenal" from the Rocky Mountain Arsenal's title may at times be accidental, of course, but its consistent elision by boosters, developers, and other parties who could benefit from its omission in their publications warrants a deeper suspicion.

Colorado Congressman (now Senator) Wayne Allard's early refuge proposal also sought to drop "Arsenal" from the converted base's name. In 1991, Allard introduced a bill calling for "legislation which will establish the Colorado Metropolitan National Wildlife

[378] Sandra Jaquith quoted in Ingold, 2004.

[379] See for example, Havlick, David and Scott Kirsch, November 2004, "A Production Utopia? RTP and the North Carolina Research Triangle," *Southeastern Geographer* 44(2): 263-277.

Refuge."[380] This was also the name used in the version of the bill introduced in the U.S. Senate by Colorado's Hank Brown (and co-sponsored by Sen. Tim Wirth), but Colorado Congresswoman Patricia Schroeder consistently included "Rocky Mountain Arsenal" in a parallel bill she introduced and pushed through Congress.[381] In the end, Schroeder's version prevailed and the refuge name continues to reflect the site's historical mission.

Renaming sites is more the rule than the exception in M2W conversions. Former DOD facilities such as the Jefferson Proving Ground, Fort McClellan, Loring Air Force Base, Longhorn Army Ammunition Plant, Pease Air Force Base, and others have each been relegated to appear only on maps as historical locations, if at all (see Table 4.1; see also Figures 1.4 and 1.5 of military-to-wildlife conversion locations).

In this way, the military histories of these places may be rather easily overwritten and quickly forgotten (or never known) for a visiting public. The discursive reframing of these sites may serve to assuage public fears about hazards at military sites that have been closed and redesignated, but will never fully be rid of contamination. As Lowenthal noted in 1975, the ways people choose to remember landscapes are often fraught with meaning, "features

Table 4.1: Renaming of Selected M2W Sites

Name as Military Site	Name as National Wildlife Refuge
Loring Air Force Base	Aroostook NWR
Woodbridge Research Facility/Harry	Occoquan Bay NWR

[380] "Introduction of Legislation Establishing Colorado Metropolitan Wildlife Refuge (House of Representatives – July 15, 1991)," p. H5436.

[381] On 14 March 1991, four months before Allard first introduced his Colorado Metropolitan Refuge bill, Schroeder submitted legislation for a Rocky Mountain Arsenal National Urban Wildlife Refuge; see Congressional Record – Extension of Remarks, 14 March 1991, 102nd Congress, 1st Session, 137 Cong. Rec. E944.

Diamond Lab	
Fort Devens (North Post)	Oxbox NWR
South Weymouth Naval Air Station	Nomans Land Island NWR
Jefferson Proving Ground	Big Oaks NWR
Driver Naval Radio Transmission Facility	Nansemond NWR
Barbers Point Achyranthes Recovery Site	Pearl Harbor NWR
Sudbury Training Annex, Ft. Devens	Assabet River NWR
Pease Air Force Base	Great Bay NWR
Fort McClellan	Mountain Longleaf NWR
Savanna Army Depot	Upper Mississippi River NW & Fish Refuge
Galeville Airport	Shawangunk Grasslands NWR
Longhorn Army Ammunition Plant	Caddo Lake NWR
Vieques Naval Training Range	Vieques NWR

recalled with pride are apt to be safeguarded against erosion and vandalism; those that reflect shame may be ignored or expunged from the landscape."[382] Foote studied this phenomenon further, as I discuss in my final two chapters, and identified four categories of representation: sanctification, designation, rectification, and obliteration.[383] The last of these, obliteration, was reserved for sites where shameful events took place that society would prefer to forget.

The transitory nature of military base names also suggests the degree to which military spaces are liminal public places. Beyond a handful of high-profile or local bases, most Americans are hard-pressed to name domestic military bases. As I have already noted, this is, by some accounts, one of the important features of military base closures and conversions: for brief periods, at least, military spaces become visible, public, and explicitly politicized.[384]

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[382] Lowenthal, David, 1975, "Past Time, Present Place: Landscape and Memory," *Geographical Review* 65, p. 31.

[383] Foote, pp. 7-8.

[384] See Woodward, p. 54.

To some, such as one woman I met who was visiting the Rocky Mountain Arsenal and expressed surprise that the site even *had* a military history, the site's recasting as a national wildlife refuge may be sufficient to allow for a glossing of the former condition and use of the place. What we see here is that even with the military reference retained in the site's name, the "national wildlife refuge" suffix may be sufficient to obscure past practices from public view. A similar phenomenon is evident at places such as the "Arsenal Mall" in Watertown, Massachusetts, where a shopping mall now fills a sprawling brick complex formerly dedicated to national weapons development. As shopping or wildlife viewing replaces weapons production, the term "arsenal" becomes naturalized as a place name rather than a description of relevant daily practices that occurred at the site.

Rocky Mountain Arsenal National Wildlife Refuge

A visit today to the Rocky Mountain Arsenal National Wildlife Refuge can hold any number of surprises. Though the perimeter of the site is still rimmed by a formidable chainlink fence, the entrance itself is unimposing, even welcoming. A small guardhouse sits in the entrance boulevard. During public visiting hours – weekends from 8 am to 4:30 pm – cars that approach are greeted by a uniformed representative of the U.S. Fish and Wildlife Service who directs traffic to the nearby visitor's center amid the scenic backdrop of Lakes Mary, Ladora, and Lower Derby. Visitors or researchers who arrive during the weekdays, when the Arsenal is closed to the public, need only report to an entrance station in order to post a visitor's pass in the windshield, then may proceed to their destination (the administrative headquarters for refuge staff, employees of Shell, the U.S. Army, and EPA are

all located centrally near the former South Plants production facility, about one mile north of the current visitors' center – see Figure 4.2).

Such apparent casualness belies the fact that once inside the Arsenal grounds only a small portion of the lands are actually open to public activity and some lands remain actively dangerous due to hazardous materials, contaminated soils, or ongoing remediation work. Most of the Arsenal is still managed as a hardhat area any time one sets foot outside a vehicle, and vehicles themselves must be sprayed clean of any dirt residues before leaving zones of active remediation (see Figure 4.7: Worker at the Rocky Mountain Arsenal NWR).

Sarin and Public Safety

Few episodes have illustrated the Arsenal's status as a place in transition more dramatically than the discovery in 2000 and 2001 of ten small sarin nerve gas bombs that were unearthed near a former scrap metal yard (sarin is also known as German Brown, or GB). The discovery led to a temporary cancellation of all public visitation, which was then reinstated only partially to a weekends-only policy. Not surprisingly, the accidental find of "grapefruit-sized bomblets" containing one of the nation's most deadly military poisons triggered a flurry of critical attention by regulators, local politicians and media questioning the safety of public use at the Arsenal.[385]

[385] Local media coverage of the sarin bomblets was nearly daily at times and national publications also featured the ongoing problems at the Arsenal. See, for example, Guy, Jr., Andrew, "'Bomblet' at Arsenal Cancels All Tours," 21 October 2000, *Denver Post*, p. A1; Guy, Jr., Andrew, "Chemicals to Dissolve Sarin-filled Bomblet," 29 October 2000, *Denver Post,* p. B-3; "Army Bombs Again," 1 November 2000, *Denver Post* editorial, p. B10;

Figure 4.7: Worker at the Rocky Mountain Arsenal NWR

The EPA, for example, expressed serious concern over the Army's ability to control such lethal artifacts: "While one such bomblet in a non-suspected area could be considered an anomaly; discovery of several more of these bomblets causes us to reconsider as to how much is really known about the disposal and destruction practices for these chemical munitions, and how many more are waiting to be found."[386] As the EPA proceeded to document in this case, the Army itself was unable to present a consistent voice of assurance

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Janofsky, Michael, "Cleanup of 'Bomblets' in Colorado Refuge Expected," 1 December 2000, *New York Times*, pp. A23, A34.

[386] Dodson, Max H., "EPA Letter to Army About Sarin Bomblets," letter dated 21 November 2000, from Assistant Regional Administrator, U.S. EPA, to Charles Scharmann, U.S. Army Rocky Mountain Arsenal Program Manager, viewed online at www.epa.gov/region8/superfund/sites/rma/rmasarinblt.html [23 September 2004].

that it could control either the flow of information regarding the sarin bomblet discovery or the actual hazards at Arsenal site. In successive days, the Army seemed if anything to grow less confident on this latter, crucial point. The Army's statement of 26 October 2000 calmly asserted, "At no time during this discovery [of the first sarin bomblet] and subsequent evaluation was employee, visitor, or neighborhood safety jeopardized." Just one day later this message was modified substantially, "National and local munitions and explosive experts have advised us that this bomblet is unstable and therefore, unsafe." By 1 November 2000, the message from the Army came, "While discoveries like this bomblet are rare, there is potential for more devices to be found."[387]

This latter comment proved to be prophetic. The Army came upon six sarin-filled bombs in the week after the initial discovery. A thorough dismantling of the metal scrapyard where the first bombs were uncovered, a task the EPA insisted on despite initial resistance by the Army, led searchers to find four additional sarin bomblets the following summer.[388]

Although the sarin was ultimately disposed in what seems to have been a safe manner, the entire episode provided an unsettling glimpse into how ill-prepared the Army was to handle dangerous substances under the light of public scrutiny. The Army's very public bungling of sarin disposal in this case becomes all the more alarming when one recalls that between 1955-1970 the Army destroyed more than 200,000 sarin-filled munitions. Lacking public scrutiny at the time, there is perhaps little wonder that the Arsenal site and its groundwater remains contaminated with sarin-related toxins such as DIMP.

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[387] All quotes from Army taken from Dodson letter to Scharmann.

[388] See Purdy, Penelope, "What is Really Buried at the Arsenal?" 14 January 2001, *Denver Post*, p. I1; "Bomblets Contain Sarin, Tests Show," 24 June 2001, *Denver Post*, p. B6; Edmonson, Valerie, "Weapons Debris Found at Arsenal," 28 June 2002, *Denver Post*, p. B1.

During the first two months after the initial sarin discovery in 2000, the Army presented an unconvincing and inconsistent plan to respond to the hazard. While this uncertainty in the face of the Arsenal's long history of chemical production might be understandable, the Army's first public response hardly seemed weighted toward public safety as it considered what to do with a bomb containing 1.3 pounds of a nerve gas toxic enough to kill a human with a single drop. Honest, albeit far from reassuring, the Army's chief public affairs officer commented of the sarin bomblet, "'Well, there could be more. You just never know. We're getting the arsenal cleaned up, and we don't know what else we could discover."[389]

Adding to the growing sense that the Army had incomplete control over the Arsenal site, at least with respect to contaminants and their remediation, the spokesperson first described a plan for open-air detonation of the nerve gas bomb right on the Arsenal grounds: "Sarin is not a persistent chemical. It is very short-lived. Once it's detonated, it's an immediate 'poof' and the sarin is gone. That's how we're going to handle this."[390]

State health department officials immediately challenged the Army's authority and researched sarin disposal techniques. They quickly announced that open detonation was neither the only nor the most cautious method available and the Army modified its plan the following week to instead dissolve the sarin bomb in an enclosed vat of chemicals.[391] Less than three weeks later, amid the discovery of additional sarin-filled bomblets at the Arsenal, Army officials conducted a test explosion in a Tuff Shed then tried to pass the results off as a

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[389] Guy Jr., 21 October 2000, quoting Ruth Meacham, U.S. Army Rocky Mountain Arsenal chief of public affairs.

[390] Guy Jr., 21 October 2000, quoting Ruth Meacham.

[391] Guy Jr., 29 October 2000, "Chemicals to Dissolve Sarin-filled Bomblet;" and "Army Bombs Again."

success. State health department officials, who had insisted on observing the test, called the Army's bluff noting, "It is perfectly obvious that this structure did not contain the effects of the explosion," which blew the building's doors open, lifted the roof, knocked off the filters and blew several holes in the structure.[392] As a derisive editorial in *The Denver Post* then observed, "Tuff Sheds are great places to store lawn mowers, but lousy places to blow up nerve gas bombs."[393]

Press coverage and public alarm finally grew heavy enough to draw the attention of elected officials. After receiving sharply-worded notices from both Colorado's Governor and Senator Wayne Allard, who had sponsored the Arsenal's wildlife refuge legislation in 1992 and happened to serve on the Senate Armed Services Committee that controlled the Army's appropriations, the U.S. Secretary of Defense sent a four-star general to the Arsenal to convene a task force and devise a range of alternatives for destroying the sarin bomblets safely.[394] Five alternatives, including open-air detonation and a leave-in-place option, were then presented to the state, which selected a fully-enclosed drain-and-detonate system that had proven effective in England but existed only as a prototype at the Army's Aberdeen Proving Ground in Maryland.[395] The Army also acceded to the state's and EPA's demands to

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[392] "State Pans Army Over Test Explosion," 18 November 2000, *Denver Post*, p. B3, quoting Howard Roitman, director of Hazardous Materials Division, Colorado Department of Public Health and Environment.

[393] "Army Bombs Out at Arsenal," 29 November 2000, *Denver Post*, p. B10.

[394] Stein, Theo, "General Sent to Arsenal," 29 November 2000, *Denver Post*, p. B1.

[395] Stein, Theo, "Self-contained System Will Destroy Arsenal Bomblets," 2 December 2000, *Denver Post*, p. A1.

conduct a meticulous cleanup of the scrapyard where the first six sarin bombs were found, a search that later yielded four more of the nerve gas munitions.[396]

Public debacles as dramatic and well documented as the sarin bomblet discoveries have been rare in the six decades since the Arsenal was established, but reports of missing or leaking nerve gas canisters, Arsenal workers falling ill, toxic soils, poisoned wildlife, unusual earthquakes, and contaminated groundwater periodically surfaced and, over time, generated a broad sense of public distrust about the safety of the site and its practices.[397] Despite the Army's routine assurances that everything was under control – and as we have seen it sought to maintain control through a variety of means – often when public oversight took place, the conditions at the Arsenal provoked alarm. Indeed, the extreme toxicity of the materials being produced at the site would seem to warrant an extraordinary standard of precaution.

Sarin, the nerve agent contained in the Army's "unstable" bomblets, was known as one of the deadliest toxins ever produced by the U.S. military, yet the Army did not cancel public visits to the Arsenal for nearly a week after the first sarin bomb was uncovered.[398] The fact that school groups once again visit the Arsenal as part of regular environmental

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[396] Stein, Theo, "General to Present Options for Bomblet Disposal," 1 December 2000, *Denver Post*, p. B1; Stein, Theo, "What More Lurks at Arsenal?" 3 December 2000, *Denver Post*, p. A1; Edmonson, "Weapons Debris Found at Arsenal."

[397] See, for example, "Nerve Gas Worker," 25 May 1979, *New York Times*, p. A16; "Nerve Gas Bombs Leaking," 26 May 1979, *New York Times*, p. A7; "Army to Provide Water to Schools Near Arsenal," 6 March 1986, *New York Times*, p. A18; Reid, T.R., "Coloradans Ask: Is Toxic-Waste Cleanup Dangerous to Our Health?" 24 December 1986, *Washington Post*, p. A5; Zaslowsky, Dyan, "Toxic Issue at Arsenal Stirs Furor in Colorado," 5 January 1989, *New York Times*, p. A16; Thurman, Skip, "Colorado Hazardous-Waste Cleanup Stirs Up Controversy," 16 March 1989, *Christian Science Monitor*, p. 8.

[398] "Army Bombs Again."

education fieldtrips (the Comprehensive Management Plan shows schoolkids digging holes for treeplanting and other hands-on activities)[399] suggests that the Arsenal's managers have been adept at containing public anxieties about the site's safety.

Such messaging has been accompanied by an active attempt to separate visitors both in time and space from the site's remediation: the Arsenal is open to visitors only on weekends and predominantly in the site's southern tier; remediation work occurs during the weekdays and primarily in the site's north-central area. As a further restriction, pedestrian and bicycle travel is prohibited outside of guided tours even in the southern tier of land where the Army has now met its CERCLA cleanup requirements. Even so, the Arsenal as an area for public use is not without its detractors. The local chapter of the Sierra Club periodically circulates a letter to all the schools in the Denver metropolitan area asking teachers not to take their students to the Arsenal for field trips.[400] This sentiment to keep visitors away from the Rocky Mountain Arsenal National Wildlife Refuge was also supported in a number of the public comments submitted during hearings on the site's conversion and remediation.[401]

Rocky Mountain Arsenal as Role Model

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[399] CMP, p. 6, 64.

[400] Personal communication with Angela Medberry, 27 July 2004 interview.

[401] See, for example, "Rocky Mountain Arsenal National Wildlife Refuge Act of 1991," 9 September 1991, Joint Hearing Before the Fisheries and Wildlife Conservation and the Environment Subcommittees of the Committee on Merchant Marine and Fisheries [serial No. 102-61] and the Military Installations and Facilities Subcommittee of the Committee on Armed Services, House of Representatives, 102nd Congress, 1st Session.

One of the reasons it is so important to understand what has happened at the Rocky Mountain Arsenal and how its current conversion to national wildlife refuge is being produced is because, despite its unique characteristics, the Arsenal's M2W conversion is being projected as a model for base closures and redesignations in other locations. Looking beyond the realm of military lands, the Arsenal's material remediation and discursive rehabilitation is attractive to many as a model of what to do with contaminated sites more generally. As the executive director of the National Fish and Wildlife Foundation proclaimed in 1990, "The arsenal's challenges embody society's most pressing problems and needs – to clean up our toxic waste and manage development pressures brought on by our ever-burgeoning population while protecting our sensitive natural resources. The arsenal can serve as a model – a model for the State of Colorado and the rest of our nation."[402]

In the most proximate sense, we need to understand what comes wrapped into this model before we continue to export it to dozens of other sites facing their own unique, but broadly familiar contours of contamination. Beyond the particular cases of the Rocky Mountain Arsenal or other sites currently in the midst of their own M2W conversions, we should understand as fully as we can how questions of authority, control, contamination, and justice are being resolved in these places. However much we support wildlife protection or may feel gladdened by the apparent greening of the military, there are political and moral ramifications when military activities are framed as compatible with conservation and when militarized spaces are presented as suitable for public recreation and environmental education.

[402] Charles H. Collins quoted in Shattil et al., 1990, p. 11.

If we take at face value, for example, statements in glossy publications that describe how the "Rocky Mountain Arsenal has emerged as a significant habitat island for wildlife; with proper care not to unbalance the ecosystem, it can develop as a refuge for a human population seeking escape from the artificial world we've created. We envision the arsenal as a place to renew our relationship with nature and to observe and learn from a harmonious working ecosystem,"[403] we embrace a world where even the nation's most toxic sites can be reconfigured as beautifully balanced ecosystems. In this vision, a longtime chemical production facility becomes normalized as pristine nature itself and an *escape* from what must now be an exceedingly marginalized artificial world.

In the next chapter I turn to my second case example of M2W conversions, which involves the redesignation of the Jefferson Proving Ground in southeastern Indiana to become the Big Oaks National Wildlife Refuge. This case offers the chance to examine one of the nation's largest base closures effected through the Base Realignment and Closure Commission (BRAC), and includes a different suite of contamination and management issues than those discussed in this chapter on the Rocky Mountain Arsenal. Among these, Big Oaks' policies toward hunting, prescribed burning, and cleanup of unexploded ordnance – including depleted uranium – merit particular attention.

[403] Shattil et al., from a preface by the photographers, p. 7.

CHAPTER FIVE

CUM SCIENTIA DEFENDIMUS[404]

At the July 2000 dedication of the Big Oaks National Wildlife Refuge, the director of the U.S Fish and Wildlife Service noted that she was not surprised that a former military range also featured "an amazing array of wildlife."[405] Although its conversion and designation apparently did not come as a surprise to the agency's director, the new refuge site had long been managed by the U.S. Army as the Jefferson Proving Ground and for many in attendance that day its new name surely sounded like a change of fortune.[406] During more than fifty years of operation, the Jefferson Proving Ground (JPG) bore up to 85 percent of all the Army's munitions testing, including weapons that ranged from small-caliber cannons to

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[404] Taken from the insignia posted at the former Jefferson Proving Ground, this slogan is part of the distinctive unit insignia of the Army Soldier and Biological Chemical Command. Translation: With Science, We Defend.

[405] Quoting Jamie Rappaport Clark, "Former Bombing Range Becomes National Wildlife Refuge," U.S. Fish and Wildlife Service, reprint from July/August 2000 issue of *Fish and Wildlife News*, online at http://news.fws.gov/articles/FormerBombing.html [3 December 2002]. I quote her more fully in Chapter One, p. 21.

[406] Jefferson Proving Ground took its name from Jefferson County, IN, in which it sits. The range/refuge also covers portions of Jennings and Ripley Counties. See Figure 5.1.

one-ton bombs.[407] Starting in 1984, the Army also fired more than 220,000 pounds of depleted uranium projectiles at the JPG's testing range, only about 25 percent of which have since been recovered.[408] (Figure 5.1: Location of Jefferson Proving Ground/Big Oaks NWR.)

While few would now deny that wildlife is flourishing at Big Oaks, serious questions remain about what role the Army will play in the ultimate cleanup of the site, or how the work of wildlife biologists and other scientists has been used to facilitate the conversion, management, and public acceptance of a military-to-wildlife conversions in southeastern Indiana. In this chapter, I focus on the environmental politics of military-to-wildlife conversions, examining in particular how environmental analysis and management priorities are shaped by scientific perspectives, and vice versa. As with the previous chapter, I turn to a case study to illuminate the processes of conversion and reclassification, this time at the Big Oaks National Wildlife Refuge.

To begin, I examine the historical geography of what is now the Big Oaks National Wildlife Refuge (BONWR). Here in southeastern Indiana, like the Rocky Mountain Arsenal, we find a landscape that doesn't simply *exist*, but rather has been produced and re-produced into farmland, a bombing range, and a wildlife refuge, with each iteration carrying with it a suite of moral, political, and economic commitments. From this historical footing, I turn to the recent politics of conversion at the Jefferson Proving Ground, including the BRAC process that has systematically downsized the domestic military infrastructure and accelerated the pace of military-to-wildlife conversions. Extending from the BRAC process, I

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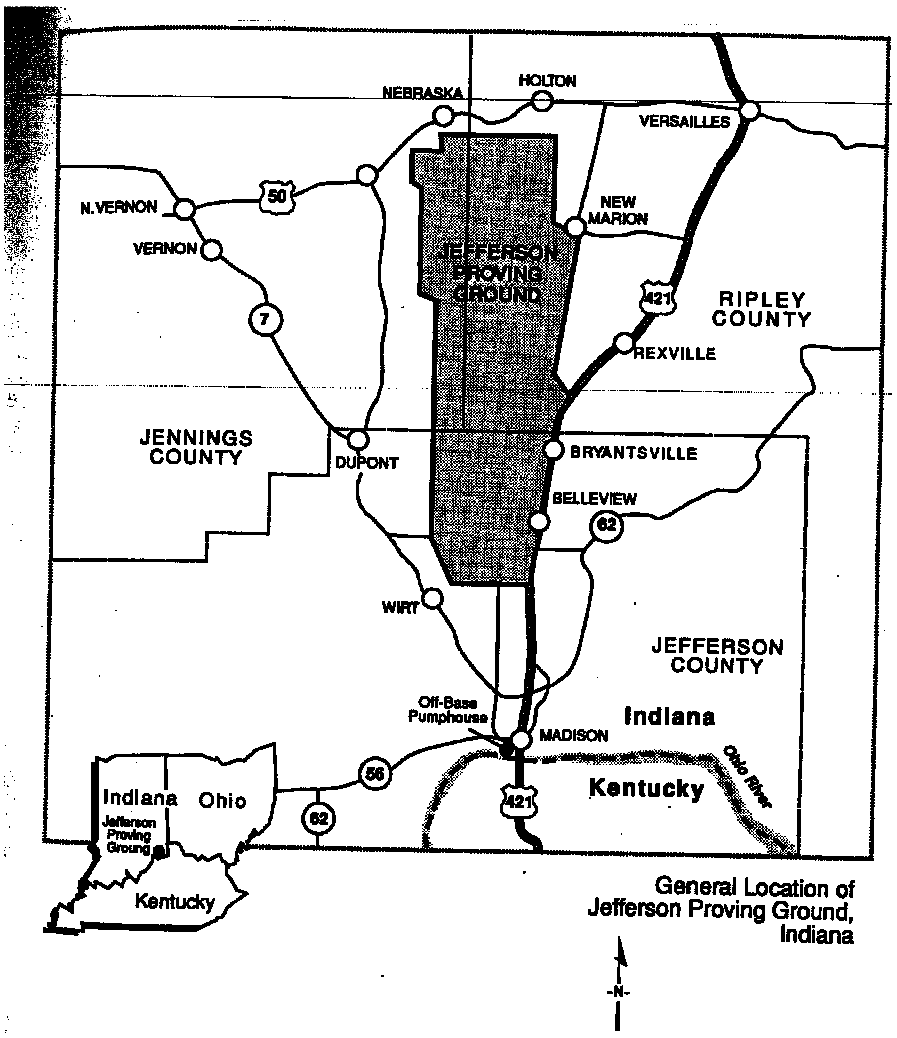
[407] Disposal and Reuse of the Jefferson Proving Ground, Madison, Indiana, Final Environmental Impact Statement (U.S. Department of the Army: September 1995), p. 4-38; Shulman, Seth, *The Threat at Home: Confronting the Toxic Legacy of the U.S. Militar*y (Boston: Beacon Press, 1992).

[408] Disposal and Reuse, p. 4-41.

Figure 5.1: Location of Jefferson Proving Ground/Big Oaks NWR[409]



address the "overlay" status that currently governs the Big Oaks National Wildlife Refuge and consider the variety of uses that this condition accommodates. With this, I examine three of the activities – hunting, bird watching, and fire management – that illustrate in practical

[409] Map credit: Base Realignment and Closure (BRAC) Cleanup Plan, Jefferson Proving Ground, Madison, Indiana, version I (Alexandria, VA: The Earth Tech. Corporation for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, April 1994), p. 1-5, figure 1-1, accessed from Archives of Hanover College, Duggan Library.

terms what this M2W conversion means on the ground as a bombing range is rendered into a public wildlife sanctuary.

Six Decades of Intensive Use: A Historical Geography of the JPG/BONWR

One year and a day before the Japanese bombed Pearl Harbor, a bomb of a different sort landed amid the rural communities of southeastern Indiana. On 6 December 1940, a cluster of local, state, and federal officials announced from the Jefferson County courthouse that a 55,000-acre tract of land was to be turned over to the federal government for use as a national defense site. On that day, hundreds of families were given thirty days' notice that their homes and farms, stores, churches and cemeteries would be condemned – either relocated, sold, or abandoned in order to make way for a new facility to test Army munitions. Just five months later the Jefferson Proving Ground felt its first rounds, as a 75-millimeter cannon struck the opening volley of more than four decades of weapons testing at the Indiana site.[410]

Although the United States was not yet at war when it created the Jefferson Proving Ground (JPG), the advance of Hitler's forces across Europe and Japanese troops into the North China Plain gave ample warning to the nation's military leaders that demands for advanced weaponry might soon escalate. As early as 1938 southeastern Indiana residents reported seeing Army vehicles cruising local roads.[411] By 1940 it had become clear that the

[410] For a patriotic history of the early days of the Jefferson Proving Ground see Baker, Sue, *Echoes of Jefferson Proving Ground: For Defense of Our Country* (Indianapolis, IN: Guild Literary Service, 1990).

[411] Baker, p. 1-2.

U.S. War Department was actively scouting to augment its primary ammunition testing facility at Aberdeen, Maryland.

As with the Rocky Mountain Arsenal, not just any place would do for a major weapons testing facility. The military sought a particular geography for its new proving ground. The site should be relatively sparsely settled, yet not so remote as to make rail, highway, or water transportation inconvenient. The base also needed to be large enough to test anti-aircraft guns, howitzers, mines, air-to-ground artillery,[412] and other large munitions in relative safety and security. What the Army's scouts found in southeastern Indiana met all of these standards and held a few added amenities as well: the site was within easy reach of the major manufacturing centers of the Midwest, sat just a few miles from the Ohio River, and was only thirty miles upstream from another new military project (operated by Dupont Chemical) in Charlestown, Indiana, that would become the world's largest smokeless powder factory.[413] The southeastern Indiana land in question, though occupied by about 2,000 rural residents, was described at the time by Army scouts as "uninhabited" and was not expected to fetch premium rates if the Army chose to buy it.[414] Indeed, this proved to be the case: of

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[412] The Air Force was not designated as a branch of the military separate from the Army until 1947, so aircraft were an important part of Army munitions tests at the time of the JPG's creation.

[413] Baker, pp. 1-2; interview with Ken Knouf, U.S. Army, Big Oaks National Wildlife Refuge, Madison, Indiana, 14 December 2005.

[414] Quote is from a video on the history of the Jefferson Proving Ground (title to be determined), produced by Elizabeth Winters and previewed 14 December 2005 at Big Oaks NWR.

the JPG's total initial costs of nearly $13 million, acquisition of the 55,000 acres of land amounted to just $3.3 million, or roughly $60 per acre.[415]

While this transition from rural homesteads to Army proving ground could be seen as simply a necessary precursor to the later military-to-wildlife conversion at the center of my research, the lives that were disrupted so dramatically in December 1940, like the anonymous thousands whose lives were eventually taken (or protected) by the weapons tested at the JPG, are also a part of the ongoing story of landscape production that I seek to illuminate.[416] The social impact of this first farmland-to-military conversion does in fact continue to weigh upon local views of the site even after more than six decades.

As base closures have become increasingly common in recent years, they have gained a largely negative reputation for their political costs, short-term economic fallout, and social upheaval to communities whose very existence seems to center upon military activities.[417] A

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[415] Baker, p. 104. Many of the displaced residents found that they were not able to buy land as cheaply as they had sold it to the U.S Government. See Baker, pp. 75-79.

[416] The farmland-to-proving ground transition was itself predicated upon earlier transitions that I will not address in depth here, such as the area's longstanding and shifting uses by indigenous peoples; the steady purge of Native Americans as white settlers from Virginia, the Carolinas, and Kentucky pressed westward; and Civil War-era skirmishes between Union and Confederate militias. Baker, 1990, covers some of these in greater detail.

[417] For example, see Lyons, Stephen J., "Leavin' on a Jet Plane," 22 August 2005, *High Country News,* p. A-1. What often gets overlooked amid the doomsday scenarios of base closures is that many, if not most communities actually end up with more vibrant, diversified economies after the military leaves. See "Renaissance: New Jobs, New Uses of Space and Resources, New Life for Former Military Bases," 2002, Base Realignment and Closure Commission, viewed online at www.defenselink.mil/brac/docs/oeabro02.pdf [22 October 2005]; and Woodward, pp. 60-61.

look at some of the personal accounts of base *designation* and its accompanying displacements shows that this earlier transition is often at least as difficult, if also pursued by local boosters. As Baker describes the displacement of local residents in her chronicle of the JPG, "It was a sacrifice to the gods of war… for defense of our country, and it was done with such ruthless, inexorable haste that the lives of hundreds of families were changed forever in less time that it takes to grow a crop of corn"[418] (ellipses in original).

In many cases, the sacrifice was not borne easily. Many recalled the pain of the upheaval decades later. In 1990, Elizabeth Curran Keller offered the following memories:

> Some people seem to think house-to-house moving does not bother little children, as long as they are with their parents. But I still have painful memories of how upset our two small sons were when we were forced to move from the farm in Monroe Township in Jefferson County in 1941. Bill and Bob were only four and six years, but they were unable to rest night or day, for weeks and weeks. It was such a strain on their little bodies and minds. So very nervous. It hurts a mother to see her children's agonizing nightmares… We finally learned to like our home in Lovett Township, in Jennings County, but it took a long time to adjust. This is where our Mary Ann was born, and we have stayed in this big, old house ever since that dreadful move in 1941.[419]

Although officials in Washington, D.C. had determined by 8 October 1940 that the southeastern Indiana location would be the site for the new Army proving ground, no public notice was given until two months later – and then residents were given a mere thirty days to make plans, pack up, and move out. (Ultimately this 30-day deadline proved to be unrealistic and many families did not vacate the area until February 1941.) In several cases, families were actually constructing new homes within the eventual JPG boundaries during the fall of 1940, a misfortune of timing that perhaps crystallized memories even more sharply:

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[418] Baker, pp. 2-3.

[419] Elizabeth Curran Keller, quoted in Baker, pp. 87-89, from her 7 April 1990 transcript.

> In the summer of 1940 my parents began work on a new house facing the Paper Mill Road. My father and a neighbor, Norman Boggs, dug a basement using horses and a hand-guided scoop. As the hole got deeper I remember being afraid the horse and scoop would fall backward onto the operator, but there were no accidents. The large fieldstone fireplace and chimney were done by local master stonemason Paul Hilbert. Although the house was not finished (plumbing, etc.), we moved into it in the fall before the weather got bad, and before tobacco was ready to be stripped, tobacco being the principal 'money crop.' Just two weeks after we moved in, a representative of the U.S. Government came and announced that this property was a part of what would become the Jefferson Proving Ground, and must be vacated in 30 days. The Thanksgiving and Christmas holidays were sad celebrations, since the entire community was being displaced. So when a farm south of Wirt on Sawmill Road (now 400 north) was offered for sale, my parents bought it and we moved there in January of 1941, after only six weeks in the new house. The Jefferson Proving Ground House, among others, was later moved to 'The Circle,' designated as Quarters 15, and used as a residence for officers and civilian personnel of Jefferson Proving Ground.[420]

In some instances there is no need to dig through historical accounts to capture the lingering effect and living memory of the 1940-1941 community displacements from the JPG site. I met with former resident Louis Munier in 2005, and he generously shared a five-pound binder of photos, newsclippings, and other memorabilia he has assembled to document his family's farmstead on the JPG near Big Creek. Though wistful about his family's loss, "It's kind of sad in a way to see what's left," Munier remains clear-eyed about what happened at the JPG. When asked if he harbored any interest in returning to his family land when news came of base closure in the late 1980s (Munier's house was heavily bombed), he said no, "Our farm – they had all that unexploded [ordnance] out there, plus the depleted uranium. Our farm is right there in that hot area."[421] (See Figure 5.2: Former JPG Resident Louis Munier.)

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[420] Nancy P. Raiser, quoted in Baker, pp 82-87, from her 30 May 1990 transcript.

[421] Interview with Louis Munier, Big Oaks National Wildlife Refuge, Madison, Indiana, 14 December 2005.

Figure 5.2: Former JPG Resident Louis Munier

Former JPG resident Louis Munier holding a photo album of his family farmstead that was condemned during the creation of the Army's base. Also pictured: Judy and Ed Schaefer, Big Oaks Conservation Society. 14 December 2005.

To this day, the former residents of Marble Corner, a community subsumed by the Army's JPG designation, hold an annual reunion of all families formerly residing on the proving ground site. Former members and friends of the vacated Monroe Presbyterian Church still get together every August for a visit and reading of the church minutes.[422]

The fact that so many families willingly acceded to the Army's relocation directives begs attention to several points. First, there seems to have been a clear perception at the time of a national interest that superseded community, family, or individual priorities. Even as

[422] Baker, p. 120.

former residents remember the anguish that accompanied their departure from family farms and rural communities, there is little in the way of the bitter anti-government backlash that often greets even relatively minor federal actions today such as designating critical habitat for endangered species habitat, regulating pollution, or limiting motorized access. Indeed, even when the United States was not yet at war in Europe or the Pacific in 1940, there was little active resistance to the decree to abandon farms, homes, churches, and cemeteries.

Admittedly, most residents may also have felt they had no choice but to comply with the government's plans, but such quiet acceptance of profound personal disruptions at the hands of government seem difficult to imagine today.[423] Whether attributed to changes wrought by the civil rights movement, Vietnam-era protests, legislation such as NEPA or the Freedom of Information Act, other examples of citizen access or empowerment, or steady calls for "small government," we need to look no further than the reaction to base closure proposals to see that a different dynamic now exists between federal authority and public action. The application of challenges to federal authority remains inconsistent, however, and an invocation of "national security" can still carry a great deal of weight in suppressing public objections. Similar appeals to national security emerge when environmental conservation goals periodically conflict with military programs.

Pragmatically, at least, we need to understand how Congress and the Department of Defense have managed to close hundreds of military installations since 1988 despite the clear opposition, in most cases, of the local populace and elected officials. As I described in Chapter Two, the Base Realignment and Closure Commission (BRAC) has played an

important role in facilitating many recent base closures through a systematic, (somewhat) depoliticized process. How a BRAC closure in Indiana came to be designated a national wildlife refuges is the focus of this next section.

The Wildlife Refuge Alternative

In 1988 the BRAC selected the Jefferson Proving Ground for closure, shifting its mission to the one million-acre Yuma Proving Ground in Arizona "in response to changing global security requirements," reductions in force structure, and military consolidations "to optimize readiness and cost effectiveness."[424] This fits a long-term trend to move military activities to ever larger, more remote locations to accommodate changing weapons technologies and security concerns. On September 30, 1994, the Army fired its last round at the JPG. The environmental impact statement to assess the Jefferson Proving Ground's closure was released that same month and described three primary alternatives: 1) encumbered disposal, where new land owners would face restrictions on possible uses due to conditions at the site including unexploded ordnance (UXO), depleted uranium, and an active air gunnery range; 2) unencumbered disposal, which would identify encumbrances and evaluate what could be done to remove them (and thereby lift restrictions on land uses); and 3) Army retention in "caretaker status," the equivalent of no action being taken after closure,

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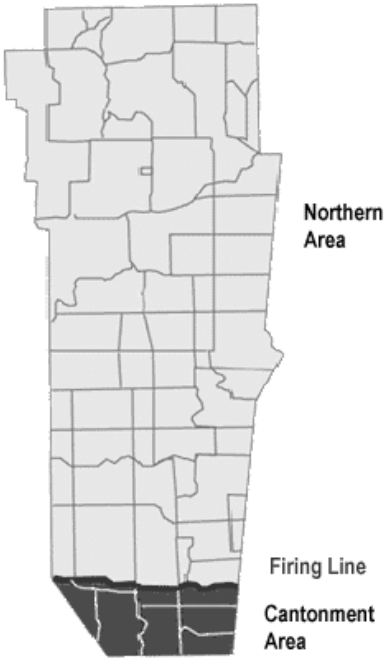
[423] In fact, where military expansions are currently proposed, such as the Pinon Canyon extension of Fort Carson in southeastern Colorado, the DOD is meeting with considerable resistance even from long-time military supporters.

[424] Disposal and Reuse, 1995, p. 1-1 and ES-1.

with no cleanup and no land transfer out of Army control.[425] The environmental analysis also highlighted differences between the 50,000 acres north of the historic firing line, which received the vast majority of all weapons tests, and 4,000-acre cantonment area south of the line, which held the administrative, residential, and manufacturing buildings for the Army's operations.[426] (Figure 5.3: Jefferson Proving Ground North and South of Historic Firing Line).

Figure 5.3: Jefferson Proving Ground North and South of Historic Firing Line[427]



[425] Jefferson Proving Ground Final Environmental Impact Statement, September 1995, pp. ES-2 to ES-3.

[426] The area south of the firing line also contained ordnance, but most rounds fired south of the line did not contain live charges; interview with Ken Knouf, U.S. Army site manager, Big Oaks National Wildlife Refuge, Madison, Indiana, 14 December 2005.

[427] Image from Jefferson Proving Ground Installation Support Management agency website, http://www.jpgbrac.com/history/site_description.htm [6 April 2006].

Of the three options presented in its analysis, the Army effectively rendered unencumbered disposal north of the firing line impractical as it ruled out a thorough cleanup of the lands north of the firing line. A genuine cleanup promised to be excessively costly in multiple ways. Simply pinpointing the location of unexploded ordnance promised to cost more than $50 million;[428] actual cleanup costs would extend far beyond that. As Shulman noted in his chronicle of contaminated military sites, "To remove all the bombs, most of JPG's wooded and bombed-out land would have to be stripped down to the level of buried ordnance – as deep as thirty feet below the surface – using special armored bulldozers. Aside from the issue of where to put the contaminated earth, the job is environmentally devastating and almost unthinkable in magnitude."[429] The Army's own assessment was scarcely more optimistic. It described:

> …up to 1.5 million rounds of UXO and up to 7.0 million inert projectiles with live fuses or spotting charges scattered across the impact areas north of the firing line at JPG. The presence of UXO constitutes a hazard to numerous kinds of activities that might occur in the area such as construction, intrusive investigation of hazardous waste site contamination, cross-country vehicular travel, and most agricultural and silvicultural operations. Removal technology to eliminate potential hazards is inadequate for the extent of the UXO contamination.[430]

Army and FWS managers currently working at the Big Oaks refuge generally agree that a complete cleanup of the site remains unrealistic and would effectively require a "strip

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[428] According to the Jefferson Proving Ground Reuse Plan, August 1994 (Madison, IN: Jefferson Proving Ground Regional Development Board), p. 73, the Army spent $1,000/acre at the Umatilla Proving Ground for such locational work.

[429] Shulman, p. 6.

[430] FEIS, p. 4-44.

mining" operation to remove all contaminated soils and explosive materials.[431] A more limited restoration effort, however, using magnetometers that identified objects down to two feet below the surface proved successful on the southern, less-contaminated portion of the JPG, which has now been sold into private ownership (i.e.unencumbered disposal). Some FWS officials expressed interest in taking a similar approach of limited cleanup across the Big Oaks refuge lands, but the Army has been unresponsive to most non-emergency requests for remediation.[432] The Memorandum of Agreement between the FWS and Army does not bind the DOD to any specific cleanup, stating simply that, "The Army retains liability for all unexploded ordnance, environmental remediation and monitoring, and all other consequences as a result of Army operations."[433]

With most commercial uses of the JPG ruled out due to the irremediable condition of the site, the last thing Indiana officials and local boosters wanted to see was for the bulk of the former bombing range to turn into a 50,000-acre patch of off-limits Army blight. Since 1977, the Indiana Air National Guard has also operated a 1,033-acre air gunnery range in the north-central portion of the JPG, which precluded human occupancy across broad safety fans

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[431] Interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005.

[432] Interviews with Joe Robb and Dan Matiotis, Big Oaks National Wildlife Refuge, 14 December 2005.

[433] Memorandum of Agreement between U.S. Army Test and Evaluation Command and Region 3, U.S. Fish and Wildlife Service for Natural Resource Management of the Firing Range of the Jefferson Proving Ground," dated 5 May 1997, photocopied from Big Oaks National Wildlife Refuge files. The subsequent permit to lease the Army's JPG property to the FWS defers to the terms of the 1997 memorandum; see Department of Army Permit No. DACA27-4-00-087 for the National Wildlife Refuge at Jefferson Proving Ground, Indiana, signed 5 July 2000 by Robert J. Krupp, BRAC Team Leader; photocopy from Big Oaks National Wildlife Refuge files, Madison, Indiana.

within the area at least while active sorties were being flown (the range receives approximately 2,100 flights per year). Finally, the Army had a keen interest in diminishing its management duties and obligations to the JPG. Streamlining infrastructure and reducing installation costs was, after all, the fundamental purpose of the BRAC process. As the Army's current site manager at Big Oaks put it, "BRAC did not mean caretaker [status]."[434]

In effect, then, the Army's analysis of alternatives for the future uses of the majority of the Jefferson Proving Ground had but one viable option: encumbered disposal. Several environmental groups voiced support for the site's conversion to a national wildlife refuge, as both the public and Army recognized that four decades of military shelling left few other appealing choices. The director of the statewide Hoosier Environmental Council raised a number of concerns about the site, but ultimately was succinct in his appraisal, "all of the lands North of the firing line should become a National Wildlife Refuge."[435]

The president of a local group, Save the Valley, testified at a public hearing, "The preservation of JPG as a wildlife refuge offers a unique opportunity for this part of the country. By the very nature of past use, much of JPG is actually unsuitable for other uses."[436] This view was also made apparent in my conversations with citizen volunteers and members of the refuge "friends" group, the Big Oaks Conservation Society. When I asked why they thought the JPG had become a wildlife refuge they responded, "What else could they do with it? There's no way they could have cleaned it all up."[437]

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[434] Interview with Ken Knouf, 14 December 2005.

[435] Tim Maloney, quoted in JPG EIS, Appendix H, 1995.

[436] Richard Hill, quoted in JPG EIS, Appendix H, 1995. This fits with the Brownfield logic of conversion described earlier in Chapter Three.

[437] Interview with Ed and Judy Schaefer, Big Oaks Conservation Society, Madison, IN, 14 December 2005.

The Army did receive public comments advocating for a more traditional economic mission for the JPG lands, though none of these effectively addressed the actual condition of the place. The three counties whose jurisdiction included the JPG developed a more sophisticated plan for economic development that was funded by the DOD's Office of Economic Adjustment. Under the auspices of the Jefferson Proving Ground Regional Development Board, the counties generated a proposal that combined a wide array of uses for the 50,000 acres north of the firing line. These included a large egg production facility and agribusiness park, conference center, private ordnance testing, wildlife refuge, veterans cemetery, solid waste landfill, prison complex, golf course, telecommunications center, hog production and meat packing plant, and solar energy park.[438] The International Union of Operating Engineers expressed serious interest in a 5,500-acre research and training facility, which the redevelopment board pitched as "a unique opportunity to establish [the JPG] as the 'UXO research center' where most of the nation's research in this area is conducted."[439] The ample supply of UXO on-site may have promised "a source of jobs and benefits for years to come,"[440] but the redevelopment board's vision stalled as their business plan remained dependent upon federal subsidies that the Army was

[438] Jefferson Proving Ground Reuse Plan, (Madison, IN: Jefferson Proving Ground Regional Development Board, August 1994), accessed from Archives of Hanover College, Duggan Library.

[439] Jefferson Proving Ground Reuse Plan, p. 7.

[440] Jefferson Proving Ground Reuse Plan, p. 7.

not willing to grant, due in part to the lasting liability of developing commercial uses on land littered with live munitions.[441]

In the end, for many residents of Jefferson, Jennings, and Ripley counties who feared economic decline with the closure of the Jefferson Proving Ground, redesignating the site as a national wildlife refuge seemed to offer at least an environmentally attractive option for a place that might otherwise languish as a brownfield or in the purgatory of federal "caretaker" status.

Comments from the Army and U.S. Fish and Wildlife Service actually echoed this uncertainty about how things were going to work out at the Jefferson Proving Ground. With commercially intensive uses of the site largely precluded by the prohibitive costs and challenges of a thorough cleanup, the future condition of the place seemed relegated to more marginal uses. Faced with a diminished Army presence and a suite of major contamination problems, the Jefferson Proving Ground seemed destined to become rather peripheral social and economic space. The designation of the site as a national wildlife refuge offered a chance to restore the site ecologically, as well as an opportunity to recast its reputation and role in society.

It was thus a very charged ecological setting that the U.S. Fish and Wildlife Service entered when it began to consider the prospects of a military-to-wildlife conversion at the JPG. The agency's cautious public testimony at a 1995 Disposal and Reuse hearing reflected some awareness of this:

> The U.S. Fish and Wildlife Service continues to be interested in protecting the natural resource values of the Jefferson Proving Ground. Over

[441] Interview with Ken Knouf, U.S. Army, Big Oaks National Wildlife Refuge, Madison, Indiana, 14 December 2005.

> the past two years, federal and state biologists have conducted on-site investigations which have reaffirmed our interest. Preliminary findings show the proving ground contains several high quality wetlands, woods and streams supporting healthy and diverse wildlife populations. The large expanse of Eastern deciduous forest habitat and its inherent biological diversity warrants consideration as a national wildlife refuge. The Fish and Wildlife Service biologists know good habitat when they see it, but until recently we have failed to recognize the magnitude of problems associated with unexploded ordnance hidden in this landscape.[442]

Working with the most ecologically-oriented mandate of any manager of the federal public lands,[443] the U.S. Fish and Wildlife Service to many observers seemed a natural fit to take custody of the closing JPG lands and tend to the thousands of acres of forest, prairie, and wildlife that were flourishing there. The agency employs only a handful of contaminants biologists, however, so it was understandably wary of adding a unit to the National Wildlife Refuge System that would simply drain its chronically underfunded coffers with cleanup liabilities – a situation that it already knew too well from the Crab Orchard NWR's lingering military hazards and ongoing industrial impacts (see Chapter One).[444]

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[442] Mike Marxen, U.S. Fish and Wildlife Service Upper Midwest Region representative, quoted in JPG EIS, Appendix H, 1995.

[443] Fischman, Robert L., *The National Wildlife Refuges: Coordinating a System Through Law* (Washington, D.C.: Island Press, 2003), p. 9; see also Meretsky, Vicky J., Robert L. Fischman, James R. Karr, Daniel M. Ashe, J. Michael Scott, Reed F. Noss, and Richard L. Schroeder, "New Directions in Conservation for the National Wildlife Refuge System," *BioScience* 56(2)(February 2006): 135-143.

[444] Interview with Mark Sattelberg, U.S. Fish and Wildlife Service contaminants biologist, 20 July 2004, Rocky Flats, Colorado. See also Memorandum Regarding Proposed Draft Legislation and Transfer of Jefferson Proving Ground, from Thomas C. Jacobs, U.S. Department of the Interior, Office of the Solicitor to William F. Hartwig, Regional Director, U.S. Fish and Wildlife Service, 4 March 1998, which references legal problems related to remediation of military contaminants at Crab Orchard. Similar concerns were raised by several

Science Steps In

Although economic, safety, and aesthetic reasons for military-to-wildlife conversions are often those most salable to elected officials and a skeptical public, scientific claims of protecting ecological attributes and biological diversity often carry the day in behind-the-scenes legal maneuvering (such as invoking the Endangered Species Act) and winning acceptance from the U.S. Fish and Wildlife Service. When M2W conversions are framed as a means to conserve rare natural resources such as wildlife or threatened habitat, as they typically are, the Fish and Wildlife Service is usually the first ally summoned from the ranks of the federal government – and in fact has a legal charge to recover threatened and endangered species. We saw this in the previous chapter when bald eagles were discovered roosting at the Rocky Mountain Arsenal. Here at the Jefferson Proving Ground, as well, the call to protect biodiversity brought the agency's wildlife biologists on site at an early stage to assess its potential as a national wildlife refuge.

Science plays multiple roles in military reclassifications generally as these rely upon scientific expertise to evaluate the hazards present at conversion locations, as well as for guidance on any subsequent mitigation or restoration activities. Depending upon their interests or expertise, the scientists involved in evaluating a site for its future uses may highlight one set of qualities above several others. This comes out in the comment quoted

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officials at the FWS's 1998 meeting to consider the impacts of military acquisitions, see "Minutes of FWS National Meeting On Military Base Closure Acquisition Issues," Denver, CO, 17 April 1998, photocopy from Big Oaks National Wildlife Refuge files.

above where the Fish and Wildlife Service spokesman acknowledges that his agency's biologists can identify good habitat at a glance but may fail to recognize the hazards of unexploded ordnance. A contaminants biologist or ecotoxicologist might see quite the reverse: tons of contamination in stark relief against a dim matrix of habitat. As Beck demonstrates with his theory of the "risk society," there is also, invariably, incomplete scientific knowledge and uncertainty when dealing with complex military settings and their re-productions.[445]

Two studies completed in the early 1990s increased the Fish and Wildlife Service's interest in assuming control over the JPG site. A 1993 biological inventory highlighted the array of rare plants and habitats that existed at the Proving Ground and was described by one Army manager as the document that kick-started serious thinking about converting the base into a national wildlife refuge.[446] In 1994, FWS biologists published a fish and wildlife management plan that detailed "a diverse wildlife community" on site, but also cautioned that the agency still had limited knowledge of the JPG's unexploded ordnance and other safety concerns.[447]

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[445] See Beck, Ulrich, "Risk Society and the Provident State," pp. 27-43, In: Lash, Scott, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996). I engage ideas of risk society more fully later in Chapter Five.

[446] See Hedge, Cloyce L., Michael A. Homoya, Rodger L. Hedge, and Colleen Baker, *An Inventory of Special Plants and Natural Areas within the U.S. Army Jefferson Proving Ground in Southeastern Indiana*, March 1993, noted for its importance by Ken Knouf, U.S. Army, author interview at Big Oaks National Wildlife Refuge, Madison, Indiana, 14 December 2005.

[447] Pruitt, Lori, Scott Pruitt, and Michael Litwin, under supervision of David C. Hudak, *Jefferson Proving Ground Fish and Wildlife Management Plan*, (Bloomington, IN: U.S. Fish and Wildlife Service, September 1994); quote is from p. 19.

By March 1994, the Fish and Wildlife Service approved a Preliminary Project Proposal to accept a no-cost land transfer from the Army and create a national wildlife refuge at the Jefferson Proving Ground. The proposal envisioned a 53,000-acre refuge for which the Army retained "permanent liability for all contaminants or hazardous wastes and unexploded ordnance, and any remediation costs required would be borne by the Army."[448] The agency's subsequent concerns surrounding the extent of these hazards and the Army's long-term liability nearly scuttled the JPG's conversion to a refuge. As a 1995 FWS memo to the Army explained,

> The Service has spent the last month examining the situation at JPG, talking with solicitors, getting comments on the Draft Concept Plan from the Environmental Protection Agency (EPA), tracking base closure trends nationwide, and contacting others involved in base closures. We have concluded that we cannot proceed with an interagency agreement on the terms and conditions of the transfer. Based on advice from the Department of the Interior Field Solicitor's Office, we do not believe that an interagency agreement would be an adequate document to define a long-term relationship involving significant financial and liability commitments.[449]

The memo went on to detail four points of concern: 1) long-term liability for UXO should remain with the Army; 2) the Army's cleanup plan for UXO was vague and insufficient; 3) there was no comprehensive data on UXO and contaminants at the JPG; and 4) the Army

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[448] Memorandum from Deputy Director, U.S. Fish and Wildlife Service to U.S. FWS Regional Director for Region 3, "Preliminary Project Proposal to Establish the Jefferson Proving Ground National Wildlife Refuge," 3 March 1994.

[449] Hartwig, William F., Regional Director, U.S. Fish and Wildlife Service, memo to Paul W. Johnson, Deputy Assistant Secretary of the Army, 19 April 1995; photocopy from Big Oaks National Wildlife Refuge files.

needed to commit to funding and staffing for FWS transition teams and for long-term safety costs.[450]

The Army acknowledged some of these concerns and in 1997 the two agencies signed a three-year Memorandum of Agreement by which the Army retained liability and responsibility for the JPG in a "caretaker" status, while the FWS managed the property in an "ecosystem-based manner."[451] The three-year arrangement was designed explicitly as a test period for both parties to assess prospective longer-term settlements for the JPG. It also delimited the responsibilities for each agency and committed $750,000 of Army funding to cover costs of the FWS salaries and expenses dedicated to JPG management.

While the 1997 Memorandum of Agreement addressed, at least in the short-term, questions of liability and funding for the JPG's management, the Army largely ignored questions relating to data or cleanup of UXO. These proved to be pivotal issues as the Fish and Wildlife Service considered the terms by which it would be willing to take lasting responsibility for the Jefferson Proving Ground as a new national wildlife refuge. The FWS appreciated the conservation potential of the JPG and considered it an important potential addition to the region's refuge holdings:

> The large undeveloped blocks of forest and grassland at JPG support 161 bird species, many of which are neotropical migratory birds. JPG has been designated as a GLOBALLY IMPORTANT BIRD AREA in American Bird Conservancy's United States Important Bird Areas Program. JPG has extremely high plant and animal biodiversity and supports one of the highest

[450] Hartwig memo to Johnson, 1995.

[451] "Memorandum of Agreement Between U.S. Army Test and Evaluation Command and Region 3, U.S. Fish and Wildlife Service for Management of the Firing Range of Jefferson Proving Ground," 5 May 1997, signed by John E. Longhouser, U.S. Army, and William F. Hartwig, U.S. Fish and Wildlife Service; photocopy from Big Oaks National Wildlife Refuge files.

> known densities of maternity colonies of the Federally endangered Indiana bat (*Myotis sodalis*)"[452] (emphasis in original).

But the agency still recognized that the entire site was contaminated with UXO and that the Army had disavowed any commitment to a thorough cleanup.

In an effort to create a more stable resolution that could succeed the three-year Memorandum of Agreement, the Fish and Wildlife Service prepared a bill that would codify the terms of Army liability and FWS management at the JPG. Indiana Congressman Lee Hamilton was keen to introduce the bill before he retired from office at the end of 1998, but attorneys overseeing the legislation on behalf of the Fish and Wildlife Service insisted on language that would unambiguously clear the agency and the Department of the Interior from liability for hazardous wastes and UXO. In fact, the model the lawyers from the Solicitor's Office pointed to was the 1992 legislation that created the Rocky Mountain Arsenal National Wildlife Refuge: "Is the FWS aware of the legislation transferring the Rocky Mountain Arsenal? Apparently in this legislation the land is being managed as a refuge, but no transfer will take place until after the cleanup is complete. Both this [regional solicitor's] office and Washington strongly recommend that the FWS review this option."[453]

Still smarting from the multi-billion dollar remediation at the Rocky Mountain Arsenal, however, the U.S. Army balked at the prospect of another cleanup and restoration

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[452] Memorandum from William Hartwig, Regional Director, U.S. Fish and Wildlife Service Region 3 to [Jamie Rappaport Clark] Director, U.S. Fish and Wildlife Service, "Legislation to Transfer Jefferson Proving Ground to the Service," 6 March 1998.

[453] Memorandum regarding Proposed Draft Legislation and Transfer of Jefferson Proving Ground, from Thomas C. Jacobs, U.S. Department of the Interior, Office of the Solicitor to William F. Hartwig, Regional Director, U.S. Fish and Wildlife Service, 4 March 1998.

project with a price estimate reaching upwards of $16 billion.[454] As one Army official at Big Oaks commented, "Why in hell would you spend $16 billion on land that you could probably buy for $1,000, $2,000 dollars an acre?"[455] The legislative push subsequently faltered as neither party could come to terms over how to resolve the question of cleanup.[456]

With the expiration of the Memorandum of Agreement looming at the end of Fiscal Year 1999 (30 September 30 1999), a move by the Indiana Air National Guard shifted the uneasy balance that existed between the Army and the Fish and Wildlife Service for the long-term management of the JPG. In the spring of 1999, Indiana Air National Guard officials notified both agencies and the region's new Congressman, Baron Hill, that "smart bomb" technologies and the continued need for air support in Kosovo and Iraq spurred a need for a larger impact area. The Air National Guard proposed taking over the entire 51,000 acres north of the firing line, with a possible accommodation for a national wildlife refuge in 10,000 acres across the northernmost tier of land.[457]

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[454] FWS employees familiar with both locations contend that the cleanup at the Arsenal is considerably simpler than that posed by the explosives at Big Oaks (e.g. interviews with Matiatos, 2004; Alan Anderson, Refuge Operations Specialist, Upper Mississippi River National Wildlife and Fish Refuge, Lost Mound Unit, 30 May 2006). The *containment* of the hazards at RMA involves essentially a massive landfilling operation – a task that is familiar to most municipal engineers, while even a modest cleanup of the UXO at Big Oaks would require expertise in identifying and handling explosives and depleted uranium.

[455] Interview with Ken Knouf, U.S. Army site manager, Big Oaks National Wildlife Refuge, 14 December 2005.

[456] Interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005.

[457] See Robert J. Mitchell, Indiana Air National Guard, letter to Representative Baron Hill, 12 May 1999; Weslander, Eric, "Nature Refuge or Bomb Range? Indiana Wildlife Plan May be Drastically Scaled Back,"

The emergent interest by the Indiana Air National Guard seemed to catch the Fish and Wildlife Service off-guard. The FWS had generally assumed that with the JPG's closure the Air Guard would soon abandon its 1,000-acre bombing range near the center of the base.[458] Suddenly the expectant wildlife refuge managers found themselves in a bidding war against a vastly expanded gunnery range, a change that cost them precious leverage in demanding a high standard of cleanup from the Army. As one FWS employee commented at the time, "We're not going to stand in the way of national defense."[459]

When the three-year funding commitment ended from the Army in October 1999, the Fish and Wildlife Service found itself both without a refuge at the JPG site and without any paid staff to manage the place.[460] Environmental groups issued urgent appeals to their members to contact the Army and elected officials in support of the JPG's military-to-wildlife conversion – "Support the Jefferson Proving Ground National Wildlife Refuge! Please don't let this once in a lifetime conservation opportunity to protect the wildlife and

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Louisville Courier-Journal, 14 August 1999, 1A; Carroll, James V., "Guard Wants to Expand JPG's Bombing Range," *Madison Courier*, 17 August 1999, 1A; photocopied from Big Oaks National Wildlife Refuge files.

[458] See, for example, 27 February 1998 draft of FWS proposed legislation for "Old Timbers National Wildlife Refuge Act of 1998," sec. 2(h); and Weslander, 14 August 1999. Photocopied from Big Oaks National Wildlife Refuge files.

[459] Joe Robb, quoted in Weslander, 14 August 1999.

[460] See Weslander, Eric, "Wildlife Service Suspends Work at Proving Ground," *Louisville (KY) Courier-Journal*, 29 September 1999.

natural areas at JPG be lost"[461] – but it had become clear to supporters of a refuge at the Proving Ground that the Army had final say over the site's destiny.

The increased public attention and concern that greeted the Air National Guard's proposal to take over the JPG site did, in fact, lead Congressman Hill to try to mediate a solution between the Army, Air Guard, and FWS. Facing the very real prospect of losing a 50,000-acre "gift" rich with biological diversity, the Fish and Wildlife Service struggled to make a suitable case for itself. As one FWS employee explained to me, if his agency demanded too high a standard for cleanup at the JPG, the Army could simply accept the Indiana Air National Guard's proposal and the refuge effort would fail.[462] Concerned that it might lose out completely on the JPG lands, the Fish and Wildlife Service also outlined a proposal for *joint* management of the entire site with the Indiana Air National Guard – even as some FWS officials expressed skepticism that the arrangement would be considered a "compatible" use of the refuge.[463]

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[461] "National Wildlife Refuge Proposal for Jefferson Proving Ground in Trouble!" Hoosier Environmental Council action alert, n/d, photocopy from Big Oaks National Wildlife Refuge files, original printed from website, www.enviroweb.org/hecweb/alerts/jpgAlert.htm [28 April 1999].

[462] Interview with Jason Lewis, U.S. FWS wildlife biologist, Big Oaks National Wildlife Refuge, Madison, IN, 15 December 2005.

[463] See Weslander, 29 September 1999; "Joint Management of Jefferson Proving Ground as Old Timbers Overlay NWR and as Air National Guard Jefferson Range," undated [ca. 1999] U.S. Fish and Wildlife Service document, photocopy from Big Oaks National Wildlife Refuge files. The Indiana Air National Guard had drafted its own proposal that would establish itself as the sole lessee of the JPG lands; see "Proposed Agreeement Between the Air National Guard and the U.S. Army for Operations at the Jefferson Proving Ground," undated [ca. 1999] Indiana Air National Guard document, photocopy from Big Oaks National Wildlife Refuge files.

Overlay Refuge Status

The solution that Congressman Hill finally brokered between the Army, Fish and Wildlife Service, and Air National Guard managed to finesse the lack of certainty regarding cleanup, liability, and long-term land use at the JPG. The parties simply opted to postpone any transfer of real property from the Department of Defense to the Fish and Wildlife Service. With the property remaining in DOD hands, the decision to remove UXO or treat other contaminants on-site similarly remained up to the U.S. Army. Unlike the Rocky Mountain Arsenal (described above and in Chapter Three), where property transfer is taking place once the Army and Shell complete the site's remediation to the satisfaction of the EPA's CERCLA criteria and the State's RCRA standards, at the Jefferson Proving Ground neither property transfer nor cleanup of unexploded ordnance is actively scheduled to occur.

This approach of creating an "overlay" refuge, where wildlife, habitat, and the visiting public are managed by the Fish and Wildlife Service but land title remains with the Department of Defense, is now being applied to approximately 20 percent of all M2W sites.[464] Many of these locations are characterized by having extensive problems of contamination and no dedicated fund or legal commitment to assure full cleanups. In effect, an overlay arranges for a shift in nomenclature at a site without the transfer of legal responsibility for its conditions.[465] The Jefferson Proving Ground is thus a closed Army

[464] Personal communication with Barbara Wyman, Realty Division program manager for base conversion lands, U.S. Fish and Wildlife Service, Washington, D.C., 6 October 2003. See Table 1.2.

[465] This type of overlay should not be confused with what Fischman, p. 22, calls "overlay systems." Fischman includes Wilderness, Wild and Scenic Rivers, and Nat'l Monument designations on national wildlife refuge

facility, disposed as directed by the 1995 BRAC, and yet the site remains technically under Army ownership as it is leased to be staffed and managed through 2025 by the Fish and Wildlife Service.[466]

Overlay arrangements provide a convenient combination of instant "greening" for contaminated military sites while little to no cleanup or ecological restoration necessarily occurs. The National Wildlife Refuge System is the least visited of the four major categories of federal public lands, but where national wildlife refuges exist they are widely considered an amenity. Despite lingering problems with secondary uses of refuges (see Chapter Three), these lands are also in most cases the least controversial type of federal land as they have a dominant use – the conservation of wildlife – that is widely supported by the American public, yet do not come with the excess of commercialization (or crowds) that can plague the national parks.[467] Consequently, the shift in names that usually accompanies M2W conversions can produce an almost immediate change in the public's perception of a place and its character, from one that resonates with danger or destruction (e.g. "proving ground," "arsenal," "depot," etc.) to one that conjures images of sanctuary and congregations of wildlife.

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lands in this category, but in each of these cases property claims remain unchanged (i.e. in the hands of the U.S. Fish and Wildlife Service) and the overlay refers only to additional layers of management restrictions.

[466] The terms of the overlay directed specified an initial lease period of twenty-five years with renewable ten year periods thereafter. Either the Army or FWS can terminate the agreement at any time with 180 days' notice. See Department of the Army Permit No. DACA27-4-00-087, 2000.

[467] The decades-long dispute about opening the Arctic National Wildlife Refuge to oil development is one obvious exception to this characterization.

This public shift in perception can occur quite rapidly, especially for people with no prior knowledge of the site. Even at places such as the Big Oaks refuge where the local public holds more persistently to the former military name – virtually everyone I met in Indiana still referred to the refuge as either "the proving ground" or "JPG" – the knowledge that the facility is now managed as a wildlife refuge encourages the impression of a kinder, gentler landscape.

The overlay arrangement also retains the Department of Defense in place as the institution bearing ultimate responsibility for its conditions. As a result, the Fish and Wildlife Service decreases its likelihood of getting burned financially by accepting military lands that come with major cleanups. Of course simply managing new refuges as a result of M2W conversions raises the budgetary needs of the USFWS, so these new lands can still strain perennially thin budgets for the agency.

Beyond the more apparent effects on a site's reputation and management that overlay status brings, this category also points to the hybrid nature of many M2W lands. These lands can no longer be cleanly separated as either/only spaces of militarism or spaces of wildlife conservation. Through a mix of natural, social, and technological processes, these conversion sites develop into altogether new geographies that retain qualities from multiple categories.[468] Such hybrid geographies have come increasingly into view as scholars dismantle or

[468] Latour contends that such interrelated networks of natural, social, and technological systems have always existed and that our failure to properly recognize them as facilitated lasting dichotomies such as that commonly ascribed between nature and society. See Latour, Bruno, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

reassemble traditional categories and apply new theoretical perspectives to questions of nature and society.[469]

While Latour contends that nature and society were *never* extricable, the splintering effects of Cartesian reason continue to dominate popular depictions of landscapes as either natural or social places.[470] On this common view, for example, we find wilderness – where the impacts of humanity are considered negligible – cast against the entirely constructed landscapes of cities.[471] Or more to the point, we find *natural* wildlife refuges contrasted against *artifactual* military bases. The overlay designation that drapes wildlife refuges nominally over closed military bases and their continued Department of Defense ownership fractures this traditional separation and ought to highlight, instead, the complex qualities of M2W lands more generally.

In the case of the Big Oaks National Wildlife Refuge, the landscape is still very much a work in progress as a variety of practices remain active on the site. I turn next to a brief examination of some of these activities and how they interact and contend with each other to continue to produce a new kind of place.

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[469] Whatmore, Sarah, *Hybrid Geographies: Natures, Cultures, Spaces* (London: Sage Publications, 2002); see also forum in *Antipode*, Volume 37, Number 4, September 2005, pp. 818-845.

[470] See, for example, Demeritt, David, "Social Theory and the Reconstruction of Science and Geography," *Transactions of the Institute of British Geographers* 21(1996): 484-503.

[471] See, for example, Cronon, William, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," in: Cronon, W. (ed.) *Uncommon Ground: Toward Reinventing Nature*, (New York: W.W. Norton & Company, 1995), pp. 69-90.

Current Practices at the Big Oaks National Wildlife Refuge

My interest in M2W conversions springs largely from asking how and why such changes are occurring; at many sites the question "When?" can also offer fruitful context for the transitions. For example, in looking at when the Jefferson Proving Ground became the Big Oaks National Wildlife Refuge, there is September 30, 1994, the date when the last round was fired at the base and the area became, through a lack of other activities, a *de facto* wildlife refuge. More formally, we could choose 1 July 2000 when the Army's lease to the U.S. Fish and Wildlife Service officially began and the two parties confirmed their administrative agreement to create an overlay refuge.[472] Or the Refuge's dedication ceremony on 8 July 2000 might signal the date the new refuge finally came of age.[473] Of course, that day in turn depended upon Congressional and Presidential approval of the 1988 BRAC recommendations that closed the JPG. Policy devotees might note that management as a refuge was signaled and included in the environmental analysis of the closure of the Jefferson Proving Ground in 1995.[474] We might anticipate the future and insist that the refuge will come to exist only when transfer of land title from Army to FWS occurs, or perhaps when a full cleanup of Army munitions has been completed. The point is that the exact shift from Jefferson Proving Ground to Big Oaks National Wildlife Refuge is rather blurry. What

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[472] See Department of the Army Permit No. DACA27-4-00-087, 2000.

[473] "Former Bombing Range Becomes National Wildlife Refuge," U.S. Fish and Wildlife Service, reprint from July/August 2000 issue of *Fish and Wildlife News*, online at http://news.fws.gov/articles/FormerBombing.html [3 December 2002].

[474] Jefferson Proving Ground Final Environmental Impact Statement, September 1995, viewed online at www.jpg.army.mil/documents/site_docs2.htm [20 October 2005].

seems like a discrete historical event actually builds from a number of related actions and diverse processes.

In terms of the actual practices occurring at the site, however, if M2W conversions are more than symbolic we should expect to find certain distinctions between what occurred here as an Army proving ground and what occurs as a national wildlife refuge. By examining more closely some of the principal activities that still take place at the Big Oaks National Wildlife Refuge – hunting, bird watching, and fire management – I will illuminate what the conversion means not just as a legal measure, political calculation, or historical unfolding, but as a set of routine practices that are inscribed here day after day.

Hunting

Residents of the lands surrounding the Jefferson Proving Ground have long used the site for a variety of activities. As I described earlier, some of these such as agricultural production pre-dated the Army's control of the site in 1941, while others were incorporated into the Army's management of its facility. By 1995, when the Army completed its active operations at the JPG, approximately 20,000 visitors were entering the premises each year for some form of recreation.[475] With more than four decades of guidance under Army management and a long history prior to that, hunting at the time of conversion had become established as the single most popular attraction to the Jefferson Proving Ground.[476]

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[475] JPG Disposal and Reuse 1995, p. 16.

[476] Interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005.

The same is now true for the Big Oaks National Wildlife Refuge. Each fall some 1,400 deer hunters take 500-600 animals for food and/or trophies. The Army also opened the JPG to a spring turkey hunt in 1982 and that tradition has continued ever since.[477] (The spring turkey hunt has grown increasingly popular under FWS management, as it now features a "youth hunt" as well. There is also a less popular mid-August-November hunting season for squirrels.[478]) Refuge officials estimate that hunting now represents the majority share of the annual use at Big Oaks, with up to 420 hunters coming in a single day during the peak of the deer season.[479] Fishing also attracts visitors seasonally to Old Timbers Lake in the northeast corner of the refuge, but at a much lower level – the FWS maintains a limit of 25 boats on the lake per day to preserve a high quality experience for anglers (bank fishing is unrestricted). (See Figure 5.4: Public Use Map of Big Oaks NWR.)

Deer hunting was a well-established activity in the rural farmlands of southeastern Indiana prior to the designation of the Jefferson Proving Ground, but after the Army claimed the base in 1940 it took more than a decade for it to offer a public hunting program on-site. This is not to say that hunting did not occur within the JPG until it was formally opened to the public. Poaching was a low-level but persistent issue, and Army insiders were commonly

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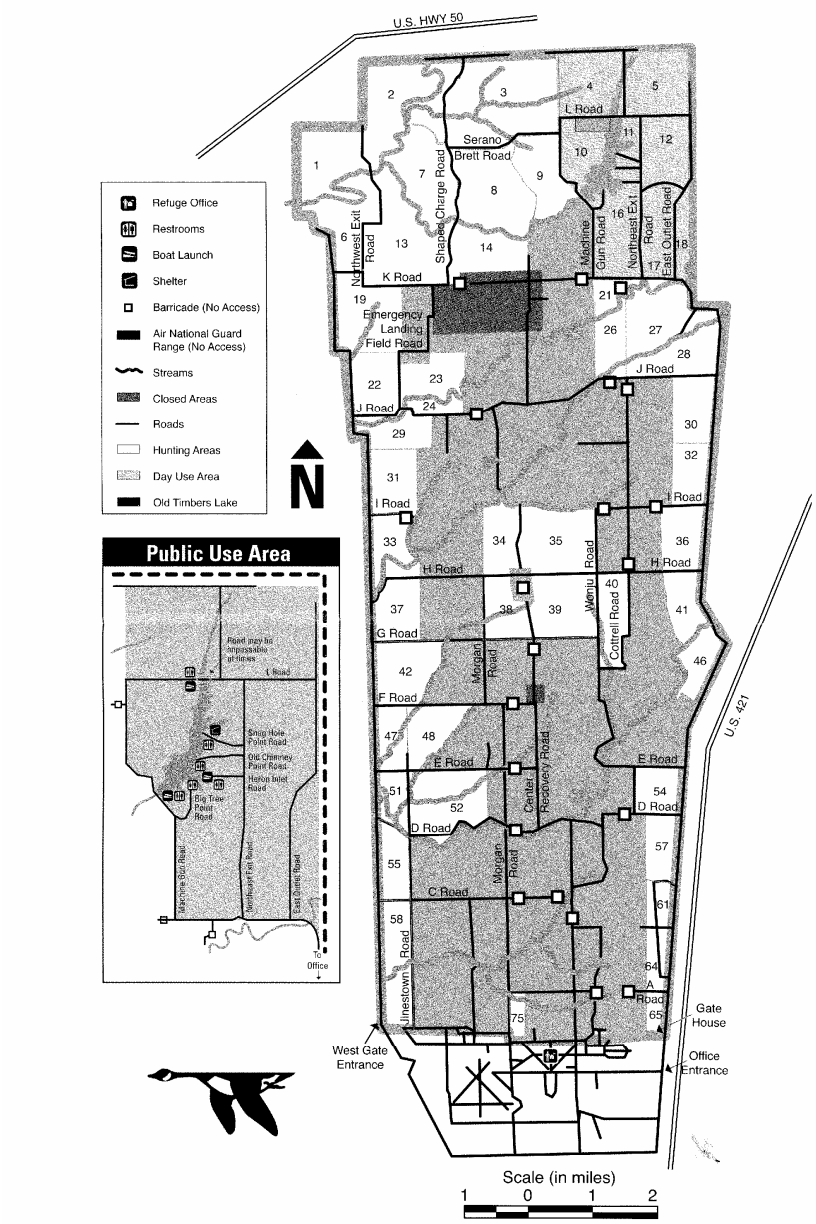
[477] Pruitt, Pruitt, and Litwin, p. 24.

[478] JPG Disposal and Reuse 1995, p. 16; Interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005; see also, Big Oaks NWR General Squirrel Hunt Information, available online at http://www.fws.gov/midwest/BigOaks/squirrel.htm [14 March 2006].

[479] Interview with Dan Matiatos, Big Oaks National Wildlife refuge operations specialist, 14 December 2005. Deer hunters account for approximately 5,000 visitor days on the refuge, as most hunters spend multiple days on site before filling their tags or quitting.

Figure 5.4: Public Use Map of Big Oaks NWR[480]



granted hunting privileges for deer within the JPG boundaries.[481] Beginning in 1953, the Army began coordinating public hunting seasons with the Indiana Department of Natural

[480] Map source: "Big Oaks National Wildlife Refuge, Map & Regulations," (Madison, IN: U.S. Fish and Wildlife Service, Big Oaks NWR, n/d [ca. 2004]).

Resources and nearby residents embraced the chance to enter the restricted area where deer population density had increased substantially over the surrounding lands.[482]

Although deer appear to be fenced *into* the Big Oaks refuge by nearly fifty miles of chainlink barrier around the perimeter, in fact they and most other animals can move fairly easily along creek corridors and other breaches in the fencing to graze on the surrounding farmlands. Even with its obvious gaps, the site's perimeter fence has offered a form of habitat security that has limited hunting pressure relative to the surrounding lands (Figure 5.5: Break in Perimeter Fence at Big Oaks National Wildlife Refuge).

In order to manage the annual influx of hunters, the Army divided the JPG into discrete hunting units. State game officials then offered permits to hunters for specific units. This same approach using the same units is used by the FWS today. Hunters need to check in at the refuge office and follow the same routine as every other visitor: watching the safety video and signing the hold-harmless waiver. Once cleared, however, and unlike other visitors who are only allowed unaccompanied into the northeastern corner of the refuge (the area including and surrounding Old Timbers Lake), hunters may roam unescorted across their assigned units. If a wounded deer flees the unit assigned to the hunter who shot the animal, the FWS can either extend permission to pursue the animal into the adjacent unit, accompany the hunter to help track the animal, or if neighboring units are considered too dangerous to enter, require the hunter to abandon the chase.[483]

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[481] According to my interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005.

[482] Pruitt, Pruitt, and Litwin, p. 27.

[483] Interview with Joe Robb, 14 December 2005.

Figure 5.5: Break in Perimeter Fence at Big Oaks National Wildlife Refuge

Despite the widespread contamination of the refuge by unexploded ordnance, in five decades of managed hunting at the site no visitor has been injured by an encounter with UXO (there have been other hunting-related accidents and lost hunters sometimes require search and rescue efforts – as of 2005, hunters are now required to carry a compass).[484] A number of JPG/Big Oaks visitors have encountered UXO, however, and the site's current managers expect that any UXO-related accident involving visitors or refuge staff would spur an immediate closure of the site for any kind of public use.[485] Considering this risk – and the

[484] Interviews with Ken Knouf, U.S. Army, and Joe Robb, USFWS Refuge Manager, Big Oaks National Wildlife Refuge, 14 December 2005; see also p. 16 of draft refuge concept plan for FWS management of JPG, photocopy from Big Oaks NWR files.

[485] Interviews with Ken Knouf, Army site manager, and Joe Robb, FWS refuge manager, Big Oaks NWR, 14 December 2005.

chronic worry expressed by refuge personnel – we might ask why hunters, in particular, are granted such relative freedom to walk unescorted across refuge lands that have not been cleaned of Army munitions?

The draft refuge concept plan for the Big Oaks refuge acknowledges some of these risks as follows, "One of the more difficult aspects of this plan [to manage the JPG as a wildlife refuge] is the conflict between public access to control the ever increasing population of white-tailed deer and the safety measures required because of UXO. Continuation of the deer hunt is considered essential because of the potential for overpopulation if deer are not harvested."[486]

With the deer hunt representing the single largest public activity on the refuge and an important outreach opportunity for the new refuge, the rationale for maintaining the hunt in its current condition is obviously not built upon ecological considerations alone. Perhaps what ought to come as a surprise is not that the FWS allows hunting to continue as it does – regulated hunting, wildlife conservation, and the National Wildlife Refuge System share a long and intertwined history in the United States, after all – but rather that the continuation of the hunt and its associated exposure of hunters to UXO has not precipitated a stronger call to clean up the JPG's military hazards. Instead, in what managers grimly hope is not a faulty reliance upon inductive inference, the past use of the JPG/Big Oaks site for hunting has established a sense of security that on-going hunts will continue to be safe even with hunters side-stepping unexploded ordnance.

Bird Watching

[486] Draft refuge concept plan, p. 12.

Not all refuge visitors interested in the wildlife at Big Oaks are carrying shotguns or rifles. Some arrive with binoculars to observe songbirds and raptors, or audio devices to attract them. If hunting was the activity that effectively established a significant public use of the JPG under Army management, since the base's conversion to a wildlife refuge birdwatchers have added a significant second constituency to the site. (Even where these constituencies overlap, they are often separated in time as hunting is more restricted by season and by daylight hours than birdwatching.)

If the leadership in the refuge's citizen support group, the Big Oaks Conservation Society, is any indication, birdwatchers may now constitute the most active public interface with the refuge. Visiting birders come seasonally to hit songbird migrations, at odd hours to catch crepuscular activity, or with short notice when sightings of rare birds promise to fill out the devotees' annual or life lists. The fact that several of the current FWS staff are avid birders themselves (a common trait in FWS employees I've met) no doubt serves to encourage local interest in birding and means that expert guides are easy to find at Big Oaks.

The JPG was already known as a haven for birds under Army management and biological assessments of the base pre-conversion confirmed that more than 100 species used the base during breeding season alone.[487] With the turn to FWS management at the site, birdwatching has been more explicitly identified as a priority activity. Birding now matches the managing agency's mission much more closely at the site than it has in the past, but local birding events such as the Hanover-Madison Christmas count and "Big May Day Count"

[487] Pruitt, Pruitt, and Litwin, pp. 22-23.

have included the JPG since 1980-1981.[488] One difference now that the JPG is a designated wildlife refuge is that these same birding events now count Big Oaks observations separately from those made off-site. The Big Oaks refuge, at least among avid birders, has become a target destination. Birders are also now invited onto the refuge specifically to participate in the two popular single-day counts, rather than earlier events when birders simply incorporated the JPG into a larger bird counting event. (For the record, the Big Oaks' Christmas Bird Count identified a best of 67 species in 2001 and the May Day event has set a mark of 97 species.[489]) Every June, refuge staff conduct a breeding bird survey as a sample of overall bird diversity.[490] Public birding programs such as the one-day counts are complemented by ornithological studies conducted at Big Oaks, including FWS-directed studies on Henslow's sparrow populations and forest and grassland bird productivity, as well as a cerulean warbler study led by a Ball State University biology professor.[491]

Despite its growing appeal, birdwatching at the refuge comes with its obstacles. Birders must be personally escorted by refuge personnel if they wish to visit anywhere but the northeastern corner (approximately 5,000 acres) of the refuge or come at times, such as pre-dawn, when birds are notoriously active but the refuge is not yet open to the public. In fact, the refuge is only open to the public on Mondays, Fridays, and the second and fourth Saturdays of each month. The schedule is constrained by limited finances as well as by the need to close a large portion of the refuge as a "safety fan" during aerial bombing runs conducted by the Indiana Air National Guard at its base near the center of the refuge.

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[488] Pruitt, Pruitt, and Litwin, p. 23.

[489] Big Oaks NWR Birds, viewed online at http://www.fws.gov/midwest/BigOaks/bird.htm [14 March 2006].

[490] Big Oaks NWR Birds, viewed online at http://www.fws.gov/midwest/BigOaks/bird.htm [14 March 2006].

[491] Big Oaks NWR Birds, viewed online at http://www.fws.gov/midwest/BigOaks/bird.htm [14 March 2006].

Limited visitor services may also marginalize the refuge's ability to attract passers-by or birders chasing spontaneous sightings, as there is currently no visitor's center. The FWS aspires to build a visitor's center near the northeast corner of the refuge, but in the meantime rents a building for its "visitor contact office" from the local developer who bought all the land and property south of the firing line (Figure 5.6: Big Oaks National Wildlife Refuge Visitor Contact Office).

Fire Management

In a 1998 intra-agency briefing statement prepared for the director of the U.S. Fish and Wildlife Service, the Jefferson Proving Ground was described as "one of the largest contiguous blocks of eastern deciduous forest remaining in the states of Illinois, Indiana, and Ohio."[492] Similar portraits of the JPG/Big Oaks site surface frequently in promotions of the refuge and have been buoyed by satellite images that show the forested block of the refuge

[492] Briefing Statement on "Legislation to Transfer Jefferson Proving Ground to the Service," prepared for Director, U.S. Fish and Wildlife Service, 3 March 1998, photocopy from Big Oaks National Wildlife Refuge files.

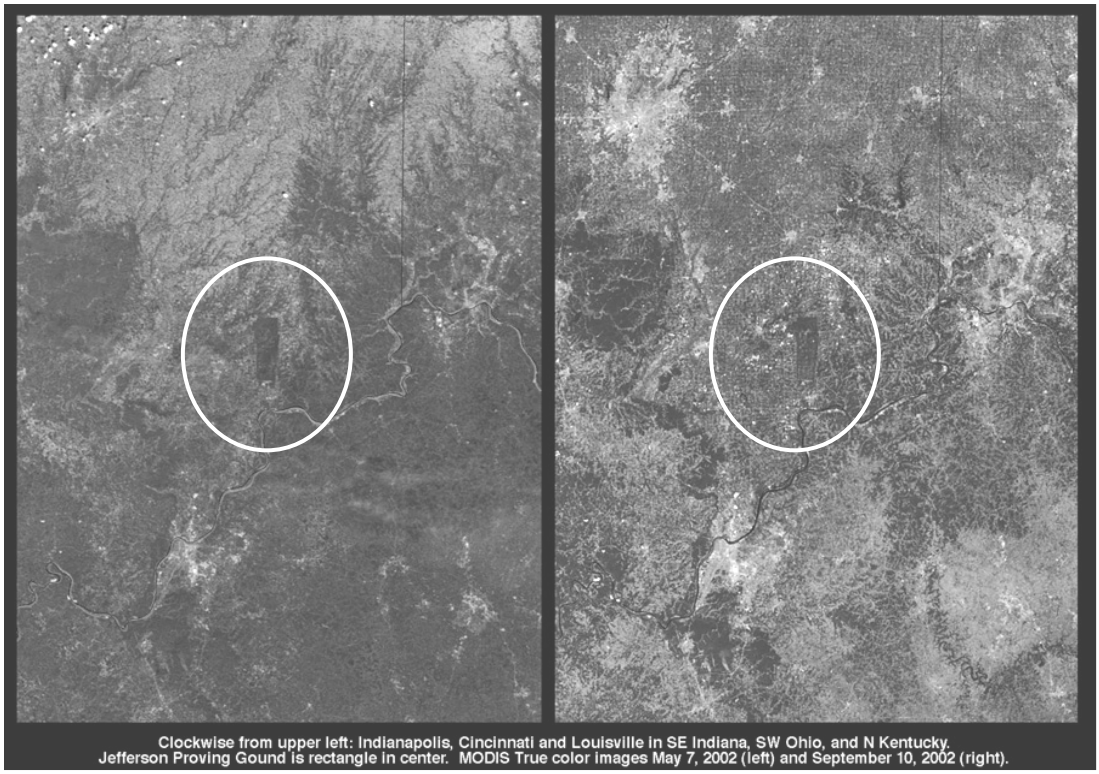
Figure 5.6: Big Oaks National Wildlife Refuge Visitor Contact Office

standing in clear relief against mottled fragments of agricultural lands and forest patches (Figure 5.7: Satellite Images of Big Oaks National Wildlife Refuge).[493]

Closer inspection of the site (or its aerial photos), however, reveals that it contains a more diverse array of conditions than the depiction of a vast tract of forest suggests. In the sixty years since the Army fenced the JPG away from its agricultural Indiana surroundings, trees *have* made steady progress in reclaiming large swaths of farmland. In order to gauge the accuracy of their many munitions tests, though, the Army frequently set fires to keep impact zones clear of forest cover. Other blazes ignited from the explosions themselves. As a result, nearly ten percent or approximately 5,000 acres of the JPG has been classified as "grassland"

[493] See, for example, Meretsky, Vicky J., Robert L. Fischman, James R. Karr, Daniel M. Ashe, J. Michael Scott, Reed F. Noss, and Richard L. Schroeder, "New Directions in Conservation for the National Wildlife Refuge System," *BioScience* 56(2)(February 2006): 135-143 [139].

Figure 5.7: Satellite Images of Big Oaks National Wildlife Refuge[494]



The Big Oaks National Wildlife Refuge appears as the dark (forested) rectangle at the center of the image.

and twenty percent qualifies as "wooded grasslands," or savanna-type lands with scattered trees.[495] These grassland and savanna communities now represent some of the most ecologically valuable lands on the refuge and provide habitat for Henslow's sparrows and other rare species.

Native grasslands have grown exceedingly scarce due to widespread fire suppression and agricultural conversion. As Pruitt, Pruitt, and Litwin note, "Grassland wildlife species have experienced even more severe habitat loss than forest wildlife species. Fifty-five grassland species in the U.S. are listed as Federally threatened or endangered, and 728 are candidates for listing… In presettlement Indiana, for example, there were almost 3 million

[494] Image copied from: http://www.gly.uga.edu/railsback/CTW/JeffersonProvingGround.jpeg [6 April 2006].

hectares (ha) of native tallgrass prairie, of which approximately 400 ha remain."[496] In order to maintain the grassland and savanna characteristics across 10,000-15,000 acres and keep the encroaching forests at bay, the FWS has continued the aggressive prescribed burning program established by the Army – though for primarily ecological reasons now instead of those related to ordnance testing.

What began as a fire program designed around military objectives is now administered in much the same way but around a new suite of objectives. As I have described elsewhere, one of the principal tenets of M2W conversions is the idea that military activities produce conditions that support environmental conservation. We find this view built into the management of fire at Big Oaks National Wildlife Refuge: wildlife managers at the site readily acknowledge that the Army's prescribed burns contributed significantly to the habitat amenities now valued at the refuge.

In addition to its role in maintaining and restoring particular ecological communities at Big Oaks, the refuge's fire program also carries distinct financial incentives. Fire comes from a different budget allocation than other refuge operations (the same is true with most federal land management agencies); in general terms, the more land an agency burns, the more the agency can expand its budget. As the Big Oaks fire specialist explained:

> I think the one reason I came here was because – the big reason – they were burning a couple thousand acres a year, five hundred, couple thousand acres a year and they were wanting to burn. They kept telling me in the office, you know we can be burning 10,000, 13,000 acres, we just don't have a staff. And that was, you know, I'm sure a lot of people in the regional [FWS] office thought, that's great work. They know about Big Oaks, they know what we're here for but the other thing is acreage means money. [*from whom?]* From the national level. You know, if you're doing fuels treatment – [*It's a different*

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[495] Pruitt, Pruitt, and Litwin, p. 6.

[496] Pruitt, Pruitt, and Litwin, pp. 6-7.

> *pot of money*?] It's a, you can, I don't know how you say it, but there are benefits to burning a lot of acres. It means more personnel, more money…Yeah. Fire's a separate budget. So yeah, you can actually get to the staffing, appropriate staffing level, by burning a lot of acres."[497]

Prescribed fire for the FWS, then, comes with an explicit set of ecological objectives, as well as a less visible set of administrative goals that help boost the level of staffing and supplies available at the refuge.[498]

In terms of how the fire program operates – its actual practices rather than its objectives – there is not tremendous distance between Army and FWS management, though the Army's activities at the site have effectively constrained the options for FWS fire crews. FWS fire managers cannot freely access and administer all areas within the burn units, and are limited to perimeter ground ignitions to start fires.[499] As the Fish and Wildlife Service's 2001 Fire Management Plan for Big Oaks noted, "fire suppression options are limited on the refuge due to the past use-history of munitions testing by the Army. All areas of the refuge may contain UXO and earth disturbing activities are generally prohibited."[500]

This ruled out common approaches to managing fire such as driving all-terrain vehicles across management areas, bulldozing fire lines, or using aerial drips to ignite fires in the

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[497] Interview with Brian Winters, FWS prescribed fire specialist, Big Oaks NWR, 15 December 2005.

[498] Supplies relating to fire at Big Oaks are noticeably abundant – one biologist noted that new fire-ready vehicles at Big Oaks outnumber refuge personnel – while more general support, such as a visitor center remain unfunded.

[499] Agency managers are actively pursuing an option for aerial ignitions using a remotely-controlled, unmanned helicopter that could operate under line-of-sight conditions from roads. Interview with Brian Winters, FWS prescribed fire specialist, 15 December 2005.

[500] Fire Management Plan, Environmental Assessment: Appendix K (Madison, IN: U.S. Fish and Wildlife Service Big Oaks National Wildlife Refuge, March 2001), p. 3.

interior of fire units. On more than one occasion, the Big Oaks' fire personnel lamented to me about the general prohibition against aerial ignitions. With the widespread presence of UXO, helicopter use is deemed too risky out of concern for emergency landings, accidents, and related recovery or evacuation. FWS managers are effectively limited to working the perimeter of the refuge's burn units – a process that they describe as cumbersome and inefficient.[501] Despite these constraints, in 2006 the Big Oaks' fire crews burned nearly 10,000 acres across eighteen management units.[502]

Under the FWS, the Big Oaks' fire program also now comes under considerable oversight, both internally and from the public. Even though several Big Oaks biologists and the refuge manager were certified as "burn bosses," the FWS made fire an explicit priority at the refuge and brought in a prescribed fire specialist whose detailed fire plans are reviewed through a separate chain of command than most other refuge activities (by a Fire Management Officer, or FMO, rather than solely the refuge manager).[503] Whereas the Army typically conducted its activities with little to no public involvement, FWS managers now routinely must provide environmental analyses that assess likely impacts of their activities and offer the public an opportunity to comment; the 2001 Fire Management Plan described further in the section that follows, is one example of this.

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[501] Interview with Brian Winters, FWS prescribed fire specialist, and David Jones, FWS fire program technician, Big Oaks NWR, 15 December 2005.

[502] "Big Oaks," Newsletter of the Big Oaks National Wildlife Refuge and Big Oaks Conservation Society, Spring 2006, viewed online at http://www.fws.gov/midwest/BigOaks/bigoaksconservationsociety_files/06SPNL.pdf [21 September 2006].

[503] Interview with Brian Winters, FWS prescribed fire specialist, Big Oaks NWR, 15 December 2005.

Ecological Restoration and the Public Interface at Big Oaks NWR

In order to establish its own program of prescribed burning, in 2001 the FWS developed a Fire Management Plan as an appendix to its environmental assessment of the new refuge.[504] According to the plan, fire is "a critical ecological process in maintenance of successional habitats required by many species of wildlife that are of management concern within the Region."[505] The financial incentives for a refuge fire program notwithstanding, there is little debate about whether or not fire promotes biodiversity at the Big Oaks site – clearly it keeps grasslands open, maintains certain ecological communities, and fosters biological complexity on the former proving ground.

What this characterization of fire casts aside, however, is one of the persistent questions of ecological restoration efforts: which point in time ought to serve as the ecological baseline?[506] As the 1994 Fish and Wildlife Management Plan for the JPG observed, "It should be noted that the land, which is now JPG, did not support any native prairie [pre-settlement]. The grasslands at JPG are a product of the prescribed burning vegetation management which has been done to support the military mission on the base. Nonetheless, these grasslands provide regionally significant wildlife habitat for grassland

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[504] "Appendix K: U.S. Fish and Wildlife Service Environmental Assessment, Fire Management Plan, Big Oaks National Wildlife Refuge," U.S. Fish and Wildlife Service, Madison, IN, March 2001. The plan is in the final stages of an update to be released in 2006.

[505] Fire Management Plan, 2001, pp. 1-2.

[506] See, for example, Pollan, Michael, *Second Nature: A Gardener's Education* (NY: Atlantic Monthly Press, 1991).

species."[507] Fire at Big Oaks, then, is not simply a "natural process" that fits unquestioningly into the matrix of this landscape; rather, we see fire more aptly as a human prescription with accompanying social, financial, and ecological commitments.[508]

The Fire Management Plan of the JPG/Big Oaks environmental assessment lists four primary needs for managing fire at the site: 1) Provide for the protection of life and property; 2) Provide for protection of habitats required by endangered and threatened species; 3) Implement a safe and cost effective program of resource protection and enhancement; and 4) Reduce hazardous fuels; and protect native biotic communities.[509] Of these, only the first falls largely outside the range of what might be labeled an "ecological restoration strategy" for fire at Big Oaks.

Restoration Issues

Restoration ecology itself has come into its own as a science only recently. The Society for Ecological Restoration was formed in 1987, and began publishing its major professional

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[507] Pruitt, Pruitt, and Litwin, p. 7.

[508] There are, of course, a small number of lightning-caused fires that would fit more comfortably into a "natural" category for fire. As a number of environmental historians have documented, even in its deeper history fire in North America has been in many regions an anthropogenic process. See for example, Denevan, William M., "The Pristine Myth: The Landscape of the Americas in 1492," *Annals of the Association of American Geographers*, 82(3)(1992): 369-385; Flores, Dan, *The Natural West: Environmental History in the Great Plains and Rocky Mountains* (Norman, OK: University of Oklahoma Press, 2001).

[509] Fire Management Plan 2001, p. 1.

journal, *Restoration Ecology* in 1993.[510] Though a number of scholars now point to restoration as a major trend in public policy as well as in science,[511] the discipline and its practitioners continue to work through some thorny questions about how restoration ought to work.[512] Much like the science of conservation biology, which also emerged in the late 20th Century and cleaves to such value-laden premises as "Biodiversity of organisms is good,"

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[510] http://www.ser.org/about.asp [3 April 2006].

[511] Historian Dan Flores, for example, has suggested that the 21st Century will become known as the era of restoration for U.S. public lands (see, Flores, Dan, *The Natural West: Environmental History in the Great Plains and Rocky Mountains* (Norman, OK: University of Oklahoma Press, 2001); the increasing popularity of dam removal, road removal, and similar restoration projects may indicate a broader trend restoration trend in society (personal communication with Martin Doyle, University of North Carolina Department of Geography); and emerging initiatives such as Montana's Restoration Summit in June 2006 indicate that restoration is gaining momentum as a public, politically-attractive phenomenon. It presents, perhaps, the perfect opportunity to test ecological modernization as practical public policy, as labor unions join with environmental groups to create job programs restoring the environment. See also, Cunningham, G. Storm, *The Restoration Economy* (San Francisco, CA: Berrett-Koehler, 2002); Havlick, David, "Removing Roads: The Redwood Experience," *Conservation in Practice* 3(4)(2002), pp. 28-34.

[512] Zuckerman considers a number of these, including the perception that restoration represents a human mastery over nature, that restoration serves to legitimate further destruction, that every ecosystem (or species) can be replaced (or restored), and that aesthetics play too large a role in restoration decisions. See Zuckerman, Seth, "Pitfalls on the Way to Lasting Restoration," in *Helping Nature Heal*, ed. Richard Nelson, (Berkeley, CA: Ten Speed Press, 1991).

restoration ecology carries with it a more explicit intertwining of values and politics than are traditionally accommodated in the sciences.[513]

The fact that something requires "restoration" is linked, of course, to the view that some prior quality was degraded or lost. More often than not, these conditions are established with some controversy or even some attribution of agency for whom (or what) caused the degradation in question. Road removal, for example, qualifies as a form of ecological restoration most clearly if one views the road as causing harm (or likely to do so), rather than serving as an essential artery for resource extraction, recreation, or transportation. Similarly, ecological restoration at M2W sites such as Big Oaks is often predicated upon an understanding of ecological harm (or risk) in comparison to other concerns, such as economics or public health. For those who would contend that the place is functioning just fine as it stands, there would not be a need for restoration (i.e. "If it ain't broke, don't fix it.") The science of restoration, in other words, cannot just rely upon data points for its grounding, but must also establish that the data supports an act of restoration that meets the needs of a particular constituency or ecological attribute.

Even at places that seem objectively to be severely degraded – such as toxic landfills, chemical manufacturing facilities, military bases, or other sites on the EPA's National Priorities List for Superfund cleanup – there is rarely a consensus view of what, if any, restoration should take place. Ski towns such as Aspen, Colorado, and Park City, Utah, have worked vigorously to avoid Superfund listings and subsequent cleanups of old mining

[513] Quote is from Soulé, Michael E., "What is Conservation Biology?" *BioScience* 35(1985): 727-734; the Society for Conservation Biology formed in 1985 and its flagship journal, *Conservation Biology*, began publication in 1987; see http://www.conbio.org/AboutUs/History/ [3 April 2006].

hazards out of concern that the notoriety (or the sight of Tyvek-clad cleanup crews) could scare off tourists. At Big Oaks, the debate has hinged more upon how to balance ecological objectives with concerns about visitor access and public health. This extends not just to the question of whether the Army should work to remove UXO from the site, but also to how the FWS should manage the 50,000 acres now charged to its ecologically-oriented agenda.

As we have already seen, the Fish and Wildlife Service's approaches to managing the activities of hunting and birdwatching are not resoundingly different from those brought by the Army prior to base closure. With prescribed fire, however, the shift to FWS management has come with a marked shift toward meeting ecological restoration rather than military objectives. As a restoration project, we might expect that the Big Oaks National Wildlife Refuge would invite a new suite of questions from a newly-engaged public. For instance, what is the Fish and Wildlife Service's vision of a restored site? What is to be restored, and who is likely to benefit (or suffer) from these actions?

Public Participation at Big Oaks

As it turns out, since the transfer to FWS management became formalized in 2000, the public has not always shown great interest in what changes might ensue. Part of this may be attributable to a general faith in the stewardship and goals of the Fish and Wildlife Service, but the many decades of military use at the site seem also to have inured the public even to rather extraordinary impacts coming from the base. In the course of my interviews, a

number of local residents described earth-jarring impacts from ordnance tests at the JPG. The explosions rattled windows and could reportedly crack plaster from the walls of homes.[514]

The off-site effects of prescribed burns, by comparison, has seemed rather mild. As the Big Oaks' fire specialist described the local response:

> So burning, I mean, seeing smoke coming from this part is nothing new for them. One year I heard they [the Army] smoked in this church out here on [U.S. Highway] 421 so bad they had to close the service and not one complaint. They're just used to it. And the Air Guard still burns quite a bit. They fire off rounds and the range burns and people are still seeing smoke coming from here. And we've continued with burning, the burning's never really lagged here. We're up to an all time high now and still no complaints.[515]

Perhaps it came as little surprise, then, that from its public comment period the 2001 Big Oaks Fire Management Plan garnered just a single letter from the public. Submitted by a local watchdog group named Save the Valley (or STV, "protecting the Ohio River Valley environment since 1974"), the letter politely deferred to the "expertise of the U.S. Fish and Wildlife Service and its most competent employees at Big Oaks," and generally concurred with the fire plan's goals and objectives.[516]

The group's comment letter did raise one serious objection, however, relating to the agency's plan to conduct prescribed burns across a particular 14,000-acre swath of the former Jefferson Proving Ground:

> We do have one concern pertaining to the plan. This has to do with the intention to conduct prescribed burns in the area that contains depleted uranium (DU). As you probably know, STV is currently researching the potential hazards that this DU may present. In our consultation with experts in toxicology, radiation hazards, and risk assessment, we have been advised that one potential problem associated with DU is inhalation or ingestion of fine

[514] Interview with Richard Hill, President Save the Valley, Madison, IN, 16 December 2005.

[515] Interview with Brian Winters, FWS prescribed fire specialist, Big Oaks NWR, 15 December 2005.

[516] Fire Management Plan 2001, p. 23.

> particles of DU (DU dust). While the greatest part of the DU at Big Oaks is contained in relatively large pieces (whole or nearly whole projectiles and relatively large fragments) there may be some DU dust present.
>
> It is our opinion that burning in the DU area may cause some of this DU dust to become airborne. This dust could then be inhaled or ingested by F&WLS [FWS] personnel and possibly even by other persons both on and off the Big Oaks site.
>
> We would advise that prescribed burns in the DU area not be conducted, at least not until more information becomes available. The issue of the possible results of burning within the DU area should be discussed during the DU License Termination process. Thus, the Nuclear Regulatory Commission (NRC) may ultimately advise whether or not such burning should be allowed.
>
> Therefore, we would recommend that prescribed burning not be conducted in the DU area unless and until the health and safety risks of burning in the DU area are completely understood.[517]

This letter could be interrogated on a number of counts, but I will focus here on just two: first, how the agency has responded with regard to managing the DU area of the refuge, and second, the role of science and scientific authority in the refuge's administration.

Depleted Uranium at Big Oaks

In its "Response to Comments" on the Fire Management Plan, the FWS acknowledged the letter submitted by Save the Valley but summarily dismissed the concerns it raised. As evidence of the fire plan's safety, the FWS noted that "current data available suggests that levels of DU carried in smoke associated with burning natural vegetation is not

[517] Fire Management Plan 2001, p. 23.

significant" and included a single citation as support.[518] In response to Save the Valley's recommendation that prescribed burning not be conducted in DU areas at least until the health and safety risks were completely understood, the agency responded: "Comment noted. For the reasons explained in 1-3 above and given no new data presented we have not changed our proposed burn boundaries to exclude the DU area."

At a glance these responses might appear simply to be examples of agency intransigence. My interviews with Big Oaks and Save the Valley personnel, though, suggest instead a more complex series of interactions that reflect differing views of risk, environmental protection, and deference to agency authority. The respective representatives from each of these parties (as well as the Army site manager) have longstanding relationships, share ideas with each other on a regular basis, and exhibit a mutual respect. The formal correspondence in the public record, in other words, does not reflect the degree to which Save the Valley and the FWS have actually been corresponding about the issue of DU and prescribed fire. Fish and Wildlife Service officials, though charged with managing Big Oaks, also recognize that the Army still owns the land and much of the expertise in dealing with ordnance. Much as STV's letter deferred to FWS expertise, the FWS itself defers to the Army's expertise in dealing with munitions and depleted uranium.

Depleted uranium, to be sure, simply falls beyond the training or interests of most FWS employees. As the Big Oaks' fire specialist explained his approach to managing the DU

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[518] Fire Management Plan 2001, p. 25. The citation provided was for: Williams, G.P., A.M. Hermes, A.J. Policastro, H.M. Hartmann, and D. Tomasko, *Potential Health Impacts from Range Fires at Aberdeen Proving Ground, Maryland* (Argonne National Laboratory, Argonne, IL, 1998), 84 pp.

area, "Maybe I should be more focused on DU but it's just, nobody's made it a priority of mine and I'm not, my education doesn't, I guess, I'm not self-motivated to go figure out what's going on with the DU and if somebody's not going to make me, you know, from people I've talked to, it's pretty implausible [that it would pose a health hazard] and so if somebody makes me deal with it, I will. But otherwise, I'm more concerned about the UXO."[519]

The FWS has, in fact, worked with the Army to conduct studies of DU in small mammals and deer (the latter is ongoing), but results have not shown significant adverse effects and the Army continues to exhibit little concern about potential hazards from exposure to depleted uranium. According to the Big Oaks' fire specialist, "when I first got here [we tried] to get some other people to come out and do some research on it [DU] and it just never panned out… I don't think the Army – I'm not sure, but I don't think the Army thinks that's very plausible [that burning DU could cause public health problems]."[520]

The Big Oaks refuge manager, who holds a Ph.D. in wildlife biology, agreed that studies conducted to date have generated little specific cause for concern about DU:

> We've done several surveys of collecting small mammals, and we're involved with the Army now in collecting deer [tissue samples]. Depleted uranium is not a great substance, but does it cause problems to natural communities? We haven't found, as yet, any problems. There might be something there that we haven't seen… Would I prefer that's all gone? Yes. Am I seeing direct degradation of animal or plant communities? I would say, not really.[521]

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[519] Interview with Brian Winters, FWS prescribed fire specialist, Big Oaks NWR, 15 December 2005.

[520] Interview with Brian Winters, FWS prescribed fire specialist, 15 December 2005.

[521] Interview with Joe Robb, refuge manager, Big Oaks NWR, 15 December 2005.

As for the author of the lone critical comment on the plan for prescribed burning in the DU area, Richard Hill is both president of Save the Valley and co-chair of the Big Oaks National Wildlife Refuge's Restoration Advisory Board, a body established as part of the base closure process. Hill was born in southeastern Indiana and his connections to the JPG run quite deep: his father, wife, and father-in-law each worked on the base, and before the land was taken by the Army his grandfather had a farm on the site (right next to Louis Munier's family's farmstead).[522]

In person, Hill comes across not so much as a critic of the FWS or Army policies taking place at the site as he does a local resident who has grown keenly aware of various perspectives of the place, many of which seem conflicting. As he recounted his group's early support of the JPG's conversion to a wildlife refuge:

> [We] were very active in promoting that to become a refuge… the main reasons of course being that it's just not very useful for anything else, because of the unexploded ordnances that are there and the great cost and damage that would be done to clean it up. Now, but there's more than one side to that and I can see the other side to that and I see it I think more now than I did then. You know then, that [M2W conversion] sounded like a good thing to do and you know, in a lot of ways it is. And I'm glad that it was done, but then I think that it was an easy way out for the Army. Which, you know, I don't know if that's necessarily a good thing or not but – and it's I mean, in effect, it's a sacrifice zone. It's just, a, you know, it's a place that at least in its present state, it's just a whole lot of things you can't use it for, but then again, that's not necessarily a bad thing either.
>
> I know I'm sounding real wishy-washy here but just a couple of years ago, I hooked up with Paul Cloud and Ken Knouf [of the U.S. Army] out in the Proving Ground and got them to give us a little tour. And by us I mean the board of Save the Valley…We wanted mainly to go and look at the DU area because we were and still are very involved with the cleanup of that. So we went out there and one of the things that Wendell [Berry, who is a board member] said was that it was a shame that there aren't more areas of the country that were totally ruined by the Army (laughs). Because you go out there, there's no trash, no litter, no sign of human anything and large, large

[522] Interview with Richard Hill, President, Save the Valley, Madison, IN, 16 December 2005.

> spaces of it. I mean, and so it is, in a very odd sort of way, beautifully preserved.[523]

Hill, like many others, recognizes that a thorough cleanup of all the UXO and DU on the Big Oaks refuge could be highly destructive. According to the Army's site manager at Big Oaks, cleaning UXO on the base would require a surface scouring to at least four feet in depth (others have suggested thirty feet is more realistic), which would come only after a detailed assessment using magnetometers that read down two feet at a time. In other words, "It's basically just still almost like a strip mining operation. And that's why, you know, people say, 'Why can't you clean up 51,000 acres north [of the firing line]?' And you'd have this huge strip mine operation. I think most folks would agree that the safety problem can be managed much better than the environmental impact it might have."[524]

From the perspective of the FWS and many advocates for protection of fish and wildlife habitat, a thorough cleanup of the military residues at Big Oaks promised to undermine many of the attributes that made the place ecologically valuable. The Fish and Wildlife Service effectively found itself in the awkward position of having to balance concerns about the uncertain, lingering hazards of Army munitions against the active destruction (at least in the near-term) of clearing away forests, grasslands, and tens of thousands of acre-feet of soil in order to rid the site of its considerable Army residues.[525]

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[523] Interview with Richard Hill, President, Save the Valley, Madison, IN, 16 December 2005.

[524] Interview with Ken Knouf, Army site manager for Big Oaks NWR, 14 December 2005.

[525] Viewed in more philosophical terms, this dilemma might be framed as the choice between "doing" versus "allowing" harm. See, for example Howard-Snyder, Frances, "Doing vs. Allowing Harm," viewed online at http://plato.stanford.edu/entries/doing-allowing/ [6 April 2006].

The character of the contaminants at the JPG also played a role in the Fish and Wildlife Service's evaluation of how cautious it should be about taking control of the site. As the principal FWS and Army managers of the Big Oaks site explained:

> FWS: "The kind of contaminants that were here, you might have a risk of a shell with some explosives attached to it, but they tend to be very discrete, tend to be nitrate-based, with – There are some heavy metals involved, like arsenic and lead, things like phosphorous…
> Army: [but chemically, there is] not much difference between explosives and fertilizers.
> FWS: But yeah, you had phosphorous, nitrate. There are some problems with those, but as far as problems that animals or plants… Not the same thing as salt and PCBs, you know."[526]

There was also a geographical component to this consideration of the contaminants' character, as heavy metals such as arsenic or depleted uranium were not expected to migrate widely across space, even as they persisted over time. As the site managers commented about depleted uranium at Big Oaks, (FWS): "It's big chunks of metal sitting out there, giving off some levels of radiation… (Army): "basically oxidizing and then flaking off, but the stuff's so heavy, it just tends to sit there. But you're talking about a material that's going to be there as long as this planet is."[527]

Scientific Authority

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[526] Interview with Joe Robb, refuge manager, and Ken Knouf, Army site manager, Big Oaks NWR, 15 December 2005. Note that for portions of my interviews, both managers were present simultaneously and their responses occasionally weaved together.

[527] Interview with Joe Robb, refuge manager, Big Oaks NWR, and Ken Knouf, U.S. Army site manager, 15 December 2005.

As the federal land management agency most dedicated to purposes of conservation and ecosystem protection,[528] the Fish and Wildlife Service is also simply oriented (and better equipped) to evaluate resources in terms of their biological or ecological attributes rather than their military liabilities. At a national meeting held by the agency in 1998 to address military base closure acquisition (i.e. M2W) issues, Fish and Wildlife Service officials noted that site assessments of military base properties rely upon the Department of Defense for contaminant information and that refuge staff commonly "do not have the proper training in the evaluation of acquired property from military base closures."[529]

The FWS generally takes pride in its scientific orientation and the training of many of its employees as scientists. As befits its wildlife conservation orientation and the overall mission of the National Wildlife Refuge System, the agency has understandably employed wildlife biologists more widely than contamination specialists. Even by the FWS's standards the staff at Big Oaks is, in fact, highly educated and well-trained: the refuge manager has a Ph.D. in wildlife biology, staff wildlife biologists hold graduate degrees in the field, and fire specialists and others have years of experience. One biologist at Big Oaks highlighted some of these qualities as well, noting, "Our biological program here is much more research oriented [than other refuges]…We're all very much research oriented."[530]

As the FWS acquires more and more lands from military transfers, what has been a real strength of the agency's personnel and training – its focus on wildlife and conservation – may in some cases become a limitation as ecological analyses struggle to accommodate the

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[528] Fischman, 2003; Meretsky, Vicky J., et al., 2006.

[529] See "Minutes of FWS National Meeting On Military Base Closure Acquisition Issues," Denver, CO, 17 April 1998, photocopy from Big Oaks National Wildlife Refuge files.

[530] Interview with Jason Lewis, wildlife biologist, Big Oaks NWR, 15 December 2005.

management challenges produced by military engineers and years of military activities. At the very least, there is again – as we saw with the Rocky Mountain Arsenal – a privileging of ecological perspectives over those of public health or toxicology. Safety is commonly listed as a top concern, but agency money and energy consistently target ecological programming rather than UXO cleanup. This is not to suggest that these are particularly incompatible considerations, but rather to highlight that a scientific assessment of the Big Oaks refuge's characteristics can still leave sizable gaps in our understanding of the conditions of the place and its hazards or features. Indeed, the majority of scientific studies focused on the site have attended to questions of ecological composition, assessments of species diversity and population levels, and wildlife biology; there is comparatively little detailed information on the effects of contaminants left over from military activities and what their fate is likely to be over the long term.

The use of scientific information presents challenges for conservation efforts, as well, as environmental groups frequently turn to science as a source of information and credibility, while also questioning what it tells them.[531] In fact, environmentalists often find themselves needing both to use and criticize scientific expertise – a move evidenced by Save the Valley's consultation with experts in toxicology, radiation hazards, and risk assessment to gain a fuller characterization of the hazards of depleted uranium and UXO, even as it

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[531] Yearley, Steven, "Nature's Advocates: Putting Science to Work in Environmental Organisations," pp. 172-190, in Alan Irwin and Brian Wynne, eds., *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996), p. 174; see also Kirsch, Scott, (2000), "Peaceful nuclear explosions and the geography of scientific authority," *The Professional Geographer* 52(2):179-192; Kirsch, Scott, *Proving Grounds: Project Plowshare and the Unrealized Dream of Nuclear Earthmoving* (New Brunswick, NJ: Rutgers University Press, 2005).

challenges the Fish and Wildlife Service's plans to apply ecological principles to maintain early successional habitats. When scientific expertise serves as a primary form of legitimization within environmental groups, as both Yearley and Jasanoff have shown, it effectively leads groups to operate within the same epistemological paradigm that, ultimately, they may wish to subvert.[532] In Yearley's view, "science's advocacy role is far from straightforward."[533] We can expand this statement to recognize that applying science to advocacy or policy also comes with a host of epistemological and practical pitfalls. The application of prescribed burns to the Big Oaks' depleted uranium area highlights the prospective danger that can arise from an excessive "technicisation of knowledge" that is reductionistic or removes too many social elements from either nature or decision-making.[534]

When federal officials use science and apply it to policy, as is particularly common with management or enforcement agencies such as the Fish and Wildlife Service, the challenges of integrating conflicting epistemologies can become quite problematic. Focusing on science and policy at the EPA, Jasanoff examines how the agency's scientific findings support its policy recommendations, and in turn illustrates how the agency has learned from its experiences relating science to political authority. This suggests how the operations of the DOD and FWS might also function in the context of military-to-wildlife conversions.[535]

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[532] Yearley 1996: 174; Jasanoff, Sheila, "Science, Politics, and the Renegotiation of Expertise at EPA," *Osiris* 2nd Series, vol. 7(1992): 194-217, p. 196.

[533] Yearley 1996: 186-187.

[534] See Grove-White, Robin, "Environmental Knowledge and Public Policy Needs: On Humanizing the Research Agenda," pp. 269-286, In: Scott Lash, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996), pp. 283-284.

[535] Jasanoff, 1992.

What we find from this work is that agencies clearly do mobilize science to legitimate policy and that in order to maintain scientific credibility agencies such as the EPA, FWS, or DOD need to become politically savvy.[536] Problems can emerge if the public loses confidence in scientists' ability to function objectively or with transparency: the credibility of both science and policy diminish.[537] Whereas advocates of a wholly objective science might seek to isolate this form of knowledge from the policy realm, Jasanoff contends that scientific authority is actually most effective when scientific facts and policy decisions are integrated.[538] In this scenario, scientific facts will drive policy. This view hinges, of course, on at least two assumptions: first, that science *can* produce such "deconstruction-proof facts."[539] For when scientific facts themselves are viewed as assailable, then the entire strategy for agency decision-making may begin to crumble. Second, for the integrated science-policy approach to be successful in generating *good* policy, the science needs to address an appropriate suite of questions.

In this respect we ought to examine M2W sites such as Big Oaks and ask whether studies of Henslow's sparrows or depleted uranium levels in deer are the ones most likely to inform sound policy for managing heavily contaminated lands. These approaches might prove very successful in reaching ecological objectives. Indeed, all my experiences at Big Oaks supported the view that a dedicated, highly-skilled staff of biologists and fire managers was managing the site commendably in this regard. What remains to be seen is how well

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[536] Jasanoff, 1992, p. 217.

[537] The current Bush administrations manipulation of reports and data on climate change present a prominent example of this effect.

[538] Jasanoff, 1992, p. 142.

[539] Quoting Jasanoff, 1992, p. 217.

these same experts – or the broader ecological orientation of the National Wildlife Refuge System itself – can manage the challenges presented by the complicated historical geographies emergent with M2W conversions.

According to Fischman, national wildlife refuges sit in the "middle of the permissable uses continuum of the federal public land systems."[540] On this view, wildlife refuges with their common assortment of secondary uses come as a middle ground between the "exclusive use" regimes of military reserves and the relatively wide-open multiple use lands of the Bureau of Land Management. What we find at some M2W refuges, however, suggests that this middle range has not been found. At Big Oaks the military-to-wildlife transition and its associated shift to an ecological restoration agenda still has little to show thus far in terms of movement toward the "public use" side of the spectrum.

In Chapter Six that follows I turn more directly to this issue as I address how M2W refuges function as public spaces. Do these refuges fit Fischman's casting of places where traditional dualisms of nature and society are broken down, integrated, even hybridized? Can we learn something new from M2W sites about the role of humanity *in* nature? Or are people still virtually excluded from M2W spaces, much as they are from most areas of active military bases? In working through these questions, we shall also begin to consider more directly the fundamental premise of M2W conversions: that military activities work to produce environmental (habitat) amenities. This ecological militarization theory will then be the focus of Chapter Seven.

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[540] Fischman, 2003, p. 3.

CHAPTER SIX

PRODUCTION OF THE REFUGE AS PUBLIC SPACE

On a bright morning in November I loaded my seven-month old daughter in the car and drove sixteen miles to go for a hike. We arrived at the Assabet River National Wildlife Refuge, in eastern Massachusetts, where a large U.S. Fish and Wildlife Service sign stood in front of a dirt parking lot (Figure 6.1: Assabet River NWR South Entrance). Beyond a boarded-up guardhouse and a shiny gate, a kiosk was stocked with brochures and maps. We set off on Trail C, a zigzagging path through the heart of the 2,200-acre refuge.

Our outing thus far could fit any number of similar visits Americans make each year to the National Wildlife Refuge System. For more than fifty years prior to 2000, however, the Assabet River National Wildlife Refuge was known as the Fort Devens Sudbury Training Annex and served as a U.S. Army ammunition storage facility. This explains, at least in part, why a walk in the woods at the Assabet River refuge can include some surprises. Trail C, for instance, begins as a paved two-lane road, complete with yellow median stripe and speed limit signs (Figure 6.2: Assabet River NWR Trail). Where Trail C intersects smaller gravel roads or trails, these secondary routes are posted, "No Pedestrians." In the fall, after the hardwoods have dropped their leaves, a handful of buildings can be seen to the side of the road, abandoned, boarded up, and overgrown. As Trail C winds more deeply into the interior of the refuge, what at first look like wooded hummocks scattered every few hundred meters

reveal themselves as concrete façades of old ammunition bunkers (Figure 6.3: Ammunition Bunkers at Assabet River NWR.)

Figure 6.1: Assabet River NWR South Entrance

Figure 6.2: Assabet River NWR Trail

Compared to many military-to-wildlife conversion sites, the Assabet River refuge is a welcoming place. With more than ten miles of trail, the refuge is open to the public every day of the week from dawn to dusk and the requirement to walk only on designated trails is a self-enforced policy that scarcely seems threatening. Indeed, during my November hike several families were ambling across an open field that was lightly rimmed with "no pedestrian" signs. Visitors can read that the area was formerly a military site, but there is little hint of danger and no requirement to sign a hold-harmless waiver or check in with FWS authorities (who are rarely present). For those who have visited other national wildlife refuges, Assabet River would not seem out of the ordinary. It blends easily enough, ammunition bunkers and all, into its role as part of the United States' third largest system of public lands.

Figure 6.3: Ammunition Bunker at Assabet River NWR

Even within Massachusetts, however, M2W refuges present a variety of characteristics. Approximately eighty miles southeast of Assabet River, Nomans Island National Wildlife Refuge has no public interface. It's simply closed. Although ninety-eight percent of the National Wildlife Refuge System is open to some form of public recreation,[541] Nomans Island is not.

In this chapter I consider how military-to-wildlife conversion sites function as public spaces. At one level I treat this as a question of management: what current policies and programs at these sites restrict, regulate, encourage, or direct public use? How open to the public *are* these spaces? These inquiries move us, in turn, toward a deeper consideration of landscape that extends from the previous chapters' examination of how particular M2W sites are produced.

According to Mitchell, unless we are willing to accept a view of landscapes as "morally neutral," we ought to recognize that "the historical form of a place structures the social relations of that place."[542] As we have already seen with the case examples at the Rocky Mountain Arsenal and Big Oaks refuges, these are not relict landscapes that simply exist; rather, they have been and continue to be actively produced through a combination of politics, science, and discourse. These processes of landscape production – from the application of eminent domain and the eviction of rural residents to the military activities that ensued to the decisions to close and convert bases – play critical roles in shaping how people

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[541] Fischman, Robert L., *The National Wildlife Refuges: Coordinating a Conservation System Through Law*, (Washington, D.C.: Island Press, 2003), p. 30.

[542] Mitchell, Don, *The Lie of the Land: Migrant Workers and the California Landscape* (Minneapolis, MN: University of Minnesota Press, 1996), p. 3. The quote "morally neutral" comes from Mitchell quoting James Parsons, "A Geographer Looks at the San Joaquin Valley," *Geographical Review* 76 (1986): 371-389, p. 387.

today understand and interact with these places as they now exist as valued sites of biodiversity, as contaminated brownfields, and as particular locations where militarism and environmental conservation are represented as compatible.

In order to expand our understanding of the public function of M2W refuges beyond issues of access and use, I consider in this chapter how these sites may create public benefits or risks. For this, I look in particular at how M2W refuges and their historical productions and technologies fit Ulrich Beck's characterization of "Risk Society."[543] Are these, in fact, places where military and related commercial technologies created hazards over time which we continue to lack the ability to fully grasp or remedy? Or, are there risks at these sites that we can now manage in a democratic fashion? M2W refuges are in fact both places in transition and places with overlapping characteristics. This ontological instability may be interpreted productively through concepts of hybridity, which I emphasize in this chapter as well.

These seemingly disparate theoretical lenses – landscape production, Risk Society, and hybridity – are ultimately linked by a common association with science and technology, and the question of how much M2W sites are transitioning (if at all) to a more open, democratic set of values versus remaining embedded within technocratic structures of a militarized state. To conclude this chapter, I examine how M2W sites can contribute to new geographies of knowledge production or erasure. What role does the conversion and renaming of M2W sites play in diminishing or encouraging a genuine, public understanding of militarized space?

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[543] See Beck, Ulrich, *Risk Society: Towards a New Modernity*, trans. by Mark Ritter (London: Sage Publications, 1992).

Land Management on M2W Refuges

When the United States designated the world's first national park at Yellowstone, in 1872, it established a set of priorities for management that have influenced federal public land policies ever since. The National Park Act of 1916 committed the U.S. "to conserve the scenery and the natural and historic objects and wild life … as will leave them unimpaired for the enjoyment of future generations."[544] The weighting of this mandate has drawn considerable attention and debate over the years, as it seems to provide a dual mission of conservation and public use. A two-pronged objective stirs little trouble when both ends are mutually compatible, but proves problematic if public enjoyment conflicts with historic, aesthetic, or natural conservation.[545]

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[544] 16 USC§1.

[545] In 2000, National Park Service director Robert Stanton issued an order intended to clarify conservation as the principal and overriding mission of the agency's mandate. By these terms, visitor services and public use remain a priority at national parks, but if these conflict with conservation then managers must recognize that the Park Service has "but a single purpose, namely, conservation."[545] Stanton's order remains subject to the changes of subsequent administrations, however, and the George W. Bush administration actively worked to rewrite national park directives to privilege a wide array of public uses – regardless of their impact on conservation objectives; see Farquhar, Brodie, "Revealed – Secret Changes to Park Rules," *High Country News*, 19 September 2005. In June 2006, Secretary of the Interior Dirk Kempthorne signaled a return to prioritizing conservation when the dual mandates appear to conflict, e.g. "Draft Management Policies to Guide the National Park Service," (Washington, D.C.: Department of the Interior, National Park Service, 16 June 2006).

In 1997, the National Wildlife Refuge System finally received a mission statement of its own to guide its management priorities.[546] As I described in Chapter Three, the 1997 National Wildlife Refuge Improvement Act sought to rid the refuges of incompatible secondary uses and established an ecological mission for national wildlife refuges: "The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."[547]

The final phrase's emphasis on public *benefit*, versus the national parks' public *enjoyment* gave notice that the Fish and Wildlife Service should consider public use a management option rather than a fundamental requirement. In this, the agency (and Congress) intended to avoid the dual mandate problem that has long hampered the National Park Service. The FWS was even more explicit in its regulations to implement the 1997 Act that conservation was not to be subverted to other goals or uses of national wildlife refuges: "the first and foremost goal of the Refuge Improvement Act is to ensure that wildlife conservation is the principal mission of the Refuge System."[548] Despite these efforts to

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[546] The 1997 Act came in response to President Clinton's Executive Order 12996, which in turn, responded to a series of GAO reports that were critical of incompatible secondary uses on national wildlife refuges. Clinton's executive order described a mission for the National Wildlife Refuge System that was largely reiterated by Congress in the 1997 legislation.

[547] Public Law 105-57, sec. 4, 9 October 1997.

[548] 65 Federal Register 33893 [2000]. Following legislative Acts, federal agencies publish implementing policies that provide a more detailed set of rules for how they will comply with the new legislation. For the Fish and Wildlife Service, these are developed in the Fish and Wildlife Service Manual, available online (as it is

establish more unified management direction with a strong ecological emphasis, the FWS must still contend with multiple missions at many refuges.

Each wildlife refuge in the national system comes with its own establishment document – a Presidential order, administrative transfer, purchase, or legislative Act – and these, in turn, include their own particular purposes that must be reconciled with the overarching mission of the National Wildlife Refuge System.[549] Where the respective purposes conflict, the 1997 Refuge Improvement Act defers to the primacy of the establishment document.[550] This means that the refuge system's ecological mission set forth by Congress in 1997 may be rebuffed or modified where a particular refuge's purposes chart a course other than conservation. At Crab Orchard NWR, for instance, the establishing purposes include the development of approximately 1,100 acres for industrial operations – including a General Dynamics defense munitions manufacturing facility – that are widely viewed as conflicting with the ecological management goals of the refuge system.[551] This seeming incompatibility is justified by the Fish and Wildlife Service simply by citing the

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completed) at www.fws.gov/policy/manual.html. Fischman takes issue with this focus insofar as it discounts the importance of plant conservation despite the equal treatment of plants and animals in the 1997 legislation.

[549] Fischman, p. 123; see also, pp. 163-182.

[550] Fischman, p. 80.

[551] See Crab Orchard National Wildlife Refuge Draft Environmental Impact Statement/Comprehensive Conservation Plan, Executive Summary (Ft. Snelling, MN: U.S. Fish and Wildlife Service, September 2005), p. viii and passim, viewed online at www.fws.gov/midwest/Planning/craborchard/DraftEIS/deisSummary.pdf [28 June 2006].

refuge's original intent, "Industrial operations is one of the legislated purposes of the refuge."[552]

At most M2W sites the conservation mission is kept intact or may seem even stronger than the system-wide norm due to restrictions on public use. At locations such as Nomans Island NWR or units in the Remote Pacific Islands NWRs, public use is proscribed – a management approach that some consider *the* best possible result for plant or wildlife conservation. One refuge manager of a converted Air Force base described this approach as the Air Force's version of wildlife conservation – they simply put a fence around their land and call it good.[553] Whether or not a hands-off approach truly is the most effective for conservation remains a matter of some debate, but a prohibition against public use precludes any number of potential conflicts with the system's conservation mission. A ban on public use also runs counter to such hunting programs as the Duck Stamp Act (see below) that have long been a staple of the National Wildlife Refuge System.

Despite the fact that some form of public use is permitted on nearly every unit within the refuge system,[554] such access has never been an established right for all refuges. The first wildlife refuges were specifically designated to protect wildlife from the public, for example at Pelican Island, Florida, where the hunting of plume birds was threatening populations with

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[552] Crab Orchard National Wildlife Refuge Draft Environmental Impact Statement/Comprehensive Conservation Plan, Appendix J: Compatible Uses (Ft. Snelling, MN: U.S. Fish and Wildlife Service, September 2005), p. 327, viewed online at www.fws.gov/midwest/Planning/craborchard/DraftEIS/deisAppendixJ.pdf [28 June 2006].

[553] Personal communication with anonymous refuge manager, July 2006.

[554] As I noted earlier in this chapter, Fischman reports that 98% of all refuges allow some form of public access or recreation; see supra 1 above.

extirpation. Initially this and other refuges were necessarily kept off-limits to public use simply to ensure the survival of the species in question – in some cases it required armed vigilance to enforce such restrictions.[555]

As hunters developed as an important constituency for the refuge system, most significantly following the passage of the Migratory Bird Hunting ("Duck") Stamp Act in 1934, hunting increasingly became accepted at refuges and drafted into management regulations. A number of M2W refuges now hearken back to the earlier prohibitions on public use, including hunting (see Table 6.1). Such prohibitions still fit easily within the refuge system's management regulations, although the 1997 Refuge Improvement Act identified "priority general public uses" of the National Wildlife Refuge System that included such "wildlife-dependent recreation" as hunting, fishing, wildlife observation and photography, and environmental education.[556]

Especially on units designated with endangered species protection as a foremost priority, many refuges restrict access either seasonally or in certain areas to protect ecological attributes. The reason for the restriction at M2W sites, however, is very different. The principal reason refuges such as Nomans Island, Big Oaks, and others limit public use is not to protect wildlife or plants – though this is a happy by-product that FWS and DOD publications often foreground – but simply because the places are too dangerous or too contaminated to allow visitors. The limits on public use often resemble similar regulations

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[555] The first warden of the nation's first national wildlife refuge, Paul Kroegel at Pelican Island, reportedly patrolled for several years armed with his personal shotgun and a salary that ranged as *high* as $1.00/month. See *Fulfilling the Promise: The National Wildlife Refuge System* (Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service, National Wildlife Refuge System, March 1999).

[556] Fischman, p. 90; see also, PL 105-57, Sec. 3, 9 October 1997.

Table 6.1: Public Use of M2W Refuges[557]

Refuge Name and Location	Public Use?	Activities Allowed	Prohibitions	Comments
Aroostook, ME[558]	Selected areas 7 days/wk	Hiking, fishing derby with stocked and marked fish, interpretive trail	No hunting; approx. 80% of refuge closed to visitors	Approximately 6,500 visitors/year
Assabet River, MA[559]	7 days/wk	hiking, hunting, birdwatching	no hiking off designated routes; no dogs	13.2 miles of trail; $3.1 million visitor center approved
Big Oaks, IN[560]	M, F, 2nd & 4th Sat.	deer, turkey, and squirrel hunting in season, fishing, birdwatching	No travel off-roads except 4,000 acres in NE corner	Hold-harmless waiver and safety video required; all visitors sign in/out
Caddo Lake, TX[561]	no		No public access	May start limited group tours and/or deer hunt by fall 2007
Great Bay, NH[562]	7 days/wk	Hiking, x-c skiing, limited weeklong deer hunt	no fishing, no travel off designated trails	Approximately 60,000 visitors/year
Guam, Pacific[563]	7 days/wk	Fishing, swimming, snorkeling, barbecueing	No hunting	Military mission granted priority; contact/nature center open in Oct. 2006. Approx. 40,000 visitors per year.
Kingman Reef, Pacific	no	permitted research only	no public access	special use permit only for qualified researchers
Mountain Longleaf, AL[564]	7 days/wk; limited to 30% of area	Hunting, hiking, bird watching, photography	no fishing	Approximately 10,000 visitors/year;

[557] All refuge activities are limited to day use only unless specifically authorized.

[558] Telephone interview with William Kolodniki, Aroostook and Moosehorn NWR project leader, 6 July 2006; and personal communication 7 July 2006.

[559] Assabet River NWR website, viewed online at http://www.fws.gov/northeast/assabetriver/ [6 July 2006].

[560] From personal communication with FWS personnel and materials collected during research visit to BONWR, 14-16 December 2005.

[561] Personal communication with Paul Bruckwicki, Caddo Lake refuge manager, 11 July 2006.

[562] Personal communication with Jimmie Reynolds, Great Bay NWR refuge manager, 7 July 2006.

[563] Personal communication with Chris Bandy, Guam NWR refuge manager, 10 July 2006.

				UXO and lead contamination
Midway Atoll, Pacific	Since 2002 open to cruise ship passengers			Reopening to public dependent upon staffing and funding
Nansemond, VA	no	boating allowed on adjacent Nansemond River		guided tours by FWS officials may be arranged
Nomans Island, MA	no			UXO and other hazards remain
Occoquan Bay, VA	Thurs-Sun			
Oxbow, MA	7 days/wk	hiking, hunting, birdwatching	No dogs	
Patuxent Research Refuge, MD	Yes	hunting in season		visitor check-in and access pass required
Pearl Harbor, HI	restricted to volunteer clean-up days and office visits		no use during stilt breeding season, Feb-July	
Rocky Mountain Arsenal, CO	weekends only	Tram rides, catch-and-release fishing, photography	no travel off designated routes	weekday hours cancelled after sarin bomblets discovered in 2000
Shawangunk Grassland, NY[565]	7 days/wk	Hiking, x-c skiing, and bird watching limited to road and runways	no hunting, no dogs; no model airplanes; no bicycles	
Upper Mississippi River, Lost Mound Unit, IL	land-based access is restricted to overlook platform	fishing and boat access outside buoyed areas only		UXO training required for all refuge volunteers
Vieques, Puerto Rico[566]	Limited areas 7 days/wk	Hiking, fishing, crabbing, environmental education	No hunting, fires, horseback riding, farming or ranching	UXO may extend 4 miles offshore

[564] Telephone interview with Steve Miller, refuge manager Mountain Longleaf NWR, 7 July 2006; and Mountain Longleaf NWR website viewed online at http://www.fws.gov/southeast/mountainlongleaf/index.htm [18 May 2006].

[565] Shawangunk Grasslands NWR Visitor Opportunities website viewed online at http://www.fws.gov/northeast/shawangunk/visitor%20opportunities.htm [7 July 2006].

[566] Vieques NWR websites viewed online at http://www.fws.gov/southeast/pubs/facts/vieques.pdf and http://www.fws.gov/southeast/vieques/QsAs.pdf [7 July 2006].

applied on other refuges, but an examination of the site histories reveals that such restrictive policies in fact come from different motives. This deeper look is critically important not just to provide the public with a clearer understanding of what processes created M2W sites, but also to highlight which actors or institutions were involved in creating the hazards that now exist. These historical contexts also illuminate some of the possibilities and limits for future land uses.

In many cases the Fish and Wildlife Service provides clear information that the new refuges are not widely open to public use because of military contamination, but these explanations come housed in a broader discourse that highlights the environmental protections offered by such restrictive management. The Nomans Island refuge brochure, for example, first turns to the ecological amenities of the site – "these 628 acres of upland and wetland habitat support many migratory bird species including the peregrine falcon during fall migration" – before moving to the more sobering news that, "Due to its prior use as a bombing range and the possibility of unexploded ordnance, the island is closed to the public."[567] Framed in this manner, the reading public may be less likely to question why the DOD has refused to clean up even this one square mile of contaminated land and instead can feel confident that the off-limits island serves as a fine ecological sanctuary. This points to one of the less tangible yet key hazards to such military-to-wildlife conversions: they may foster a blithe public acceptance of these places as havens for wildlife without examining or holding accountable the actions and institutions that produced such lands.

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[567] *Eastern Massachusetts National Wildlife Refuge Complex* (Sudbury, MA: U.S. Fish and Wildlife Service, June 2001), p. 14.

This lack of concern or understanding is not necessarily common to the FWS personnel assigned to manage M2W sites. A number of the current M2W refuge managers express a strong interest in overseeing a thorough DOD cleanup of their refuges to ensure the safety of their staff, the visiting public, and the resident wildlife and ecosystems. The catch, of course, is that the military holds the major purse strings but only occasionally shares the same commitment to a complete cleanup.[568] At more than one remediated M2W site, FWS personnel are working to assess the long-term physiological condition and reproductive success of wildlife in order to gauge whether the DOD's cleanup actually protects wildlife in a meaningful way.

Whether intentional or inadvertent, the discursive erasure of military practices is often facilitated by emphasizing an M2W site's newfound ecological amenities. Fish and Wildlife Service information about the Shawangunk Grasslands National Wildlife Refuge, which emerged from the closure of the Galeville Military Airport in 1994, (the Department of Defense transferred the land to FWS control in 1999), highlights the refuge as "one of New York's top 10 areas for grassland dependent migratory birds."[569] This type of framing reverberates in popular accounts of M2W sites. One author of a newspaper travel piece on the Shawangunk Grasslands refuge recounted, "As I followed the wildflower-fringed gravel path, I had to remind myself that the sunny meadow spread before me was once an airport. It

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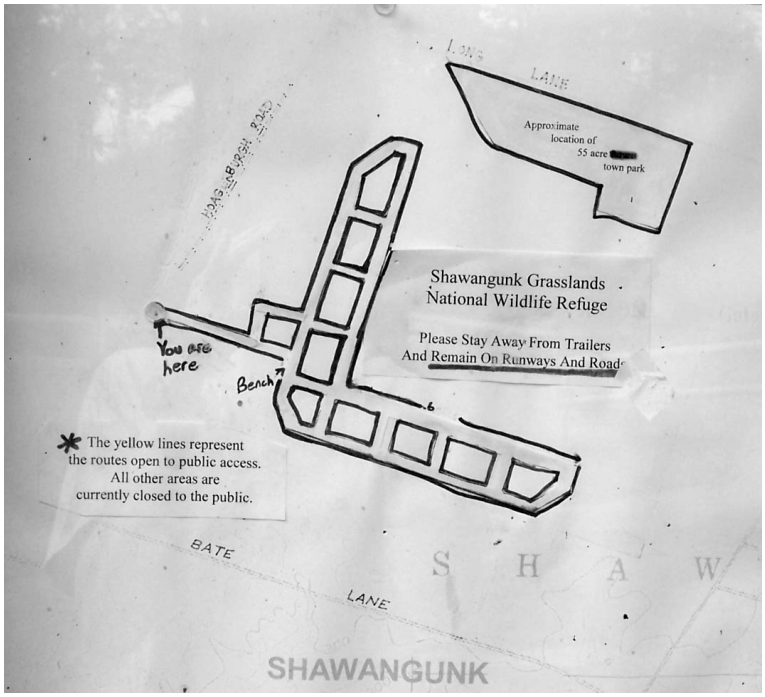
[568] The various refuge managers' anecdotal evidence of this is corroborated by lawsuits, agency memos, and the continued absence of remediation work at sites such as the Rocky Mountain Arsenal, Big Oaks, Aroostook, and other M2W refuges.

[569] Shawangunk Grasslands National Wildlife Refuge website, "History," viewed online at www.fws.gov/northeast/shawangunk/history.htm [18 May 2006].

was so easy to forget."[570] This type of description scarcely reflects the fact that the only "trails" at the Shawangunk refuge are the obvious concrete runways from its former use as an airfield for Army, special operation drills, and FBI landings (see Figure 6.4: Diagram of Shawangunk Grasslands NWR, and Figure 6.5: Photo of Shawangunk Grasslands NWR "Trail").

Figure 6.4: Diagram of Shawangunk Grasslands NWR



The National Wildlife Refuge System's ecologically-focused mission also becomes an asset in explaining public use restrictions at the new Shawangunk refuge:

> Unlike national parks, state parks, and state forests, the management priority at national wildlife refuges is 'Wildlife First.' These lands are managed by the U.S. Fish and Wildlife Service, which is the only agency of the U.S. Government whose primary responsibility is fish, wildlife, and plant conservation. Public uses of national wildlife refuges must be compatible with plant and animal conservation. Our guiding legislation identifies priority

[570] Rothbaum, Rebecca, "Wildlife Lives on Shawangunk Grasslands," *Poughkeepsie Journal*, 20 June 2002.

> public uses on national wildlife refuges that can be allowed if they are compatible with the management of that refuge for wildlife.[571]

Only after these opening explanations does the diligent reader learn that, "Because of potential safety hazards left by the military, **public access is restricted to existing roadway and runways**"[572] (emphasis in original). Also coming later is the fact that the ecologically valuable grassland is a by-product of the old military runway: "The grassland that you see today was created when the military filled a wetland with tons of earth to make the airstrip in the 1940's [sic]… The grassland persisted over the past 50 years by routine mowing and livestock grazing to remove emerging woody plants."[573]

As I noted earlier, the Fish and Wildlife Service can scarcely be accused of deceiving the public; the agency's publications, exhibits, and employees are quite open about the military past of these new refuges. The overriding narrative that sweeps across these places, however, serves to foreground the new management goals of fish, wildlife, and plant conservation. At Shawangunk Grasslands the interested visitor can easily find lists of bird species that frequent the refuge, but will search fruitlessly to find further information on what types of hazards were left behind by the military, or what military activities took place during more than four decades at the site. In fact, public information is so scant about the military past of this place – it was officially kept as an auxiliary airfield controlled by the U.S.

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[571] Shawangunk Grasslands National Wildlife Refuge website, "Visitor Opportunities," viewed online at www.fws.gov/northeast/shawangunk/visitor%20opportunities.htm [18 May 2006].

[572] Shawangunk Grasslands National Wildlife Refuge website, "Visitor Opportunities," viewed online at www.fws.gov/northeast/shawangunk/visitor%20opportunities.htm [18 May 2006].

[573] Shawangunk Grasslands National Wildlife Refuge website, "History," viewed online at www.fws.gov/northeast/shawangunk/history.htm [18 May 2006].

Military Academy at West Point – or the content of its military residues we may not even flinch at the irony of the Fish and Wildlife Service's parting admonition for refuge visitors to, "Leave only footprints, take only memories."[574] Only the cynical few may be left to wonder: was this the guiding principle for operators of the Galeville Military Airport as well?

In terms of the management policies or programs actually in place to encourage or prevent public use, the range we find at M2W sites fits easily within the variety that exists

Figure 6.5: Photo of Shawangunk Grasslands NWR "Trail"

[574] Shawangunk Grasslands National Wildlife Refuge website, "History," viewed online at www.fws.gov/northeast/shawangunk/history.htm [18 May 2006].

system-wide. Area or seasonal closures are a common feature of many refuges, but as I have already noted the reasons for closure are quite different at M2W refuges. In addition to the reasons highlighted above, it is important to illuminate the causes of these public closures because they signal an increasing management liability that the U.S. Fish and Wildlife Service is poorly equipped to bear. The FWS already stakes claim to being the most impoverished federal land management agency: it receives fewer dollars per acre than the BLM, National Park Service, or U.S. Forest Service. The agency's deferred maintenance backlog in 2002 was estimated at $663 million, roughly twice its annual appropriation for refuge operation and maintenance.[575] Ultimately, the reason so many M2W refuges currently operate with severe limits on public access or use is not because this is necessarily the preferred way to manage the lands for their conservation mission, but rather because the Department of Defense has not cleaned most of their closed bases to any thorough degree and the FWS has neither the money nor the expertise (in most cases) to conduct the cleanup itself. One FWS official summed up this "definite liability" of receiving military lands for M2W refuges by commenting, "When you arrive as a manager [at an M2W refuge], your first response is, 'Oh my God, why did we take this?'"[576]

With many M2W lands, their limited function as public spaces is at least in part a concession to the DOD's greater claim to authority and money. In the previous two chapters' examples from the Rocky Mountain Arsenal and Big Oaks refuges, we could see how the characteristics of these M2W landscapes emerge from a particular set of practices and events. Even if we choose to embrace the environmental amenities that can now be found in such

[575] Fischman, 2003, pp. 118-119.

[576] Personal communication with anonymous refuge manager, July 2006.

places, we must not overlook the often-destructive military practices that contributed to their production. In fact, when we manage to extend our gaze beyond the boundaries of M2W refuges or similar sites of ecologically-oriented military spaces, we find that the physical and social destructiveness of the U.S. military continues apace, often as a result of military base consolidations, the creation of international installations, or outsourcing military activities to private contractors.

In order to consider the theoretical implications of this view of landscape production, in the next section I turn more directly to what Mitchell calls the "social struggle" of these sites as it becomes naturalized into environmental policies.[577] These policies, in turn, often influence how we relate to these public lands.

Coexisting Landscapes

As should by now be clear, the management policies for many wildlife refuges include restrictions on the types of uses permitted, as well as the timing or location of public access. Although in some instances these restrictive policies may seem to come simply as a result of *natural* circumstances – endangered bald eagles roosting in cottonwoods of the Rocky Mountain Arsenal, for example, or the presence of rare grassland communities in Northeastern or Midwestern sites – the landscapes of these places are also always the product of social contestations. Grasslands did not just *appear* at the Big Oaks or Shawangunk Grasslands refuges; rather, they were *created* through a series of actions: the shelling, clearing, and burning of agricultural lands following the designation of the Jefferson Proving

[577] Mitchell, 1996, pp. 34-35.

Ground, for the first, and the filling, mowing, and grazing of a wetland at Shawangunk. These actions, in turn, did not just *happen*, but were produced through a series of decisions. As we saw in each of the previous two chapters, the ecological amenities that are now highlighted at both the Rocky Mountain Arsenal and Big Oaks now that they are national wildlife refuges were only made possible through the federal appropriation (condemnation) of the respective places from their agricultural and residential conditions prior to 1941, and then later through the decades-long manufacturing and testing of military weapons at these sites.

When we work to see the deeper histories and politics built into M2W landscapes we need to understand what actions created these landscapes, toward which suite of objectives, and with what kinds of extended consequences. When visitors today walk through a field tittering with the song of bobolink at the Shawangunk Grassland refuge or pass by an otter-filled creek at Big Oaks, they may easily forget that these places were not always just so. Imagining this often is exactly the appeal of coming to wildlife refuges or other protected lands that can hold our gaze so differently from the urban spheres we increasingly inhabit, but we deceive ourselves if we slip too comfortably into the "natural" embrace of such places. As Mitchell cautions, "Since social struggle is strategic, compromises often gain the appearance of stability: landscapes become naturalized; they become quite unremarkable."[578]

In many respects, M2W refuges actually *do* seem remarkable and may well stand out from other kinds of federal lands by more clearly blending social and natural elements. M2W sites differ considerably from one another, with an array of landforms, land use histories, and habitat types, but each brings to the fore some element that clears the temptation to view

[578] Mitchell, 1996, p. 31.

these as wholly "natural" places. At the Rocky Mountain Arsenal, Tyvek-suited remediation workers, heavy machinery, and triple-lined landfills stand out from the open fields and prairie dog colonies; at Big Oaks, UXO and radiation hazard signs caution visitors back to the roadways; the Shawangunk Grasslands sparkles with the sounds of songbirds, but (newspaper travel reports notwithstanding) it is impossible not to notice that the refuge "trails" are an aging grid of airplane runways. The Lost Mound Unit of the Upper Mississippi River refuge, Big Oaks, and Assabet River refuges are dotted with overgrown ammunition bunkers, while the wetlands and forests of the Oxbow refuge cannot entirely muffle the machine-gun rattle and heavy thuds of artillery practice at the still-active portion of adjacent Fort Devens. From this peculiar mix of features, M2W refuges emerge as a type of hybrid space – seemingly natural places shaped by military technologies. In the next section, I examine one of these landscapes and its hybridized mix of characteristics by turning to the map that illustrates public use of the Big Oaks National Wildlife Refuge.

The Big Oaks NWR Public Use Map

The map of Big Oaks shows a patchwork of access categories across the 50,000-acre expanse of the site, including day use, hunting areas, roads, streams, and closed areas. One shaded block that stands out in the north-central part of the refuge is labeled, "Air National Guard Range – No Access" (Figure 6.6: Big Oaks NWR Public Use Map).

In the place portrayed by this map we can witness both past productions and current landscapes as they coexist. Even as Indiana Air National Guard bombing runs seem to be very different in nature from U.S. Fish and Wildlife Service activities dedicated to

conservation, these actions in fact occur within the same perimeter fences of the Big Oaks National Wildlife Refuge. Unlike many M2W sites where FWS managers contend primarily with the residues of past military actions, within Big Oaks we find military exercises concurrent with the FWS's conservation programs.

A 1,033-acre Air National Guard parcel, nestled within the boundaries of the national wildlife refuge, continues to function as an active air gunnery range for the Indiana Air National Guard where, "almost daily, fighter jets come into this area from five states to test shooting accuracy," including air-to-ground bombing and strafing.[579] During its environmental analyses, the Fish and Wildlife Service considered such activity "incompatible" with the refuge so the bombing range was kept apart as an inholding "until such a time when the range is no longer needed and the land can be transferred to the refuge."[580] In fact, the Air National Guard offers benefits recognized by some of the Big Oaks' FWS staff. The Guard currently maintains all forty-eight miles of perimeter fencing that encircles the refuge, and also covers maintenance and repairs on a portion of the refuge roads. These services represent a contribution of more than $50,000 annually that the FWS likely would not be able to afford on its own.[581]

Although the bombing range is technically not part of the wildlife refuge, the targeting area exists fully within the Big Oaks' refuge boundary. Most weeks from Tuesday through Friday the Air Guard conducts aerial operations dropping duds at ground targets. This requires the FWS to keep out of a one to two-mile buffer surrounding the targeting zone

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[579] JPG Disposal and Reuse 1995, p. 11.

[580] JPG Disposal and Reuse 1995, p. 11.

[581] Personal communication with Dan Matiatos, Assistant Refuge Manager, Big Oaks National Wildlife Refuge, IN, 14 December 2005.

for approximately one hour (during hunting seasons this sometimes also requires a rearrangement of assigned hunting units).[582] One or two times per year the majority of the entire refuge is also closed off as a safety fan for a precision guided range that includes live munitions (Figure 6.7: Big Oaks NWR Aerial Bombing Ranges and Safety Fans).

The environmental impact statement for the JPG's closure and proposed reuse as a refuge includes only a brief assessment of the consequences of bombing practice occurring inside a wildlife refuge: "Potential conflicts exist between the Public Use Plan and the Air National Guard activities. People using adjoining areas for wildlife oriented activities would be subjected to the noise generated by low flying jets… Future planning efforts will need to look at this issue to determine if relocation of the range to a better location is feasible."[583] The FWS has long assumed that the Indiana Air National Guard would soon terminate its mission at the Jefferson range, but military officials have given no indication that this will be the case. As I pointed out in the previous chapter, the FWS actually has no control over the fate of the Air Guard base. According to the terms of the Army's lease to the FWS, "The Air National Guard's range use schedule will have precedence over wildlife management activities,"[584] and it is far from clear whether the FWS or Indiana Air National Guard holds the stronger hand in dictating future uses of the site.

The Big Oaks refuge is subjected to hazards that go beyond the nuisance of low flying jets or the regular closure of a portion of its lands. In 1998, an Indiana Air National Guard pilot lost control of his F-16 jet and was forced to eject. His aircraft exploded upon

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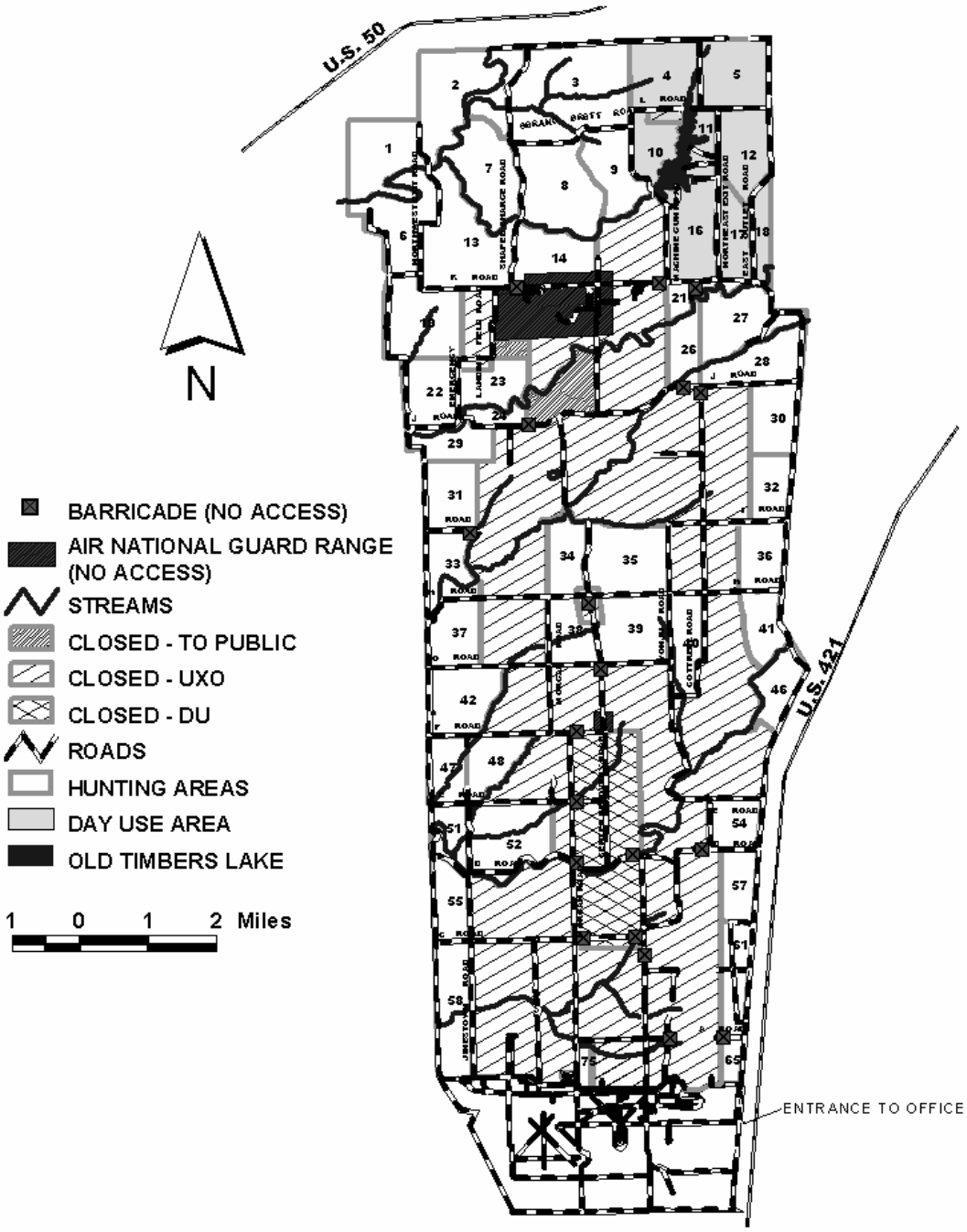
[582] Personal communication with Dan Matiatos, 14 December 2005.

[583] JPG Disposal and Reuse 1995, p. 11.

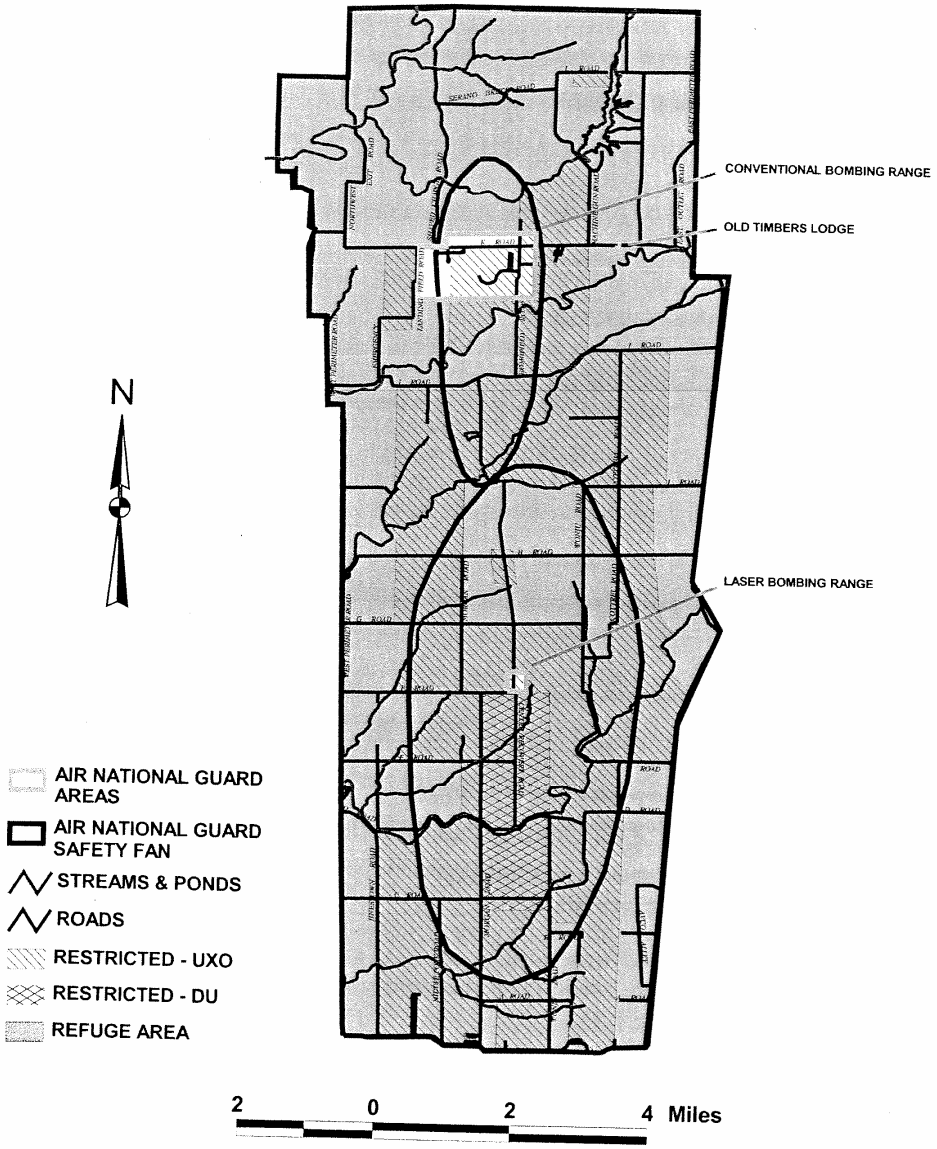
[584] Memorandum of Agreement, p. 2.

Figure 6.6: **Big Oaks NWR Public Use**[585]



[585] Source: http://midwest.fws.gov/BigOaks/recreationmapall.htm [3 March 2004].

Figure 6.7: Big Oaks NWR Aerial Bombing Ranges and Safety Fans[586]



impact in the JPG.[587] Such events bring a sobering element of reality to the mandatory visitor training currently in place to orient the public to likely hazards of the Big Oaks site. The Fish

[586] Map source: Department of Army Permit No. DACA27-4-00-087 for the National Wildlife Refuge at Jefferson Proving Ground, Indiana, 5 July 2000, photocopy from Big Oaks NWR files. Safety fans, or zones of exclusion, are drawn as prominent black ovals surrounding the conventional and laser bombing ranges.

[587] 18 November 1998, *Atlanta Journal and Constitution*, p. 7A, "Pilot Safely Ejects Before Jet Crashes."

and Wildlife Service requires all visitors of the Big Oaks site to watch a 20-minute video that illustrates the various hazards present at the site, then sign a hold-harmless agreement (see Appendix B: Release and Acknowledgment of Danger – Hold Harmless Agreement for Big Oaks National Wildlife Refuge). Of course, Air National Guard activities also impact the refuge's non-human inhabitants – presenting another potential hazard wildlife must contend with in addition to UXO and DU at Big Oaks.[588]

Portraying Landscapes

Even as cluttered with information as the Big Oaks Public Use map (Fig. 6.6) may be, it actually represents only a portion of the social struggle over this landscape that has taken place, and in some cases continues; like any map, it both reveals and conceals particular contestations over place. We find landscape features such as roads, streams, and lakes clearly portrayed. With the map's demarcation of hunting units and a block designation for day use in the northeast corner we can infer that the public has access to certain spaces, at least, while other notations (Air National Guard range, barricade) clearly establish that such access has limits. There is no indication, however, that the areas open for hunting or day use remain cluttered with military hazards, and that hunting exists in these particular units not because they are known to be *safe*, but simply because hunting has occurred here for decades. To the contrary, closures that appear on the map with a form of explanation (i.e. "closed – UXO") suggest that open areas might actually be free from such dangers.

[588] Similar conflicts over military activities as "secondary uses" of national wildlife refuges emerged from the GAO reports discussed in more depth in Chapter Two.

There is also no indication on the public use map of the temporary closures that affect the refuge periodically during aerial bombing practices; no hint that Fish and Wildlife Service Director Jamie Clark sought and failed to secure a five-year sunset provision for the Air National Guard base's existence inside the refuge boundaries[589] or that the FWS and Air Guard ever competed for exclusive control of the entire 51,000 acres north of the firing line. The map does not offer any explanation *why* public day use is only permitted in one corner of the refuge, or reveal that the FWS sought and failed to secure an Army cleanup of the entire northern tier of the refuge. The zone harboring depleted uranium ("Closed – DU") appears static and contained on this map, regardless of the questions that continue to be asked about its movement through biological and physical transport, or the fact that its Nuclear Regulatory Commission permit remains open and allows for additional radioactive materials to be deposited on site.[590]

It may be tempting to dismiss such a list of questions and concerns because o*f course* a single map can only present a select amount of information about a particular place and each of these points in some ways might seem rather mundane. This brings us back directly to Mitchell's point that strategic struggles and compromises can gain an appearance of stability that seems unremarkable. Central to our consideration of the Big Oaks refuge ought to be the message that it remains a remarkable place. If a map serves to naturalize the presence in the landscape of such extraordinary landscape features as thousands of pounds of

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[589] Personal communication with Joe Robb, Big Oaks National Wildlife Refuge Manager, Big Oaks NWR, IN, 16 December 2005.

[590] See minutes from Big Oaks National Wildlife Refuge Restoration Advisory Board, 30 April 2003, pp. 75-100. There is no indication that the Army has active plans to add to the quantity of DU currently present on site at Big Oaks.

depleted uranium or millions of rounds of military explosives, then we may quickly lose track of the meaning of the very processes that produced these characteristics. We may, in short, grow to understand such places as *simply* national wildlife refuges rather than also recognizing their lasting existence as militarized spaces.

Public Hazards and Risk Society

One way to view M2W refuges more openly as spaces characterized by elements of wildlife conservation *and* militarization is through the lens offered by Ulrich Beck's theorization of "Risk Society."[591] In describing risk society, Beck points to two stages of modernity: the first is characterized by reliance on nation-states and a period of industrialization; the second stage emerges with the aging of stage one and is characterized by society's inability to insure itself against the hazards produced by the risks taken during industrialization. In this second stage, hazards and social structures are no longer bounded by political territories: "The very idea of controllability, certainty or security – which is so fundamental in the first modernity – collapses. A new kind of capitalism, a new kind of

[591] See, for example, Beck, Ulrich, *Risk Society: Towards a New Modernity*, translated from German by Mark Ritter, (London: Sage Publications, 1992); Beck, Ulrich, Ecological Politics in an Age of Risk (Cambridge, UK: Polity Press, 1995); and Beck, Ulrich, *World Risk Society* (Cambridge, UK: Polity Press [US publication by Blackwell, Malden, MA] 1999).

economy, a new kind of global order, a new kind of society and a new kind of personal life are coming into being, all of which differ from earlier phases of social development."[592]

M2W conversions and the opening of military spaces to new kinds of uses provide a fitting example of this description of a reordering of hazards and the breakdown of seemingly rigid boundaries. Much as military base conversions can open up previously closed spaces to increased public scrutiny and use, they also release hazards into a more public sphere. In some cases, such as contaminated soils becoming airborne or toxins entering groundwater, the hazards have long extended beyond the confines of DOD boundaries but *information* about the hazards was carefully guarded or simply unknown. In other instances, the opening of military spaces to new uses as wildlife refuges actually exposes the public to dangers that had been more limited under military management. One chilling example of this was recalled by a biologist working at the Upper Mississippi National Fish and Wildlife Refuge's Lost Mound Unit. In order to conduct a mussel survey, state researchers were grubbing blindly in the Mississippi River sediments to catch and identify the mollusks. One particularly large "mussel," once brought to the surface and washed of mud, turned out to be a hand grenade.[593] Munitions experts later identified the grenade as a "practice dummy," but there is plenty of live ordnance still buried in the site's Mississippi mud.

In still other cases, such as hunting at Big Oaks, the on-site exposure may be very little changed as lands change from military control to FWS management, but the public

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[592] Beck, *World Risk Society*, 1999, p. 2. In addition to the two stages of modernity, Beck also describes a third epoch of "pre-industrial society" typical of traditional societies. In addition to Beck, 1992; and Beck, 1995; see also Mythen, Gabe, *Ulrich Beck: A Critical Introduction to the Risk Society* (London: Pluto Press, 2004).

[593] Personal communication with Ed Anderson, Illinois Department of Natural Resources District Natural Resources Biologist, Savanna Field Station, 30 May 2006.

awareness of hazards may actually diminish as the reputations of these places shift from explicitly requiring caution to pointing instead toward conservation and the assurance of safety connoted by the label "refuge."[594] Given the conditions of aging infrastructure at many M2W sites, the historical processes and decisions by which these places were created, and the array of hazards now present, these places in many ways appear as prime examples and particular locations that fit Beck's terms of Risk Society. What remains less certain, however, is how this view of M2W refuges as components of risk society can inform public management and understanding. Will these places provide scientists and federal managers with new opportunities to critically examine the relationship between technology, militarism, and the environment, as Beck's theory might suggest, or will these spaces perpetuate existing institutions and environmental politics?

No Refuge from Risk Society

According to Beck, a risk society emerges after individuals and institutions systematically take risks over a period of decades. The ultimate consequences may be neither foreseeable nor, ultimately, fully remediable. Military venues such as the JPG present a classic case of this type of activity. Artillery exercises are planned and conducted with little apparent regard for the long-term condition of the place in which they occur, or the prospect that such sites might one day be opened to different priorities incompatible with hazardous military residues. As a case in point: the JPG's disposal and reuse analysis estimated that the cost of cleaning up millions of rounds of unexploded ordnance that litter the Big Oaks

[594] Admittedly, the entry process at Big Oaks likely instills a certain cautiousness in most visitors.

National Wildlife Refuge would range from $8,500 to $22,000 per acre for a clearing depth of four feet. To clear UXO to a ten foot depth (which would still leave some ordnance in place), the cost estimates jump to $30,000 per acre for a "best case scenario" up to $88,000 per acre for less optimal conditions.[595]

As risk societies mature into Beck's second phase, risks begin to dominate "public, political and private debates."[596] From Congress to BRAC Commissions to refuge managers or local citizen advocacy groups, we now find ourselves needing to engage with these hazards that had formerly been hidden or seemed contained. The distribution of risks is also characteristically uneven in both space and time; unlike blighted industrial districts, toxic repositories, or other residues of the first modernity that spark cries of environmental injustice, the risks of Beck's new era spread more broadly across class lines. Military sites and their toxic and explosive hazards were produced over a period of decades in restricted areas and are now entering society via shifting land designations that render the closed military spaces into the more open realm of wildlife refuges. These refuges in many cases are viewed as amenities that attract leisure-class visitors as well as wealthy developers.

Remediating the hazards of latter day risk societies is an extremely costly proposition. As Beck notes, there is also a certain asymmetry to risks and hazards.[597] Though clearly related, risks and hazards often involve different constellations of people. Military activities over the years involved risks taken by a number of military planners and personnel; today's hazards primarily affect refuge staff trying to manage and clean up their newly acquired sites.

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[595] Disposal and Reuse 1995, pp. 4-40 – 4-41.

[596] Beck 1996: 27.

[597] Beck 1996: 37.

This shift in exposure actually shows in EPA standards for cleaning up contaminated M2W sites. The typical EPA standard at these locations is gauged to protect the health of a wildlife refuge worker – a less rigorous threshold than that required for most commercial or residential uses where exposure is expected to be essentially continuous. Even though the public coming to visit these lands face a more temporary exposure, they too are subject to hazards created during years of military activity. (Of course, there is also an array of resident wildlife at any site that receives only occasional monitoring and is not necessarily covered by the EPA standards.) There are also off-site hazards that may be inadequately considered – or impossible to determine – as management activities such as prescribed burning or transporting contaminated soils, physical processes such as wind and water, recreational activities, or biological transport via wildlife may mobilize dangerous substances and disperse them beyond the site boundaries.

There is in fact a good deal of uncertainty about how best to deal with problems such as contaminated soils, ammunition bunkers, UXO, depleted uranium, and other military residues that linger at most M2W sites. What the effects of management activities will be, and if enough cleanup is even possible to ensure human safety on (or off) the site remains uncertain and disputed. According to Beck, it is not possible in any practical sense to insure against the production of some hazards generated by risk societies: we undertake the actions, such as building a nuclear reactor (Beck's example) or impacting 50,000 acres with tons of explosives and depleted uranium (to use the Big Oaks refuge as an example), in a myopic state of optimism or ignorance. At best, we postpone effective understanding of the consequences of such actions to many years or generations hence. Even over time, however,

science and technology may produce hazards that scientists cannot fully consider or mitigate against.

This latter point emerges clearly at many M2W sites where a common response from federal officials is that complete cleanup simply is not possible. At the Rocky Mountain Arsenal, the consolidate-and-contain remediation strategy currently underway was adopted in part due to a lack of other attractive options. A number of citizens who participated in the decision-making process for the Arsenal's conversion advocated for what they saw as a more complete cleanup, in which contaminated soils would be hauled off-site for treatment or stockpiling in a location removed from a metropolitan area. Federal authorities ruled against this option primarily for reasons of cost and scientific uncertainty: there was no way to guarantee the safety of hauling thousands of truckloads of contaminated material on public roadways to a remote destination.[598] As it turns out, and much in accord with Beck, even the alternative being implemented at the Arsenal comes with no guarantee of a permanent, safe resolution. Landfilling toxic materials is, at best, an imperfect science and it comes with a long record of failures. For a reminder of this we need to look no farther than the Arsenal's Basin F landfill that leached contaminants into groundwater with disastrous results; when it was completed in 1956, Basin F was widely touted for being "leakproof."[599]

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[598] These same risks of transportation were deemed acceptable when it came to shipping radioactive waste to the Department of Energy's Yucca Mountain site in Nevada.

[599] "Asphaltic Membrane is Used to Leakproof a Lake," *Engineering News Record*, 22 November 1956, pp. 40-41 (Rocky Mountain Arsenal JARDF document # B5600033); and "Leakproof Bottom Underlies 100-acre Lake Near Denver," *Omaha* (Nebraska) *World-Herald*, 11 November 1956 (Rocky Mountain Arsenal JARDF document # B5600032).

Risk Society and Ecological Modernization

At first glance, the trend toward technological decay and hazard highlighted by Beck seems to conflict with one of the dominant environmental discourses of recent decades, ecological modernization, which presents technological solutions to environmental and economic problems.[600] As Christoff characterizes the decline of this rosy view of technology, "Optimistic notions of progress, based on uncritical belief in the benefits of the scientific and industrial appropriation of Nature, have now collapsed into anxiety and mistrust."[601]

While this anxiety and mistrust is most evident in the realm of high-consequence technologies such as nuclear, chemical, ecological and genetic engineering, the lesson brought by an awareness of risk society is that some technologies simply cannot be controlled over the long term.[602] This exact lesson emerges from a number of M2W conversion locations. Land managers have discovered that they cannot fully insure against the hazard of chemical contamination, radiation, the volatilization of depleted uranium through prescribed burns, or unexploded ordnance deemed too ubiquitous to countenance any concerted cleanup. At some basic level, most M2W refuges rest upon the shaky foundations of risk society even as policymakers seek to explain military-to-wildlife conversions through the terms of ecological modernization (or more specifically, ecological militarization, which I examine in the next chapter).

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[600] See Hajer, 1995.

[601] Christoff, Peter, "Ecological Modernisation, Ecological Modernities," *Environmental Politics* 5(1996), p. 496.

[602] See Blowers, Andrew, "Environmental Risk Policy: Ecological Modernisation or the Risk Society?" *Urban Studies* 34(5-6)(1997): 845-871.

In fact, risk society and ecological modernization can be seen as related explanations of contemporary environmental politics and public policy as both rely upon certain constructions of science and technology. This is a point highlighted by Cohen, "The role of scientific rationality in promoting economic and environmental progress is particularly central in both the risk society and ecological modernisation."[603] The question remains, however, whether these two perspectives can somehow be reconciled to contribute toward a productive, enduring, and environmentally safe society. For this task, a "strong" form of ecological modernization may present a real prospect for change that genuinely addresses environmental problems and conservation, thoughtfully integrates modern technologies, and brings decision-making more fully into civil society.[604]

In its strongest form, ecological modernization does not simply accommodate existing institutions and technologies, but rather challenges the status quo of industrialization to *ecologize*, or reorient along more holistic and diverse priorities. These would necessarily extend across traditional environmental, social, and cultural boundaries adhered to by weak ecological modernization, thereby constructing new geographies of nature and society. That is, "strong ecological modernisation therefore also points to the potential for developing a range of alternative ecological modernities, distinguished by their diversity of local cultural and environmental conditions although still linked through their common recognition of human and environmental rights and a critical or reflexive relationship to certain common technologies, institutional forms and communicative practices."[605]

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[603] Cohen, Maurie J., "Risk Society and Ecological Modernisation," *Futures* 29(2)(1997), pp. 105-119 (p. 106).

[604] Christoff, 1996.

[605] Christoff, 1996, p. 496.

In this version, ecological modernization manages to operate not in spite of or in opposition to the existence of risk society, but rather as a discourse fully informed by this critical view of technology and its responsiveness to questions of risk and authority. As Cohen points out:

> Increasing incertitude about the virtues of technological advance and public recognition of science's shortcomings can facilitate the democratisation [sic] of technical knowledge. This reorientation generates the possibility for the lay public to gain control over its technology while encouraging science to overcome its reductionist tendencies. With the emergence of a more holistic science, space is created for a process of social learning to emerge. In such a manner, the most odious effects of a risk society can be contained and it becomes feasible to envision a future built upon more humane technology.[606]

Recognizing, then, that it ought to be possible to work from a position informed for the better by risk society *and* ecological modernization, I examine in the next chapter the more pointed question of whether military-to-wildlife refuge conversions represent examples of such integrative and productive change.

Learning from Risk Society

In addition to M2W sites' relevance to Beck's Risk Society, another productive reason for turning to this theory is that it presents a view that is not exclusively pessimistic. In fact, Beck chides the "ontological pessimism of certainty" that relieves us "of all responsibility for action."[607] In place of this motive for inaction, Beck sees the destabilizing qualities of Risk Society as offering opportunities for change: "Where everything is at stake,

[606] Cohen, 1997, p. 108.

[607] Beck, World Risk Society, pp. 88 and 86, respectively.

everything can and must be rethought and reexamined."[608] Framing M2W refuges as constituents of Risk Society in this context presents an opportunity to consider these changes as broader contributions of social change. As I have highlighted already, M2W conversions can open military spaces to more transparent and public decision-making processes. Beck notes a similar opening of decision-making that comes with the onset of risk society and suggests that institutional reform of private corporations and the sciences (and I would add, federal agencies), "could encourage environmental innovations and help to construct a better developed public sphere in which crucial questions of value that underpin risk conflicts can be debated and judged."[609]

This points to the possibility that M2W conversions could contribute to changes in society that extend beyond the mere renaming of military bases to an actual examination of what kinds of actions occur on military bases, how far-reaching the impacts of these activities can be, and what underlying values are represented or fostered in these spaces. This perhaps seems a tall order, but increased public awareness about what actually occurs on military bases may well come as an essential early step in spurring broader public debate about militarization generally. Unlike the human casualties and environmental consequences of foreign wars, the impacts that we uncover from many domestic military bases strike in many ways much closer to home.

This may be rather obvious geographically, as local residents learn about toxic groundwater plumes, airborne pollutants, or other hazards that affect them directly. These may also come in the form of physically maimed and psychologically damaged soldiers

[608] Beck, World Risk Society, p. 88.

[609] Beck, World Risk Society, p. 5.

returning from combat to communities and institutions no longer willing or able to support them.[610] Or, as U.S. President (and General) Dwight D. Eisenhower once noted, "Every gun that is made, every warship fired, signifies in the final sense a theft from those who hunger and are not fed, those who are cold and not clothed."[611]

We may also recognize, however, that the risks taken during years of activity at military bases have generated hazards that differ from those of war by virtue of their "peaceful" origins, or what Beck calls "normal birth."[612] These impacts differ from war damage in their genesis from, "the centres of rationality and prosperity with the blessings of the guarantors of law and order. They differ from pre-industrial natural disasters by their origin in decision-making, which is of course conducted never by individuals but by entire organizations and political groups."[613] What we find at military bases once they are opened somewhat to public inspection is that violence has been done to the land, water, plants, animals, atmosphere, and more, but not directly to *humans* in the same way it is during warfare.

In order to understand M2W conversions in a way that contributes constructively to a more democratic politics, we must also recognize that even as the products now found at

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[610] See Lutz, xx; and de Yoanna, Michael, "Pattern of Misconduct: Fort Carson Soldiers Allege Abuse and Intimidation," *Colorado Springs Independent*, 13-19 July 2006, pp. 14-19. De Yoanna's article describes heightened levels of suicide, substance abuse, and drunk driving among soldiers returning from active duty in Iraq, many of whom have been diagnosed as suffering from post-traumatic stress disorder but instead of receiving institutional support from the Army face dishonorable discharges and a loss of employment and health and education benefits.

[611] Eisenhower quoted in Barnett, p. 96.

[612] Beck, World Risk Society, p. 50.

[613] Beck, World Risk Society, p. 50.

these sites become naturalized and viewed as part of the landscape, the liabilities that come with these products should not in turn be accepted as *natural* hazards. To return to Beck, "Risks always depend on decisions – that is, they presuppose decisions. They arise from the transformation of uncertainty and hazards into decisions."[614] The hazards of unexploded munitions, chemical contamination, discarded jet fuel, and other military residues come as a result of risks taken and decisions made during an earlier stage of industrial and military development – a stage that is now aging but also continues in new forms and in new locations around the world.

If M2W conversions are to contribute meaningfully to real political change and democratization, then we also need to reveal the chronic uncertainty of the risks that have been taken in these places rather than simply accept experts' assurances of safety. As Beck contends, "The exposure of scientific uncertainty is the liberation of politics, law and the public sphere from their expert patronization by technocracy. Thus the public acknowledgement of uncertainty opens the space for democratization."[615] We see this increased democratization of military spaces taking various form among the M2W conversion sites, from citizen groups such as Save the Valley and the Sierra Club at Big Oaks and the Rocky Mountain Arsenal, respectively, to the stronger role of public regulatory agencies such as state health departments and the federal EPA, to more visible indigenous claims to land at Vieques and Pacific island sites.[616]

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[614] Beck, World Risk Society, p. 74.

[615] Beck, World Risk Society, p. 61.

[616] See, for example, Davis, Jeffrey Sasha, "Representing place: 'Deserted isles' and the reproduction of Bikini Atoll," *Annals of the Association of American Geographers,* 95 (3)(2005): 607-625; Davis, Jeffrey Sasha, "'Fish and Wildlife is another name for the Navy:' Military destruction, environmental preservation and social

Demilitarized Geographies?

While the M2W conversion process generally opens up previously closed spaces to NEPA assessments, public hearings, Restoration Advisory Boards, regulatory oversight, and other forms of public engagement that are typically rare on active bases, the increased transparency may be only a passing phase if the resulting wildlife refuge (or other conversion category) remains completely closed to public use. At M2W refuges where there is no DOD-sponsored cleanup, no visitor center, or no public access, the actual public engagement with the places may remain at or below levels maintained during military management. The opacity of these places, in other words, has the potential to return even in the absence of an active military.

Such entirely "closed" M2W settings as Nomans Island and the Pacific island refuges still come with some political appeal as elected officials can point at least nominally to a new national wildlife refuge established in their districts rather than to a brownfield military base, but the deeper political opening that Woodward and others highlight for military conversions may not much apply to these settings.[617] In these cases we can see again how scientific analyses alone may be incapable of establishing sufficient understanding of M2W sites. The ecological amenities of such places may be exceptionally well-protected behind locked gates and fences or in remote island settings, but the biological indices that establish this will tell

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justice" presentation at the Annual Meeting of the Association of American Geographers, Chicago, Illinois, March 2006.

[617] e.g. Woodward, *Military Geographies*, p. 54.

us very little about the broader contexts and meanings that produced such favorable conditions. Conservation biology's opening premise that "biodiversity is good," for example, can lead us to the logical conclusion that M2W conversions also are good if they serve to protect biological diversity.

We should be wary of such broad determinations from one perspective, however worthwhile it may be, as the complex characteristics of M2W sites call for more multi-faceted analyses. While this point may by now seem obvious, I return to it here because of the authoritative role that certain sciences come to play at many M2W refuges and how this affects public perceptions of these places. Staffed predominantly by experts with training in wildlife biology, conservation biology, or other natural sciences, M2W sites are cast as refuges for biodiversity and day-to-day management proceeds accordingly.

While I support this conservation goal in its broader outlines – such environmental protections remain an essential component to maintaining a recognizable and sustaining biosphere – we should be wary of the assumptions built into our embrace of such militarized places *as refuges*. There is a reason why we smile only wincingly at remarks such as Wendell Berry's comment from the Big Oaks refuge (quoted in Chapter Five), that it is "a shame that there aren't more areas of the country that were totally ruined by the Army."[618] When granted a fuller sense of the historical contexts of Big Oaks or other M2W locations, most observers likely agree that militarization is not the most desirable conservation strategy. We can find reason to appreciate some of the qualities now extant in these sites, but should not lose sight of the other characteristics that remain here as well. M2W refuges by another name are

[618] The quote is actually from Richard Hill, paraphrasing Berry from his visit to Big Oaks. See Chapter Five. From the context of the original quote, Berry is clearly aware of the irony of his remark.

simply "demilitarized zones," which like the DMZ dividing the Korean Peninsula remain both highly militarized and the product of political conflict, social upheaval, and physical destruction. I suspect that few among us would actively prescribe this approach to creating landscapes, but faced with this very prospect we ought to at least strive to understand its lasting implications.

Questioning Biodiversity

Since the protection of biological diversity rests at the core of much of what we find valuable and positive about M2W refuges, it may be worth taking a moment to examine its construction and implications. Whatmore offers a pointed critique of the very concept of biodiversity, contending that it "fuels the scientific zeal for classification with a new moral purpose" and leads to the creation of increasingly institutionalized and commodified interactions with wildlife.[619] This type of critique also resonates with animal rights activists who often point to the meaning of individual lives rather than attending primarily to population or species-level concerns. Both these positions seek to break down the dualistic separations between an "us" of humanity versus a "them" of the rest of the world's biota. On this view, we should treat other living things *as if they matter*.[620]

The Linnaean system of taxonomy that categorizes individuals into groups of similar kinds – into separate kingdoms, phyla, and so on down to species and sub-species – is of

[619] Whatmore, *Hybrid Geographies*, 2002, p. 21. For a more thorough consideration of biodiversity, see Takacs, David, *The Idea of Biodiversity: Philosophies of Paradise* (Baltimore: Johns Hopkins University Press, 1996).

[620] Whatmore, p. 31, uses this phrase to distinguish from a view built solely from an economic valuation of wildlife.

course an inherently dualistic project that depends upon either-or distinctions. Thus we have the functionally clear tool of a dichotomous key: either you have flower-like bracts or you do not.[621] In this way, our understanding of biological diversity and our ability to identify it depends very much upon an institutionalized process that shapes our interactions with other organisms. This no doubt can lead to a heightened appreciation of certain individuals over others and generates a hierarchy of values – a version of what Whatmore laments as commodification. According to Takacs' history of the creation of biodiversity as a concept, this was partly the intent: scientists sought to translate their research into terms that could be marketed politically without losing the prestige of objectivity.[622] For those still operating somehow outside this system of classification, the value of the individual may remain untainted by an institutionalized framework. In this way, for example, my young daughter can see in a bird its iridescent plumage, its nimble hopping, and the marvel of flight what I dismiss as European starling. She sees starlings as if they matter; I see a non-native pest, *Sturnus vulgaris*.

Institutionalized systems of knowledge production can of course be extremely effective for a variety of purposes. Without some system for identification and classification, it might well be impossible to know when entire categories of organisms teetered on the brink of extinction. Tempting though it may be to blame contemporary environmental problems upon rifts triggered by the rational constructions of Descartes or Linnaeus, there is ample evidence that wildlife extinctions and other significant environmental transformations

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[621] In recent years many of these seemingly clear distinctions have also come under scrutiny. See for example, Stamos, David N., *The Species Problem: Biological Species, Ontology, and the Metaphysics of Biology* (Lanham, MD: Lexington Press, 2003).

[622] Takacs, 1996.

were also wrought by human societies operating outside such epistemologies.[623] Ongoing projects to categorize and protect biodiversity may contribute to certain forms of wildlife commodification as Whatmore suggests, but we should recognize that these institutionalized approaches also help ensure organisms' continued existence over the long term. If our lasting objective is to create a "better" set of relationships across categories – less hierarchical, rigid, commodified, or dualistic – a useful precondition in the case of human-wildlife interactions should at least be to encourage the prospect that representatives from all sides continue to exist. However tainted by institutionalized knowledge my view may be of European starlings, I suspect I still have a better chance of learning to treat them *as if they matter* than I do with the extinct Carolina parakeet.[624]

Whatmore, too, ultimately adopts a rather pragmatic baseline for her critique of biodiversity. In fact, her ultimate vision is one that seems particularly appropriate for wildlife refuges with such militarized pasts as M2W sites: "the wildlife sanctuary…still has a place but it is no longer one of last resort or without a past. Rather, such sites mark one kind of dwelling-place in which to configure human-animal relations in ways which account of the social habits and ecological orderings of all their inhabitants."[625] In other words, we ought to

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[623] For example, Denevan, William M., **"**The Pristine Myth: The Landscape of the Americas in 1492," *Annals of the Association of American Geographers*, 82(3)(1992): 369-385; Flores, Dan, *The Natural West: Environmental History in the Great Plains and Rocky Mountains* (Norman, OK: University of Oklahoma Press, 2001); Martin, Paul S., "Pleistocene Overkill," *Natural History* (December 1967)pp. 32-38.

[624] Horgan makes a similar point in his review of Takacs's critique of the concept of biodiversity; see Horgan, John, "It's Not Easy Being Green," review of *The Idea of Biodiversity* by David Takacs in 12 January 1997 *New York Times Review of Books*.

[625] Whatmore 2002, p. 34.

acknowledge and bear witness that these refuges exist amid the contested settings of science, technology, and policy. We find here, as well, that it is important to make visible the forms of production for these places.

Avoiding Erasure

Running through the trend of recent military closures generally, and M2W conversions more particularly, is the peril of historical erasure. As bases close and become known for new types of land use, we face the prospect of losing the memory of what happened in these places and what these actions promoted in terms of our national values, politics, and environment. As Mitchell warns, "one of the purposes of landscape is to make a scene appear unworked, to make it appear fully natural. So landscape is both a work and an erasure of work."[626] M2W conversions work doubly to naturalize sites of military production: the places become known publicly as wildlife refuges, which in turn are supposed to be *natural* places constituted largely outside the realm of culture.

There are, conversely, ways that M2W conversions could work to secure our cultural memory of the institutions and actions that predominated in creating the landscapes we now identify as new wildlife refuges. As I have already suggested, the often-dramatic hybrid qualities of these places can spur us to think more integratively about nature and society as co-producers of these landscapes and the changes occurring here. It may be, however, that labeling these militarized-naturalized sites as "wildlife refuges" fails to fully capture this sense. We may be lulled by this nomenclature into an oversimplified understanding of these

[626] Mitchell, Lie of the Land, p. 6.

landscapes and their production. This very concern emerged from the hearings held for the conversion of the Rocky Mountain Arsenal into a wildlife refuge, as a representative of The Wilderness Society suggested that the site should not be called a national wildlife refuge because it would weaken the popular understanding of this network of lands dedicated to wildlife conservation.[627]

There is a certain irony to The Wilderness Society's expression of concern here, as the concept of wilderness, itself, has come under attack for its possible contributions to cultural erasure and a nature-society dualism. Cronon's influential critique of wilderness (1995) signaled that there may be broader risks associated with land preservation efforts that seem to close off spaces as natural at the exclusion of the social.[628] With this characterization, "wilderness leaves precisely nowhere for human beings actually to make their living from the land."[629]

The prospective forfeiture of any lasting sense of the complex social relations built into M2W refuges stands out as one of the fundamental risks found with these conversions. Richard Misrach offers at least one way through this pitfall of lost sociopolitical memory

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[627] "Rocky Mountain Arsenal National Wildlife Refuge Act of 1991," transcript of hearings by the House of Representatives, Military Installations and Facilities Subcommittee of the Committee on Armed Services and the Fisheries and Wildlife Conservation and the Environment Subcommittee of the Committee on Merchant Marine and Fisheries, Denver, CO, 9 September 1991.

[628] Cronon, William, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," in: Cronon, W. (ed.) *Uncommon Ground: Toward Reinventing Nature*, (New York: W.W. Norton & Company, 1995), pp. 69-90. For further consideration of Cronon's concerns, see Callicott, J. Baird and Michael P. Nelson, eds. *The Great New Wilderness Debate*, (Athens, GA: University of Georgia Press, 1998); and Havlick, 2006.

[629] Cronon, 1995, p. 80.

with his provocative proposal for a Bravo 20 National Park.[630] A stark landscape littered with craters, bomb casings, UXO, and the charred remains of military targets (including school buses and communications towers), the Bravo 20 site scarcely conjures up associations with America's scenic national parks. In order to retain and commemorate the blend of social and environmental attributes extant in places such as the Nevada Bravo 20 bombing range, Misrach envisions an environmental memorial that invites the public to explore, confront, and consider the site as it combines violence, power, politics, and nature:

> Bravo 20 would be a unique and powerful addition to our current park system. In these times of extraordinary environmental concern, it would serve as a permanent reminder of how military, government, corporate, and individual practices can harm the earth… it would be a national acknowledgment of a complex and disturbing period in our history… Bravo 20 would not only provide a graphic record of our treatment of less celebrated landscapes but also help deter their destruction in the future.[631]

Misrach's vision is explicitly political and critical – he suggests that the Bravo 20 visitor center, "be devoted to the history of military abuse in peacetime. Displays and exhibits will include our radioactive experiments on the residents of the Marshall Islands in the Pacific, the contamination of continental America by tests at the Nevada Nuclear Test Site, the Colorado Rocky Flats nuclear weapons plant and Hanford nuclear area in Washington State, chemical weapons storage, toxic waste disposal, and the confiscation of land and airspace throughout America."[632] (See Figure 6.8: Bravo 20 National Park Proposal.) Yet the photographs and text that accompany his proposal make clear that there is also an element of

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[630] Misrach, Richard (with Myriam Weisang Misrach). Bravo 20: The Bombing of the American West (Baltimore: Johns Hopkins University Press, 1990).

[631] Misrach, p. 95.

[632] Misrach, p. 95.

beauty in this place that contributes to the project serving as a memorial for abused lands as well as a form of environmental protection. Misrach's depiction illustrates how an environmental memorial could preserve not only a snapshot of land but a sense of the processes and institutions that created the land's form. It would, in other words, maintain the visibility of the landscape's production and press the public to learn from these actions.

Misrach is neither alone in his vision nor, in some respects, outlandish. In addition to the scenic national parks for which it is most well-known, the U.S. National Park Service currently manages dozens of historical sites that recognize and commemorate military battles, massacres, and other events that do not necessarily reflect favorably upon the United States' national heritage.[633] The refuge manager of the Aroostook NWR in northern Maine noted that this M2W site would have made an excellent national park in order to preserve the place's cultural legacy; as Loring Air Force Base, the site was the nearest nuclear-armed domestic base to Moscow throughout the Cold War.[634]

This points to one of the common explanations of the value of learning about history: that we may learn from the past to inform the present and future.[635] Foote addresses this concern, as well, in his work on how landscapes of violence are commemorated or

Figure 6.8: Bravo 20 National Park Proposal[636]

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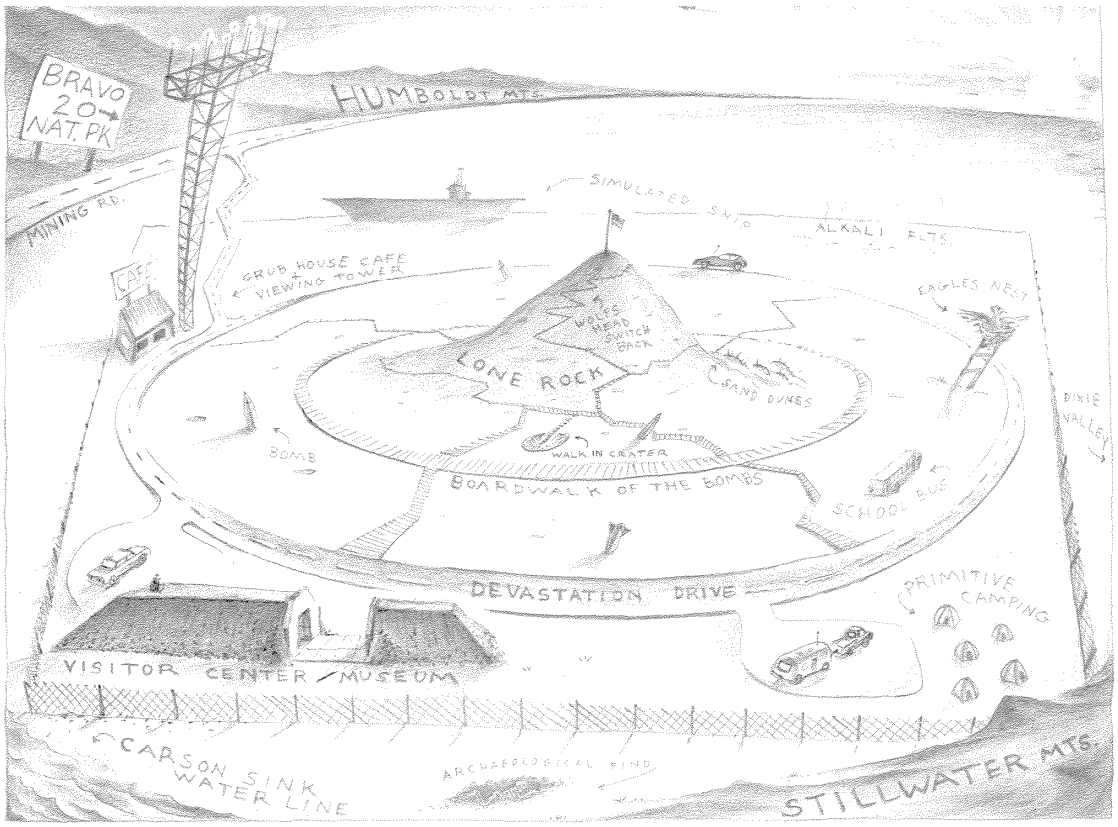
[633] These include sites such as the Sand Creek Massacre National Historic Site, Little Bighorn Battlefield National Monument, and Big Hole National Battlefield.

[634] Personal communication with William Kolodnicki, 6 July 2006.

[635] See, for example, the Forest History Society's motto, "By understanding the past, we shape our future;" www.foresthistory.org.

[636] From Misrach, p. 99.



obliterated. When he turns in particular to how lands associated with late twentieth-century militarization are being expunged from public view, he muses, "Perhaps it would be better if more of these reminders of the Cold War were kept to commemorate a period when the entire world seemed at all times only moments away from nuclear destruction. It is my hope that these largely forgotten sites of the past fifty years will one day be marked in the landscape as reminders – and warnings – for future generations."[637]

A pivotal turn in this process of commemoration versus historical erasure comes with the Department of Defense's ability to convince the public that it has already moved beyond the problems of the past. Put more in terms of Beck's risk theorization, the DOD seeks to

[637] Foote, Shadowed Ground, p. 357.

generate public trust by appearing to have insured society against historical risks.[638] By greening military bases and committing them toward new projects of environmental conservation, the federal government works to assure the public that the military practices that produced technologies ranging from chemical weapons to depleted uranium ordnance to nuclear missiles can be successfully managed, and that these hazards can become ecologically benign or even *helpful*.

The key framing for this transformation to succeed rests upon what I call ecological militarization.[639] In the chapter ahead I turn more fully to this particular discourse of change that casts military activities as compatible with environmental protections. This, in turn, may influence how the general public learns to recognize over the long term the contested character of M2W spaces.

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[638] Beck, World Risk Society, p. 50, calls this the "calculus of risks" and maintains that the DOD and other institutions have, in fact, produced uninsurable hazards.

[639] As I have noted elsewhere, ecological militarization extends from the broader discourse of ecological modernization. On the latter, see for example, Hajer, 1995; Dryzek, 1997; Massa, Ilmo and Mikael Skou Andersen, "Special Issue Introduction: Ecological Modernization," *Journal of Environmental Policy and Planning* 2(2000):265-267; Fisher, Dana R., "Ecological Modernization and its Critics: Assessing the Past and Looking toward the Future," *Society and Natural Resources* 14(2001): 701-709.

CHAPTER SEVEN

ECOLOGICAL MILITARIZATION: A NEW ENVIRONMENTAL POLITICS FOR THE MILITARY

Among the diverse characteristics of military-to-wildlife conversions and the array of legal processes by which they are enacted, one aspect of these changes that holds constant is the presentation that military activities and environmental conservation are at some level compatible. In this final chapter, I examine a key discourse at work in M2W conversions, *ecological militarization*, and assess what the consequences may be of accepting this version of compatibility between the military and the environment.

Ecological militarization extends from the substantial existing literature on ecological *modernization*, so my analysis opens with a brief examination of this broader discourse. Ecological modernization brings technological, growth-oriented responses to bear upon environmental problems. Whether such responses represent a thorough reworking of existing practices and ideologies or a superficial treatment of symptoms depends, at least in part, upon whether they are characterized by ecological or economic principles, and how fully we open the process to democratic and public engagement versus entrusting it to experts and traditional institutions of power.[640] After sharpening this discourse analysis to the more

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[640] Hajer, Maarten A. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process* (Oxford: Clarendon Press, 1995); Dryzek, John S. *The Politics of the Earth: Environmental Discourses*

specific cases of military-to-wildlife conversions, I close by assessing how M2W conversions could foster a genuine transformation of militarized spaces that leads to a democratic and open environmental politics, as well as a more robust understanding of militarization and its relationship to nature and society.

Ecological Modernization

Ecological modernization rests upon the view that ecological crises can be overcome by technical and procedural innovation and that existing institutions can respond sufficiently to environmental problems.[641] More simply, ecological modernization contends that economic growth and environmental protection are compatible, even complementary goals.[642] In this, the discourse offers a route through (post)industrial society that can be both politically and environmentally attractive and often promises win-win solutions.

(Oxford: Oxford University Press, 2nd edition, 2005), pp. 172-176; and Christoff, Peter, "Ecological Modernisation, Ecological Modernities," *Environmental Politics* 5(1996): 490.

[641] See Hajer, 1995, pp. 25-26. More generally on ecological modernization see: Mol, Arthur P.J., "Ecological Modernisation and Institutional Reflexivity: Environmental Reform in the Late Modern Age," *Environmental Politics* 5(1996): 302-323; Mol, A. and D. Sonnenfeld, "Ecological Modernisation around the World: an Introduction," *Environmental Politics* 9(1)(2000): 3-16; Mol, A. and Gert Spaargaren, "Ecological Modernisation Theory in Debate: A Review," *Environmental Politics* 9(1)(2000): 17-49; Gonzalez, George A., "Local Growth Coalitions and Air Pollution Controls: The Ecological Modernisation of the U.S. in Historical Perspective," *Environmental Politics* 11(3)(2002): 121-144.

[642] See Hajer, Maarten, A., "Ecological Modernisation as Cultural Politics," In: Lash, Scott, Bronislaw Szerszynski and Brian Wynne (eds.) *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996), pp. 246-268; and Gonzalez, 2001, p. 327.

The accommodation of existing institutions and values leads to a principal critique that ecological modernization fails to challenge basic capitalist ideologies and may be coopted into little more than a rhetorical greenwashing strategy. As Christoff describes ecological modernization: "there is a danger that the term may serve to legitimise [sic] the continuing instrumental domination and destruction of the environment, and the promotion of less democratic forms of government, foregrounding modernity's industrial and technocratic discourses over its more recent resistant and critical ecological components."[643] Even so, as Dryzek counters, ecological modernization may also offer, "a plausible strategy for transforming industrial society into a radically different and more environmentally defensible (but still capitalist) alternative."[644] This tension between ecological modernization as a strategy for legitimizing industrial society versus one dedicated to reforming it remains actively contested. It also emerges frequently in the context of military conversions as new M2W refuges are commonly seen as either superficial, least-cost designations to cover up damage wrought by military activities, or they are viewed as beacons of change signaling a streamlined and newly environmentally conscientious Department of Defense.

The common casting of military-to-wildlife conversions as win-win scenarios where managerial and technological innovation produce military and environmental "goods," nests rather easily within the ideas of ecological modernization. As I highlighted in Chapter One, this presentation of military-environment compatibility emerges from the innermost circles of the federal government, with Dick Cheney noting in 1990, "Defense and the environment is

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[643] Christoff, 1996, p. 497. Hajer, 1996; Harvey, 1996; Dryzek, 1997; and Gonzalez, 2001; each raise versions of these critiques.

[644] Dryzek, John S. *The Politics of the Earth: Environmental Discourses* (Oxford: Oxford University Press, 2nd edition, 2005), p. 179.

not an either/or proposition. To choose between them is impossible in this real world of serious defense threats and genuine environmental concerns."[645]

As I turn in the sections that follow to a more detailed examination of ecological militarization as a policy discourse that facilitates M2W conversions, the parallel features and perils of ecological modernization never drift far from view. As I build toward the conclusion of the dissertation I move to an examination of how we may develop a stronger version of ecological militarization that contributes to genuine social change, environmental conservation, and diminished militarization.

Ecological Militarization

Beyond the two federal institutions I have highlighted throughout this dissertation – the U.S. Department of Defense and the U.S. Fish and Wildlife Service – one of the more formalized venues for the promotion of ecological militarization is the Center for Environmental Management of Military Lands (CEMML) at Colorado State University. Based in Fort Collins, Colorado, CEMML functions as a quasi-independent research organization – housed within Colorado State University, but largely funded by DOD contracts – that supplies environmental professionals to work in military settings. Its promotional materials succinctly state one of the fundamental premises of ecological militarization: "CEMML recognizes that military land use and resource conservation are

[645] Quoted in Dumanoski, Dianne, "Pentagon Takes First Steps Toward Tackling Pollution," *Boston Globe*, 9 September 1990.

compatible goals that can be accomplished through the integration of sustainable land management practices."[646]

Though the Center for Environmental Management of Military Lands may be distinctive in its mission to advance the idea that military activities and environmental conservation fit neatly together, this same storyline comes through elsewhere from an array of sources including scientific publications, DOD and FWS reports, newspaper accounts, conservation organizations, Congressional hearings and legislation.[647] From these diverse accounts, we can identify three principal elements held in common by ecological militarization.

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[646] Center for Environmental Management of Military Lands website viewed online at http://www.cemml.colostate.edu/ [11 July 2006].

[647] I have provided examples of these throughout the previous chapters. As representative examples, see: Kim, Ke Chung, "Preserving Biodiversity in Korea's Demilitarized Zone," *Science* 278:5336(10 October 1997): 242-243; Leslie, Michele, Gary K. Meffe and Jeffrey L. Hardesty, *Conserving Biodiversity on Military Lands: A Handbook for Natural Resource Managers* (Washington, D.C.: The Department of Defense Biodiversity Initiative, U.S. Department of Defense, and The Nature Conservancy, 1996); Hoffecker, John F.,*Twenty-Seven Square Miles* (Colorado: U.S. Fish and Wildlife Service, Rocky Mountain Arsenal National Wildlife Refuge, 2001); Schmidt, William E., "Nature Sows Life Where Man Brewed Death," *New York Times*, 12 March 1989, sec. 1, part 1, page 1; "National Wildlife Refuge Proposal for Jefferson Proving Ground in Trouble!" Hoosier Environmental Council action alert, n/d, photocopy from Big Oaks National Wildlife Refuge files, original printed from website, www.enviroweb.org/hecweb/alerts/jpgAlert.htm [28 April 1999]; "Rocky Mountain Arsenal National Wildlife Refuge Act of 1991," 9 September 1991, Joint Hearing Before the Fisheries and Wildlife Conservation and the Environment Subcommittees of the Committee on Merchant Marine and Fisheries [serial No. 102-61] and the Military Installations and Facilities Subcommittee of the Committee on Armed Services, House of Representatives, 102nd Congress, 1st Session; PL 102-402.

First, military practices and environmental conservation represent compatible activities that provide for the national defense *and* protection of biodiversity. In particular, the streamlining and modernizing of military operations in response to contemporary geopolitics creates new opportunities to protect plants, wildlife, and habitat. Next, existing institutions, current and advancing technologies, and centralized managerial responses can adequately accommodate requirements for cleanup, remediation, public safety, and conservation at military sites undergoing conversion. And third, economic and strategic considerations trigger the initial changes in land management objectives at military bases, but the *nature* of militarized places often dictates their reclassification to national wildlife refuges. Whether bases are closed as a result of the BRAC process, legislation, or other means, no one seriously claims that such closures occur first and foremost out of a desire to protect rare plant or animal populations. Once economic or military considerations direct a site into closure, then ecological factors are often parlayed to generate support for a wildlife refuge designation.

Upon examining these characteristics of ecological militarization more closely, we find that the structure of this discourse in many respects matches what critics describe as a "weak" version of ecological modernization (Table 7.1).[648] Based largely upon the experience of the United States, ecological militarization pertains primarily within the context of a highly-industrialized state capable of externalizing many of the impacts of military activity. While the UK, Germany, and other developed states also have former military sites that are now either officially

[648] Christoff, 1996; Gonzalez, 2001.

sanctioned or informally known as wildlife refuges, few less developed countries have either the incentive or the means to decommission militarized sites.[649]

Table 7. 1: Two Types of Ecological Modernization[650]

Weak Ecological Modernization	Strong Ecological Modernization
Economistic	Ecological
Technological (narrow)	Institutional/systemic (broad)
Instrumental	Communicative
Technocratic/corporatist	Deliberative/democratic
Closed and shallow	Open and deep
National	International
Unitary (hegemonic)	Diversifying

Indeed, the federal "streamlining" of the military infrastructure in the United States (and of U.S. bases in Germany) is largely made possible by: a) the expansion of U.S. military activities into the overseas territories of less developed regions such as Central and Southeast Asia; b) the shifting of militarization to less developed regions *within* the United States, such as the arid lands of the Intermountain West and Southwest, including lands long claimed as sovereign and still inhabited by Native Americans; and c) the outsourcing of military security, food service, energy and transportation supplies, and other essential services to private contractors such as Halliburton, Blackwater, Wackenhut, and others.[651]

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[649] One obvious exception comes from sites in the former Soviet Union where decommissioning occurs due to technological failure, lack of funds, and/or the obsolesence of the technology.

[650] Modified from Christoff, 1996, p. 490.

[651] In the ongoing war in Iraq, for example, the U.S. military is supplying approximately 130,000 troops, while private contractors contribute 50,000. See Latham, Lewis, "Lionhearts," *Harper's* (September 2006): 9-11.

Military streamlining, and the base closures and conversions associated with this effort, are thus not at all synonymous with a process of demilitarization. At the White Sands complex in New Mexico, for example, more than 43,500 missile firings took place between 1945 and 1993; the current rate is 1,000-plus training missions and more than 3,000 nuclear effects tests each year.[652] The fact that U.S. military expenditures rose 48 percent from fiscal year 2001 to 2007 is but an additional measure of an increasing trend of militarization even as domestic installations close and face reclassification.[653] Ongoing military campaigns in Iraq, Afghanistan, and the geographically and temporally unbounded "War on Terror" further emphasize the continued extensive reach of the United States' military objectives.

Similar to ecological modernization's reliance upon state or corporate institutions,[654] ecological militarization also operates with what is essentially a technocratic, centralized response to military base closures. As I have pointed out previously, the process of base closure does open up military sites to new levels of public scrutiny – both as a result of the NEPA process's public comments and open hearings, as well as with any subsequent formalization of public use and visitor services – and this can certainly shape cleanup and management actions to varying degrees. For example, at the Rocky Mountain Arsenal, the base conversion process

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[652] Kuletz, pp. 58-59.

[653] Office of Budget and Management Department of Defense budget, viewed online at www.whitehouse.gov/omb/budget/fy2007/pdf/budget/defense.pdf [31 August 2006].

[654] Langhelle, Oluf, "Why Ecological Modernization and Sustainable Development Should not be Conflated," *Journal of Environmental Policy and Planning* 2(2000), p. 309; see also Mol and Spaargaren, 1993, p. 454; Dryzek, 2005; and Gonzalez, 2001.

directly corresponded to lawsuits, Congressional and State intervention, media attention, and citizen activism that continue to influence the remediation and public use occurring at that site.

In most every M2W case, however, the ultimate decision-making authority still rests with such centralized institutions as the Department of Defense and, to a lesser degree, the Fish and Wildlife Service. To point again to the example of Rocky Mountain Arsenal, the Remediation Venture Office's consortium of Army, FWS, and Shell managers wields the greatest power on a day-to-day basis, with the Army the lead authority within that triumvirate. The RVO's power is tempered by the terms of court rulings, regulatory agencies, and legislation, but even these come from institutions of centralized authority: the State of Colorado, the U.S. Department of Justice, U.S. Environmental Protection Agency, and the U.S. Congress.

Consonant with ecological modernization, the treatments prescribed to assist in the reclassification of M2W sites consistently turn to science and technology rather than citizen participation or local processes. One version of this is characterized by Big Oaks National Wildlife Refuge's policy on the management of depleted uranium: when the local citizens' group Save the Valley raised concerns about the possible effects of burning contaminated areas, the agency dismissed the questions with a brief reference to a study conducted at the Department of Energy's Argonne National Laboratory.[655] A different type of response at M2W sites, but one that also defers to a narrow view of technology and control, is present at sites such as Noman's Island

[655] Fire Management Plan, Environmental Assessment: Appendix K (Madison, IN: U.S. Fish and Wildlife Service Big Oaks National Wildlife Refuge, March 2001), p. 25.

NWR or former bases in the Pacific where the new refuges are simply kept off-limits. At several of these locations, the only access permitted is to credentialed scientific investigators. Debates about the condition or character of these places, or how they ought to be managed in the future, are thus carefully restricted to those conversant in particular kinds of scientific knowledge.

My point here is not that science is a poor way of understanding these places. Clearly science and technology can offer important insights in assessing contamination levels at M2W sites, determining ecological condition and function, mapping hotspots of biodiversity and/or contamination, providing strategies for cleanup, and more. In many instances, the specialized training needed to identify and clean up hazards at former military sites will almost certainly come from the same disciplines that informed the production of these hazards, whether these are chemists, soil scientists, explosives technicians, or nuclear engineers. Even accepting all of this, however, we can still recognize that by restricting the knowledge base and decision-making authority within M2W sites to the same epistemologies responsible for their construction, we may not open these spaces considerably to new politics or values.

The degree to which this maintenance of the status quo prevails depends in part upon how science is managed. If, as Irwin and Wynne point out, we grant science "automatic authority in framing what the issues are," then M2W spaces may well remain places largely characterized and controlled by centralized institutions of

science and technology.[656] Science can also be applied more democratically, however, serving not as ultimate authority but more openly as a "key resource in public issues."[657] Leopold makes a similar distinction in how science can be utilized differently for purposes of "man the conquerer *versus* man the biotic citizen"; in this, there is "science the sharpener of his sword *versus* science the searchlight on his universe"[658] (emphases in original).

A reliance upon a technocratic, authoritarian form of science can, in turn, contribute to a belief common to weak ecological modernization that there are no limits to what human ingenuity can achieve. Inspiring though this may be in some contexts, it can also lead disastrously toward hubris. The promise of technological innovation can promote a view that effectively encourages carelessness over precaution: if we trust that we can develop technologies that will clean up any mess, then we may be less assiduous about preventing disasters in the first place.

At M2W sites this faith in society's long-term ability to repair and restore the environment has often been layered with a protracted disregard for any impacts of military activity.[659] It remains unclear whether this latter view stems from military officials following orders with little attention to local conditions, a behind-closed-gates attitude that military

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[656] Irwin, Alan and Brian Wynne, "Introduction," pp. 8-9, In: Irwin, Alan and Brian Wynne, eds., *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996).

[657] Irwin and Wynne, 1996, pp. 8-9.

[658] Leopold, Aldo, *A Sand County Almanac and Sketches Here and There* (Oxford: Oxford University Press, 1987 [1949]), p. 223.

[659] See for example, Shulman, 1992.

actions need not attend to environmental regulations or common safety precautions, a view that environmental conditions had no bearing on the national security mission of the military, or some combination of these and other factors. The consequence of this combination of views is, however, quite clear in the chronic contamination problems that haunt military installations and their environs.

At many M2W sites it has also become evident that technologies do not, in fact, currently exist that can sufficiently respond to the chemical, explosive, or nuclear hazards that still reside in these places. Whether future societies will manage to develop new techniques remains to be seen, but the fact that planning horizons for the current tasks of isolation and containment at venues such as the Rocky Mountain Arsenal are framed in terms of one thousand years or more, rather than decades, suggests that current land managers and policymakers remain skeptical over the pace of technological cures (and aware of the current hazards).[660]

The carefully bounded geographical focus of ecological militarization also resembles weak ecological modernization in that social justice holds little if any bearing upon decision-making.[661] There is, for one, the disregard of individuals affected by the military practices both inside and outside even the most environmentally protective bases. Soldiers trained at

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[660] The same is true of the disposal of nuclear waste. At the Rocky Mountain Arsenal,the current remediation project is based upon a one thousand year design life; see Shakely, 2004. The planning horizon for the federal Yucca Mountain nuclear depository is ten thousand years; see Kuletz, Valerie L. *The Tainted Desert: Environmental Ruin in the American West* (NY: Routledge, 1998); and U.S. Department of Energy Yucca Mountain Repository, online at www.ocrwm.doe.gov/ym_repository/about_project/index.shtml [4 September 2006].

[661] See Langhelle, 2000.

North Carolina's Fort Bragg who are subsequently posted to Iraq might well envy the on-base treatment accorded the federally endangered red-cockaded woodpecker. Reports of elevated levels of substance abuse, domestic violence, and post-traumatic stress disorder among active-duty Army personnel returning home also highlight some of the social costs that rarely get factored into the win-win depictions of ecological militarization.[662]

While many of these impacts on individuals reverberate through military communities, the siting and expansion of military bases generate even more profound social disruptions and may also be viewed as a matter of social injustice. The military's dislocation of families and entire communities appeared as a point of historical concern in my earlier examinations of the Rocky Mountain Arsenal and Big Oaks M2W conversions (Chapters Four and Five), but similar policies continue in the present as well. Fort Carson's 236,000-acre Piñon Canyon Maneuver Site is but one case in point: created in 1983 through a combination of land purchases and condemnations, the Army announced in 2006 that it seeks to expand the site by more than 400,000 acres to make it the Army's largest single training site.[663] The area under consideration for the expansion currently includes more than 5,000 people, two towns, and several schools.[664] A map published in the La Junta (CO) *Democrat*

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[662] See Lutz, 2001, on the social disruptions common among Fort Bragg soldiers returning home to Fayetteville, NC; or De Yoanna, Michael, "Pattern of Misconduct: Fort Carson Soldiers Allege Abuse and Intimidation," *Colorado Springs Independent*, 13-19 July 2006, pp. 14-19, for an account of the PTSD-related issues at Fort Carson, Colorado.

[663] Louden, Tamara, "Army Expansion Plans Have Ranchers on Edge," *The Denver Post*, 13 August 2006, pp. 1E-2E; De Yoanna, Michael, "Targeting Paradise," *Colorado Springs Independent*, 10-16 August 2006, pp. 14-17.

[664] Louden, p. 1E; De Yoanna, Michael, "Army Manuevers," *Colorado Springs Independent*, 24-30 August 2006, p. 11.

Tribune and attributed to Army sources showed additional plans for expansion that would stretch the base boundaries to the Colorado-Kansas-Oklahoma border and encompass up to 2.3 million acres. Such a move that would consume the region's cattle industry, family farms, Comanche National Grassland, and numerous historic and archaeological sites.[665]

This type of consolidation and expansion of military training sites highlights, again, the point that M2W conversions come not as a step toward *demilitarization* so much as they represent a shifting of military priorities and geographies. The turn toward massive, consolidated bases far removed even from rural populations promises to close military practices off from view ever further, presenting a countervailing trend against the public opening of military bases that occurs during the closure and conversion process. Kuletz describes this type of closed, militarized landscape as it currently exists in Nevada, Arizona, and New Mexico as a "Geography of Sacrifice."[666] The Department of Defense, for its part, acknowledges that a shift toward larger, consolidated bases in remote areas will allow it to conduct activities that currently attract opposition:

> In many geographic regions, the [Armed] Services are constrained in their ability to train because of encroachment near maneuver areas and live-fire ranges. Examples include limits on air operations due to noise, ordnance limits at various ranges, reduced availability of ranges for live fire, restrictions on the use of landing beaches, and pressures from local communities to halt training activities such as artillery firing and air strikes.[667]

There is also a growing international aspect to these issues of social justice as the U.S. military sets up bases or temporary staging areas in Uzbekhistan, Indonesia, Saudi

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[665] De Yoanna, 2006; Louden, 2006.

[666] Kuletz, 1998, p. 77 and passim.

[667] "Base Realignment and Closures: Report of the Defense Secretary's Commission," December 1988, p. 20, retrieved from www.dod.mil/brac/docs/1988.pdf [24 August 2006].

Arabia, Kuwait, and other geopolitical hotspots. At one level this is nothing new – the U.S. has a long record of establishing military bases and operations in farflung locations, from the Philippines and the islands of the Pacific to South America and the islands of the Caribbean – but the systematic BRAC closures that have advanced domestic military base conversions since 1988, as well as post-Cold War withdrawals from western Europe, might tempt some to falsely assume that the U.S. is diminishing its international military presence as well.

Ecological militarization's highlighting of environmental amenities at active or closed military sites may also promote the false impression that ecological considerations operate on a similar plane of importance as economic or strategic considerations in determining base closures. From its first effort to its most recent, the Base Realignment and Closure Commission has made very clear that base closures are prioritized on strategic considerations, first and foremost. In 1988, the closure commission's report noted, "While cost reduction was an important reason for its chartering, the Commission decided that the military value of a base should be the preeminent factor in making its decisions."[668] Of the eight ranked criteria identified for the 2005 BRAC, the first four attend explicitly to "military value" considerations, the next three address economic and logistical concerns, and the last points to environmental impact[669] (Table 7.2).

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[668] Base Realignment and Closures, 1988, p. 6.

[669] Although the 1988 BRAC included nine rather than eight criteria, the list has remained essentially unchanged for each iteration of closures. The 2005 list consolidated two earlier points into one, and added detail for several of the criteria without substantively changing them.

Table 7.2: 2005 Final Selection Criteria for DOD Base Closure and Realignment[670]

Military Value

1. The current and future mission capabilities and the impact on operational readiness of the total force of the Department of Defense, including the impact on joint warfighting, training, and readiness.
2. The availability and condition of land, facilities, and associated airspace (including training areas suitable for maneuver by ground, naval, or air forces throughout a diversity of climate and terrain areas and staging areas for the use of the Armed Forces in homeland defense missions) at both existing and potential receiving locations.
3. The ability to accommodate contingency, mobilization, surge, and future total force requirements at both existing and potential receiving locations to support operations and training.
4. The cost of operations and the manpower implications.

Other Considerations

5. The extent and timing of potential costs and savings, including the number of years, beginning with the date of completion of the closure or realignment, for the savings to exceed the costs.
6. The economic impact on existing communities in the vicinity of military installations.
7. The ability of the infrastructure of both the existing and potential receiving communities to support forces, missions, and personnel.
8. The environmental impact, including the impact of costs related to potential environmental restoration, waste management, and environmental compliance activities.

This list illustrates how thoroughly military and strategic elements are privileged over economic concerns, which in turn rate higher than environmental considerations. In fact, far from a demilitarization project, the BRAC process is cast as a means of *strengthening* the United States' military capabilities. As the Secretary of the Army commented in 2002, "The [2005] BRAC will… realign the Army's infrastructure *to maximize our warfighting capabilities* and efficiency"[671] (emphasis added).

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[670] Adapted from: "Memorandum for Infrastructure Executive Council Members, Infrastructure Steering Group Members, Joint Cross-Service Group Chairman," 2005 Base Closure and Realignment Selection Criteria, from Michael J. Wynne, Acting Under Secretary of Defense, Acquisition, Technology and Logistics (Washington, D.C.: 4 January 2005); retrieved from www.dod.mil/brac/docs/criteria_final_jan4_05.pdf [24 August 2006].

[671] Quoting Secretary of the Army Thomas E. White, 12 December 2002, retrieved from www.dod.mil/brac/army.htm [24 August 2006].

What we find happening with M2W conversions, then, is not so much a "greening" of the U.S. military as it is an attempt to wrap the ongoing (and growing) project of American militarization in a new ecologically protective cloak. Viewed in this light, we can see that criterion number eight's environmental focus (in Table 7.2) is not oriented toward the protection of prime environmental amenities at closing bases, but rather factors environmental issues into the process as a means of cost-avoidance. BRAC closure sites bearing heavy loads of contamination thus have a predisposition toward possible refuge designation; as I noted earlier, the cleanup standard for a wildlife refuge is tiered toward the lesser standard of a non-resident Fish and Wildlife Service employee or other temporary visitors, rather than the stricter terms needed to accommodate residential or many other commercial developments. By these terms, despite the best efforts of refuge managers and other FWS staff working to fulfill the wildlife refuge system's conservation mission, ecological militarization and M2W conversions may offer much greater support for *militarization* than they do *ecology*.

If all this suggests that M2W conversions match the weak form of ecological modernization noted earlier, then in the interest of redirecting policy we ought to ask: Is there a way to shift these processes of ecological militarization to create a "strong" version? How could we attain a more *ecological* conversion of military lands that fosters a democratic politics and an opening of public space?

Before turning to these practical questions more fully, I should note that the form that ecological militarization assumes *as a discourse* is important in its own right. As Woodward highlights, "The control of space is as much a discursive as it is a physical act, in that control is wrapped up in arguments about defence [sic] and security in order to legitimize military

claims to space."[672] Much as military land use has been characterized by its opacity and restrictiveness, the discursive framing of military-to-wildlife conversions can also serve as a barrier to alternative perspectives. It is in the interest of prying open new discourses and creating new kinds of (closing) military spaces that I turn in the next section to how M2W conversions might be produced as representatives of a strong form of ecological militarization, or perhaps more accurately, an ecological *de*militarization.

Social Change, Environmental Conservation, and Demilitarization

In its starkest form, the difference between policies driven by weak versus strong ecological militarization is characterized by authoritarian technological regimes that conveniently integrate environmental protections, versus institutions characterized by open democratic processes and genuine care for the environment. If we are to generate the changes promised by the strong version, reform of both discourse and policy will be needed. To accomplish this type of project, Harvey contends we must articulate environmental transformation with alternate modes of production.[673] For M2W conversions, one example of this might be elevating citizens and grassroots institutions into decision-making positions. Hajer, in turn, calls for an approach of "reflective awareness" that renews debate about what kind of relationships of nature, society, and technology we wish to build.[674] Until ecological militarization truly promotes a relationship between these elements that is grounded in an ethic of inclusiveness and justice, however, it will likely serve more as a tool for powerful

[672] Woodward, 2004, p. 37.

[673] Harvey, 1996, p. 401. Harvey was referring to the broader context of ecological modernization.

government or military interests than the human and wildlife communities M2W conversions purport to benefit.

In the interest of encouraging movement toward a strong version of ecological militarization – one that ultimately contributes to actual demilitarization and increased environmental protection – I suggest four realms of military-to-wildlife conversions where important changes ought to occur. These include the role of science and technology, a transfer of institutional control, the publicizing and preservation of landscape productions, and attentiveness to impacts beyond base closure sites.[675]

Recasting Science and Technology

A number of issues of science and technology rest at the core of M2W conversions. As I have chronicled throughout this dissertation, scientists played fundamental roles in developing the military products that were manufactured, tested, stored, or discarded at military installations now facing closure. As bases close and convert to new uses as wildlife refuges, the expertise of scientists continues to be called upon for projects ranging from plant, wildlife and habitat surveys to soil, air, and water quality monitoring; public health assessments; demolition or demilitarization of buildings, chemical compounds, and

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[674] Hajer, 1996, pp. 265-266. Hajer, too, addresses modernization, not militarization.

[675] Barnett (2001, p. 107) draws a slightly different list of terms that military conversions should meet if they are to contribute to structural change: they must seek a positive environmental outcome; be of a non-coercive nature; be restricted to action within the same country; be implemented with involvement of Green groups and local stakeholders; and the fundamental policy goal must not be to perpetuate the security establishment but to convert it.

explosives; cleanup and containment of contaminants; ecological remediation and restoration; and more.

In most all of these applications, science is employed from positions of authority, controlled and funded by the Department of Defense, U.S. Fish and Wildlife Service, Environmental Protection Agency, or other government or corporate entities. Public input and local knowledge is typically limited to comment periods and hearings required by the National Environmental Policy Act (NEPA), or to Restoration Advisory Boards (RABs) and similar bodies mandated by Superfund legislation and cleanup requirements for federal facilities.[676] The NEPA process and RABs do expose decision-makers to a broad range of public views on military conversions, and in some cases the conversations that result can lead to important outcomes or foster trust and respect across long-standing military-civilian or environmentalist-bureaucrat schisms. The decision-making authority, however, remains firmly vested in the domain of powerful institutions.

One way that citizens have sought to recast these traditional lines of power is by deploying their own scientific expertise and technologies into the public realm. With increasing access to Geographic Information Systems (GIS) and other digital technologies, for example, environmental groups and other non-governmental organizations since the mid-1990s have been able to publish detailed maps to rally public attention. Whether focused

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[676] See "Restoration Advisory Board Guidelines," DOD Base Reuse Implementation Manual (Washington, D.C.: U.S. Department of Defense and Environmental Protection Agency, September 1994); retrieved from www.acq.osd.mil/installation/reinvest/manual/rab.html [30 August 2006]. See also, "Restoration Advisory Board (RAB) Implementation Guidelines," Federal Facilities Restoration and Reuse (Washington, D.C.: U.S. Department of Defense and Environmental Protection Agency, 27 September 1994); retrieved from www.epa.gov/fedfac/documents/rab.htm [30 August 2006].

upon wildlife and habitat amenities or toxic plumes and other forms of contamination, these maps leverage the authority granted by sophisticated cartographic technologies to garner public trust and command attention from federal or state officials.[677]

Incorporating scientific and technological expertise has proven to be a powerful strategy for conservation groups more broadly. As Yearley points out: "In modern Western societies it is accepted that wildlife and the natural environment need advocates; scientific expertise has emerged as the form of advocacy which commands the greatest legitimacy. A scientific interest in nature also motivates many supporters of conservation organisations, while the organisations themselves harness scientific expertise for practical tasks such as reserve management and the monitoring of biodiversity."[678] This embrace of science and technology remains problematic in many cases, though, as a number of citizen activists find themselves positioned as users *and* critics.[679] One outcome of this conflicting perspective may be the mainstreaming trend common to large environmental organizations, which no longer call for radical change in economic or political structures so much as they push for highly technical win-win solutions typified by ecological modernization. This diminishment

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[677] In the mid-1990s I participated in this type of effort directly by mapping road densities across national forests with designated grizzly bear habitat, then confronting the U.S. Forest Service with data and GIS maps that were far more detailed and sophisticated than the agency's own.

[678] Yearley, Steven, "Nature's Advocates: Putting Science to Work in Environmental Organisations," pp. 186-187, In: Irwin, Alan and Brian Wynne, eds., *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996), pp. 172-190.

[679] Yearley, 1996, p. 187, makes a similar point, and also notes that some environmentalists – even as they use science to advance their agendas – remain uncomfortable with modernism more broadly. See also Dryzek, 1997.

of truly independent critiques is what spurs Jamison, for one, to call for a new breed of "partisan social scientists" to challenge and recast existing environmental discourses.[680]

As in many other cases, the assertion of a strict dualism here misrepresents the range of possibilities that exist. Environmental activists can surely be intellectually dexterous enough to both use and critique applications of science and technology.[681] Scientists (social and otherwise) can both hold strong normative convictions *and* carry out rigorous, credible research programs. And science itself, as I have already pointed out, need not be viewed as only a monolithic project (i.e. Big Science) predetermined to grant ever more authority to institutions of power; science *can also* be used to foster more democratic constructions of knowledge that lead to genuine social and environmental reforms.[682]

One means of pursuing just such ends with M2W conversions may be to better accommodate lay perspectives and local knowledge. This is not to present these exactly as alternatives to science or approaches to be held on par with such expertise as that provided by specialists in contamination biology, demilitarization of explosives, or systems ecology; rather, by integrating lay knowledge more genuinely into conversion activities taking place at

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[680] Jamison, Andrew, "The Shaping of the Global Environmental Agenda: The Role of Non-Governmental Organisations," p. 243, In: Lash, Scott, Bronislaw Szerszynski and Brian Wynne, eds., *Risk, Environment and Modernity: Towards a New Ecology* (London: Sage Publications, 1996), pp. 224-245.

[681] Irwin, Alan, Alison Dale and Denis Smith, suggest as much in highlighting how savvy citizens actually are in turning to sources of scientific information, and the levels of trust they grant depending upon the source. See "Science and Hell's Kitchen: The Local Understanding of Hazard Issues," pp. 47-64, In: Irwin and Wynne, 1996.

[682] As Irwin and Wynne point out, both "science" and "the public" are more diverse than often portrayed and this complexity needs to be considered critically; see Irwin, Alan and Brian Wynne, "Introduction," p. 8, In: Irwin and Wynne, 1996, pp. 1-17.

closing military bases we may create a more humane science less bound to reductionistic or technocratic knowledge.[683] Such as shift turns upon a constructivist view at least to the extent that we acknowledge science is embedded as social knowledge and that "constructions of society" are linked to scientific accounts.[684] What this does, in effect, is present science not in a position of automatic authority but in a propositional status that asks what scientific knowledge can do for us. It reorients science as responsive to social interests rather than dictating the rules society must obey. Or, as Grove-White presents it, by reintroducing notions of human nature into science we infuse research agendas with important aspects of "lived experience."[685]

In addition to granting citizens a more robust voice in decisions pertaining to M2W conversions, this democratization of scientific authority could respond more effectively to the particularities of local conditions. Scientific knowledge and lay knowledge each rely upon versions of control, but traditional scientific knowledge depends upon the ability to control or restrict experimental conditions; lay knowledge, on the other hand, turns more to local, contextualized knowledge as a means of establishing control of diverse local conditions.[686] As my descriptions of M2W sites and their geographic histories should by now have made clear, the scientific template – and subsequent policy formulations – for remediating the

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[683] See Wynne, Brian, "May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide," In: Lash, Szerszynski and Wynne, 1996, pp. 44-83.

[684] The quote is from Irwin and Wynne, 1996, pp. 8-9; see also Longino, Helen, *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry* (Princeton, NJ: Princeton University Press, 1990).

[685] Grove-White, Robin, "Environmental Knowledge and Public Policy Needs: On Humanizing the Research Agenda," pp. 283-284, In: Lash, Szerszynski and Wynne, 1996, pp. 269-286.

[686] Wynne, 1996, pp. 70-71.

Rocky Mountain Arsenal may bear little relevance to the small airstrip in New York State now called Shawangunk Grasslands NWR or the Jefferson Proving Ground's expanse of bombing range. In these instances, only a scientific effort deeply informed by local knowledge and local concerns will ultimately prove successful in establishing public trust and creating genuinely protective and "open" refuges in the future.

Institutional Change and Agency Control

Much like the previous point relating to science and technology, the issue of institutional control rests to large degree upon considerations of authority. Whether at sites such as the Rocky Mountain Arsenal where some land title has actually been transferred from the Army to the U.S. Fish and Wildlife Service, or at the many "overlay" refuges where ownership and liability remain with the military, ultimate *control* of these places still resides predominantly with the Department of Defense. In order to support the ecological portion of ecological militarization – as well as the conservation mission of the National Wildlife Refuge System that M2W sites are joining – the balance of power at military-to-wildlife conversion locations needs to tip convincingly toward the FWS.

The ongoing extent of DOD control stems in part from the fact that the military's annual budget towers above the Fish and Wildlife Service's by a factor of more than 360 to one.[687] The FWS receives the lowest funding of any federal land management agency and the

[687] According to the U.S. Office of Management and Budget, in fiscal year 2005 expenditures for the Department of Defense were $474 billion compared to $1.3 billion for the Fish and Wildlife Service. See www.whitehouse.gov/omb/budget/fy2007/pdf/budget/defense.pdf and www.whitehouse.gov/omb/budget/fy2007/pdf/budget/interior.pdf [31 August 2006].

National Wildlife Refuge System (which constitutes just a portion of the FWS' entire budget) continues to suffer from a deferred maintenance backlog that at more than $660 million amounts to roughly twice its annual appropriation from Congress.[688] As it receives new, heavily contaminated lands from the Department of Defense, the National Wildlife Refuge System faces ever-more-daunting budget shortfalls. This exacerbates an unevenly dependent relationship between the FWS and the military, where the DOD has a vast budget but little incentive to thoroughly clean M2W sites whose daily management responsibilities have been shifted to the Fish and Wildlife Service. During my interviews and off-the-record conversations, several M2W refuge officials noted that they wished the DOD would dedicate more time and resources into cleanup activities, but that there was little FWS employees could do to press the point. At most M2W locations, the DOD has worked to clean sites aggressively only when faced with emergency situations, or when compelled by legislation, court judgments, or other legal settlements.

This points to another way in which the FWS remains dependent upon Defense personnel: in most instances when unexploded ordnance, toxins, or other hazards surface at M2W refuges, wildlife officials lack the training or expertise to defuse or decontaminate the threat. This results in refuge area closures that range from the relatively short-term – such as shutting down bridge construction for a few days at Big Oaks until an Army bomb squad from Ft. Knox can attend to exposed UXO[689] – to the weekends-only policy for public visits

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[688] The fiscal year 2007 budget for refuge maintenance and operations is $382 million. See www.fws.gov/budget/2007/Fy%202007%20GB/01.01%20general%20statement.pdf [31 August 2006]. See also Fischman, 2003, pp. 118-119.

[689] This incident was related to me during my interview with Big Oaks National Wildlife Refuge manager Joe Robb, 14 December 2005.

at the Rocky Mountain Arsenal following the sarin bomblets episodes of 2000-2001, to the complete closure of sites such as Noman's Island and Pacific Island refuges. In each of these cases, the past actions by and ongoing reliance upon the military constrain how FWS managers can conduct refuge operations.

Although it is clear from the priorities established by the BRAC Commission that military and strategic objectives take precedence in determining military closures, many FWS officials may not realize initially how pervasively the influence of the military would remain at M2W sites. At a 1998 FWS meeting dedicated to "Military Base Closure Acquisition Issues," wildlife officials noted that their agency must operate on a short timeline with incomplete information when considering whether or not to request transfers of closing military lands. As the agency's Realty Division program manager for base conversion lands explained the process and its drawbacks:

> FWS has only 30 days to express interest in closing military bases. After expressing interest, the Service has only 60 days to look at the property and decide if we want it. The Service then prepares a 1334 [form to request transfer]… even though at that point, we do not know contaminant levels. After this action is taken, it is extremely difficult for the Service to back out of the acquisition… Although the Service policy requires a level I contamination survey be performed on the property, most Regions are not accomplishing them because the DOD accepts cleanup responsibility. The problem usually remains that DOD cleanup standards are less than the Service desires for trust resources and public use.[690]

One final element that looms over the relationship between the Department of Defense and Fish and Wildlife Service in managing M2W sites is the question of national security. Despite conservationists' earnest explanations that protecting natural resources

translates to important long-term domestic security issues, the military retains the ability to trump all claims to land and resources if it identifies a national security emergency. As I highlighted in Chapter Five, this very scenario surfaced during negotiations over the future of the Jefferson Proving Ground. When the Indiana Air National Guard expressed interest in the entire 50,000 acre tract, Fish and Wildlife officials found themselves squeezed into a position of compliance with little leverage for a full Army cleanup of the site. As a FWS official working to close the deal that would lead to the Big Oaks refuge designation commented to a local reporter, "We're not going to stand in the way of national defense."[691]

Wildlife officials and conservation advocates found themselves similarly pinched shortly after the attacks of 11 September 2001 when Bush administration officials invoked national security claims to announce that military training and base operations would no longer be subject to a suite of federal environmental regulations. One message from such instances is that ecological militarization may be permitted or encouraged, so long as the militarization component can proceed unhindered.

Changing this paradigm will no doubt require a long-term shift in national priorities, but granting the FWS more genuine control of M2W sites would represent a meaningful first step. Legislation or court orders that compelled the DOD to respond to FWS requests for funds, cleanup, technical assistance, and other actions at these locations would surely not fully redress the current imbalance between the two institutions, but could at least liberate

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[690] Quoting Barbara Wyman, Realty Division program manager for base conversion lands, U.S. Fish and Wildlife Service, Washington, D.C., from "Minutes of FWS National Meeting On Military Acquisition Issues," Denver, Colorado, 17 April 1998 [photocopy obtained from Big Oaks National Wildlife Refuge files].

[691] Quoting Big Oaks NWR manager Joe Robb in Weslander, Eric, "Nature Refuge or Bomb Range? Indiana Wildlife Plan May be Drastically Scaled Back," *Louisville Courier-Journal*, 14 August 1999, p. 1A.

wildlife officials to manage lands with greater authority and in fuller accord with the principles of the National Wildlife Refuge System. In addition, the transfer of sufficient funds and decision-making authority from the DOD to the FWS at military-to-wildlife refuges could represent a modest but symbolic fracture in the military's position of authority among federal institutions.

Environmental Memorials and Hybrid Places

One of the consequences of the institutional disparities addressed above is that M2W refuges remain in a state of contamination purgatory – no longer active as military sites, yet actively affected by the chemical, explosive, radioactive, infrastructural, or other residues of years of DOD management. In many cases, these places come into FWS jurisdiction with no serious cleanup in sight. Considering their conditions, M2W refuges' classification into the National Wildlife Refuge System strikes many observers (and some FWS officials) as inappropriate. Even as national wildlife refuges remain the least visited of any major type of federal public land, to most Americans the title "national wildlife refuge" conjures pristine places carefully managed to protect flora and fauna. As Fischman casts this fanciful vision, "Imagine a network of federal lands and waters designed to sustain healthy ecosystems…[and] serve as a refuge for animals and plants."[692]

By converting a closing military base into a national wildlife refuge there is undoubtedly a perception of reduced hazard, increased environmental safety, and an overall

[692] Fischman, 2003, p. 1. The quote is describing what the Fischman sees as the *aspiration* of the National Wildlife Refuge System in a state he contrasts with its actual condition.

"greening" of the site and its surroundings. Woodward describes this shift as part of a discursive strategy that "obscures the idea that military activities themselves are environmentally damaging."[693] This, in turn, raises an important set of questions: how might such conversions be processed differently in order to better preserve not just their landscapes but the histories of production that created these landscapes? In other words, how might we direct military-to-wildlife conversions in such a way that the places are not superficially rendered as safe and that retains a memory of what practices occurred? How do we *public*ize these places in meaningful ways?

One response, inspired by Misrach's proposal for the Bravo 20 area described in the previous chapter, is that closing military sites should not be reclassified as national wildlife refuges but instead should contribute to an entirely new category of land (and historical) preservation. This new land type could be called National Environmental Memorials, much as Misrach suggests, and constitute part of a new National Restoration Lands System that includes areas degraded by high road densities, burdened with obsolete dams, scarred by mining waste, or impacted by other actions of industrial society now scheduled for removal and/or ecological restoration. These lands could be managed under a consolidated mission by different agencies, much like the National Wilderness Preservation System. This type of structure could also facilitate mechanisms for diverting defense funds into restoration activities – the DOD, U.S. Forest Service, Bureau of Reclamation, Army Corps of Engineers,

[693] Woodward, 2004, p. 102.

mining corporations, and other responsible parties could be identified and compelled to fund the restoration programs dedicated to the new Restoration Lands System.[694]

Such a system would provide the FWS with crucial bureaucratic allies and legal leverage in the effort to clean up military sites, while the social and environmental histories of M2W sites would remain more transparent. At the very least, Environmental Memorials would spur public interest in contaminated places and what happened (and is still happening) in these and similar sites. This could also encourage a perceptual integration of the natural and social characteristics of these places and discourage the simplistic impression that degraded military sites (as social places) have been transformed into pristine wildlife refuges (natural places). By openly acknowledging the complex histories of M2W refuges, a National Environmental Memorial could facilitate some reconciliation of the paradox of these sites' qualities without needing to explain it away. Hybrid places replete with social and natural histories, M2W refuges could then inspire new management approaches and new constituencies of citizen advocates.

Demilitarization

Perhaps the greatest risk presented by military-to-wildlife conversions is not the prospect that an individual deer or turkey hunter will accidentally detonate a bomb at the Big Oaks NWR or that toxins consolidated at the Rocky Mountain Arsenal will leak once again into groundwater or even that adding such militarized sites will undermine the objectives,

[694] Existing Superfund cleanups similarly tap into an array of responsible parties to complement federal appropriations.

reputation, or management of the National Wildlife Refuge system; greater than these still, is the prospect that by accepting M2W conversions as a *natural progression* for land management we will fail to look beyond the boundaries of these new refuges.

Military conversions typically do not address the underlying power of the military to resist genuine change.[695] The marketing of ecological militarization serves as a key strategy to obscure the broad array of destructive activities that the Department of Defense continues to project across what must truly be considered a global theater of conflict.[696] In this effort, M2W conversions clearly can contribute to the DOD's attempts to focus public attention not upon the devastation wrought by military actions in Iraq or other hotspots of conflict but instead to a "celebration of biodiversity" (or biological hotspots) and goals of environmental protection that resonate with beauty, quietude, and refuge.[697] One of the serious risks in accepting this type of discourse is described by Ross, "If the Pentagon succeeds in its kinder, gentler mission, it may result not in the greening of the military but in the militarization of greening."[698]

In order for M2W conversions to go beyond a discursive strategy and work to effect institutional change and environmental protection, they will need to be coupled with an actual process of demilitarization that extends well beyond the borders of existing military bases or wildlife refuges. Without this geographically expansive shift, the localized environmental protections won by military-to-wildlife conversions are simply offset by

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[695] See Barnett, 2001, p. 105.

[696] See Woodward, 2004.

[697] Woodward (2004) emphasizes similar points; see pp. 90-91.

[698] Ross, A., "The Future is a Risky Business," *The Ecologist* 26(1996): 42-44, quoted in Woodward, 2004, p. 102.

similar or worse impacts at newly consolidated, expanded, or privatized training locations, as well as in war zones.[699]

Far from emerging from a process of natural landscape evolution, M2W refuges ought to be noticed and understood as the intentional products of politics, science, and discourse operating in distinctive ways across unique social and natural terrain. Military control, Woodward points out, "is exerted not only through material practices which affect the natural environment, but also through discursive or representational practices through which those material practices are made meaningful. The study of militarized environments requires attention to both."[700]

We may still find it is possible to manage and understand lands such as the Big Oaks National Wildlife Refuge, the Rocky Mountain Arsenal, and other M2W refuges in ways that accommodate the complex and confusing historical, political, environmental, economic, and scientific circumstances of such places. To do so, however, will press us to move beyond highly technicized or reductionistic approaches. A conscientiously socialized science will no doubt prove essential, as will a concerted push to renegotiate our understanding of the natural and social landscapes currently committed to militarization.

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[699] See, for example, Kiefer, Christie W., "Militarism and World Health," *Social Science and Medicine* 34(7)(1992), pp. 719-724.

[700] Woodward, 2004, p. 103.

Appendix A: Questions Used in Semi-Structured Interviews

Cluster One – U.S. Fish and Wildlife Service employees

1. Why is the FWS taking over management of former DOD sites?
2. What are the greatest challenges you are encountering with this conversion?
3. What kind of public support or opposition have you encountered?
4. How does the FWS decide which DOD sites to accept?
5. Who is paying for maintenance work and remediation? What is the annual budget versus estimated cost?
6. How does this refuge differ from others where you have worked?
7. How are you educating the public about this area's history, where they can go, and what they can do here?
8. Are any legal waivers, training, or hold-harmless agreements required for visitors? (if so, request copies)
9. What is the public's role in the management of these lands?
10. (How) Have you been affected by the change of administrations in D.C.?

Cluster Two – U.S. Department of Defense employees

1. Why is the FWS taking over management of former DOD sites?
2. What are the greatest challenges you are encountering with this conversion?
3. What kind of public support or opposition have you encountered?
4. How does the DOD decide which sites to convert to NWRs? Why is this site converting to a NWR versus other uses?
5. What military operations occurred here? Why and when did they stop?
6. Do you think it's important for the public (local or national) to know about this site's history?
7. What is the public's role in the management of these lands?
8. (How) Have you been affected by the change of administrations in D.C.?

Cluster Three – Local stakeholders

1. Why is the FWS taking over management of former DOD sites?
2. What are the greatest challenges you are aware of with this conversion?
3. Has there been any public support or opposition?
3. What do you see as the greatest benefits to such change?
4. What do you see as the greatest risks to such change?
5. Have you visited this site? Why? What did you do there?
6. What other federal public lands have you visited in the past three years? What other types are you aware of?
7. What is the public's role in the management of these lands?
8. Have you noticed any differences associated with the change of administrations in D.C.?

Appendix B: Release and Acknowledgment of Danger – Hold Harmless Agreement for Big Oaks National Wildlife Refuge

ACKNOWLEDGMENT OF DANGER: RELEASE AND HOLD HARMLESS AGREEMENT AND ACCESS PERMIT APPLICATION FOR BIG OAKS NATIONAL WILDLIFE REFUGE

(This form is subject to the Privacy Act of 1974) Issuing Agency: USFWS/Army

AUTHORITY: 10 U.S.C. 3013; AND 50 CFR

PRINCIPAL PURPOSE: Indicates certification by an individual or corporation to hold the United States Government, Department of Defense, and Department of Interior harmless in consideration of permission granted by the U.S. Government to visit Big Oaks National Wildlife Refuge (BONWR). Indicates an individual or corporation will make an informed decision regarding what each believes is an acceptable level of potential risk before being granted access.

ROUTINE USES: Used to gain access to the BONWR.

DISCLOSURE IS VOLUNTARY: Failure to provide this information would result in an individual or corporation being denied access to the BONWR.

TERM OF AGREEMENT: This agreement is valid from April 1 through March 31 for BONWR. **The issued access permit does not grant you access to Jefferson Range (conventional, Precision Guided Munitions ranges) or closed areas on the refuge or other areas you are unauthorized to enter.** The access permit allows you only to enter areas as directed by authorized BONWR personnel. You must check in and check out of the refuge at the refuge office (bldg. 125).

PLEASE READ AND INITIAL EACH BLANK

_____1. BONWR contains the danger of property damage and permanent, painful, disabling, and disfiguring injury or death due to falling objects such as aircraft, live ammunition, and practice munitions due to the proximity of Jefferson Range. There are also physical injury and health dangers from ground and aerial LASER (Light Amplification by Stimulated Emission of Radiation) and other electromagnetic emissions from training exercises at Jefferson Range.

_____2. BONWR contains the danger of property damage and permanent, painful, disabling, and disfiguring injury or death due to the presence of expended, but still live, bombs, rockets, cannon rounds, flares, and other types of warheads. Unexploded munitions may be encountered anywhere within BONWR: lying on the ground or partially or completely buried. These munitions can still explode though they may have lain in the ground for decades. I have been instructed **NOT** to approach or disturb any military equipment or ordnance discovered on BONWR. **IF** encountered, please report to BONWR office. **DO NOT** touch any metal object.

_____3. BONWR contains the danger of injury or death from the presence of old cisterns, wells, natural sinkholes, and other openings or weaknesses in the earth, as well as other natural and/or man-made conditions which are too numerous to list herein.

_____4. Although signs exist to identify recreation and closed areas, BONWR cannot feasiblely be marked to warn of the location and nature of each danger. Be aware of where you are and make sure you are in an area that you are authorized to be in. Watch your step.

_____5. BONWR occupies one of the more remote areas in Indiana. I have been advised to guard against the dangers presented by the remoteness of BONWR, occasional extreme temperatures, and other threats such as venomous snakes. BONWR contains no source of safe drinking water. I have been advised to pack sufficient water, food, compass and first aid supplies with me for any visit.

_____6. BONWR has limited services. If my vehicle breaks down, or in the case of any emergency, I understand that I will pay for emergency road services. There are regular patrols of BONWR, but it is advisable to possess a cell phone for emergency use. When using a cell phone, stay away from unexploded ordnance. It is advisable to call from a road surface. I will bear the full cost of all search and rescue activities resulting from my actions on the BONWR.

_____7. I have been advised that I am responsible for knowing and abiding by all federal, state, refuge, and military rules and regulations pertaining to use of BONWR. I have read and understand the applicable refuge rules and regulations.

_____8. When on BONWR, I will possess on my person a valid daily pass at all times and present it upon request to any authorized law enforcement officer or U.S. military personnel. Any person without a valid daily pass may be fined and/or barred from BONWR.

Upon my own initiative and, therefore, at my own risk, I accept permission to enter this area and in consideration of such permission do, for myself, my spouse, my children, my heirs, personal representatives, and assignees of the same, remise, release, and forever discharge as well as agree to indemnify and hold harmless the United States Government, any lessee therefrom, any individual officer, agent, employee, or director thereof from any claim of liability for injury, death, or property damage arising out of my usage of or presence upon said Big Oaks National Wildlife Refuge in accordance with permission to enter thereon.

I further affirm that I will never prosecute or assist in prosecuting any civil action against the United States Government, U.S. Army, the Indiana Air National Guard, U.S. Air Force, U.S. Fish and Wildlife Service, or U.S. Department of Interior, or any of their agents, employees, service members, contractors, or lessees for claim or liability arising from my entry to BONWR.

Please fill in the following:

PERMIT # _____
AMT. RCVD _____
WAIVED? _____
≤16 ____ DS____
GAge ____GAcc____ GEa ____

_____
Name (Print or Type)

_____
Street Address

_____
Date of Birth

_____
City/State/Zip Code

_____
Home Telephone

_____
Work Telephone

Drivers License Number and State of Issuance:_____

Each adult individual (18 yrs or older) in the group must complete and sign and submit a separate HOLD HARMLESS AGREEMENT AND PERMIT APPLICATION. I have received a map and rules and regulations for requirements and procedures for legal access to BONWR. I understand that non-compliance with any state and federal laws, and BONWR rules and regulations by myself, or anyone accompanied by myself, is a violation of this permit. My access may be revoked or suspended for violations or conduct inconsistent to the management goals of the BONWR. **I CERTIFY THAT BEFORE SIGNING BELOW, I RECEIVED, READ, AND UNDERSTAND THE HOLD HARMLESS AGREEMENT, THE BONWR RULES, REGULATIONS, AND MAP.**

_____
Signature

_____
Date

_____
Signature guardian or responsible adult (if applicant < 18 yr.)

_____
Date

Address: Big Oaks NWR, 1661 West JPG Niblo Road, Madison, IN 47250
Phone: 812- 273-0783
Fax: 812-273-0786
E-mail: R3RW_MSC@fws.gov

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