

STRATEGIC SURPRISE: THE DISPERSAL OF AGENT ORANGE
IN VIETNAM AND KOREA IN THE LATE-1960s

by

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DEDICATION

I would like to dedicate this research in loving memory to
my mentor, colleague, and friend,
Dr. James W. Pohl
(1931–2015)

7, I: 13

Dear Heather,

Thank you for your beautiful Christmas card and note. Of course, graduate school is tough. It's supposed to be. It's presumed that you want to be a historian, that you want to join the clan, the fellowship, the company of historians. If you want to be a historian, your professors want you to be tough, brave, and true—that you can do the job.

I know that you have the ability not only to meet the challenges but also the courage and intelligence to conquer the challengers. I know that because I remember your intelligence and determination as an undergraduate. I have not the slightest doubt that you can match the other good graduate students, and not only match them but exceed them.

So, suck in your stomach, set your jaw, and always remember your strengths. I have no concerns about your intelligence or your grit.

Sincerely,
[signed] James W. Pohl

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STRATEGIC SURPRISE: THE DISPERSAL OF AGENT ORANGE IN VIETNAM AND KOREA IN THE LATE-1960s

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LIST OF ABBREVIATIONS

Abbreviation	Description
2,4.D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
ACTOV	Accelerated Turnover to Vietnam
ARVN	Army of the Republic of Vietnam
CCZ	Civilian Control Zone
CDTC	United States-Vietnamese Development and Test Center
CINCUNC	Commander-in-Chief, United Nations Command
CIP	Counter-Insurgency Plan
COMNAVFORV	Commander of U.S. Naval Forces, Vietnam
DMZ	Demilitarized Zone
DOA	Department of the Army
DOD	Department of Defense
DPRK	Democratic Peoples Republic of Korea
GVN	Government of the Republic of South Vietnam
JCS	Joint Chiefs of Staff
JSA	Joint Security Area
KATUSA	Korean Augmentation to the United States Army

KPA	Korean People's Army
KSC	Korean Service Corps
LST	Landing ship, tank
MACV	Military Assistance Command, Vietnam
NLF	National Liberation Front
NVA	North Vietnamese Army
PBR	River patrol boats
PTSD	Post-Traumatic Stress Disorder
RAG	River assault groups
ROK	Republic of Korea
SEALORDS	South-East Asia Lake, Ocean and Delta Strategy
TCDD	2,3,7,8-tetrachlorodibenzo-para-dioxin
UNC	United Nations Command
USA	United States Army
USAF	United States Air Force
USFK	United States Forces, Korea
VA	United States Department of Veteran's Affairs
VC	Vietcong
VNN	Vietnamese Navy

I. INTRODUCTION

The dispersal of chemical warfare agents in Southeast Asia in the 1960s and 1970s remains a contentious topic among scientists, scholars, and veterans as each question the morality of U.S.-initiated herbicide operations in the region.¹ In fact, twenty-two American scientists, including seven Nobel laureates, called on President Lyndon Johnson in September 1966 to suspend the use of antipersonnel and anti-crop chemical weapons, fearing the international proliferation of chemical warfare agents:

The United States, along with other nations, recognizes that the use of even the smallest nuclear artillery shell in war would raise issues of extreme gravity. It would break down barriers to the use of more powerful nuclear weapons, and no one could tell where the escalation might end. The use of chemical or biological weapons, even relatively mild ones, involves similar dangers.²

In the months that followed, the Johnson administration publicly emphasized the careful restrictions on chemical warfare agents that prevented escalation to more dangerous and toxic chemicals. Despite protests from the scientific community, the Pentagon confirmed the continuation of herbicide use in Vietnam.³

This study traces the scientific development of Agent Orange in the United States and the combat circumstances around which simultaneous herbicide missions commenced in Vietnam and along the Korean Demilitarized Zone (DMZ). After the

¹ A brief selection of relevant scholarship on the moral and political implications of U.S.-initiated chemical warfare practices—that are not discussed here—include: Barnaby, et. al., *The Supreme Folly: Chemical and Biological Weapons* (1969); Bocking, *Ecologists and Environmental Politics: A History of Contemporary Ecology* (1997); Dunlap, *DDT: Scientists, Citizens, and Public Policy* (1981); Eisendrath, *Military Ecocide: Man's Secret Assault on the Environment* (1992); Epstein, *Chemical and Bacteriological (Biological) Weapons and the Effects of Their Possible Use* (1970); Jones, "American chemists and the Geneva Protocol" (September 1980); Neilands, et. al., *Harvest of Death: Chemical Warfare in Vietnam and Cambodia* (1972); Westing, *Herbicides in War: the Long-Term Ecological and Human Consequences* (1984).

² "22 Scientists Bid Johnson Bar Chemical Weapons in Vietnam," *The New York Times*, September 20, 1966.

³ Sarah Bridger, *Scientists at War: The Ethics of Cold War Weapons Research* (Cambridge, MA: Harvard University Press, 2015), 91.

implementation of chemical warfare operations in Indochina, which provided some minor defensive successes, military scientists discovered adverse health effects in laboratory mice exposed to the Dioxin-contaminated Agent Orange dispersed by American military personnel. Desperate to defeat the Vietcong (VC) and North Vietnamese Army (NVA) in Vietnam and subdue communist infiltrators along the Korean DMZ, military and political leaders continued with herbicide operations, despite increasing claims from returning veterans of severe health problems. The simultaneous dispersal of herbicides in Vietnam and along the Korean DMZ reflected the Cold War diplomatic policy of forced pacification as military officials implemented a defensive strategy that not only sought to pacify local indigenous populations, but the environment itself.

What differentiates this study from previous scholarship is the incorporation of oral histories from American enlisted veterans and, most intriguingly, from Dr. Lee Cao Dai, a Vietnamese doctor who provided medical services to injured guerilla forces during the conflict. The inclusion of these personal testimonies is not only a means of accessing and interpreting a generally excluded source of historical information, but draws attention to this underrepresented group of enlisted servicemen and women who were enthusiastically willing to discuss their experiences and recollections. Military histories of the Vietnam era are often elitist histories—official narratives defined by officers and, by extension, the departments to which they dedicated themselves. Thus, these histories neglect a significant cohort of enlisted veterans. This thesis is set in opposition to this elitist approach and attempts to fill this gap in the historiography.

Oral historians record the views of witnesses to historical events, which should involve a balanced combination of interviews with both elites and nonelites. My work

fuses the official elitist narrative with personal testimonies of veterans in order to give voice to this typically excluded group. The interviews themselves emphasize empowerment among enlisted veterans as they recover and interpret their pasts and not have it interpreted or imposed upon them.⁴ Not only is this a history of specific events, but more importantly, it is about what these events mean to those who experienced it. These recorded memories, therefore, are interpreted life events rather than a linear chronicling of the past. The resulting narrative from oral history interviews are not necessarily fluid or articulated in a precisely chronological fashion. As a result, topics arise organically in the interview. Thus, the analysis is often linear and causal as an interviewee's social and cultural processes shaped their subjectivity and recollections.

Memory, and its associated process of remembering, is essential to the practice of oral history as the recollections of the interviewee serve as the evidentiary source. As a process of remembering, memory involves “the calling up of images, stories, experiences, and emotions from our past life, ordering them, placing them within a narrative or story and then telling them in a way that is shaped at least in part by our social and cultural context.”⁵ As a result, memory is an active process in which an individual’s traces of the past maintain a symbiotic relationship with the public memorialization of the past. Therefore, memory is a socially shared experience.

When involving oneself in memory studies, it is prudent for the researcher to be aware of the power of the interviewee to distort or shape recalled memories. Memory is fallible. However, people retain memories over long periods of time, often with no

⁴ Mary A. Larson, “Research Design and Strategies,” in *History of Oral History: Foundations and Methodology*, ed. Thomas L. Charlton, Lois E. Myers, and Rebecca Sharpless (Lanham, MD: Rowman & Littlefield, 2007), 106, 107.

⁵ Lynn Abrams, *Oral History Theory* (London: Routledge, 2010), 78-79.

significant memory loss because people are more likely to remember experiences, images, stories, and emotions that are important to them. While some details might fade, broad concepts remain throughout life.⁶ In fact, Operation Ranch Hand veteran Richard Duckworth explained that personnel directly involved in herbicide spray operations in Vietnam, known colloquially as Ranch Hands, avoided

sensationalism and dramatization which seem[ed] firmly embedded in media hype. . . . Anybody that mentions the word orange, if you ask half these people, ‘What do you remember about the Vietnam War,’ whether they’re young, old, or what. . . they won’t recognize the word Westmoreland. They’ll remember My Lai and Agent Orange. And that was such an insignificant part of that war. I mean, we bombed that country for 10 years! Jesus, Laos was wiped out! We flew more sorties, dropped more bombs, sent more troops, sent in more supplies than you can believe . . . and yet the thing they remember is this Agent Orange stuff.⁷

Duckworth’s analysis of the collective American perception of the conflicts in Indochina correlates to the historical and scientific scholarship published since the conclusion of hostilities. Military histories of the Vietnam War especially fall into two polarized categories as academic authors either relied on official declassified documents—often disseminated to the public by military and political officials—or they served as advocates in order to give voice to an underrepresented group.⁸ This study combines these two most common forms of historical dialogue on tactical herbicide dispersal in Vietnam and Korea in order to provide a more holistic history of chemical warfare policy enactment in the 1960s and 1970s. Herbicide dispersal not only embodied the latest biological defense technology, but reflected the Cold War diplomatic policy of

⁶ Abrams, *Oral History Theory*, 85, 86.

⁷ Interview with Richard Duckworth, 23 March 2000, Richard Duckworth Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 7 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0099>>.

⁸ Edwin A. Martini, *Agent Orange: History, Science, and the Politics of Uncertainty* (Amherst: University of Massachusetts Press, 2012), 3.

forced pacification as the U.S. military implemented a strategy that not only sought to pacify local populations in Vietnam and Korea, but the environmental landscape itself.

The war in Vietnam was undoubtedly affected by political considerations and the outcome was shaped and determined more by politics than by military operations. In 1970, Creighton Abrams, while in command of U.S. forces in Vietnam in the latter years of the war, observed that “the nature of the military conflict in South Vietnam has been under change since Tet of 1968. Although shifts in the level of violence, type of military operations, and size and location of forces involved are characteristics of this change, the allied realization that the war was basically a political contest has, thus far, been decisive.”⁹ The political and military stability of Vietnam swiftly deteriorated in 1961 as President John F. Kennedy took office. Kennedy confirmed that Soviet aircraft continually supported insurgent forces in Laos. Shortly thereafter, the North Vietnamese government in Hanoi publicized the recent formation of the *Mat-Tran dan-toc giaiphone*, the National Liberation Front (NLF). As a result, Vice President Lyndon B. Johnson travelled to Saigon to consult with Vietnamese President Ngo Dinh Diem about potential American support. This meeting confirmed the establishment of a joint United States-Vietnamese Development and Test Center (CDTC) in Saigon under the auspices of developing new counterinsurgency methods and weapons that included the evaluation of tactical herbicides that could be used as a means to eradicate tropical vegetation and enemy food supplies.¹⁰

⁹ Creighton Abrams quoted in Lewis Sorley, *Vietnam Chronicles: The Abrams Tapes, 1968-1972*. (Lubbock: Texas Tech University Press, 2004), 404.

¹⁰ Paul Frederick Cecil, *Herbicidal Warfare: The Ranch Hand Project in Vietnam*. (New York: Praeger, 1986): 22, 23.

Beginning on 7 January 1962, the dispersal of the combined chemical agents 2, 4, 5-trichlorophenoxyacetic acid (2, 4, 5-T) and 2, 4-dichlorophenoxyacetic acid (2, 4-D), commonly known by its code name Agent Orange, commenced in South Vietnam. The United States Air Force (USAF) and the United States Army (USA), under the authorization of Operation Ranch Hand, dispersed the herbicide for the purposes of “roadside clearance to reduce ambush, boundary demarcation, vegetation control, area denunciation to uncover selected targets and to reveal enemy hideouts, and aquatic weed control.”¹¹ The utilization of ‘rainbow herbicides’—Agents Blue, Green, Orange, Pink, Purple, and White—caused the reduction and elimination of jungle foliage and vegetation in order to expose VC and NVA guerilla movements.

In what ways had the situation in Vietnam differed from that of previous conflicts and how did that affect the wartime strategy? The existing scholarship suggests a trend away from the view of Military Assistance Command, Vietnam (MACV) General William C. Westmoreland’s tactics of attrition warfare towards that of an American occupation of the region. In 1965, four years before the start of the long withdrawal of American forces from Vietnam, the *New York Times* published the first announcement of the use of chemical weapons, including herbicides, during the conflict.¹² In the decades following the conclusion of hostilities, historical scholarship surrounding the war grew to include the political decision-making, subsequent policy enactment, and the historical context in which herbicidal operations in Vietnam commenced. From the 1980s to the

¹¹ The synonymous term “Agent Orange” originated from the orange band that surrounded the 55-gallon steel drums in which the herbicidal agent was stored and transported allowing servicemen to quickly identify the substance. Alvin L. Young, *The History, Use, Disposition and Environmental Fate of Agent Orange*. (New York: Springer, 2008), 27.

¹² J.B. Neilands, “Vietnam: Progress of the Chemical War,” *Asian Survey* 10 (March 1970): 209.

present, the gradual declassification of Department of Defense (DOD), MACV, CIA, FBI, and Pentagon correspondence caused a resurgence of historical scholarship on the subject. This expansion of scholarly knowledge regarding the use of strategic herbicides created analyses that both opposed and improved previous historical understandings. With the release of material from the DOD and VA, my work incorporates a dual focus on the concurrent dispersal of chemical warfare agents in Vietnam and Korea, which previous scholarship has not done.

The earliest works involving the chemical war in Vietnam and herbicidal spray maneuvers were the most controversial as they centered on the legality and morality of these operations. Undoubtedly influenced by Rachel Carson's *Silent Spring* and the subsequent American environmental movement of the 1960s, Ivan L. Bennett, Jr., former Deputy Director of the Office of Science and Technology, initiated the chemical warfare dialogue in January 1970 when he presented "The Significance of Chemical and Biological Warfare for the People" to The National Academy of Sciences. Acknowledging the concerns of the growing anti-war movement, Bennett emphasized the key characteristics of chemical and biological warfare and suggested a foreign policy strategy that aligned with "the present climate of public opinion" including the abolishment of biological and chemical agents. His work was one of the first academic publications that confirmed the use of tear gas and chemical herbicides, including Agent Orange, by U.S. armed forces in Vietnam. In addition, his work publicly exposed the

existing U.S. foreign policy that incorporated chemical and biological warfare tactics in combat.¹³

J. B. Neilands, professor emeritus at the University of California, Berkeley, furthered the chemical warfare dialogue in March 1970 with the publication of “Vietnam: The Progress of the Chemical War.” Neilands claimed that the United States, while not formally subject to the 1925 Geneva Protocol, respected the international restriction of dispersing bacteriological methods of warfare because the only chemical agents used in the region were the tear gases phenacyl chloride (CN), 2-chlorobenzylidene malononitrile (CS), and diphenylaminochlorarsine (DM).¹⁴ According to Army *Field Manual 27-10: Law of Land Warfare*, the United States was not subject to any restriction of “the use in warfare of toxic or non-toxic gases, or smoke or incendiary materials, or of bacteriological warfare.”¹⁵

Neilands maintained the same foreign policy argument as that of Ivan L. Bennett by questioning the legality of the U.S.-initiated dispersal of chemical agents, initially citing herbicidal operations as a violation of international law. One of the first to connect herbicidal spray operations in Vietnam to the Geneva Protocol, Neilands argued that the American political interpretation of the use of anti-personnel gases and herbicides in Vietnam was that of exemption from international law. With a dual focus on foreign policy and the ecological impact of biological and chemical warfare agents, Neilands’s

¹³ Ivan L. Bennett, Jr., “The Significance of Chemical and Biological Warfare for the People,” *Proceedings of the National Academy of Sciences of the United States of America* 65 (January 1970), 278, 271.

¹⁴ Neilands, “Vietnam: Progress of the Chemical War,” 209.

¹⁵ U.S. Department of the Army, *Field Manual 27-10: The Law of Land Warfare* (Washington, D.C.: GPO, 1956), 18.

work was important in understanding how the existing U.S. foreign policy affected military operations on the ground during the conflict.

With the steady release of declassified DOD, FBI, CIA, and MACV correspondence in the 1980s, the historiography of biological and chemical warfare shifted to include a focus on specific military operations in Vietnam. Paul Frederick Cecil initiated this discourse in 1986 with his foundational study, *Herbicidal Warfare: The RANCH HAND Project in Vietnam*. Cecil's analysis of Operation Ranch Hand was comprehensive as he detailed the tactical challenges of herbicidal spray operations in South Vietnam. Paying respect to his 21-year career in the USAF, including a tour with a Ranch Hand unit, Cecil explained that the demand from officers for herbicide missions surpassed the capacity of the operation despite continual project expansion.¹⁶ By placing military operations in the historical context of the conflict, Cecil concluded that the effectiveness of Agent Orange was overshadowed by the mismanagement of the Government of the Republic of South Vietnam (GVN) in relocating noncombatants away from spray zones.

The historiography shifted dramatically in 1991 when John Modell and Timothy Haggerty assessed the societal impact of Agent Orange on American soldiers returning home from Indochina. In "The Social Impact of War," Modell and Haggerty determined that Agent Orange gave Vietnam veterans "meaning and cause for their pain" as they readjusted to civilian life. Additionally, those veterans most affected by post-traumatic stress disorder (PTSD), often attributed their anxiety disorder to the chemical agent.¹⁷

¹⁶ Cecil, *Herbicidal Warfare*, 1.

¹⁷ John Modell and Timothy Haggerty, "The Social Impact of War," *Annual Review of Sociology* 17 (1991): 208.

While Modell and Haggerty discussed the larger social implications of wartime service, the authors neglected to include or comment on those soldiers not directly affected by Agent Orange who also suffered from PTSD.

Alvin L. Young's *History, Use, Disposition and Environmental Fate of Agent Orange* was an excellent revision to Frederick Cecil's outdated *Herbicide Warfare*. In his *History*, published in 2009, Young presented a thorough narrative of the formulaic discovery, military-industrial manufacture, use, and disposal of Agent Orange. Honoring his service in the USAF evaluating the effectiveness of aerial and infantry spray equipment used in Operation Ranch Hand, Young focused on the environmental fate of tactical herbicides and the health risks of human exposure to Dioxin-contaminated Agent Orange.¹⁸ The growing number of Vietnam veterans filing service-related disability claims—citing Agent Orange exposure as cause for a number of different ailments including cancer—influenced his work. In fact, Vietnam veteran Charles Sims, who served with the Transportation Corps claimed,

I was not sure that I bought this whole Agent Orange thing when I was younger, but about three years ago I went to one of the reunions and there were about six or seven of us sitting around the table having dinner one night and I started going down my own medical conditions, all which were presumptive: heart quadruple bypass, stints, skin cancers, some not skin cancers—some more internal—diabetes, [and] peripheral neuropathy. My health was failing, so I asked the guys sitting around the table. I said, “How many of y’all had bypass surgery?” Of the seven at the table, I do not remember the exact numbers, but like five of them had. I said, “How many of y’all had these cancers?” Almost everybody at the table. “How many of y’all got diabetes?” Like six out the seven. “How many of you have peripheral neuropathy?” Everybody. It was a real eye-opener to me that with this small group, this was a reunion of the 88th Transport Company . . . that we were all eaten up with the same medical conditions . . . which were all presumptive. . . . I’m not a statistician, but I think that’s telling. Most of these guys were gun truck guys breathing in this stuff day after day for 12 hours a day.¹⁹

¹⁸ Young, *The History, Use, Disposition and Environmental Fate of Agent Orange*, vii.

¹⁹ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

Young's work complemented that of Bennett and Neilands as Young claimed that Operation Ranch Hand "involved the actual deployment of tactical herbicides as a weapon of war" against the GVN by the USA and USAF.²⁰ Undoubtedly, chemical weapons, including tactical herbicides, changed the public perception of American warfare in Vietnam. He contended that the U.S. rejected a foreign policy that included adherence to international laws, like the Geneva Protocol, which led to an inevitable stalemate in Vietnam as Gen. William C. Westmoreland relied upon chemical and biological weapons to support his outdated attrition tactics .

Following the same adherence to a military service-supporting narrative, like those of Young and Cecil, D. Hank Ellison's *Chemical Warfare during the Vietnam War: Riot Control Agents in Combat* placed chemical and biological warfare tactics in the historical context of the conflict. *Chemical Warfare* was instrumental to the study of Vietnam as Ellison, a former USA officer in the Chemical Corps, determined whether riot-control agents, like vomit-inducing chloroacetophenone and tear gas grenades, were advantageous in battle and whether "there were any situations for which they were uniquely used."²¹ According to Ellison, American military commanders questioned whether the potential tactical and strategic gains were more valuable than the subsequent VC and NVA propaganda campaigns with their potential damage to the long-term U.S. goals in the region.

Ellison contended that the use of riot-control agents was not a violation of international laws like the Geneva protocol. By the time hostilities broke out between

²⁰ Young, *The History, Use, Disposition and Environmental Fate of Agent Orange*, 3.

²¹ D. Hank Ellison, *Chemical Warfare during the Vietnam War: Riot Control Agents in Combat*. (New York: Routledge, 2011), 4, 5-7.

U.S. forces and VC and NVA units, the U.S. possessed an extensive arsenal of chemical and biological agents, including tear gases and tactical herbicides. American political and military leaders concluded that tactical herbicides were not bacteriological agents and, therefore, were not subject to dispute by international laws. Ellison pointed out, however, that the U.S. government was anxious to avoid publicized communist propaganda charges and, therefore, hesitated in dispersing riot-control agents and chemical herbicides against VC and NVA units.²²

In “Eating Soup with a Spoon: The U.S. Army as a ‘Learning Organization’ in the Vietnam War,” Gregory Daddis, associate professor of history at Chapman University, suggested that the war against NVA and VC guerilla forces was unsuccessful as it ultimately resulted in U.S. withdrawal without declaration of victory or admission of defeat. Daddis rejected the critical historiographical assumption that Westmoreland “employed a flawed strategy of attrition, concentrating, at the expense of all other missions, on killing enemy soldiers.”²³ Daddis proposed, rather, that the Joint Chiefs of Staff (JCS) failed to develop a coherent plan for the conflict that fit within the larger grand strategy of implementing, supporting, and maintaining a “stable and independent noncommunist government.” This left Gen. Westmoreland “to invent his own strategic concept” that involved the elimination of enemy forces and the expansion of South Vietnam’s population under Saigon control.²⁴

Where critics of the Vietnam War oftentimes suggested Gen. Westmoreland fought a war of attrition, Daddis offered the opposing view, citing Westmoreland’s two

²² Ellison, *Chemical Warfare during the Vietnam War*, 8.

²³ Gregory A. Daddis, “Eating Soup with a Spoon: The U.S. Army as a ‘Learning Organization’ in the Vietnam War.” *Journal of Military History* 77, no. 1 (January 2013): 240.

²⁴ *Ibid.*, 240-41.

types of security threats: the “large, well organized and equipped forces” and “the guerilla, the assassin, the terrorist and the informer.”²⁵ In order for U.S. troops to quell insurgencies by these groups, Daddis concluded, the population of South Vietnam had to be pacified and secured from such external threats. However, Daddis did not detail the pacification efforts made by Westmoreland in Vietnam, only mentioning Westmoreland's three-phase sustained campaign.

Edwin A. Martini, professor of history at Western Michigan University, authored some of the most recent and prolific scholarship involving the dispersal of Agent Orange in Vietnam. Martini examined the strict U.S. military control over the inhabitants of South Vietnam by placing it within the context of the chemical war. In his article “Even We Can’t Prevent Forests: The Chemical War in Vietnam and the Illusion of Control,” Martini addressed the use of forest fire as a military weapon against the dense southern Vietnamese foliage. Where Young’s work focused on the historical and scientific narrative of herbicidal spray operations, Martini argued that the White House and the Pentagon attempted to impose control over the environment and the people of South Vietnam with the implementation of a chemical warfare program that included the dispersal of Agent Orange. He noted the descriptive use of the six ‘rainbow herbicides’ in accordance with their respective vegetation control disbursement operations in Vietnam, Cambodia, and Laos. Martini concluded that politicians, military strategists, and commanders saw the natural environment of Vietnam “less as a combatant to be destroyed” and more “as an object to be pacified and, ultimately controlled.” According

²⁵ Daddis, “Eating Soup with a Spoon,” 242.

to Martini, military officials believed that humans could “understand, harness, and ultimately control the power of nature.”²⁶

In April 2013, Martini published “Hearts, Minds, and Herbicides: The Politics of the Chemical War in Vietnam,” which shifted the focus to include an underrepresented character in the Vietnam narrative: RAND, the California-based institute that contracted with the U.S. military and intelligence agencies to research insurgency and counterinsurgency in Vietnam, Laos, and Thailand during heightened periods of the conflict. Martini traced the contradictions inherent in the approach taken by U.S. foreign policy and military advisors in Vietnam. RAND determined that politicians “consistently relied on military solutions to solve political problems, clung to impossible distinctions between civilians and combatants, and ignored data that impugned its approach while selectively highlighting information that supported it.”²⁷ Martini’s conclusion complimented Cecil’s in arguing that the failure of herbicidal spray operations resulted from the assumption that defoliation missions supported the strategic hamlet program, in which American soldiers forced noncombatants out of the zones targeted for defoliation, as a means of pacifying the indigenous population.

The last decade witnessed a resurgence in scholarship surrounding the ecological implications of chemical and biological weapons. Martini built upon the work of David Zierler, one of the first historians to examine the relationship between environmental control and the American diplomatic struggle to control global security.²⁸ Incorporating

²⁶ Edwin A. Martini, “Even We Can’t Prevent Forests: The Chemical War in Vietnam and the Illusion of Control,” *War & Society* 31, no. 2 (October 2012): 266, 267.

²⁷ Edwin A. Martini, “Hearts, Minds, and Herbicides: The Politics of the Chemical War in Vietnam,” *Diplomatic History* 37, no. 1 (April 2013): 60, 62.

²⁸ David Zierler, *The Invention of Ecocide: Agent Orange, Vietnam, and the Scientists Who Changed the Way We Think about the Environment* (Athens, GA: University of Georgia Press, 2011), 5.

the aforementioned articles into a comprehensive compendium—*Agent Orange: History, Science, and the Politics of Uncertainty*—Martini blended the history of Agent Orange as a material artifact with the soldier and civilian understandings of herbicide use as a cultural phenomenon. Martini incorporated a new historiographical focus when he addressed the military and political illusion that foreign governments could control indigenous populations and subdue nature itself through advancements in chemical warfare technology. Thus, the growing domestic chemical manufacturing process became inextricably linked to the American military-industrial complex at a time when the hazardous effects of the Dioxin-contaminated herbicide were not widely known.²⁹

The historiography of chemical and biological agents utilized in the 1960s and 1970s can appropriately be placed in the historiographical category of American military history. This is reflective of the recent declassification of FBI, DOD, JCS, MACV, and Pentagon correspondence previously unavailable to researchers. In fact, American attorney Peter Sills obtained these formerly classified records through the Freedom of Information Act. In *Toxic War: The Story of Agent Orange*, Sills shifted the narrative from regional environmental consequences to recurring veteran health problems that resulted from the deliberate negligence of herbicide manufacturers. As one of the attorneys who represented the Vietnam Veterans of America in the Agent Orange class action lawsuit, Sills accessed and navigated previously classified DOW Chemical and Monsanto documents in order to confirm that these manufacturers were aware of the Dioxin contamination at the time of dispersal during the conflict.³⁰

²⁹ Martini, *Agent Orange: History, Science, and the Politics of Uncertainty*, 5, 6.

³⁰ Peter Sills, *Toxic War: The Story of Agent Orange* (Nashville, TN: Vanderbilt University Press, 2014), x, 13.

Publications in the last decade demonstrated a historiographical shift from U.S. chemical herbicide dispersal to veteran recollections of their individual combat experiences. Ron Milam, Vietnam veteran and associate professor of history at Texas Tech University, drew attention to the role of junior officers who were unjustly stigmatized as careless and impulsive in popular media. Often unfairly associated with Lieutenant William Laws Calley and his involvement in the My Lai Massacre of 1968, junior officers were not the gentlemen defined in previous conflicts. The irregularity of the Vietnam War—which included unconventional warfare tactics like punji pits and booby traps—fundamentally differentiated the conflict from that of previous wars.³¹ Milam’s incorporation of personal testimonies and declassified records allowed for a balanced narrative that drew attention to less well-known junior officers.

Social history, as a historiographical school, has largely been ignored in the chemical warfare and biological weapons dialogue. With the release of new primary source material, including transcripts of both informal and official oral history interviews, historians have the ability to revise the existing narrative to include a more global and social perspective. While Milam does not directly address herbicidal warfare and its effects on returning veterans and indigenous populations, *Not a Gentleman’s War* was one of the first to incorporate oral histories, informal interviews, journals, and memoirs of American veterans in order to challenge the unsupported notion that junior officers lacked adequate preparation and leadership skills for combat in the region. Drawing on Milam’s incorporation of personal testimonies from veterans, my study not only includes an analysis of the U.S.-initiated chemical warfare policy in relation to international law,

³¹ Ron Milam, *Not a Gentleman’s War: An inside View of Junior Officers in the Vietnam War* (Chapel Hill: University of North Carolina Press, 2009), 5.

but the sociological impact of chemical warfare tactics on veterans returning from combat in Vietnam and Korea.

This study also incorporates original historical research surrounding herbicide operations conducted in Korea, a country that maintained fraternal and ideological ties to guerilla forces in Vietnam. Largely ignored in the historiography of U.S.-sanctioned chemical warfare strategy, Republic of Korea (ROK) personnel were responsible for dispersing the herbicides Monuron, Agent Orange, and Agent Blue for clearance of roadsides, checkpoints, and observation posts in addition to vegetation control along designated sectors of the DMZ and in allied foxholes.³² The success of foliage reduction in Ranch Hand missions likely influenced the initiation of herbicide operations in Korea.

Historians drew little attention to this region of dispersal likely due to the slow declassification of official documentation that confirmed tactical herbicide operations. In January 2011, the U.S. Department of Veteran's Affairs (VA) confirmed that the organization, whose primary mission is Veteran advocacy, will "presume herbicide exposure for any Veteran who served between April 1, 1968 and Aug. 31, 1971 in a unit determined by VA and the Department of Defense (DOD) to have operated in an area in or near the Korean DMZ in which herbicides were applied."³³ At the same time, the VA released the previously-classified "Final Report, Vegetation Control Plan CY 68," the official historical narrative of herbicide dispersal as provided by the Department of the Army (DOA). A strict reliance on these documents, in addition to other official military histories like *U.S. Army Counterinsurgency and Contingency Operations Doctrine, 1942-*

³² Julian E. Buckner, *Final Report, Vegetation Control Plan CY 68*, (San Francisco: Department of the Army Headquarters, U.S. Army Advisory Group, Korea, 1969), 2.

³³ *VA Publishes Final Regulation to Aid Korean War Veterans Exposed to Agent Orange* (Washington, D.C.: Department of Veterans Affairs, 2011), 1.

1976 by Andrew J. Birtle and *Scenes from an Unfinished War: Low-Intensity Conflict in Korea, 1966-1969* by Daniel P. Bolger, would neglect the voices of those American veterans directly exposed to the herbicide. Veteran Charles Sims warns researchers that,

The Army official story about what happened in Vietnam is still far from the correct version. Still far from the correct version of what happened. . . . And consequently, you cannot depend on the official records for things like Agent Orange and things like that. They are not true. Some of them [are] just bureaucratic incompetency [and] some of it I think purposefully not true.³⁴

Recent scholarship on the use of chemical warfare agents rarely engaged with oral history as the central methodological practice. This is not unusual as the incorporation of personal testimonies into the historical narrative places the additional burden on historians to determine “verifiability, reliability, validity, and representation as defined by the dominant intellectual structures” of the discipline.³⁵ Therefore, oral historians must be conscious of, and actively identify, prosthetic memories. Alison Landsberg, associate professor of history at George Mason University, identified this phenomenon in *Prosthetic Memory: The Transformation of American Remembrance in the Age of Mass Culture* when she argued that the advanced technologies of mass culture—the internet, interactive museum exhibits, movies, and television dramas—and “the capitalist economy of which they are a part open up a world of images outside a person’s lived experience, creating a portable, fluid, and nonessentialist form of memory.” Like a prosthetic limb, these memories are not organic products of lived experience, but are nevertheless useful because to the oral history interviewee, “they help condition how

³⁴ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

³⁵ Ronald J. Grele, “Oral History as Evidence,” in *History of Oral History: Foundations and Methodology*, ed. Thomas L. Charlton, Lois E. Myers, and Rebecca Sharpless (Lanham, MD: Rowman & Littlefield, 2007), 56.

[the] person thinks about the world and might be instrumental in articulating [their] ethical relation” to events.³⁶

Landsberg’s concept of prosthetic memory primarily centers on active spectatorship that provokes an emotional response that, in turn, brings about progressive change. While Landsberg did not give concrete examples of the transformative experience she posed, *Prosthetic Memory* was an innovative approach to the discipline of memory studies and instrumental to my work. The concept of prosthetic memory reinforced the idea of reactionary learning as the anti-war movement, prolonged news media coverage, and the continued and evolved historical dialogue altered the memories of American veterans returning from active duty in Vietnam and Korea. Through their optimistic reinterpretation of events through mass culture, American military veterans participated in escapism—removing themselves from the restrictions of race, class, and gender—as the means to understand, incorporate, and empathize with historical circumstances entirely different from their lived experience.

As one of the few studies that not only applies the historical context of hostilities in Vietnam and Korea to herbicidal warfare strategy, this study also draws upon personal narratives and testimonies of American veterans in order to balance the official narrative with that of individual experiences that did not necessarily reflect official doctrine. This work draws on memory studies, notably the contributions of Alison Landsberg, through the incorporation of oral histories as a means to give authenticity and relevance to the enlisted veteran experience. While external mass cultural processes certainly entered the consciousness of veterans, and thereby altered individual and sometimes traumatic

³⁶ Alison Landsberg, *Prosthetic Memory: The Transformation of American Remembrance in the Age of Mass Culture* (New York: Columbia University Press, 2004), 18, 21.

wartime experiences, the inclusion of personal memories nevertheless transform an otherwise elitist and official narrative into one of diverse inclusion.

II. RANCH HANDS AND ORANGE CLOUDS: HERBICIDAL WARFARE AND COUNTERINSURGENCY DOCTRINE IN THE VIETNAM WAR³⁷

The dispersal of herbicides in Indochina during the Vietnam War remains a controversial topic—one that has plagued scientists and historians since the withdrawal of American troops from the region in the 1970s. The ultimate decision to implement an herbicidal warfare program in Vietnam was as much a reflection of U.S. counterinsurgency doctrine as it was a component of military combat tactics and maneuvers. Desperate for a winning tactic in the face of Vietnamese improvisation and U.S. strategic failure, the U.S. employed chemical weapons to destroy enemy forests and thereby deprive the enemy of both the tactical benefits as well as environmental and psychological benefits of the foliage.

Efforts to use herbicides and non-lethal chemical agents as part of Pres. John F. Kennedy's Counter-Insurgency Plan (CIP) and in support of Vietnamese Pres. Ngo Diem's strategic hamlet program were generally unsuccessful, while similar operations along narrow inland rivers and canals yielded promising results. The reason this was successful in one area and not another was because Admiral Elmo R. Zumwalt, Jr. authorized the dispersal of Agent Orange along inland waterways in order to isolate insurgents, thereby severing their supply lines and communication with the general Vietnamese population. While American military scientists recognized the adverse environmental and humanitarian effects of Agent Orange, mid-level military leaders embraced an herbicidal warfare program as politicians attempted to conceal the true impact of the chemical agents on human health.

³⁷ One of the earliest iterations of this thesis chapter was published in *Sound Historian: Journal of the Texas Oral History Association* 17 (2015).

This study serves to inform a greater historical understanding of U.S. strategies and tactics implemented over the course of the war. The situation in Vietnam changed continually and rarely reflected the classic image of war as defined in U.S. policy and doctrine. Vietnam was a theatre of war, fought over a vast territory, where the enemy remained elusive and where traditional battle lines seldom existed. Justin Frank Nicholas, a former member of the 82nd Airborne Division, an active duty division of the U.S.

Army, recalled:

The [Vietnamese] jungles were worse; you left there to go on patrol. You stay[ed] out there quite a while. Then you just [filed] [in] . . . [to] search and destroy missions. . . . Wasn't no other way to get in there, triple canopy jungle. Any helicopter flying around [was] shot down.³⁸

Larry Burke, who served as Infantry Company Commander, Battalion S-3, and Division Liaison Officer to Headquarters, Field Forces with the 1st Battalion, 2nd Infantry, 1st Infantry Division, described his company as they cautiously navigated through the Vietnamese foliage:

I [had] this real fear that my company [was] going to get separated. I had the first guy in my line grab hold of the web gear on the last guy in Charlie Company. I said you hang on the end and don't you let go. I had every one of my guys grab hold, physically grab hold of the guy in front of them. I mean you could not see, you hear the term you can't see your hand in front of your face. Well, when you're under a triple canopy jungle in that tropical setting like that . . . [you] had to tramp this elephant grass down by linking arms and tramping in to [it].³⁹

Minor but successive Vietcong (VC) defeats caused U.S. forces to alter their strategy and tactics in such a way that presented a new situation through the incorporation of new

³⁸ Interview with Justin Frank Nicholas, 5 April 2001, Justin Frank Nicholas Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 24 May. 2015. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0160>>.

³⁹ Interview with Larry Burke, 21 April 2001, Larry Burke Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 24 May. 2015. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0177>>.

operations.⁴⁰ Gen. Creighton Abrams, while heading Military Assistance Command, Vietnam (MACV) in the latter years of the war, observed in 1970 that “the nature of the military conflict in South Vietnam has been under change since Tet of 1968” with characteristics including “shifts in the level of violence, type of military operations, and size and location of forces involved.”⁴¹

After his inauguration in January 1961, Pres. Kennedy approved a CIP that had been working its way through drafting problems for the previous eight months. The CIP, the basis for extended U.S. assistance to Vietnam, offered financial support for a 20,000-man increase in the Army of the Republic of Vietnam (ARVN), which then stood at 150,000. In addition, the CIP afforded support for the counterinsurgent auxiliary force known as the Civil Guard. In return for financial and military support, Diem would substantially reduce or ultimately surrender his control over the ARVN’s chain of command, which included 38 provincial chiefs, 3 regional commanders, and a chief of staff. Diem wanted to ensure the U.S. commitment to South Vietnam without surrendering his independence; therefore, he never fully released control but instead allowed the U.S. to incorporate weapons and combat maneuvers into the ARVN. By April 1961, Kennedy endorsed the moderate commitment of U.S. ground combat units in

⁴⁰ William C. Westmoreland, *General Westmoreland's Report on the War in Vietnam*, ed. Colonel Reamer W. Argo and Lieutenant Commander Paul S. Frommer, draft ed. (San Francisco: Military History Branch, Military Assistance Command, Vietnam, 1968), ix.

⁴¹ Creighton Abrams quoted in Sorley, *Vietnam Chronicles*, 404.

South Vietnam with the nominal mission of establishing two training centers.⁴²

In that same year, the Third Congress of the Lao Dong (Communist) Party of North Vietnam announced that one of their strategic goals was to liberate South Vietnam and that the National Liberation Front (NLF) had to fight against the U.S.-Diem regime in order to reunify the region.⁴³ In June 1961, Saigon demanded another increase in U.S. military support, effectively raising the strength of the ARVN from 170,000 to 270,000 men “to counter the ominous threat of communist domination.” This request came in addition to the dispatch of “selected elements of the American Armed Forces” as a symbol of the American commitment to Vietnam.⁴⁴ Kennedy’s approval of the CIP effectively increased the Vietnam aid program to \$262 million from the existing \$220 million.⁴⁵

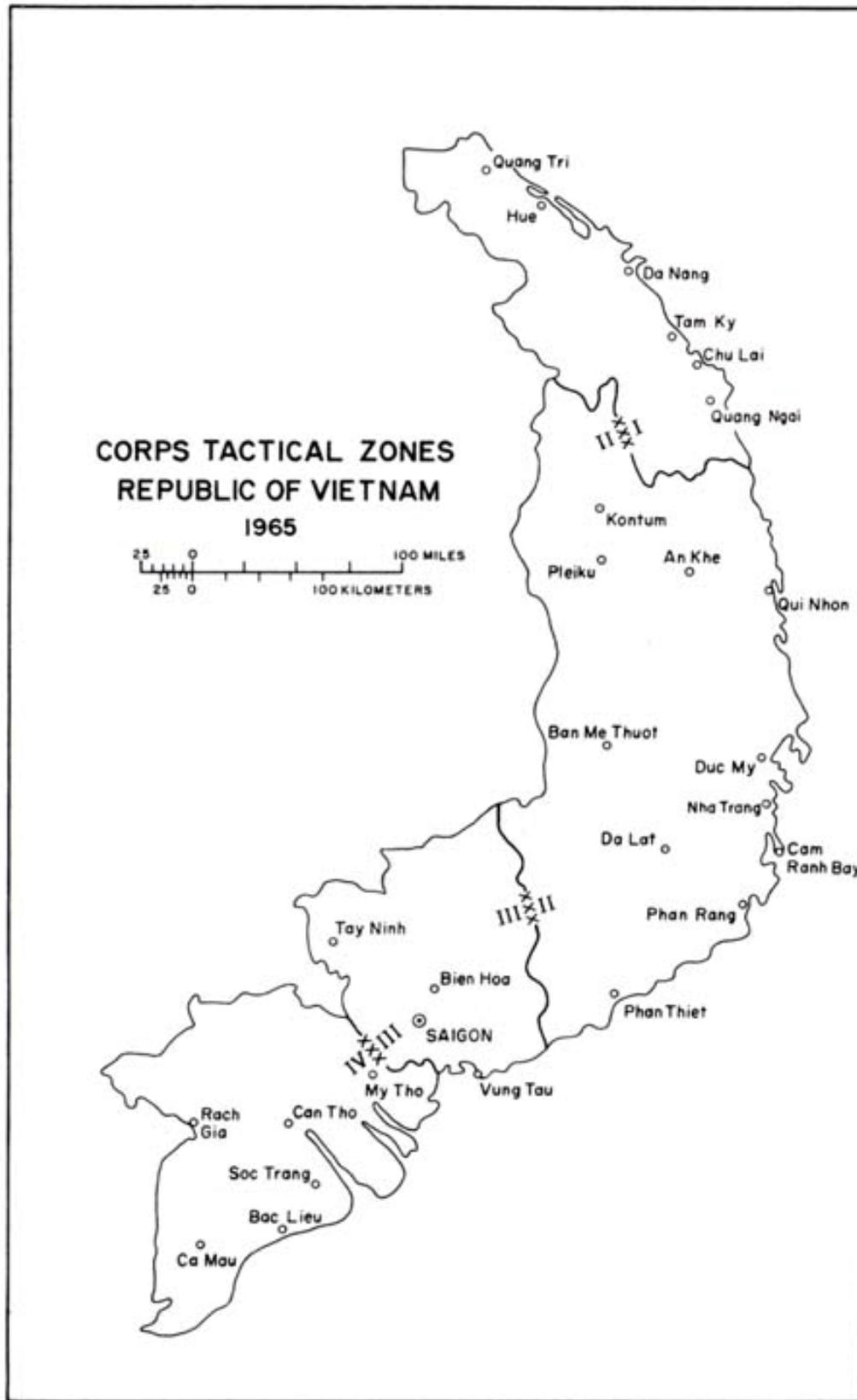
With increased U.S. financial assistance and aggressive combat operations promoted by U.S. advisors, hostilities grew between the VC and the ARVN by September 1961. VC forces viciously attacked government and military posts, including a raid on Phuoc Vinh, a province capital 55 miles from Saigon, in which Diem’s province chief was publicly beheaded. Reporting from Saigon, Gen. Maxwell Taylor and Special

⁴² “Evolution of the War. Counterinsurgency: The Kennedy Commitments, 1961-1963. Strategic Hamlet Program, 1961-63.” NARA-Research-The Pentagon Papers. [Online version, <http://media.nara.gov/research/pentagon-papers/Pentagon-Papers-Part-IV-B-2.pdf>, National Archives and Records Administration, 7 March 2014]; “Evolution of the War, Counterinsurgency: The Kennedy Commitments and Programs, 1961.” NARA-Research-The Pentagon Papers, [Online version, <http://media.nara.gov/research/pentagon-papers/Pentagon-Papers-Part-IV-B-1.pdf>, National Archives and Records Administration, 7 March 2014]; Gabriel Kolko, *Anatomy of a War: Vietnam, the United States, and the Modern Historical Experience* (New York: Pantheon Books, 1985), 142-3.

⁴³ James Rothrock, *Divided We Fall: How Disunity Leads to Defeat* (Bloomington, IN: Author House, 2006), 57.

⁴⁴ “Evolution of the War, Counterinsurgency: The Kennedy Commitments and Programs, 1961.” NARA-Research-The Pentagon Papers, [Online version, <http://media.nara.gov/research/pentagon-papers/Pentagon-Papers-Part-IV-B-1.pdf>, National Archives and Records Administration, 7 March 2014].

⁴⁵ William S. Buckingham, Jr., *Operation Ranch Hand: The Air Force and Herbicides in Southeast Asia: 1961-1971* (Washington, D.C.: Office of Air Force History, 1982), 9.



Map 1. Tactical Zones, Republic of Vietnam, 1965. Map by Major General Robert P. Ploger.

Assistant for National Security Affairs Walt Rostow cited the “demoralizing effect of Viet Cong successes” for the loss of morale and predicted that a strong U.S. military commitment was imminent.⁴⁶ On October 14, 1961, *The New York Times* released an article—presumably leaked by Pres. Kennedy himself⁴⁷—hinting at the desirability to send troops in support of South Vietnam.⁴⁸ This leak had the potential to force Diem to relinquish some power, as previously agreed, while ending public speculation about Kennedy’s stance on troop deployment in Vietnam. Finally, on December 15, 1961, *The New York Times* publicized the formal exchange of letters between Kennedy and Diem confirming increased aid to Vietnam, including the promise of a stronger military commitment.⁴⁹

In his retrospective *Report*, former MACV Commander Gen. William C. Westmoreland claimed it was crucial for the U.S. Army to clear large areas of VC while simultaneously providing territorial security and developing a new life for the Vietnamese.⁵⁰ This reflected the existing U.S. counterinsurgency policy claiming four tasks required to defeat irregular forces and prevent resurgence in Vietnam. The first task was to establish effective government and military intelligence systems capable of furnishing precise and detailed information of guerilla forces. Only through accurate intelligence could the U.S. military physically separate irregular forces from the local population and any sponsoring powers. The primary objective, the elimination of the VC

⁴⁶ “Evolution of the War, Counterinsurgency: The Kennedy Commitments and Programs, 1961.” NARA-Research-The Pentagon Papers, [*Online version*, <http://media.nara.gov/research/pentagon-papers/Pentagon-Papers-Part-IV-B-1.pdf>, National Archives and Records Administration, 7 March 2014].

⁴⁷ *Ibid.*

⁴⁸ “Saigon Hopeful on Trip,” *The New York Times*, October 14, 1961, 9.

⁴⁹ “U.S. WILL INCREASE HELP FOR VIETNAM: Kennedy, in Reply to Diem Appeal, Promises More Arms and Flood Aid,” *The New York Times*, December 15, 1961, 1.

⁵⁰ Westmoreland, *General Westmoreland's Report on the War in Vietnam*, 247.

and NVA guerilla force, then occurred by means of surrender, capture, defection, or death. Finally, the government would ideologically reeducate dissidents and remedy the causes of discontent.⁵¹

The VC and NVA insurgency movement relied upon the support of the rural Vietnamese people to acquire food, shelter, and military intelligence. So long as the rural populace supported or sympathized with insurgents, the movement survived.⁵² Therefore, the overwhelming defeat of organized VC and NVA units was the first stage in the process of providing security and of building the country into an independent cohesive entity.⁵³ Locating the insurgents and physically separating them from the general population were necessary steps to reduce or eliminate widespread rural sympathies. This aspect of the U.S. counterinsurgency policy proved difficult to achieve because NVA and VC guerilla forces utilized the dense inland forest canopies of South Vietnam as cover. Sergeant Charles Sims described the Vietnamese topography as a

very robust jungle where the Highway 19 there was pretty much cow path, but it actually overlapped the highway in some places. . . . We got ambushed there all the time. There must have been a tunnel system under there somewhere where they could move in and out without us seeing where they came from or where they went. . . . As a matter of fact, if you pushed the grass back in some of those areas and looked, you could still find French armored vehicles that had been destroyed and trucks that had been pushed back from the road back there. The engineers had come along and bulldozered, pushed them back into there. But it was just a very robust jungle right through there.⁵⁴

⁵¹ U.S. Department of the Army, *Operations Against Irregular Forces: Field Manual 31-15* (Washington, D.C.: GPO, 1961), 4.

⁵² While sympathies undoubtedly spread among the indigenous population, there was also a great deal of intimidation implemented as a classic form of insurgency tactics. "Because guerilla warfare basically derives from the masses and is supported by them, it can neither exist nor flourish if it separates itself from their sympathies." After training and indoctrination, agitators set out to persuade and convince inhabitants to support the cause. Mao Tse-Tung, *On Guerilla Warfare*, trans. Samuel B. Griffith, II (Garden City, NY: Doubleday, 1978), 41.

⁵³ Westmoreland, *General Westmoreland's Report on the War in Vietnam*, 247.

⁵⁴ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

Therefore, the elimination of foliage used for concealment was essential. Significant changes in the landscape not only deprived the enemy of its chief advantage but also supported psychological operations through the shock of witnessing nature itself subdued.

The ability to destroy the mangroves used by VC and NVA units was essential to separating insurrectionary forces from the populace. Smaller experimental missions commenced as early as August 1961, when the South Vietnamese Air Force conducted the first herbicide spray missions for roadside clearance.⁵⁵ As a member of the Transportation Corps, Charles Sims frequently travelled along Highway 19 in a line haul convoy and described typical herbicide operations in the region:

. . . somewhere on Highway 19 the spraying got heavier between the An Khe pass and the Mang Yang pass because below the An Khe pass going into Qui Nhon was a lot of rice paddies and stuff, so there was really no need to spray those areas. But as you got up the An Khe pass, then you got into the jungles of the Central Highlands because the An Khe pass was about an 8-mile trip up, so you could feel the weather change . . . just going up that pass, but you got into a completely different climate and what was growing up there. I do not recall particularly where we were when this happened, somewhere on that road and, of course, the first thing you would notice was a couple of Air Force . . . generally C-123s that did the spraying. Although there apparently were some C-130s that they tricked out to do it and even a few helicopters. I do not remember ever seeing a helicopter spraying, but it was the small two-engine Air Force planes. You would notice them working the road ahead or behind you. It was obvious, it looked like a crop dusting operation. That's what it looked like. Then, eventually, they would get to your place, wherever you were on that road, and they did not stop spraying. They were going, who knows how fast those things were going, 125-150 miles an hour, and they were spraying. The Air Force guys did not know what this stuff was, so they were not going to stop spraying because we [were] on the road where they really need to dump the stuff. It did not happen a lot. I saw it two, maybe three times, but I would see the effect often where they had been there two or three days before. The new vegetation was dying like crazy. . . . The Mang Yang pass . . . looked like the backside of the moon. Everything is just dead, but we were happy with that. We were very happy with that because that [Agent] [Orange] was keeping us alive.⁵⁶

⁵⁵ Zierler, *The Invention of Ecocide*, 59.

⁵⁶ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

Recognizing the tactical and strategic value of herbicidal warfare, Diem selected the forest targets for the first fixed-wing spray missions. The success of such missions caused him to request a massive herbicide operation throughout the central highlands in order to deny crops to NLF guerillas.⁵⁷ Gen. Maxwell Taylor and Secretary of Defense Walt Rostow called for aerial inspections of the test areas as negotiations continued in September and October between the U.S. and South Vietnam. The inspections revealed mixed and sometimes inconclusive results. One of the most impressive effects occurred on the accidental spraying of rice crops near Kontum, where the expected crop yield was reduced by 90 percent.⁵⁸ Although herbicide dispersal was unintentional, the dramatic results translated into national strategy when Pres. Kennedy “approved the recommendation of the Secretary of State and Deputy Secretary of Defense to participate in a selective and carefully controlled joint program of defoliant operations in Viet Nam.” The operations began with the clearance of key infiltration routes and proceeded “thereafter to food denial only if the most careful basis of resettlement and alternative food supply [were] created.”⁵⁹

Ambushes by NVA and VC guerilla forces along the major highways were the greatest threat to American supply transports. Sgt. Sims remembered his first ambush:

It was a convoy with the 359th, probably one hundred truck[s], tankers, 18-wheelers. I had just been there a couple of weeks and we were going from Pleiku to Quin Yon down the Mang Yang pass and we got ambushed. I was in the back of this gun truck and I was behind a .50 caliber machine gun and it was total confusion, fear, the smell of gunpowder, explosions, something like you have never experienced before in your life and very scary—which that never got un-scary. Never. Even later, when I had years more experience doing this, it was still an

⁵⁷ Zierler, *The Invention of Ecocide*, 59.

⁵⁸ Cecil, *Herbicide Warfare*, 25.

⁵⁹ “National Security Action Memorandum 115” (November 30, 1961) quoted in Zierler, *The Invention of Ecocide*, 65.

incredibly scary experience because you were really exposed. It was not like you could just lay down on the ground or get in a foxhole or something. You were out there on that gun truck and your sole job was to protect those convoys. . . . But, our job was not to try and hold that highway. Our job was to get our trucks through, get our drivers, you know, any casualties, get them policed up and get them out of there. So, usually one of those things was over in 15 minutes or so and the critical period was the first minute. You had to achieve fire superiority over the NVA that were attacking the convoy and if you did not do that in the first minute, there was a good chance you were going to lose. . . . At the time, we had no idea what we were doing was something that never happened before—that the Army had never faced this problem of line haul convoys in a guerilla theatre of operations. We thought everyone did this. Of course, later, we found out that what we were doing was completely unique. There was no Army doctrine. There was no Army training to do any of this. We just figured it out on our own.⁶⁰

As a result of threats to American lives in Vietnam, defoliation missions commenced on January 7, 1962 under the direction of Operation Ranch Hand. Retired USAF Major John R. Spey discussed the circumstances surrounding his deployment as a Ranch Hand:

We weren't told where we were going, what we were going to do initially. It was classified, but it was pretty obvious to anybody that we knew that we were going to Vietnam. We were the first C-123s to fly across the Pacific to Southeast Asia. The first spray missions were conducted in January of 1961. For the following three and a half years I served with Operation Ranch Hand flying what I call combat crop dusting.⁶¹

USAF and USA units dispersed chemical herbicides in Cambodia, Laos, South Vietnam, and along the Demilitarized Zone (DMZ) between North and South Vietnam. Several combinations of chemicals were employed in addition to the dispersal of Agent Orange, an equal mixture of butoxyethanol esters of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D). Also widely-used were: Agents White

⁶⁰ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

⁶¹ Interview with John Spey, 04 October 2000, John Spey Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 18 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0067>>.

(triisopropanolamine salts of 2,4,D and picloram), Purple (containing iso-butyl esters of 2,4,5-T and 2,4-D), and Blue (cacodylic acid).⁶²

Ranch Hand missions consisted of brief, two-minute sprays requiring three-to-five modified C-123 cargo aircraft flying in a staggered lateral formation. Ranch Hand C-123s travelled at speeds of 130 knots, roughly 150 miles per hour, and only fifteen knots faster than the speed at which the aircraft stalls and crashes. Each aircraft carried approximately 11,000 pounds of herbicide dispensed from a height of 150 feet. Stationed at Bien Hoa with the 12th Special Operations Squadron in 1968, KC-123 pilot Allen Trott, Jr.

described one of his typical missions:

Instead of going 140 [mph] all the time, I was going 160 [mph] which was a much better maneuverability speed for the C-123 loaded. But it played hell with the spray pattern. It wouldn't go down as well and stuff like that because you're going too damn fast. So we did that a couple of times. We didn't take as many hits but we also didn't get the target done so we had to come back again. And that was our big dread to have to come back two and three times for a target.⁶³

Dispersal operations over authorized targets took four minutes, but the entire herbicide tank could be ejected within thirty seconds if the aircraft were threatened by enemy fire. The air force allocated 24 C-123s to Ranch Hand and dropped thousands of gallons of defoliant on the jungles of Vietnam weekly.⁶⁴ Dr. Le Cao Dai, who worked as a surgeon and ultimately became the head of the department of surgery at a military hospital in

⁶² Kolko, *Anatomy of a War*, 144-45; John Lewallen, *Ecology of Devastation: Indochina* (Baltimore: Penguin Books, 1971), 64; Arthur H. Westing, "Ecological Effects of Military Defoliation on the Forests of South Vietnam," *BioScience* 21, no. 17 (September 1, 1971): 895; Cecil, *Herbicide Warfare*, 24, 31-2; Jeanne Stellman et al., "A Geographic Information System for Characterizing Exposure to Agent Orange and Other Herbicides in Vietnam," *Environmental Health Perspectives* 11 (March 2003): 321; Young, *The History, Use, Disposition and Environmental Fate of Agent Orange*, 2.

⁶³ Interview with Allen Trott, Jr., 04 March 2003, Allen Trott, Jr. Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 18 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0272>>.

⁶⁴ Neilands, "Vietnam: Progress of the Chemical War," 220-1; Buckingham, Jr., *Operation Ranch Hand*, 31; Lewallen, *Ecology of Devastation*, 67; Elmo Zumwalt, Jr., Elmo Zumwalt, III, and John Pekkanen, *My Father, My Son* (New York: Macmillan, 1986), 48; Zierler, *The Invention of Ecocide*, 2; Sills, *Toxic War*, 25.

Hanoi until 1966 and thereafter directed the largest jungle hospital in the Central Highlands until 1974, recalled:

the first [spray] operation . . . [involving] three aircraft, they flew very, very high in the sky . . . so they flew very close to the top of the trees and . . . they push[ed] the cloudy smoke. . . . I had been two or three times sprayed from overhead It came like, you know, smell of chemical; we didn't know what kind of chemical it was. . . . [We] [had] to protect . . . to cover ourselves and to . . . protect our nose. . . . [O]nly one or two days later the leaves start to fall.⁶⁵

Target approvals were often delayed because of the complex operational command structure. The initial request for an herbicide dispersal mission “usually came from province officials or field commanders, with occasional special mission requests directly from headquarters.” Leaders directly responsible for the targeting and employment of Agent Orange under Operation Ranch Hand met weekly to discuss requests and schedule reconnaissance flights over potential areas. Unescorted survey sorties then identified target locations and planned optimum dispersal routes by a Ranch Hand chief or assistant chief of targeting, a copilot, a navigator, and a U.S. Army Chemical Corps officer.⁶⁶ With a Ranch Hand contingent based out of Saigon, USAF Second Lieutenant John Hodgkin reminisced:

When we were spraying, the actual spray run I'm guessing would be around six or seven minutes. It wasn't long at all. We would go back and forth. We had to double spray it because we only put out a gallon per acre. And we needed, later on a gallon and a half per acre. We needed twice that much to kill the trees over there.⁶⁷

⁶⁵ Due to the author's death, he was unable to provide edited corrections to this transcript. A copy of the original draft is on file with the Virtual Vietnam Archive. Interview with Le Cao Dai, 1 November 1999, Dr. Le Cao Dai Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 26 Jan. 2015. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0110>>; Christian G. Appy, *Patriots: The Vietnam War Remembered from All Sides* (New York: Viking, 2003), 138.

⁶⁶ Cecil, *Herbicidal Warfare*, 83.

⁶⁷ Interview with John Hodgkin, 03 February 2003, John Hodgkin Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 18 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0264>>.

With special approval from the Vietnamese government, MACV commander, and American ambassador in Saigon, USAF sorties were responsible for targeting and defoliating mangroves and jungle foliage to improve visibility of enemy territory, thereby exposing VC and NVA infiltration routes, base camps, weapons placements, and storage sites.⁶⁸ Between 1961 and 1971, USAF units conducted 6,542 spray missions and deployed approximately 19.5 million gallons of defoliant on South Vietnam for tactical defoliation and enemy crop destruction.⁶⁹ The words of Ed Erdmann, who served as the communications officer aboard USS *Frederick* in Vietnam from April 1970 to 1971, provide a dramatic account of how pervasive and ecologically devastating the use of Agent Orange was at the time.

When we came back down the river out of Saigon, we were escorted, again, by the swift boats and the [Huey] gunships . . . used to spray the Agent Orange over the jungles. . . . [G]oing up the river to Saigon was like going across a desert or across Kansas. As far as you could see, it was defoliated. It was bare. It was waste. And we could see other ships coming back, or the opposite direction, and since you couldn't see the water, it just looked like they were tooling across the prairie.⁷⁰

Agent Orange was an effective biotechnology, and the resulting ecological destruction only proved the effectiveness of its military purpose and application. Army scientists determined that an initial spray of Agent Orange was immediately “absorbed

⁶⁸ Cecil, *Herbicide Warfare*, 85; Michael G Palmer, “The Case of Agent Orange,” *Contemporary Southeast Asia* 29 (April 2007): 172; Heather M. Brown, “Defense by Defoliation: The Necessity for Agent Orange in Vietnam,” *Small Wars Journal* 7, no. 5 (May 2011), 1.

⁶⁹ Spencer Tucker, *Encyclopedia of the Vietnam War: A Political, Social, and Military History*, abridged ed. (New York, NY: Oxford University Press, 2000), 480; Hisao Furukawa, *Ecological Destruction, Health, and Development: Advancing Asian Paradigms*, ed. Nishibuchi Mitsuaki, Kono Yasuyuki, and Kaida Yoshihiro (Rosanna, Vic.: Trans Pacific Press, 2004), 143; David N. Pellow, *Resisting Global Toxics: Transnational Movements for Environmental Justice* (Cambridge, Mass.: MIT Press, 2007), 159; Brown, “Defense by Defoliation,” 1.

⁷⁰ Edward A. Erdmann III, interview by Heather Haley, digital recording, 14 October 2014, San Marcos, Texas.

into the wax layer of the plant cuticle” and “could not be physically dislodged.”⁷¹ An initial spray had the potential to destroy wooded forests without the possibility of reforestation. The first spray mission over a dense mangrove forest in South Vietnam destroyed a moderate number of trees whereas the second application killed 50 percent of all mangroves within the spray radius.⁷² From its inception in late 1961, Operation Ranch Hand was widely accepted by U.S. armed forces because Agent Orange embodied the latest biological defense technology.⁷³ Successful herbicide missions allowed for tactical force protection, operational reconnaissance, and targeting. In fact, so many field commanders enthusiastically requested to conduct herbicide missions that they “exceeded the capacity of the organization, despite repeated project expansion.”⁷⁴

Table 1. Estimated Acres Treated with Herbicides in South Vietnam

Year	Defoliation	Crop Destruction	Total
1962	17,119	717	17,836
1963	34,517	297	34,814
1964	53,873	10,136	64,009
1965	94,726	49,637	144,363
1966	775,894	112,678	888,572
1967	1,486,446	221,312	1,707,758
1968	1,297,244	87,064	1,384,308
1969 (Jan-Mar)	356,421	4,693	361,114

Source: Data adapted from J. B. Neilands, “Vietnam: Progress of the Chemical War,” *Asian Survey* 10, no. 3 (March 1970): 220.

As Operation Ranch Hand commenced in 1962, Pres. Diem implemented his Strategic Hamlet Program. The idea was to isolate the general population away from the

⁷¹ Alvin L. Young et al., “Environmental Fate and Bioavailability of Agent Orange and Its Associated Dioxin During the Vietnam War,” *Environmental Science and Pollution Research* 11, no. 6 (November 2004): 359.

⁷² National Academy of Sciences, Committee on the Effects of Herbicides in Vietnam, Division of Biological Sciences, Assembly of Life Sciences, *The Effects of Herbicides in South Vietnam: Part A - Summary and Conclusions* (Washington, D.C.: Government Printing Office, 1974), xii; Neilands, “Vietnam: Progress of the Chemical War,” 223.

⁷³ Brown, “Defense by Defoliation,” 3.

⁷⁴ Cecil, *Herbicide Warfare*, 1.

foraging VC by gathering the populace into well-fortified, government-supported hamlets.⁷⁵ Diem's hamlet program ultimately failed because it forced Vietnamese families to relinquish traditional cultural values by abandoning their homes and farmlands established by previous generations. The U.S. military naively assumed NVA and VC crop destruction would enhance the ongoing pacification efforts of Diem's hamlet program as troops were involved in the ushering of noncombatants out of the zones targeted for defoliation. Diem and military officials relied on a military solution—enemy crop destruction—as a means to solve the pacification problem.

Insurgencies along Vietnam's extensive inland waterways gave rise to riverine warfare, an amphibious type of guerrilla warfare against fully developed insurgents. Pres. Kennedy identified this as "another type of warfare—new in intensity, ancient in its origin—war by guerrillas, subversives, insurgents, assassins—war by ambush instead of aggression—seeking victory by eroding and exhausting the enemy instead of engaging him."⁷⁶ In September 1968, Adm. Zumwalt took command of American all naval forces in Vietnam, including the brown-water navy, a component of the U.S. Navy comprised of small aluminum and fiberglass cruisers that patrolled the inland rivers, canals, and coasts of Vietnam. Upon arrival in Vietnam, Zumwalt immediately toured the country to assess the situation and commented that morale was low as the naval headquarters at Saigon fell into "a country club atmosphere" where the general attitude toward the war in Vietnam

⁷⁵ Westmoreland, *General Westmoreland's Report on the War in Vietnam*, 249; Martini, *Agent Orange: History, Science, and the Politics of Uncertainty*, 71.

⁷⁶ Pres. John F. Kennedy quoted in Robert Debs Heinl, *Dictionary of Military and Naval Quotations* (Annapolis: United States Naval Institute, 1966), 140.

was that direct combat was the responsibility of the army.⁷⁷ This is confirmed by the testimony of Charles Sims, who remembered:

By late-1969, the Army—our officers and NCOs, senior NCOs—abandoned us. When the first trucking companies, the Eighth Group, arrived by boat in Vietnam, in the Quin Yon area and then spread to An Ke and Pleiku, company commanders would go on the road as convoy commanders because that was where they were supposed to be. Wherever their trucks and men were, so they would become the convoy commanders and go out on the road. By Tet [January] [1968], they had pushed that responsibility down to the lieutenants and company commanders [and] pretty well quit going out on the road. Depending on who you talk to, that happened for two reasons. One, the higher battalion group commanders said they were not supposed to be out there, they should be back at the base camps running the camps. That's bullshit. That's what they had lieutenants and first sergeants for. Higher ranking officers, even down to the level of lieutenants, had figured out by then that the war was a lost cause and that they weren't going to go out there and die, plus it was a miserable existence being down those highways every day for twelve or fourteen hours a day. [It] [was] dirty. . . . So, we were kind of on our own up there, making it up every day as we went along. I've got some resentment for the higher-ranking officers in the Eighth Group. . . . Their primary goal became what was called 'tons and miles.' That was the way they were being rated. How many ton-miles they could move every day. Sometimes the supply line would kind of break down where we were not getting loads. That was one of the things about being in line haul, we did not load or unload anything. The most valuable asset was a truck and a driver, an 18-wheeler and a driver, so we just dropped trailers at trailer transfer points. We never loaded or unloaded anything. The object was to turn around and move as much freight as you could as fast as you could. But, occasionally the supply line would break down and there wouldn't be any legitimate loads ready to go, so they would just recycle a load. They would take that trailer that was supposed to be unloaded, put it back in the trailer transfer point, and haul it back to Quin Yon or from Quin Yon back to Pleiku because it made the statistics good.⁷⁸

In November 1968, Zumwalt implemented the South-East Asia Lake, Ocean and Delta Strategy, or Operation SEALORDS. The strategy called for mixed units of river patrol boats (PBRs) and river assault groups (RAGs) to form a blockade against the

⁷⁷ Zumwalt, Zumwalt, and Pekkanen, *My Father, My Son*, 41.

⁷⁸ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

Cambodian border with swift boat support.⁷⁹ Initially, U.S. patrols along the canals and smaller inland rivers caught VC insurgents off guard. The dense vegetation along the rivers restricted navigation and visibility, which increased the enemy threat from the riverbanks.⁸⁰ Insurgents set up ambushes because the waterways were narrow and the men in PBRs could easily be targeted from either side. In addition, Zumwalt found that an intelligence analysis confirming the importance of Cambodia as a major logistics base for the communists in Vietnam underscored the validity of Operation SEALORDS, whose primary purpose was to clear and hold key delta areas.⁸¹

Swift boats and PBRs were especially vulnerable because they had so little protection. Swift boat hulls were made of aluminum one-eighth of an inch thick.⁸² PBR hulls were green fiberglass “commercial cabin cruiser/sport fisherman hulls.”⁸³ Each boat was armed with .50-caliber machine guns, M60 machine guns, and a 40-mm automatic grenade launcher.⁸⁴ VC units attacked these boats under the cover of the mangrove trees that lined the riverbanks and casualty rates steadily rose. Seamen serving a year’s combat tour along Vietnamese rivers had a 70 to 75 percent chance of being killed or wounded.⁸⁵

⁷⁹ The U.S. military refurbished one hundred small 15-meter aluminum watercrafts initially used to resupply oil platforms in the Gulf of Mexico. These fast and light craft “proved effective for the coastal and major river patrols.” Zumwalt, Zumwalt, and Pekkanen, *My Father, My Son*, 45; Wynn Goldsmith, *Papa Bravo Romeo: U.S. Navy Patrol Boats at War in Vietnam* (New York: Ballantine Books, 2001), 272.

⁸⁰ U.S. Navy, Naval History Division, *Riverine Warfare: The U.S. Navy's Operations on Inland Waters*. (Washington, DC: U.S. Government Printing Office, 1969), 42.

⁸¹ Colonel Victor J. Croizat, *The Brown Water Navy: The River and Coastal War in Indo-China and Vietnam, 1948-1972* (Poole, Dorset: Blandford Press, 1984), 137.

⁸² Zumwalt, Zumwalt, and Pekkanen, *My Father, My Son*, 47.

⁸³ Goldsmith, *Papa Bravo Romeo*, vii.

⁸⁴ R. Blake Dunnavent, *Brown Water Warfare: The U.S. Navy in Riverine Warfare and the Emergence of a Tactical Doctrine, 1775-1970* (Gainesville: University Press of Florida, 2003), 113.

⁸⁵ Zumwalt, Zumwalt, and Pekkanen, *My Father, My Son*, 47; Testimony of E. R. Zumwalt, Jr., Chairman of Agent Orange Coordinating Council re Agent Orange, 04 August 1993, Folder 26, Box 02, Admiral Elmo R. Zumwalt, Jr. Collection: General Correspondence, The Vietnam Center and Archive, Texas Tech University. Accessed 07 Feb. 2014. <<http://www.vietnam.ttu.edu/virtualarchive/itemsphp?item=6210226048>>.

The immediacy of saving American lives was paramount to the success of riverine warfare in Vietnam. By destroying the foliage along the riverbanks, the enemy would be forced farther inland, therefore making it difficult to ambush swift boats and PBRs. Zumwalt authorized the dispersal of Agent Orange along inland waterways in Vietnam as the means to push the foliage back from the water line because of the success of Ranch Hand defoliation operations.⁸⁶

Reinforcing the existing U.S. counterinsurgency policy, Zumwalt recognized that the primary step in defeating insurgents along Vietnam's canals and rivers was to isolate these forces by inhibiting their supply lines with strict population and resource control. In order to achieve that end, destroying the foliage along inland waterways seemed essential. Zumwalt's authorization to disperse Agent Orange proved to be the means to that end. Once the area was cleared, naval surveillance forces maintained a careful watch over the infiltration of enemy personnel and the transport of arms by sea while allied control over fishing areas denied the enemy an important food source. River patrols monitored thousands of Vietnamese watercrafts transporting goods and people over inland waterways.⁸⁷

In the final step of the successful U.S. counterinsurgency policy, Zumwalt supported the Vietnamization program initiated in the closing days of Lyndon Johnson's presidency. In October 1968, Zumwalt conceived and established the Accelerated Turnover to Vietnam (ACTOV), a systematic program that would transfer U.S. Navy small combat river assault craft, blue-water ships, and logistical support to the

⁸⁶ Zumwalt, Zumwalt, and Pekkanen, *My Father, My Son*, 48.

⁸⁷ U.S. Navy. Naval History Division, *Riverine Warfare: The U.S. Navy's Operations on Inland Waters*, 38.

Vietnamese.⁸⁸ With the implementation of Zumwalt's Vietnamization program during the SEALORDS campaign, the number of U.S. Navy personnel in the region declined from 38,083 in September 1968 to 16,757 by the end of 1970. At that time, the Vietnamese Navy (VNN) took control of the interdiction barrier along the Cambodian border. The Commander of U.S. Naval Forces, Vietnam (COMNAVFORV) turned over its entire inventory of river crafts to the South Vietnamese by the end of 1970.⁸⁹

Operation SEALORDS typified the success of riverine warfare in Vietnam. The campaign demonstrated the unique strategic, operational, and tactical capabilities of the brown-water navy, as the blockade of Cambodia essentially cut off enemy lines of communication and resources. Zumwalt's implementation of ACTOV escalated the navy above the other services with respect to the Vietnamization program that allowed for the continued offensive concurrent with the withdrawal of U.S. naval forces from the region.⁹⁰ The use of Agent Orange in this operation was essential to its success.

Despite the Pentagon's claims of ignorance to elevated health risks resulting from exposure to Agent Orange, military scientists continued herbicide operations with full knowledge and scientific disclosure of the 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) contamination in the herbicide.⁹¹ In addition, they were aware that the special

⁸⁸ Accelerated Turnover to the VNN, January 1970, Folder 03, Box 01, Arthur Price Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 04 Mar. 2014. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=16200103004>>; GENERAL 1969 MAC-V Summary Oct Part 1, 01 January 1970, Folder 01, Bud Harton Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 05 March 2014. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=168300010794>>.

⁸⁹ William C. McQuilkin, "Operation Sealords: A Front in a Frontless War, An Analysis of the Brown-Water Navy in Vietnam" (master's thesis, U.S. Army Command and General Staff College, 1996), 72.

⁹⁰ McQuilkin, "Operation Sealords: A Front in a Frontless War," 72.

⁹¹ General William C. Westmoreland testified in a federal court deposition that the Pentagon was aware of the murmurings among VC insurgents that herbicides were dangerous to humans, but dismissed them as a product of enemy propaganda. Larry Elkin, "'Agent Orange Just a Battle Weapon,' Says Westmoreland," *The Evening News* (Newburgh-Beacon, NY), November 16, 1983, 15B.

formulation for military application “had a higher dioxin concentration than the ‘civilian’ version” due to the lower cost and speed of production.⁹²

Although the military dispensed Agent Orange in concentrations 6 to 25 times the manufacturer's suggested rate, “at that time the Department of Defense (DOD) did not consider herbicide orange toxic or dangerous to humans and took few precautions to prevent exposure to it.”⁹³ In fact, Edward Erdmann, while on the deck of the USS *Frederick* in 1971, recalled a unique experience in which twin Huey gunships escorted the LST out of the mouth of the Saigon River and sprayed the ship in an almost ceremonial fashion:

As we headed back down the [Saigon] river, and we were getting to the mouth of the river, I was on the radio . . . and we said goodbye to the swift boats and they went off, and we said goodbye to the helicopters and we thanked everybody for their help. And the two helicopters came from aft, over us, and sprayed beautiful orange smoke over as their farewell. . . . We knew it was Agent Orange ‘cause we knew they’d sprayed it and they showed it on TV. . . . [It] [was] no big deal.⁹⁴

Yet, evidence suggests experts knew that Agent Orange was harmful to civilians and military personnel. In a revealing letter to Senator Tom Daschle in 1988, Dr. James R. Clary, former government scientist with the Chemical Weapons Branch, claimed that “because the material was to be used on the ‘enemy,’” willfully ignorant military

⁹² Report to the Secretary of Veterans Affairs the Honorable Edward J. Derwinski from the Special Assistant: Agent Orange Issues Admiral Elmo R. Zumwalt, Jr. USN (Ret.) (First Report), 05 May 1990, Folder 08, Box 02, Admiral Elmo R. Zumwalt, Jr. Collection: Agent Orange Publications, The Vietnam Center and Archive, Texas Tech University. Accessed 07 Feb. 2014. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=6150208001>>.

⁹³ Report to the Secretary of the Department of Veterans Affairs on the Association Between Adverse Health Effects and Exposure to Agent Orange- As Reported by Special Assistant Admiral E. R. Zumwalt, Jr., 05 May 1990, Folder 01, Box 01, Admiral Elmo R. Zumwalt, Jr. Collection: Agent Orange Correspondence, The Vietnam Center and Archive, Texas Tech University. Accessed 8 Feb. 2014. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=6130101073>>.

⁹⁴ Edward A. Erdmann III, interview by Heather Haley, digital recording, 14 October 2014, San Marcos, Texas.

scientists never considered the scenario in which American military “personnel would become contaminated with the herbicide.”⁹⁵

Responding to the concerns of politicians, scientists, and military officials, Bionetics Research Laboratories of Bethesda, Maryland, under contract from the National Cancer Institute and the Department of Health, Education and Welfare, conducted toxicological research on industrial chemicals and pesticides in 1963. Bionetics was tasked with determining if widely speculated compounds were, in fact, carcinogenic, mutagenic, or teratogenic. Among the chemicals tested were T- and D-acids and the butyl ester of D, which made up half of the mixture of Agent Orange.⁹⁶ A preliminary report released to the National Cancer Institute in 1966 indicated that pregnant female laboratory rats and mice injected with small amounts of 2,4-D and even smaller amounts of 2,4,5-T gave birth to offspring with birth defects. Larger doses caused all female rats to produce stillborn or mutated young.⁹⁷ Women returning from Vietnam often had to make difficult life choices. Ann Kelsey, recruited by the U.S. Secret Service to serve as the director of a library in Saigon, commented:

I just keep waiting for my personal health repercussions, so far I have been very either fortunate or lucky . . . in that I don't have any health problems but most of the women I know [who] [were] there do and some of them major and severe and life threatening. I made some decisions to not have kids because of the dioxin thing and so I had a tubal ligation in the early eighties. . . . [Women] [who] [served] [in] [Vietnam] [suffer] [from] various cancers, spina bifida in children, thyroid, [and] non-Hodgkin's lymphoma. It's incredibl[e] the number of women I know who are

⁹⁵ Dr. James R. Clary quoted in Report to the Secretary of Veterans Affairs the Honorable Edward J. Derwinski from the Special Assistant: Agent Orange Issues Admiral Elmo R. Zumwalt, Jr. USN (Ret.) (First Report), 05 May 1990, Folder 08, Box 02, Admiral Elmo R. Zumwalt, Jr. Collection: Agent Orange Publications, The Vietnam Center and Archive, Texas Tech University. Accessed 19 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=6150208001>>.

⁹⁶ Cecil, *Herbicidal Warfare*, 160; Sills, *Toxic War*, 109.

⁹⁷ Larry Berman, *Zumwalt: The Life and Times of Admiral Elmo Russell “Bud” Zumwalt, Jr.* (New York: Harper, 2012), 497; Cecil, *Herbicidal Warfare*, 160; Sills, *Toxic War*, 109.

[were] Vietnam who have Type II diabetes. . . . In the men, prostate [cancer] . . . [and] Type II diabetes.⁹⁸

The 1966 National Cancer Institute report did not reach the Food and Drug Administration for two years and was not seen by Agriculture or Defense Department officials until 1969, when part of the report was made public. When questioned about the suppression of the report, a White House staffer claimed that release of the report would have strengthened the anti-war movement and added to international criticism of American chemical warfare practices.⁹⁹ It was clear that the Johnson and Nixon administrations were eager to suppress incriminating statistics regarding the link between adverse health effects and the herbicide program.

Meanwhile, in the eastern hemisphere, the Saigon government forcibly suspended several Vietnamese newspapers after they published reports of fetus deformations “allegedly attributed to the defoliants.” The Vietnamese Public Health Ministry refused to provide normal and abnormal birth statistics after a Vietnamese Agriculture Ministry official claimed he did not “think the Americans would use the chemicals if they were harmful.”¹⁰⁰ Dr. Le Cao Dai continued to work as a surgeon in the army until 1983, when he then served on a committee to study the consequences and effects of the chemicals used during the war, including Agent Orange. Dai recalled a severe outbreak of malaria from 1966 to 1969 in the Central Highlands:

I believe that maybe [Agent] [Orange] . . . cause[d] the immune deficiency we began to see in our people. . . . I had to make [an] autopsy of some people who died from this kind of malaria and so their intestines [were] . . . similar to [that] of

⁹⁸ Interview with Ann Kelsey, 27 March 2001, Ann Kelsey Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 18 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0154>>.

⁹⁹ Lewallen, *Ecology of Devastation: Indochina*, 115; Cecil, *Herbicide Warfare*, 160.

¹⁰⁰ Ralph Blumenthal, “U.S. Shows Signs of Concern Over Effect of 9-Year Defoliation Program in Vietnam,” *The New York Times*, March 14, 1970.

wrapped sausage . . . [with] no layer of muscular [tissue] . . . perforation of intestines . . . [and] [a] lack of Vitamin A.¹⁰¹

In October 1969, Dr. Lee F. Dubridge, Science Advisor to the president, announced there would be a partial curtailment of the use of Agent Orange. This decision resulted from the National Institute of Health confirmation of malformations and stillbirths in mice exposed to 2,4,5-T. DOD officials, in turn, restricted the use of Agent Orange to remote areas away from large Vietnamese populations, an indication that the scientific evidence ultimately led to a change in policy, but only in the final years of the war.¹⁰²

Table 2. Number of Non-Pregnant Mice After Repeated Daily Doses of 2,4,5-T (1971)

2,4,5-T mg/kg	Days of treatment						
	3	4	5	6	7	8	9
120	0	0	0	0	0	0	0
130	0	0	0	1	2	3	5
143	0	1	3	4	6	7	9
154	0	2	10	11	12	14	15
165	0	5	9	12	14	14	15
176	0	8	10	11	13	15	-

Source: Data adapted from Diether Neubert and Imke Dillman, "Embryotoxic Effects in Mice Treated with 2,4,5-Trichlorophenoxyacetic Acid and 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," *Naunyn-Schmiedeberg's Archives of Pharmacology* 272, no. 3 (1972): 246.

In 1970, scientists Gordon Orians and E. W. Pfeiffer published *Ecological Effects of the War in Vietnam* in response to the numerous claims of health abnormalities in returning veterans exposed to the herbicide. They reported that birds feeding and nesting in the mangrove trees lining the riverbanks "may have been less severely affected by

¹⁰¹ Interview with Le Cao Dai, 1 November 1999, Dr. Le Cao Dai Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 26 Jan. 2015. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0110>>; Appy, *Patriots: The Vietnam War Remembered from All Sides*, 139.

¹⁰² Bruce F. Myers, "Soldier of Orange: The Administrative, Diplomatic, Legislative and Litigatory Impact of Herbicide Agent Orange in South Vietnam," *Boston College Environmental Affairs Law Review* 8, no. 2 (1979): 166-167.

defoliation than the terrestrial ones,” suggesting herbicide dispersal caused adverse health effects in indigenous fauna.¹⁰³ Mounting scientific reports and studies suggesting that veterans exposed to the defoliant 2,4,5-T might incur severe health problems caused the Surgeon General of the United States, Jesse Steinfeld, to issue a warning on April 15, 1970 that the use of 2,4,5-T might be hazardous. He was publicly criticized for not disclosing the information sooner.¹⁰⁴

Table 3. Hospitals and Quarters Admissions and Incidence of Selected Conditions, Fiscal Year 1970 (Rates per 1,000 average strength per year)

	Worldwide	Pacific	
		All Areas	Vietnam
Admissions			
All causes	346	394	442
Disease	290	290	314
Injury	56	104	128
Incidence			
Malaria	7.19	16.83	18.49
Acute upper respiratory infection and Influenza	94.32	30.81	29.20
Dermatophytosis	9.52	19.70	22.83
Neuropsychiatric conditions	14.04	19.55	20.94

Source: Data adapted from William Gardner Bell, *Department of the Army Historical Summary, Fiscal Year 1970* (Washington, D.C.: Center for Military History, 1973), 64.

Under the Johnson administration, the herbicidal warfare program expanded dramatically as Ranch Hands sprayed 15 of the 20 million total gallons of Agent Orange between 1966 and 1969. The herbicide controversy continued after Johnson’s departure as spray operations undermined President Richard Nixon’s relaxation of Cold War tensions. One of Nixon's détente policies was to abolish the U.S. military’s biological weapons program with the resubmission of the Geneva Protocol of 1925 to the U.S. Senate. The resubmission resulted in an impasse. Nixon’s chemical and biological

¹⁰³ Gordon H. Orians and E. W. Pfeiffer, “Ecological Effects of the War in Vietnam,” *Science* 168, no. 3931 (May 1, 1970): 548.

¹⁰⁴ Myers, “Soldier of Orange,” 167.

weapons initiative stalled until January 1975, when Pres. Gerald Ford ratified the Geneva Protocol fifty years after its initial proposal. Two years later, the U.S. military transferred the remaining stocks of Agent Orange, approximately 2.25 million gallons, to one of the most isolated islands in the Pacific Ocean, Johnston Atoll, where the herbicide was incinerated.¹⁰⁵

In order to secure American interests in Vietnam by blocking the communist threat, U.S. troops participated in ecological and psychological warfare. In utilizing a chemical weapons strategy of highly questionable morality, MACV and brown water navy forces left a symbolic and psychological imprint on the region. Agent Orange had a supporting role in Pres. Kennedy's CIP, as the herbicide improved aerial and ground visibility and applications around U.S. base perimeters offered additional protection to American troops stationed in the region.

Efforts to utilize herbicides and non-lethal chemical agents as part of the overall counterinsurgency operation in mainland Vietnam generally did not prove successful, even though similar operations along rivers and canals had favorable results. The reason U.S. Army-initiated herbicide missions were unsuccessful was because high-level military leaders depended on the continued use of defoliants as the means to pacify the South Vietnamese after the failure of Diem's strategic hamlet program. Agent Orange had tangible short-term tactical benefits, but due to the failure of the larger pacification strategy, it had limited success overall.

Adm. Zumwalt recognized the tactical significance of Agent Orange when he authorized dispersal along South Vietnamese canals and rivers in order to force the

¹⁰⁵ Zierler, *The Invention of Ecocide*, 2-3, 156; Young, *The History Use, Disposition and Environmental Fate of Agent Orange*, 136.

enemy farther inland. His action, in turn, helped the U.S. gain a strong foothold along the waterways, and made it difficult for NVA and VC units to ambush swift boats and PBRs. The tactical success of herbicide dispersal along the rivers led to operational victories in areas with large waterways. Ultimately, however, these tactical and operational achievements failed to translate to strategic success in Vietnam.

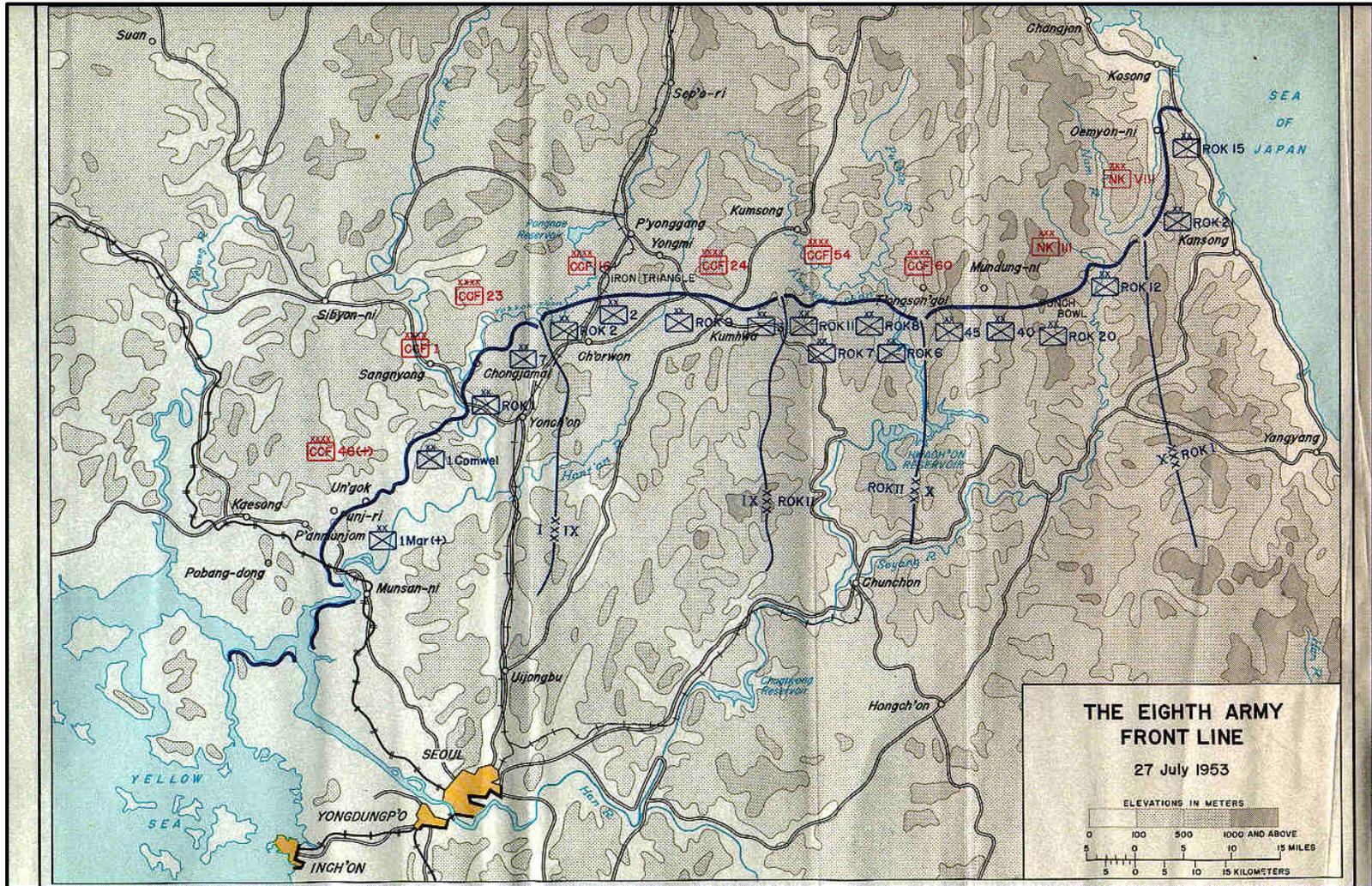
III. DEFOLIATING FENCE AND FOXHOLE: AN UNCONVENTIONAL RESPONSE TO AN IRREGULAR THREAT ALONG THE KOREAN DMZ

As the war in Vietnam pitted American military forces against the North Vietnamese Army and Vietcong in the mid-to-late-1960s, simultaneous and frequent hostile incursions occurred along the Korean Demilitarized Zone (DMZ) as North Koreans attempted to infiltrate the territory of the South. The demarcation line that still divides North Korea from South Korea was created as a result of the Armistice Agreement, which formally ended the Korean War on 27 July 1953. The agreement officially ended hostilities and instigated a bureaucratic system that maintains the ceasefire to this day. Comprised of ten members—five from each side—the Military Armistice Commission is headquartered at the Joint Security Area (JSA) at Panmunjom. This neutral area in the two-and-a-half-mile-wide DMZ not only separates the opposing forces but is the only place where the two sides are in continuous formal communication.¹⁰⁶

The Korean DMZ itself stretches the width of the peninsula, approximately 151 miles, and routine policing of the zone is the responsibility of both belligerents in their own designated sectors.¹⁰⁷ Mirroring the style of early-20th century trench warfare, the Chinese and North Koreans pulled their forces back two km north from the demarcation line while the United Nations Command (UNC) pulled its forces back two km south,

¹⁰⁶ Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration; P. Wesley Kriebel, "Korea: The Military Armistice Commission, 1965-1970," *Military Affairs* 36, no. 3 (October 1972): 96; Lee Jin-hyuk, *The DMZ: Dividing the Two Koreas* (Seoul, South Korea: Seoul Selection, 2010), 12.

¹⁰⁷ "Truce Village: The Last Combat Zone," *Time*, August 30, 1976, 42.



Map 2. Korean Demilitarized Zone, Eighth U.S. Army Front Line, 27 July 1953. Map courtesy of Korean War Project.

creating a four-kilometer no man's land.¹⁰⁸ According to the 1953 Armistice Agreement, the opposing forces established the DMZ as a buffer zone to prevent future incidents which might lead to a renewed outbreak of hostilities.¹⁰⁹ Stationed at Camp Wentzel in the midwestern region of South Korea from 1969-1970, Sergeant Charles Groff recalled:

there was a fence along our side of the DMZ. The DMZ is approximately a mile wide. In the middle is the demarcation line, that's the official line, half a mile from there is our fence, half a mile the other way is the North Korean's fence. So our mission was to guard a sector that was assigned to us along our [side] [of] [the] fence.¹¹⁰

The armistice denied all persons—civilian or military—access to the boundaries of the DMZ, unless authorized by the Military Armistice Commission. Following the armistice, the commission supervised the erection of all markers along both the demarcation line and the boundaries of the northern and southern DMZ. The demarcation line itself remains clearly marked along the boundary between the belligerents' respective areas and the demilitarized zone.¹¹¹

Substantial indigenous populations lived in the vicinity of the DMZ before the outbreak of the Korean War, which included the establishment of 70 villages within the zone itself. While the armistice stipulated that “neither side shall execute any hostile act within, from, or against the Demilitarized Zone,” the entire length of the DMZ became militarized. Ultimately, the two sides unleashed chemical warfare tactics against the

¹⁰⁸ Jin-hyuk, *The DMZ: Dividing the Two Koreas*, 12.

¹⁰⁹ Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration.

¹¹⁰ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹¹¹ Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration.

foliage as belligerents subjected the environment to concentrated dispersals of military-grade defoliants, including Agent Orange.¹¹²

In 1967, as part of a general review of the DMZ defenses, the United States Forces, Korea (USFK) and UNC found that vegetation within the DMZ and contiguous areas provided cover for North Korean raiding parties, which grew along the DMZ Security Fence unencumbered since the Armistice. Fourteen years of dense uncontrolled foliage growth was an integral defensive problem that significantly hindered UN and Republic of Korea (ROK) defensive operations, while simultaneously enhancing enemy infiltration operations. According to the Final Report of Vegetation Control Plan CY68, “effective use of night vision devices was affected by dense foliage and frequently movements of UN Forces into defensive positions were being hampered.”¹¹³

Not unlike in the concurrent situation along the inland waterways of Vietnam, the U.S. Department of Army (DOA) authorized dispersal of Agent Orange, an equal mixture of butoxyethanol esters of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D), along the Korean DMZ from mid-May 1968 through 1969 in order to deprive the enemy of the tactical benefits of indigenous foliage.¹¹⁴ To supplement the effects of Agent Orange, ROK personnel dispersed two additional herbicides, Monuron and Agent Blue, in order to clear offensive fields of fire from observation posts, check points, and roadsides. Thus, the DOD modified the existing defense policy along the DMZ to include defoliant operations as a means to

¹¹² Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration; Jin-hyuk, *The DMZ: Dividing the Two Koreas*, 58, 60.

¹¹³ Buckner, *Final Report, Vegetation Control Plan CY 68*, 1-2.

¹¹⁴ *Ibid.*, 10.

counter North Korean agitators, saboteurs, and guerillas and thereby reduce their ability to infiltrate the zone.

The ultimate curtailment of herbicide use by American forces in Southeast Asia in mid-April 1970 prevented allied forces from using chemical agents to remove a large Normandy poplar tree at the Joint Security Area (JSA) at Panmunjom. The tree, which towered at 25 meters, obstructed observation between the check point in the JSA and an allied observation post on the opposite side of the Bridge of No Return. While the suspension of herbicide use resulted from Vietnam veteran claims of health abnormalities from exposure to carcinogenic 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD), the curtailment ultimately prevented the safe removal of the poplar tree from within the neutral boundaries of the Korean DMZ. The imperative of halting the use of chemical herbicides contributed to the brutal deaths of two American officers, Captain Arthur Bonifas and Lieutenant Mark Barrett, at the hands of North Korean military personnel in August 1976. As will be seen, clearing the area of the poplar tree with chemical herbicides not only would have prevented the deaths of these two American officers but would have fettered North Korean insurgencies in the area.

Although a communist movement persisted in South Korea into the 1960s, it never maintained its momentum and lacked the manpower to overthrow the South Korean government. Nevertheless, North Korean Premier Kim Il Sung continued to send agitators into the South across the heavily defended DMZ that separated the North from the staunchly anti-communist South.¹¹⁵ Assigned to the First Cavalry Division, First Battle Group, Seventh Cavalry Regiment, platoon leader Thomas Spencer recalled:

¹¹⁵ A. J. Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine, 1942-1976* (Washington, DC: Center of Military History, U.S. Army, 2006), 329.

When I was there, there were a couple of minor instances in Pan Mon Jon [*sic*]. There were a couple of minor crossings of the border or people coming through the DMZ area. We had a cavalry regiment, the Ninth Cavalry Regiment, a recon squadron [that] was actually responsible for patrolling inside the DMZ territory there. We were spread out along the DMZ's south side. . . . They [Ninth] [Cavalry] [*sic*] had observation posts [and] we'd get tagged to go up and man one of those for a period and we watched and watched and watched our little friends on the other side do their thing, [while] they watched us do our thing. But at that period of time, basically the DMZ was peaceful, except for a couple of minor incidents. It was not like it was several years later when they had some blowups there.¹¹⁶

By the mid-1960s, these minor incursions failed to undermine the Seoul government and Kim escalated activity along the DMZ with entire units of insurgents and guerillas. With heightened activity, he hoped the infiltrators would form the nucleus of a renewed insurgency that would ultimately drive the Americans out of Korea altogether.¹¹⁷ Larry Ritter, who served along the Korean DMZ from 1969-1970, recalled:

I didn't know what was going to happen. I was always on edge. You're reminded of a cat in a room full of rocking chairs. You're always on edge, ready to strike. You had to be that way. You had to have your head and your ass wired together. You had to be that way and that is where I guess a lot of the . . . post-traumatic stress comes from after because of the letdown. 'Cause you [were] always on edge.¹¹⁸

In 1966, the Democratic People's Republic of Korea (DPRK) launched a four-pronged operation against the ROK, the result of which heightened allied sentry operations along the DMZ. During this incursion, North Korean troops ambushed a U.S. patrol south of the zone and killed six Americans near Panmunjom. The success of this incursion escalated DPRK infiltrations as northern subversives ambushed U.S. and South Korean patrols and even bombed a Second Infantry Division barracks south of the DMZ.

¹¹⁶ Interview with Thomas Spencer, 08 October 2001, Thomas Spencer Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 7 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0190>>.

¹¹⁷ Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 329.

¹¹⁸ Larry Ritter, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

Some insurgents managed to move farther south in an effort to commiserate with South Korean communists and renew peasant uprisings. In 1968 alone, there were more than 760 incidents in the DMZ, including 356 firefights, with a total of 500 deaths between the two sides.¹¹⁹ Squad leader Rocky Burke admitted his initial uneasiness upon arrival at the DMZ in January 1974:

One of the guys in my ranger unit had served in the z[one]. He said it was combat, it wasn't long-term combat, but it was ambushes and stuff like that, that would last maybe 30 seconds when they [were] shooting at you, you [were] shooting at them. So I was kind of apprehensive about that, I mean I talked a good story but I don't know if I really wanted to get shot at in Korea and so I was a little bit apprehensive.¹²⁰

In December 1968, an incident occurred along the DMZ involving two North Koreans who attempted to infiltrate a sector guarded by a company of U.S. infantrymen based out of Camp Wentzel. The following month, Sgt. Charles Groff of Alpha Company, Second Division of the Ninth Battalion, had “to mimic everything that transpired through that incident about ten times . . . for all [of] the dignitaries” who came through Korea on their way to Vietnam. Groff begrudgingly described the incident:

Behind us was a big high hill. On top of that hill was a search light that would traverse the fence. . . . Well, the sergeant in charge, somebody in his platoon reported to him that they heard something. You know, a strange sound that wasn't normal coming from the other side of the fence. So he sat there a while and he listened. There was something moving. There was something out there. At least, in his mind, he thought there was something. He did not know what it was. Could have been a deer 'cause the deer in Korea . . . [were] like miniature ponies. So he [got] on the telephone, talk[ed] to the guy operating the searchlight. He [said], I want you to continue traversing the fence as you normally do, when I tell you to mark, I want you to mark—you know, make a note of it where it's at—don't stop, but make a mark when I tell ya and he kept going with the floodlight. He then continued with the conversation with the guy, he says, we think we hear something

¹¹⁹ Wayne A. Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 2nd ed. (Elizabeth, N.J.: Hollym International, 1984), 19; Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 330; “Truce Village: The Last Combat Zone,” *Time*, 42.

¹²⁰ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

out there. I want you to continue normal traversing procedure and when I tell you to hit that spot, you stop and turn that light on. That's what happened. They waited about 10 minutes and when they hit that spot, he said, "now," meaning turn the light on. There were two North Koreans standing in front of him. They killed one and one got away. That's how they got the guy. And they shot right through the fence.¹²¹

In authorizing these incursions, Kim Il Sung hoped intense and repetitive insurgency operations would force the American imperialists out of Korea and undermine the anti-communist South Korean government led by President Park Chung Hee. With the U.S. military's attention diverted to the escalating war in Vietnam, the moment seemed fortuitous.¹²² Through the establishment of guerilla bases south of the DMZ, the DPRK could disrupt the political climate of South Korea, destabilize their economy, and conduct direct attacks against the ROK—all of which offered fraternal support to its Southeast Asian brethren in North Vietnam.¹²³ Military operations conducted by six- to nine-man commando teams supported by the DPRK culminated in the attempted assassination of Pres. Hee in January 1968. In October of that same year, 120 commandos of the infamous DPRK Unit 124 were unsuccessful in infiltrating Gangwon Province on the southeastern coast, resulting in the capture of seven, the escape of three, and the death of the remaining 110.¹²⁴

U.S. Army General Charles H. Bonesteel III, the commander of UN forces in Korea, had numerous advantages over Military Assistance Command, Vietnam (MACV) Gen. William C. Westmoreland. Of the four branches of the DPRK armed forces, the Korean People's Army (KPA) posed the most significant conventional threat (see Table

¹²¹ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹²² Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 329.

¹²³ Kirkbride, *DMZ: A Story of the Panmunjom*, 20.

¹²⁴ Daniel P. Bolger, *Scenes from an Unfinished War: Low Intensity Conflict in Korea 1966-1969*, Leavenworth Papers 19 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1991), 86.

4). Altogether mobilized, the KPA had the capacity to deploy approximately 34 division equivalents in the field.¹²⁵ Although UN forces along the Korean DMZ were well-trained and well-equipped to counter a conventional attack, South Korea's incongruous topography made stopping these incursions exceptionally difficult.

Table 4. Balance of Conventional Military Power in Korea (Nov. 1966)

	PERSONNEL	DPRK	UNC	U.S. PORTION
ARMY	Soldiers	345,000	600,000	50,000
	Special Operations Forces	3,000	1,000	
	Border Guards	26,000	39,000	
	Militia	1,200,000		
	Regular Divisions	24	22	2
	Reserve Divisions	10-17	10	
	Tanks	800	656	216
	Other Armored Vehicles	900	1,381	781
	Artillery	5,200	2,160	224
AIR FORCE	Airmen	30,000	28,000	5,000
	Combat Airplanes	590	265	60
	Helicopters	20	65	58
NAVY	Sailors	9,000	17,450	450
	Marines	2,000	30,050	50
	Destroyers/Frigates	0	7	
	Submarines	4	0	
	Minor Combatants	79	30	
	Landing Craft	20	23	
Auxiliaries	34	12		

Source: Data adapted from Daniel P. Bolger, *Scenes from an Unfinished War: Low Intensity Conflict in Korea 1966-1969*, Leavenworth Papers 19 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1991), 14.

The Korean DMZ, while mountainous, was well-documented, heavily guarded, and stretched a mere 151 miles. Additionally, Bonesteel maintained operational authority over the army of the ROK, thereby giving him more autonomy than Westmoreland in shaping military action against the North. According to Larry Ritter, stationed at Camp Wentzel from 1969 to 1970, ROK marines stationed along the DMZ “wanted to fight. As

¹²⁵ Bolger, *Scenes from an Unfinished War*, 13.

a matter of fact, [superior] [officers] would send them to Vietnam to fight. [North] [Koreans] would not go near them because they just wanted to fight.”¹²⁶ In fact, American sentry units were supplemented with KATUSAs, or Korean Augmentation to the United States Army forces. Serving along the Korean DMZ in the early-1960s, Lieutenant Thomas Spencer commented that the KATUSA program not only doubled military personnel stationed along the DMZ, but it “was a cultural plus.” He commented that,

Manpower-wise, it helped us. . . . [In] [terms] [of] Combat readiness, I would question whether it was truly effective. It gave us manpower, but I don’t know, because we were never tested with it by being shot at. We had one Korean sergeant in each company, which was a liaison-type sergeant who was the interpreter and the boss that controlled KATUSAs as far as what they had to do or if they got into a disciplinary problem, he solved the disciplinary problem. We didn’t mess with [it] as far as our disciplinary system, we gave it to him. His disciplinary system was pure physical, might have got [on] [the] side of brutality at times, but it was a pure physical disciplinary system. We had a Korean liaison officer assigned to battle groups who was in charge of these sergeants in each company and made them make sure they toed their line and did their thing.¹²⁷

South Korea was also a much more culturally and ideologically homogenous nation than South Vietnam, with a capable military, a stronger government, and a history of successful counterinsurgency operations, which substantially differentiated the situation along the Korean DMZ from that of Vietnam.¹²⁸

¹²⁶ Larry Ritter, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹²⁷ Interview with Thomas Spencer, 08 October 2001, Thomas Spencer Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 7 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=OH0190>>.

¹²⁸ Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 330. Unlike Ho Chi Minh, Kim Il Sung did not have the pre-independence anti-colonial pedigree. While Kim and Ho began their respective regimes in similar circumstances, Ho’s record of resisting the French made him an icon among the entire Vietnamese population. Even if North Korea eventually developed its own strong state foundations, the fact remained that in the beginning, it was very much a Soviet proxy and very much dependent on Soviet support.

Gen. Bonesteel incorporated a dual counterinsurgency campaign in order to respond to the irregular threat. The first element was to tighten security along the southern border of the DMZ. While the incorporation of additional American sentries and munitions heightened allied alertness against DPRK guerillas, it did not fundamentally transform the situation along the DMZ. In addition to stepping up patrol, ambush, and counter-infiltration training, Bonesteel erected a new defensive barrier just behind the demarcation line, known as the DMZ Security System Fence or south tape.¹²⁹ In order to infiltrate southern allied sectors of the DMZ, Ritter claimed North Korean insurgents

would have to cut their way through the fence. I mean, they had seismic stuff, too, and the thing about it, they . . . almost channeled one way or the other because of the mine fields behind 'em. There was, at the fence line . . . a buffer zone. Probably 20 feet wide and then right behind was mine fields, so they would have to channel one way in through these spider holes. . . . You didn't want to go near the fence. That's where a lot of friendly fire came from. You get near the fence, they'll open up on ya.¹³⁰

Surrounded by a thin layer of dirt that revealed footprints, the new fence was topped with a strand of barbed wire, and the surrounding defoliated area improved allied observation from foxholes and cleared UNC and ROK fields of fire. Sgt. Groff remembered:

The foliage in front of us, around us in the foxholes, you always had to keep it maintained so you can sit and be in them. You know, we had to maintain that. . . . On the other side of the fence, the foliage was growing and trees were, just like out here [in] [the] [U.S.], maybe a little thicker in certain parts, but basically that is what you would see there.¹³¹

In addition to routine manual pruning maintenance around the fence, foxholes, minefields, observation posts, and check points, regular patrols supported by rapid

¹²⁹ Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 101, 330.

¹³⁰ Larry Ritter, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹³¹ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

reaction forces rounded out the system. While these precautions did not stop every DPRK incursion, trespassers faced a challenging gauntlet that significantly increased the ability of UNC allied forces to combat North Korean infiltrators.¹³² When asked if he saw frequent combat in his sector, Sgt. Groff recalled:

You saw more infiltration. That is what basically we were protecting against, the North Koreans infiltrating down. It wasn't a large force, maybe one or two or three men on a mission of some sort to disrupt whatever. It wasn't massive, people coming down [into] [South] [Korea].¹³³

Responding to heightened sentry operations along the DMZ in 1972, North Korean Premier Kim Il Sung announced to *New York Times* correspondents that,

The U.S. Government still adopts unfriendly attitudes toward our country. Under these circumstances, we cannot but prepare ourselves always for war. The most important thing in war preparation, in my opinion, is that we educate our people in the spirit of hating the enemy. Without educating our people in this spirit we cannot defeat the U.S., which is superior in technology.¹³⁴

U.S. technological superiority over North Korea included the development, production, and dispersal of tactical herbicides developed specifically by the Department of Defense (DOD) for use in combat operations in Southeast Asia and regions with similar climates. The successful testing of various aerial dispersal methods using Air Force B-29, B-50, and C-119 aircraft spraying various mixtures of 2,4-D and 2,4,5-T proved that the dispersal of tactical herbicides from military aircraft could be achieved in combat environments as a means to clear overgrown vegetation, like that along the Korean DMZ. The development of new herbicides and new delivery systems was the responsibility of the U.S. Army Chemical Corps, specifically to the Crops Division of the

¹³² Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine*, 330.

¹³³ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹³⁴ Kim Il Sung, "Excerpts from Interview With North Korean Premier on Policy Toward the U.S.," *New York Times*, May 31, 1972, 14.

Biological Warfare Laboratories located at Fort Detrick, Maryland. By the mid-1950s, scientists tested and evaluated the aerial application dispersal methods and the herbicidal activity of various mixtures of 2,4-D and 2,4,5-T on rice and grasses at Fort Ritchie, Maryland in 1956; Dugway, Utah in 1959; and Fort Drum, New York in 1959.¹³⁵ For well over a decade, the DOD publicized its advancements in herbicidal warfare technologies, much to the consternation of North Korean Premier Kim Il Sung.

As early as 1963, CG I US Corps¹³⁶ proposed the dispersal of herbicides within the contiguous Korean DMZ to improve observation and fields of fire while simultaneously denying hostile forces the concealment provided by vegetation. U.S. Army Biological Laboratories at Fort Detrick, Maryland received a feasibility study that recommended applications of herbicides be conducted using C-123 aircraft. Predicting accusations of armistice violations as opposing air forces were “to respect the air space over the Demilitarized Zone and over the area of Korea under military control of the opposing side,” Commander in Chief, United Nations Command (CINCUNC) Guy S. Meloy, Jr. denied requests for aircraft application of herbicides.¹³⁷ In late-1963, a ROK Corps Chemical Officer reported that an undisclosed, but small, amount of 2,4-D “was used in selected areas such as observation posts and guard posts to clear fields of fire.” Denied the scientific evaluation of the herbicide, ROK Army infantry forces dispersed weak concentrations of 2,4-D to these grassy areas, unaware that the higher military-

¹³⁵ Office of the Under Secretary of Defense U.S. Army Research Office, *The History of the US Department of Defense Programs for the Testing, Evaluation, and Storage of Tactical Herbicides*, by Alvin L. Young (Cheyenne, WY: A. L. Young Consulting, 2003), 7.

¹³⁶ The I US Corps included Second Infantry Division, 98th ROK Regimental Combat Team (RCT), and Fifth ROK Marine Corps (MC) Brigade (BDE).

¹³⁷ Buckner, *Final Report, Vegetation Control Plan CY 68*, 1; Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration.

grade concentration of the herbicide specifically targeted broad leaf vegetation and that their weaker concentration had little or no effect upon the annual and perennial grasses of the region.¹³⁸

In March 1967, representatives of the Plant Sciences Laboratory of the U.S. Army Biological Laboratories toured Korea and inspected typical vegetation growth along the DMZ Security Fence.¹³⁹ The region itself sweeps from the steep eastern mountains and gradually declines to the lava plateau and basaltic ravines of the western isles.¹⁴⁰

Traversing the countryside from Gimpo International Airport in Seoul to Camp Wentzel in the western inlands in January 1969, Sgt. Groff likened the scenery to

the western [United] States, not as rocky as the Rocky Mountains, but [Korea] had some good mountains. That is what I'd compare it to. . . . [I] can't call it Appalachia because of [the] hills [and] there's no trees on the south side of the river. They cut all the tress down for heating the house and cooking. That was their source of fuel. There was no trees—nothing taller than a human being. Nothing. Then when you got across the river, the civilians weren't allowed over there unless they were working. . . . The trees on the north side of the river were full grown trees. But some of the hills were rocky, some kind of rolling like the Appalachia hills and not steep, you could climb them. You didn't have to be one of these rock climbers. . . . I was surprised to see that until I knew what the reason [was] [for] [that]. I thought it was war killed them, no it was the people just chopping 'em down.¹⁴¹

The DMZ features diverse ecological environments that vary from the Mongolian oak forests of Hyangno Peak to the rice paddies of the southwestern Civilian Control Zone (CCZ)¹⁴² and the salt marshes along the estuary of the Imjin River. The dominant flora populations that most obstructed the DMZ Security Fence included oriental cork

¹³⁸ Buckner, *Final Report, Vegetation Control Plan CY 68*, 1.

¹³⁹ *Ibid.*, 6.

¹⁴⁰ Bolger, *Scenes from an Unfinished War*, 18-19.

¹⁴¹ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

¹⁴² The CCZ is an area designated by the Armistice that controls and limits the entry and exit of civilian populations. Korean War Armistice Agreement, July 27, 1953, Treaties and Other International Agreements Series #2782, General Records of the United States Government; Record Group 11, National Archives and Record Administration.

oak, red pine, and Mongolian oak trees.¹⁴³ Identified by the DOA as “scrub,” needle leaf and broad leaf plants dominated DMZ vegetation. Trees varied in size from six to nine feet in height while various reeds and sedges obscured fields of fire from allied foxholes.¹⁴⁴

In order to clear the area and maintain agreements within the armistice, the army evaluated various manual modes of vegetation clearing, which included “hand clearing, mechanical clearing, and use of herbicides,” in relation to each method’s “effectiveness, initiation and recurring costs, and other pertinent factors,” including “adverse communist and third-country reactions.”¹⁴⁵ Evaluators selected small patches of foliage south of the DMZ not only to establish effectiveness of herbicide use, but to define the criterion for vegetation control in the region. Groff remembered wilting foliage while he was on duty along the fence because he “was trained to observe those things.” In fact, he believed that ROK personnel sprayed Agent Orange along both sides of the allied fence:

And maybe 15 feet from the fence out into the zone was sprayed that far out. What you would get [was] a clear field of fire. Plus I saw the LP [listening post] on the top of the hill. All of a sudden you could see the guys walking around without field glasses because all the vegetation from the top ten or 15 feet down the hill was gone.¹⁴⁶

Positive results yielded preparations for herbicide applications between the demarcation line and the south tape. The primary conclusion of the study was that the use of chemical defoliant to control vegetation along the DMZ, in conjunction with manual

¹⁴³ Kwang-bok Ham, *Whispers of the DMZ: All about the DMZ, a Symbol of Peace and Nature*, ed. Ŭn-jin Pak (Goyang City, Gyeonggi-do, South Korea: Wijŭdŏm Hausŭ, 2013), 106, 11.

¹⁴⁴ Buckner, *Final Report, Vegetation Control Plan CY 68, D-2*.

¹⁴⁵ *Ibid.*, 2.

¹⁴⁶ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

and mechanical means, was practical, manageable, and politically acceptable.¹⁴⁷ Systemic herbicide defoliation acted much like normal seasonal defoliation by causing leaf fall through reduction of the hormone auxin in leaf blades. Weak cells formed at the base of the leaf, thereby causing it to fall. Other damaging effects included interference with plant respiration and photosynthesis. Agent Orange was particularly effective against angiosperms, or flowering plants, by retarding growth of broad-leafed weeds. At the concentration levels used in Southeast Asia, however, these herbicides were deliberately non-selective to insure maximum and prolonged effect on a broad range of high-humidity jungle vegetation.¹⁴⁸

HQ Eighth U.S. Army (EUSA) issued defoliation instructions for First ROK Army and I US Corps to disperse test applications of available herbicides Monuron and 2,4,D on flat terrain, conducted by the Second U.S. Infantry Division, and in the mountains by the Twenty-First ROK Infantry Division. On 15 April 1968, ROK personnel began the process of defoliation by dispensing a systemic semi-permanent soil sterilant known as Monuron. A compound that inhibits photosynthesis, Monuron did not exhibit any signs of carcinogenicity in humans, but side effects included mild-to-moderate irritation to the skin, nose, and throat. Urox 22, the form of Monuron applied with granular herbicide dispensers to areas south of the DMZ, penetrated the roots of perennial and annual grasses, weeds, trees, and woody plants to inhibit and retard growth over a period of two to three months. The defoliant action of Monuron relies upon rainfall

¹⁴⁷ Buckner, *Final Report, Vegetation Control Plan CY 68*, 1-2, 5, 10; Julian E. Buckner, *Standard Operating Procedure for Vegetation Control*, (San Francisco: Department of the Army Headquarters, U.S. Army Advisory Group, Korea, 1969), 2.

¹⁴⁸ Military Herbicides, undated, No Date, Folder 13, Box 05, Paul Cecil Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 7 Feb. 2016. <<http://www.vietnam.ttu.edu/virtualarchive/items.php?item=2520513007>>.

to absorb the active ingredient into the soil and penetrate plant roots. Therefore, ROK personnel completed this initial application of Urox 22 in the days leading up to the start of monsoon season.¹⁴⁹

After the initial Monuron application targeted heavily foliated areas along the south tape, a ratio of three gallons of Agent Orange to fifty gallons of diesel was dispensed with hydro pump defoliation hand sprayers. When absorbed into the leaves, the herbicide caused rapid dehydration, defoliation, and eventual death of the plant. Effective against evergreens, shrubs, and other vines, Agent Orange allegedly posed no danger “to warm blooded animals in connection with its handling or application,” according to the DOA at the time of dispersal in 1968. The final step in the defoliation process included another herbicide, Agent Blue (cacodylic acid), which caused the woody and grassy foliage to rapidly dry, thereby starving the foliage of water and leaving the soil unsuitable for further growth.¹⁵⁰

Table 5. Priority, Scope, and Defoliant Requirements in Korea

PRIORITY	MATERIAL	QUANTITY	TOTAL ACRE COVERAGE
DMZ SECURITY SYSTEM FENCE	Monuron	390,000 lbs.	7,800
	Orange	13,140 gal.	4,300
	Blue	4,500 gal.	1,500
CPs AND OPs	Monuron	0 lbs.	0
	Orange	5,440 gal.	1,815
	Blue	4,200 gal.	1,400
ROADSIDE CLEARANCE	Monuron	0 lbs.	0
	Orange	900 gal.	300
	Blue	20,760 gal.	6,920

Source: Data adapted from Julian E. Buckner, *Final Report, Vegetation Control Plan CY 68*, (San Francisco: Department of the Army Headquarters, U.S. Army Advisory Group, Korea, 1969), G-1.

¹⁴⁹ Buckner, *Final Report, Vegetation Control Plan CY 68*, 1-2, 5, 10; Buckner, *Standard Operating Procedure for Vegetation Control*, 2.

¹⁵⁰ Buckner, *Standard Operating Procedures for Vegetation Control*, 3, 7.

In order to remain compliant with the 1953 Armistice Agreement, ROK personnel avoided herbicide application between the demarcation line and the south tape. However, dispersers gave priority to the fence itself. Herbicide application took place within a 100-meter radius on either side of the DMZ Security System Fence and around the perimeters of checkpoints and observation posts. Work details manually cleared the first 50 meters and the remaining area was treated with one or a combination of the three defoliants. Application of liquid Agents Orange and Blue began in mid-May 1968 (see Table 5). Although restrictions attempted to limit or eliminate the potential for run-off, spray drift into the area surrounding the demarcation line, and damage to food crops, U.S. troops often observed these effects as far as 200 meters downwind.¹⁵¹

Ultimately, the application of Monuron, Agent Orange, and Agent Blue along the south tape was successful “as it provided a clear area for observation and fields of fire and to a certain degree improved the effectiveness of night vision devices by producing an area of high contrast.” Areas surrounding observation posts and check points exposed these installations to enemy observation. Roadside clearance, however, was less effective because the width of the area covered—less than 30 meters on each side—was not adequate enough to protect allied military transports and convoys from ambush.¹⁵²

The following year, the Departments of Agriculture, Interior, and Health, Education, and Welfare formally announced a ban on the domestic production, sale, and use of herbicides containing 2,4,5-T. Few Americans were aware that common household weed killers such as Scotts Turf Builder, Scotts Kancel Weed Killer, Amchem Garden

¹⁵¹ Ted Sypko, “Korea DMZ Vets & Agent Orange,” *VFW, Veterans of Foreign Wars Magazine*, January 2004, 44.

¹⁵² Buckner, *Final Report, Vegetation Control Plan CY 68*, 15.

Weeder, Plus-1, Ortho Brush, and Ortho Triox Liquid contained 2,4,5-T as the main herbicidal agent.¹⁵³ In a Department of the Interior news release, the government departments collectively claimed that “2,4,5-T, as well as its contaminant, dioxins, may produce abnormal development in unborn animals. Nearly pure 2,4,5-T was reported to cause birth defects when injected at high doses into experimental pregnant mice.” The effects of Agent Orange on humans were unavailable at the time of the announcement.¹⁵⁴

The suspension of all commercial herbicides containing 2,4,5-T in April 1970 included those higher concentration, military-grade defoliants used abroad in Southeast Asia. As a result of this action, the use of Monuron, Agent Orange, and Agent Blue along the Korean DMZ ceased immediately. Allied ROK and UNC personnel completed any future foliage reduction manually with axes, machetes, and mechanized handsaws. The inability to disperse chemical herbicides was problematic in 1976 when North Korean personnel became verbally and physically combative against UNC personnel over the pruning of a large poplar tree that obstructed the view of a checkpoint in the JSA at Panmunjom.

Colloquially labeled “The Loneliest Outpost,”¹⁵⁵ UNC Checkpoint Three connects to UNC Checkpoint Five by way of The Bridge of No Return, over which the exchange of North and South Korean prisoners of war occurred following the armistice in July 1953. Between these checkpoints stood a Normandy poplar tree that annually blocked the view between these two checkpoints when its foliage filled out in the summer

¹⁵³ Martini, *Agent Orange: History, Science, and the Politics of Uncertainty*, 97; “U.S. Curbs Sales of a Weed Killer: Also Suspends 2,4,5-T Use as Defoliant in Vietnam,” *New York Times*, April 20, 1970, 29.

¹⁵⁴ Office of the Secretary of the Interior, *Home Use of 2,4,5,-T Suspended*, (Washington, D.C.: Department of the Interior, 1970), 1.

¹⁵⁵ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

months. During this time, a Korean Service Corps (KSC) workforce manually trimmed the tree.¹⁵⁶ In the summer of 1974, a KSC work party made its annual pilgrimage, which included U.S. Army scout Rocky Burke, who described the scene:

Right on the other side of this bridge was a [North] Korean building [where] . . . they kept a whole bunch of Korean soldiers. . . . It was their quick reaction force and so if anything happened, these guys would come pouring across that bridge We had an escape road that if something happened, we could get out, [but] the North Koreans would put drop gates on everything. And a drop gate could stop a jeep, [but] it couldn't really stop a deuce-and-a-half [M35] [Cargo] [Truck] but it could really slow it down on all the different roads there, so that they could stop us if we tried to leave. . . . [The] [North] [Koreans] didn't like that, so they decided to build a checkpoint and drop gate on our recently-built escape road. While they're doing that, there was a tree—I think they said it was a poplar tree—and this tree obstructed the view from OP5 to that new checkpoint. It had been okay until that new checkpoint was being built, so when it obstructed the view, we decided that we had to trim the tree. It was a bad situation because it was right there next to the Bridge of No Return and so [the] [North] [Koreans] could [militarily] reinforce what happened there instantly. When I was there, they sent us down . . . to trim that tree. And I had been there a pretty long time, I was a senior—kinda an NCO there, because everybody rotated home after a year and we had a new lieutenant. So we went . . . to cut that tree down and we had some civilian workers with axes, some saws, and ladders. . . . So we got there, we got out, we deployed, put the ladders on the tree and all that. This North Korean captain, Captain Pak, showed up, actually he came across the bridge, I don't know how, he showed up with maybe about ten guys and he was standing there and he said, "If you cut that tree, you will be dead before it hits the ground." And so, I didn't doubt him at all. . . . So we got back on the truck and left.¹⁵⁷

Two years later, on 18 August 1976, the confrontation reprised itself as a contingent that included two American officers—Captain Arthur G. Bonifas and First Lieutenant Mark T. Barrett—an ROK officer, and eight enlisted UNC guards set off down the Bridge of No Return to prune the massive 82-foot poplar tree. A West Point graduate, Capt. Bonifas spent the previous year commanding South Korea's elite guards and was, therefore, the most experienced officer to lead the team. Lt. Barrett, on the other

¹⁵⁶ Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 28.

¹⁵⁷ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

hand, was only in the first month of his projected twelve-month tenure along the Korean DMZ. Work began peacefully at 10:40 am as three members of the work party, Kim Chil Young, Chang Thong Chi, and Sohn Won Son, climbed the tree. The team brought axes, small handsaws, larger manual and motorized saws, and one machete to the site, leaving the bulk of the equipment exposed beneath the tree. Supervisors Kwak Hi Hwan and Lee Hyong No remained under the tree to remove fallen branches and foliage from the site.¹⁵⁸

North Korean Lieutenant Pak Chul, accompanied by ten guards, arrived within minutes of the work party's annual pruning ritual. Pak and his guards observed the South Korean maintenance detail armed with axes, saws, and machetes, directed by two American imperialist aggressors. As head of the work team, Hwan could not forget the ominous North Korean warning: "Don't cut the tree, or we will kill you." A heated verbal exchange subsequently took place between Lt. Pak and Capt. Bonifas as Pak demanded the work cease until the status of the tree could be determined at a security officer's meeting.¹⁵⁹ Pak's aggressive behavior was neither uncommon nor undocumented and required equally threatening counter behavior.

What you did [was] play mind games with those guys. Like Captain Pak, we dealt with him all the time. One of the strategies that we used was we would stay close to him and it's like, okay you got a lot more guys, et cetera, et cetera, but I am going to grab your ass and I am going to get you. You guys are going to get all of us, I guess, but definitely we're going to get you. And that is what we did and it worked pretty good.¹⁶⁰

However, Bonifas's refusal to comply with Pak's directive proffered heightened verbal threats to the entire work detail. Pak sent a subordinate across the bridge and

¹⁵⁸ Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 29; "Sudden Death at Checkpoint Three," *Time*, August 30, 1976, 42.

¹⁵⁹ *Ibid.*, 30, 29.

¹⁶⁰ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

within minutes, an additional 20 North Korean guards crossed the bridge and arrived on the scene. Bonifas, like the commanders before him, was no stranger to aggressive verbal threats from “Bulldog” Pak and was comfortable turning his back on the lieutenant to reassure the apprehensive work party. Interpreting Bonifas’s behavior as a personal affront and show of disrespect to the authority of North Korea, Pak removed his Seiko watch from his wrist, neatly wrapped it in his handkerchief—undoubtedly to prevent soiling this treasure with the blood of U.S. imperial aggressors—and carefully placed it in his pocket. Seconds later, he shouted the order to kill.¹⁶¹

While on sentry duty from atop the elevated UNC Checkpoint Five that overlooked the Bridge of No Return, Corporal Timothy Gray recorded the chaotic scuffle using a movie camera and telephoto lens. Snippets of his film aired the following night on national news outlets in the United States and ultimately helped military analysts determine the cause of the hysteria.¹⁶² Recounting the incident from acquired knowledge and training, Burke recalled,

It had been like ten to ten and then it ended up being like 30 to ten or something like that. When that incident happened, they all jumped the captain, Captain Bonifas, and killed him. The Korean service workers, the civilians, they all kinda hauled ass and they left their axes and stuff and so the North Koreans picked up some of their axes. There was the captain and the first lieutenant. The first lieutenant had gone down into this little grassy area to help one of the guys, there was a little wall there and I think somebody got pushed over the wall or something like that. . . . But [the] [North] [Koreans] just whooped up on them, on the Americans.¹⁶³

¹⁶¹ Brandon K. Gauthier, “When Two Americans Were Axed to Death by N. Korean Soldiers,” *NK News*, August 20, 2013, accessed February 2, 2016, <https://www.nknews.org/2013/08/when-two-americans-were-axed-to-death-by-n-korean-soldiers/>; Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas; Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 30; Reed P. Probst, *Negotiating with the North Koreans: The U.S. Experience at Panmunjom*, (Carlisle, PA: U.S. Army War College, 1977), 8.

¹⁶² Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 31.

¹⁶³ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

Distracted by the workers, Capt. Bonifas did not notice Lt. Pak's suspicious behavior. He was ambushed and bludgeoned to death by at least five KPA guards armed with clubs, metal pipes, and the axes left behind by the fleeing South Korean work detail. Savagely beaten to the point of death, the maimed body of Bonifas's deputy, Lt. Barrett, was found in a forested area 50 meters east of Checkpoint Three. The skirmish ended within minutes when a UNC driver drove his truck over Bonifas's body to prevent further attacks. The UNC guards who accompanied the work party scattered from the area after repeated attacks by KPA guards.¹⁶⁴ In accordance with the 1953 Armistice Agreement, allied guards posted in the JSA carried a .45 auto capacity pistol. Rocky Burke confirmed:

All the North Koreans carried the little nine millimeter, but if you pulled your weapon, you were always outnumbered. So if you pulled your weapon and then they pulled theirs, you were out of luck, you would be dead. It was really drilled into you, you [did] [not] use your weapon. It was all like intimidation stuff. Incidents that had happened before us, guys had gotten beaten really badly.¹⁶⁵

While all military personnel stationed in the JSA carried a firearm, the brief two-minute skirmish only involved hand-to-hand combat with the pruning equipment left by the retreating work detail.

Immediately following the incident, USFK Command issued a DEFCON order and a response team comprised of South Korean special operations units deployed into the JSA. Although the incident concluded peacefully with Kim Il

¹⁶⁴ "Sudden Death at Checkpoint Three," *Time*, 42; Gauthier, "When Two Americans Were Axed to Death by N. Korean Soldiers"; Kirkbride, *DMZ: A Story of the Panmunjom Axe Murder*, 30, 31.

¹⁶⁵ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

Sung's official expression of regret,¹⁶⁶ guards stationed inside the JSA remained on high alert. On 19 August, the DPRK issued a statement that challenged the series of events transmitted to U.S. audiences. In fact, U.S. national news media, according to North Korean propaganda, "contented itself with a bicentennial orgy of jingoist one-sided reportage" after Reuters reported that two American officers "died from massive head injuries and stab wounds inflicted by about 30 North Korean guards."¹⁶⁷

The Korean Central News Agency of the DPRK reported the incident as a provocation by allied UNC forces who "committed the unbearable insulting act of hurling invectives and spitting at the security personnel" of North Korea. Facing numerical superiority, including "30 hooligans" led by U.S. imperialist aggressors, DPRK security personnel acted in self-defense against the allegedly premeditated plans of U.S. forces. The account went on to suggest that allied forces at the JSA planned the attack, having made "preparations for photographing it."¹⁶⁸ The incident itself and embellished reporting could have been avoided had military applications of Agent Orange continued along the Korean DMZ. Rocky Burke did not know how UNC personnel "would have really applied [the] [herbicide]. It was a big tree and . . .

¹⁶⁶ "It is regretful that an incident occurred in the Joint Security Area, Panmunjom, at this time. An effort must be made so that such incidents may not recur in the future." Kim urged allied forces to prevent provocation because North Koreans would "never provoke first, but take self-defensive measures only when provocation occurs." Kim Il Sung quoted in "North Korea Leaders Calls DMZ Incident 'Regretful': U.S. Rejects Message, Says That Forces Will Remain on Alert in Wake of Killing of Two Americans," *New York Times*, August 23, 1972, 6.

¹⁶⁷ Ham, *Whispers of the DMZ*, 63; "U.S. Newspaper "The Guardian" Edits Special Writeups on August 26" in *The Truth of the Panmunjom Incident* (Pyongyang, Korea: Foreign Languages Pub. House, 1976), 24; "Two U.S. Officers Hacked to Death," *Korea Herald* (Seoul, Korea), August 28, 1976.

¹⁶⁸ "Statement of the Korean Central News Agency," in *The Truth of the Panmunjom Incident*, 7.

it was not really problem until the North Koreans built that checkpoint . . . [when] [allied] [forces] had to have a different lane of vision.”¹⁶⁹

Not unlike the concurrent situation in Vietnam, hostilities along the Korean DMZ in the late-1960s rarely reflected the classic image of war enumerated in U.S. Army doctrine. Of the defensive operations conducted by UNC forces, the land anti-infiltration role along the DMZ was crucial. Frequent hostile incursions exercised by DPRK units forced Gen. Bonesteel to employ front-line U.S. and ROK divisions who were “responsible for both the DMZ security mission and the defense mission.”¹⁷⁰ Citing numerous patrolling and ambush casualties in 1967, Bonesteel concentrated his efforts to protect his subordinates with anti-infiltration training. This change in defensive policy ultimately included the dispersal of chemical herbicides to clear vegetation along the DMZ Security System Fence, check points, observation posts, and the foxholes from which daily anti-infiltration observation operations took place. Starting in April 1968, ROK personnel work details dispersed concentrated amounts of military-grade Monuron, Agent Orange, and Agent Blue in response to repeated DPRK threats.

In the year prior to the curtailment of all herbicides containing dioxin-contaminated 2,4,5-T, allied U.S.-ROK forces had enough defoliant to clear 24,115 acres along the contiguous Korean DMZ.¹⁷¹ Lamenting retrospectively over the barren mountainsides that now prominently display opposing military observation platforms at Ulji and Mt. Kachil, Lee Si-Woo commented,

¹⁶⁹ Rocky Burke, interview by Heather Haley, digital recording, 19 September 2015, San Antonio, Texas.

¹⁷⁰ Gen. Charles Bonesteel, III quoted in Bolger, *Scenes from an Unfinished War*, 46.

¹⁷¹ Buckner, *Final Report, Vegetation Control Plan CY 68*, G-1.

It's been fifty years since the war ended, and so there should be trees that are nearly fifty years old. A resident told me that the mountains are treeless because of a defoliant. . . . I used to think that the DMZ and the Mintongsun area should be an ecological paradise, but now I'm not so sure any more.¹⁷²

The DOA undoubtedly recognized the tactical significance of Agent Orange—and the successful defoliant operations in Vietnam—when it authorized dispersal along the DMZ as the means to force DPRK insurgents farther from the demarcation line. This action not only made it difficult for guerilla forces to ambush patrols, convoys, and sentry operations, but helped Gen. Bonesteel maintain his grip over ROK personnel. Unfortunately, the restriction of herbicide production, sale, and use in April 1970 prevented dispersal of Agent Orange at Panmunjom. This action forced a UNC work detail, led by two American officers, to prune a towering Normandy poplar tree manually in August 1976. The use of tactical herbicides not only would have prevented manual pruning, but also the deaths of two American officers. Despite this unfortunate incident, herbicide dispersal along the Korean DMZ led to successful allied UNC and ROK anti-infiltration operations and reduced casualties.

¹⁷² Lee Si-Woo, *Life on the Edge of the DMZ*, trans. Myung-Hee Kim (Folkestone: Global Oriental, 2007), 210.

IV. CONCLUSION

In 1964, prior to contracting with the Department of Defense (DOD) to produce military-grade herbicides for dispersal in Vietnam, researchers at the Dow Chemical Corporation discovered the 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) contamination in their products intended for domestic consumer use. Dow officials responded by defining a threshold for TCDD and closely monitored production thereafter to ensure that no defoliants contained dioxin above that level. This information was not disclosed for well over a decade, until Vietnam veterans brought national attention to their class action lawsuit against American chemical manufacturers, including Dow Monsanto, and Diamond Shamrock, concerning the effects of Agent Orange on their health.¹⁷³

As early as 1966, American scientists and researchers argued against the U.S.-initiated use of chemical warfare agents—both defoliants and anti-personnel gases—in Vietnam. While the official narrative claims ignorance to the direct exposure of American troops, Sgt. Charles Sims distinctly remembered:

[Sorties] on occasion dropped CS [tear] gas . . . which [was] very very unpleasant. Very unpleasant. [Officials] will deny that, yes, they used CS gas in places [where] they thought the enemy were, so they did not expose [their] [own] troops to the gas. They damn sure did and did [so] on a regular basis.¹⁷⁴

Fearing the United States would set a precedent for the international proliferation of biological and herbicidal weapons, scientists publicly expressed their apprehension with the *New York Times*:

The United States, along with other nations recognizes that the use of even the smallest nuclear artillery shell in war would raise issues of extreme gravity. It

¹⁷³ Bridger, *Scientists at War*, 100.

¹⁷⁴ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

would break down barriers to the use of more powerful nuclear weapons, and no one could tell where the escalation might end. The use of chemical or biological weapons, even relatively mild ones, involves similar dangers.¹⁷⁵

At the time of the announcement, scientific concern lay more with the environmental effects of picloram, the Dow-produced active defoliant ingredient in Agent White. Unlike the shorter-lived phenoxyacetic acids, picloram could remain in the soil for two or more years and had the potential enter the digestive tract of a mule that ingested contaminated foliage.¹⁷⁶ Thus, picloram not only affected the indigenous flora, but the natural ecosystem of the region. In response to publicized concerns from the scientific community, Fred Tschirley, assistant chief of the Crop Protection Research Branch of the Agricultural Research Service, concluded that the “herbicides used in Vietnam [were] only moderately toxic to warm-blooded animals.”¹⁷⁷

As the scientific debate progressed in the United States, Ranch Hand sorties routinely defoliated select areas in Vietnam in order to increase visibility and to prevent roadside ambushes. Herbicide dispersal as a component of counterinsurgency operations did not prove successful as MACV Commander Gen. William C. Westmoreland relied on defoliants as a means to force noncombatants out of areas targeted for herbicide missions. While Agent Orange and the additional rainbow herbicides had tangible short-term tactical successes, the larger pacification strategy failed because forcing the indigenous Vietnamese populations out of their ancestral lands and into government-operated strategic hamlets proved ineffective.

¹⁷⁵ “22 Scientists Bid Johnson Bar Chemical Weapons in Vietnam,” *The New York Times*, September 20, 1966.

¹⁷⁶ Bridger, *Scientists at War*, 97.

¹⁷⁷ Fred H. Tschirley, “Defoliation in Vietnam,” *Science* 163, no. 3869 (February 21, 1969): 785.

However, defoliant operations involving the use of Agent Orange along Vietnam's inland waterways had favorable results in relation to the imperative of saving American lives. Sgt. Sims likened the convoys through the Central Highlands to the situation along the inland rivers claiming,

Going up a highway with a line haul convoy [was] very much like [a] PBR [patrol]. You [were] in a fixed place . . . an easy target, and they sprayed enormous amounts of Agent Orange to drive the jungle back away from the edge of the river. The same thing with, mainly, Highway 19 and they had to spray it often because even after they killed off all of the trees, this grass . . . would grow like crazy. Even though the Agent Orange killed it dead, it would regenerate and come back quick. So they would have to keep spraying it. . . [Highway] 19 was one of the heaviest-sprayed areas in Vietnam, so we were not only exposed to this stuff, we were in the back of these open gun trucks going down the highway stirring up dust. Sometimes at night, the guys would get to coughing from all that dust and, this is kind of gross, but just hacking up brown red clay dirt. Just horrible. Just horrible trying to get that out of their lungs. So we [were] not only getting the effects of the spray, we were getting all this [contaminated] dirt. Of course . . . we were quite happy when we would see the Air Force planes come over spraying because that was keeping us alive by pushing the grass and the jungle back 100 meters or so on each side. . . . So, we were happy to see them, although it kind of pissed us off when they got us wet. The official Army [reports] will claim that did not happen. They made a point not to spray troops in the field. [But] they damn sure did. They sprayed us regularly.¹⁷⁸

After taking command of all naval forces in Vietnam, including the brown water navy, Adm. Elmo R. Zumwalt III authorized Agent Orange dispersal along canals and rivers in order to force VC and NVA guerillas farther inland. The implementation of herbicide operations by the brown water navy made it difficult for insurgents to attack swift boat and PBR patrols and helped the U.S. maintain operational authority along Vietnamese rivers and canals. However, these smaller operational achievements failed to transform into U.S. strategic victory in Vietnam.

¹⁷⁸ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

Like the concurrent situation along the inland waterways of Vietnam, hostilities along the Korean Demilitarized Zone (DMZ) in the late-1960s rarely reflected the traditional image of war disseminated to American troops in basic training. Prior to 1967, most detection of North Korean insurgents along the DMZ occurred by chance and often resulted in hostile engagements and numerous casualties. Gen. Charles H. Bonesteel III imposed anti-infiltration tactics that hindered and neutralized intruders, which included the constant patrolling of the fence itself. Routes and timings of sentry patrols changed frequently in order to confuse Korean People's Army (KPA) observers.¹⁷⁹

Bonesteel's change in counterinsurgency policy ultimately included the dispersal of chemical herbicides to clear overgrown vegetation along the DMZ Security System Fence, observation posts, check points, and the foxholes from which daily observation operations took place. Starting in April 1968, Republic of Korea (ROK) personnel dispersed concentrated amounts of Monuron, Agent Orange, and Agent Blue in order to improve observation and clear fields of fire. While on patrol along the DMZ fence after a successful herbicide dispersal operation, Sgt. Charles Groff observed,

all the vegetation was basically gone. Not gone in the way it disappeared, but it was dead like winter, where winter comes and its cold and the sun [is] gone and it wilts and it dies. All this stuff was just dead . . . [but] the morning before when we left it was normal.¹⁸⁰

¹⁷⁹ Bolger, *Scenes from an Unfinished War*, 47.

¹⁸⁰ Charles Groff, interview by Heather Haley, digital recording, 24 September 2015, San Antonio, Texas.

Like the application of herbicides along inland waterways in Vietnam, defoliation operations along the Korean DMZ and around observation posts and checkpoints saved American lives.

In 1966, Bionetics Research Lab in Bethesda, Maryland completed a study of the effects of high doses of 2,4,5,-T on laboratory mice. Researchers concluded that exposure to Agent Orange caused birth defects and stillborn young. However, this study did not reach the Food and Drug Administration until the fall of 1968. It was not until the spring of 1970 that the Pentagon announced the suspension of all Agent Orange use after the Department of Agriculture curtailed the domestic production, sale, and use of products containing 2,4,5,-T.

Ultimately, the suspension of herbicide operations along the Korean DMZ prohibited use in 1976 when a United Nations Command (UNC) work detail, led by Capt. Arthur Bonifas and Lt. Mark Barrett, attempted to prune a poplar tree that towered at 25 meters and blocked the view between check points on the Bridge of No Return. A scuffle between Korean People's Army (KPA) personnel and the work detail broke out within minutes and resulted in the brutal deaths of the two officers. The use of defoliants not only would have prevented the necessity for pruning work details, but also the deaths of the two American officers. Despite this unfortunate incident, herbicide dispersal along the Korean DMZ led to successful anti-infiltration operations and reduced casualties. Speaking retrospectively, one involved veteran commented, "if we had to do it over again, we would go with the Agent Orange . . . because we may be sick now, but [we] would not be here without it."¹⁸¹

¹⁸¹ Charles Sims, interview by Heather Haley, digital recording, 20 March 2016, San Marcos, Texas.

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