



CURRICULUM VITAE



2023 NOVEMBER

DR. WAYNE DWERNYCHUK

B.Sc. [Hons. Zoology], M.Sc. [Zoology], Ph.D. [Biology]

ENVIRONMENTAL SCIENTIST

AGENT ORANGE SPECIALIST

BRITISH COLUMBIA

CANADA

(Senior Vice President, Hatfield Consultants Ltd., Retired 2006)

C-123 AGENT ORANGE SPRAY PLANES, SOUTHERN VIETNAM (AP Photo)

(See Related Agent Orange & Unexploded Ordnance [UXO] Photos Pages 25 - 40)



SUMMARY OF EXPERIENCE

Dr. Dwernychuk has designed, implemented, and authored numerous environmental assessments and monitoring studies for over 45 years. The impact of industrial developments (existing and proposed) on physical/chemical/biological components of ecological systems constitutes a major segment of his expertise. The integration of water quality/physical data with biological information has been a key approach in understanding temporal and spatial changes in biological communities as they may relate to potential sources of environmental perturbations.

Dr. Dwernychuk has functioned extensively in the capacity of Project Director/Advisor, Project Manager, and Principal Scientist responsible for all aspects of projects, including compliance to budgets and schedules, in conjunction with administrative/liaison duties associated with environmental investigations. Project planning, experimental design, data collection, analyses, and authorship of interpretive documents have been primary responsibilities.

Dr. Dwernychuk has been extensively involved in study design and the execution of environmental monitoring programs in Canada and abroad. The environmental assessment of chemical contaminants and physical disruptions on biological systems forms a substantial segment of his expertise. He served as Chief Scientist for Hatfield Consultants comprehensive studies in Viet Nam from 1994 through 2006 involving the impact of dioxins on the environment and humans. Dioxin was present in the Agent Orange herbicide mixture which was sprayed extensively over southern Viet Nam during the American/Viet Nam War. Mitigative strategies were developed to address chemical contamination in populated areas.

Dr. Dwernychuk was involved in Hatfield Consultants' investigation in Viet Nam focussing on landmines, unexploded ordnance, and chemical contamination, which was an integrated approach to landmine/unexploded ordnance clearance in areas also potentially contaminated with war chemicals (i.e., herbicides, explosives, etc.).

Dr. Dwernychuk also served as a Director/Senior Scientist for Hatfield Consultants' joint-venture companies in Indonesia (PT Hatfindo Prima) and Thailand (Pro-En Envirosiences Ltd.). He retired from his position of Senior Vice President and part owner of Hatfield Consultants Ltd. in November 2006; however he continues to serve as a senior scientific advisor to Hatfield Consultants on select projects.

POINT OF INTEREST

Early on in Dr. Dwernychuk's career, he, through his research on island-nesting waterfowl (1965 - 1967), documented peculiar behavioral patterns in the selection of nesting habitat. Nesting waterfowl on the islands were constructing their nests among gull colonies. On the islands, colonial gulls would provide protection to waterfowl nests/eggs by attacking other avian predators (e.g., crows, magpies). Gulls would completely ignore the existence of waterfowl nests and eggs on the islands. Subsequent

to hatching of waterfowl eggs, while females were leading their ducklings to water, waterfowl families would again be ignored by gulls as they 'waddled' through the gull colonies, with adult gulls making way for females and their ducklings. However, once the waterfowl family entered the water and were metres off shore, gulls would attack the family, and, in many cases, devour all the ducklings while mothers frantically tried to protect their little ones. An anthropogenic interpretation of these events states that these island-nesting waterfowl were 'trapped' into a false sense of security thought to be provided by colonial gulls in their provision of protection from other avian predators.

In 1972, Dwernychuk and his research advisor on his M.Sc. program (Dr. D. A. Boag) formulated and published the concept of the 'ecological trap'. Ecological traps are scenarios in which rapid environmental change and certain ecological factors lead organisms to prefer poor-quality habitats, which may result in detrimental consequences for the wildlife species in question.

More on the ecological trap concept may be reviewed at:

https://en.wikipedia.org/wiki/Ecological_trap

A SAMPLING OF ARTICLES/COMMENTS

- <https://www.hatfieldgroup.com/wp-content/uploads/2020/05/chemosphere-hotspots.pdf>
- <https://www.hatfieldgroup.com/wp-content/uploads/2020/05/chemosphere-1.pdf>
- <http://www.salem-news.com/articles/february022012/ao-controversy-wd.php>
- <https://www.japantimes.co.jp/community/2013/08/26/voices/denials-of-defoliant-at-former-u-s-base-site-in-okinawa-fly-in-the-face-of-science/#.XmUtdKhKhPY>
- **HATFIELD CONSULTANTS ON '60 MINUTES (CBS NETWORK):**
 - <https://youtu.be/gFLdfR7O9xc?t=18>

EDUCATION

- 1975 Doctor of Philosophy (Biology), University of Saskatchewan, Regina, Saskatchewan, Canada
- 1968 Master of Science (Zoology), University of Alberta, Edmonton, Alberta, Canada
- 1967 Bachelor of Science with Honours (Zoology), University of Alberta, Edmonton, Alberta, Canada

AWARDS AND SCHOLARSHIPS

- Queen Elizabeth Scholarship (2): 1964-65, 1965-66
- University of Alberta First Class Standing Prize (1): 1964-65
- National Research Council of Canada Scholarship (4): 1967-68, 1968-69, 1970-71, 1971-72
- Canadian Wildlife Service Scholarship (3): 1969-70, 1972-73, 1973-74
- University of Saskatchewan Graduate Scholarship (3): 1972-73, 1973-74, 1974-75

HONOURARY AWARD

Dr. Dwernychuk was nominated by the Vietnam Veterans of America and Associates of Vietnam Veterans of America, and on September 22, 2002, invested into *The Legion of Honor* of "The Chapel of Four Chaplains" (https://en.wikipedia.org/wiki/Four_Chaplains#Chapel_of_Four_Chaplains). This honor was bestowed for his work on Agent Orange, and for recognition of Hatfield Consultants' research in Vietnam on Agent Orange and the benefits accrued to Vietnam Veterans and their families as a result of these studies. Dr. Dwernychuk is only the fifth Canadian to be invested into the *Legion of Honor* since its inception in the late 1940's, and the first Canadian west of Ontario.

SPECIFIC CAREER EXPERIENCE

The following synopses are presented as a general overview of studies with which Dr. Dwernychuk has had direct involvement:

- Viet Nam/ Agent Orange/ Dioxin
- Initial Environmental Evaluation Studies
 - Mining
 - Pipeline Construction
 - Thermal Power Plant
 - Housing Development
 - Oil Exploration
- Environmental Impact Assessment of Industrial Operations/Discharges
 - Mining
 - Pulp and Paper/Forest Industry
 - Chemical Industry

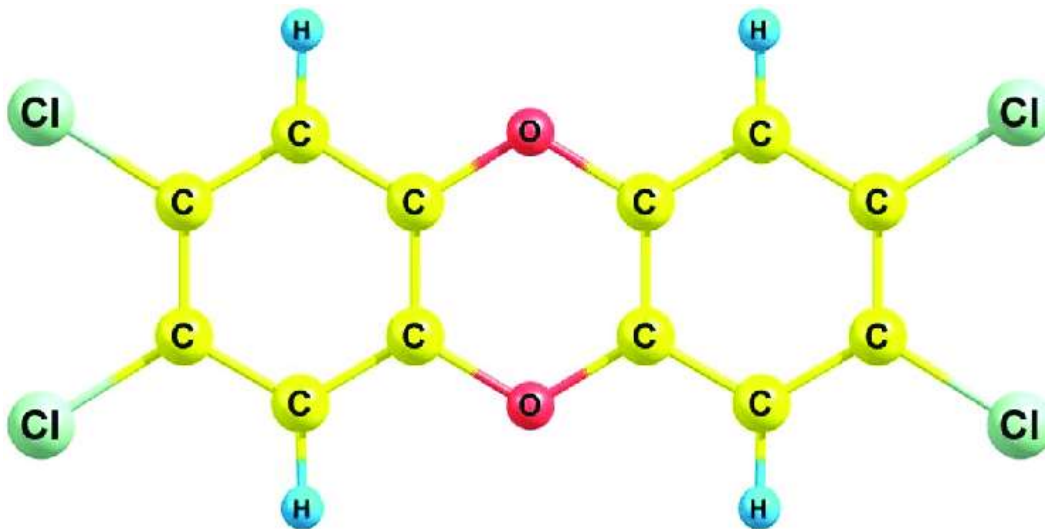
- Other Investigations
 - Pulp and Paper/Forest Industry
 - Fisheries
 - Impact Assessments
- Aquaculture Related Studies

COUNTRY EXPERIENCE

- | | | | |
|-------------|-----------|---------------|-------------|
| • Argentina | • Sweden | • Turkey | • Vietnam |
| • Chile | • Finland | • Thailand | • Nigeria |
| • Italy | • Russia | • Indonesia | • Germany |
| • Singapore | • Laos | • Philippines | • Hong Kong |

KEY PROJECT EXPERIENCE

Viet Nam/Agent Orange/Dioxin



2,3,7,8 - Tetrachlorodibenzo-p-dioxin = TCDD = DIOXIN

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- Twenty three years after I wrote a comprehensive report on the Agent Orange/Dioxin levels in the environment and humans inhabiting villages in close proximity to a former US Special Forces Base in southern Vietnam during the war, contaminant clean-up has occurred. A recent publication in Vietnam outlines this success. It has taken a considerable length of time of reach this time in history. <https://en.vietnamplus.vn/a-so-airport-cleared-from-dioxin-contamination/270103.vnp> . 2023
 - **Jack R. Greenwood** - Mr. Greenwood served as a mechanic for the US military during the Vietnam War on the Travis Air Force Base in California. Vehicles (wheeled and tracked) were returned to the US mainland for repairs. These machines were covered in dirt/soil from use in Vietnam. Mr. Greenwood repaired these machines that were potentially contaminated with Agent Orange/dioxin. I was asked to provide an opinion regarding his potential exposure to dioxin during the repair of these vehicles. 2023
 - **George Black** - Mr. Black's book 'THE LONG RECKONING' was published March 2023. This excellent literary work delves into the convulsions of both the American and Vietnamese governments during the war. In addition, it generously describes the ground breaking research on Agent Orange Hatfield Consultants (my former company) performed in the A Luoi Valley (known as the A Shau Valley during the war) which clearly elucidates the responsibility of the US government, regarding the ecological and human health catastrophes of their herbicide program (Ranch Hand) during that conflict. 2023
 - **Dr. Charles Bailey** - Dr. Bailey interviewed Dr. Dwernychuk with a number of questions he posed regarding a series of reports and a scientific publication addressing a dioxin investigation in Vietnam. The study was in the Phong My commue just north of the A Luoi Valley, west of Hue. The commune is situated in the Phong Dien District. 2022
 - **Military-Veterans Advocacy, Inc., United States** - Commander J. B. Wells U. S. Navy (Retired), Chairman, requested a professional opinion regarding dioxin contamination (TCDD/DIOXIN) associated with the Fleet Air Support Unit (FASU) terminal at the Da Nang airbase and staged cargo at the terminal, including the Carrier Onboard Delivery (COD) aircraft. This opinion was directed toward contaminated cargo and Navy personnel frequenting FASU and COD related to aircraft carrier replenishment. 2022

- **Mr. John Rossie** – Mr. Rossie, a Vietnam Veteran, requested a professional opinion regarding the movement of contaminated (TCDD/DIOXIN) items from mainland Vietnam to aircraft carriers during the Vietnam War. 2022
- **Mr. George Black** – Mr. Black, a New York author requested I review/edit his forthcoming book: “The Long Reckoning – A Story of War, Peace, and Redemption in Vietnam.” 2021
- **Mr. John T. Biciocchi** – This Vietnam War Veteran requested a professional opinion from Dr. Dwernychuk regarding his potential exposure to Agent Orange during his service at the Nakhon Phanom (NKP) Air Force Base in Thailand. The VA APPEAL BOARD granted a Permanent Total Disability Award. 2021/2022
- **Dr. Kenneth R. Olson and Dr. Larry Cihacek** – Dr. Dwernychuk provided editorial comments on the paper entitled “The Fate of Agent Blue, the Arsenic Based Herbicide, Used in South Vietnam during the Vietnam War” ... https://www.scirp.org/pdf/ojss_2020112716124414.pdf . 2020
- **“The Travels of Orange and Other Toxins”** - Dr. Dwernychuk edited this book and assisted the author, Donna Tornoe, during the course of her writing and producing the final. Her efforts focussed on the examination of herbicides in the Panama Canal Zone. 2020
- **Contract employee working to repair and overhaul damaged helicopter returned to the US from Vietnam at the Corpus Christi US Army Depot, Texas.** Some of these choppers were used for spraying Agent Orange. I was asked to provide an opinion as to the potential of this employee being contaminated with herbicide during the performance of his duties. It is believed Agent Orange residues were present on the interiors for these choppers. 2020
- **J. R. Richardson Served on the USS RANGER Aircraft Carrier during the Vietnam War** – The Board of Veterans’ Appeals requested an opinion on the likelihood of this veteran being exposed to Dioxin contaminated mail bags, which were delivered to the carrier from a site near the Ranch Hand Agent Orange location at Da Nang airbase. He was granted AO exposure for diabetes. 2020/2022
- **Military-Veterans Advocacy, Inc., United States** – Dr. Dwernychuk provided a written scientific opinion regarding the exposure to Agent Orange of U.S. military personnel serving on Johnston Atoll where over 32,000 55 gallon barrels of Agent Orange were being stored after the Vietnam War. 2020
- **Military-Veterans Advocacy, Inc., United States** – Dr. Dwernychuk provided a written scientific opinion regarding the exposure to Agent Orange of U.S. military

personnel serving on over 50 U.S. military installations in Thailand during the Vietnam War. Agent Orange was used for base perimeter spraying and also throughout the confines of each of these military installations. **2020**

- **The New York Times Magazine/Mr. George Black** – The New York Times Magazine commissioned Mr. George Black, a journalist/author, to prepare an article on Agent Orange. Dr. Dwernychuk was contacted by Mr. Black to provide a face-to-face interview on the subject of Agent Orange in Vietnam. The interview was conducted in British Columbia. **2019**
- **Leonard Weizer** – This Vietnam Veteran was denied compensation by the Dept. of Veterans Affairs for exposure to Agent Orange. Mr. Weizer requested Dr. Dwernychuk provide a professional opinion as to his claimed exposure by reviewing all the circumstances. The presiding judge of the appellate court agreed with Dr. Dwernychuk’s assessment and granted Mr. Weizer compensation. **2018**
- **American Vietnam Veterans** – Dr. Dwernychuk provided advice, information, and opinions on the exposure of individual American Vietnam Veterans to Agent Orange/Dioxin during their service in Vietnam. This includes family members of Vietnam Veterans. Most of his involvement was assistance/opinions to Veterans or their family members struggling to receive compensation from the U.S. Department of Veterans Affairs for dioxin exposure. He is pleased to report that some Veterans, who initially were rejected for compensation, did receive their due compensation once the judiciary in the U.S. considered his written opinions on their exposure during military service. **2005, Ongoing**
- **C-123 Air Crews** – Dr. Dwernychuk provided advice, information, and opinions to specific members of the C-123 Agent Orange spray planes that were returned to America following their service during the Vietnam conflict. The aircrews associated with these planes were suspected to have been contaminated by residues of Agent Orange/Dioxin remaining inside these aircraft subsequent to their return to the U.S. mainland. Aircrews submitted requests for compensation from the U.S. Department of Veterans Affairs. Dr. Dwernychuk submitted an opinion on the exposure potential of C-123 air crews to Agent Orange/Dioxin during their use in the U.S. **2016/17**
- **U.S. Blue Water Navy** – Dr. Dwernychuk provided advice, information, and opinions to the Blue Water Navy addressing the exposure potential of Navy service men to Agent Orange/Dioxin while they were serving on Navy ships during the Vietnam conflict. Dr. Dwernychuk’s opinions centred on Navy ships in close proximity to Vietnam’s land mass, specifically Da Nang Harbour. His opinions were submitted to the U.S. Department of Veterans Affairs supporting exposure of service men during the conflict. **2016 to 2019**

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- **U.S. Veterans who served in Panama** – Dr. Dwernychuk provided advice, information, and opinions to a Veteran who served in Panama. The Veteran had multiple health issues and suspected exposure to either Agent Orange/Dioxin or 2,4,5-T, one of the herbicides in Agent Orange which contained ‘dioxin’, per se. Dr. Dwernychuk provided a written opinion of exposure potential which was submitted to the U.S. Department of Veterans Affairs. **2017**
 - **Various news outlets** – Dr. Dwernychuk provided opinions/articles to news outlets addressing the potential for Agent Orange/Dioxin contamination in Okinawa. He also provided opinions/articles on the use of Scientology’s Hubbard Method for the excretion of dioxin from the human body (this being impossible). He provided articles on the cleanup of dioxin contaminated lands in Vietnam. **2012 to 2016**
 - **Ford Foundation** – Dr. Dwernychuk served as supporting environmental scientist and advisor during a comprehensive investigation of dioxin residues in soils, sediments, foods, human blood and human breast milk collected on and in the vicinity of the Bien Hoa airbase, Viet Nam. **2010/2011**
 - **Renaissance Journalism Center, San Francisco State University (Pro Bono)** – Dr. Dwernychuk presented overviews of Agent Orange and dioxin Hot Spots in Viet Nam. Fellows at the Center are travelling to Viet Nam to undertake a variety of journalistic projects in country addressing Agent Orange and its impacts. **May 2010**
 - **Ford Foundation** – Dr. Dwernychuk served as supporting environmental scientist and advisor during a comprehensive investigation of dioxin residues in soils, sediments, foods, human blood and human breast milk collected on and in the vicinity of the Da Nang airbase, Viet Nam. **2006 to 2009**
 - **Ford Foundation** – Dr. Dwernychuk served as principle scientist on a study of dioxin residues at seven former US military bases in southern Viet Nam. **2004 to 2006**
 - **Agent Orange Research and Policy Briefing, Washington, D.C.** – Dr. Dwernychuk was invited to present the Hatfield Agent Orange studies and comment on the most recent research on defoliant use during the Viet Nam war. The session was opened by Congressman Lane Evans. Those in attendance included the US State Department, NGOs, academics, The Viet Nam Veterans of America and embassy representatives from Viet Nam and Lao PDR. The panel meeting was sponsored by the Fund for Reconciliation and Development (New York), Oxfam America and the American Friends Service Committee. **July 8, 2003**

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- **Dr. Dwernychuk has presented the Hatfield Agent Orange investigations at numerous venues during 1998 - 2004:**
 - Vietnam Veterans of America Leadership Convention, Buffalo, New York
 - Vietnam Veterans of America Convention, Pennsylvania Chapter, Pennsylvania State University, University Park, PA
 - Health Canada, Ottawa, Ontario
 - Canadian International Development Agency, Ottawa, Ontario
 - University of British Columbia, Vancouver, British Columbia
 - Langara College, Vancouver, British Columbia
 - Capilano College, North Vancouver, British Columbia
 - British Columbia Institute of Technology, Vancouver Campus, Vancouver, British Columbia
 - Canadian Department of Indian Affairs and Northern Development, Ottawa, Ontario
 - Conference on the Long-Term Environmental Consequences of the Viet Nam War, Stockholm, Sweden
 - Government of Vietnam, Hanoi, Vietnam
 - American Ambassador, U.S. Embassy, Hanoi, Vietnam
 - Canadian Ambassador, Canadian Embassy, Hanoi, Vietnam
 - Washington University, Seattle, Washington
 - Dr. Dwernychuk was unable to attend; an alternate presented Hatfield's Vietnam studies, Paris, France
 - **Government of New Zealand, Ministry of Health** – Retained by the Ministry of Health to critique a study plan investigating dioxin contamination in humans, resulting from potential exposure to materials associated with historical chemical manufacturing (New Plymouth, New Zealand). **2002**
 - **Nominated by The Vietnam Veterans of America and Associates of The Vietnam Veterans of America for investiture in “The Legion of Honor”** (https://en.wikipedia.org/wiki/Four_Chaplains#Chapel_of_Four_Chaplains) of “The Chapel of Four Chaplains” for work on Agent Orange and for recognition of the benefits that Hatfield’s work on Agent Orange has had to Viet Nam veterans and their families. Dr. Dwernychuk is only the fifth Canadian to be vested into the Legion of Honor, and the first Canadian west of the Ontario US Coastguard Base, Cape May, New Jersey. **September 2002**

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- **International Conference on the Ecological and Health Effects of the Viet Nam War** - Invited to present the Hatfield Agent Orange studies in Viet Nam at the conference at Yale University, New Haven, Connecticut. **September 13-15, 2002**
 - **Rockefeller University, New York** - Invited to present the Hatfield Agent Orange studies at a seminar session which focussed on Agent Orange investigations in Viet Nam and Lao PDR. **September 2002**
 - **Vietnam-United States Scientific Conference on Human Health and Environmental Effects of Agent Orange/Dioxin** - Invited to present the Hatfield Agent Orange studies in Viet Nam at the international conference in Ha Noi. **March 3-6, 2002**
 - **Development of Methodologies and Technology for Supporting Clearance of Landmines and Unexploded Ordnance (UXO) in Viet Nam** - Senior Scientist. This work included using satellite remote sensing, topographic maps and military archive information to create Geographic Information System (GIS) products to efficiently provide landmine/UXO clearing personnel with historic and present day site information relevant to planning and carrying out their programs. The project also included the development of landmine/UXO clearing protocols in chemically contaminated soils and for rehabilitating cleared sites. **2001 to 2002**
 - **International Conference on the Long-Term Environmental Consequences of the Viet Nam War (Stockholm, July 26-28, 2002)** - Served on the conference Steering Committee, and the sub committee on "Ecosystems" for the Stockholm conference (<http://www.nnn.se/vietnam/environ.htm>). **2000 to 2002**
 - **United States National Institute of Environmental Health Sciences (NIEHS)** - Served as a member of an *Ad Hoc* Panel charged with developing strategies for investigating the environmental/human health consequences of herbicide use during the Viet Nam War. Discussions preceded the signing of a collaborative agreement between the US and Viet Nam to initiate in-country investigations. **2000 to 2001**
 - **Royal Danish Embassy, Ha Noi, Viet Nam** - Senior Scientist. Investigations on dioxin contamination of soils near a former US military fire base in Quang Tri province, Viet Nam. **1999 to 2000**

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- **Environmental Impacts and Mitigation Strategies, Addressing the Use of Agent Orange Herbicide During the Viet Nam War, Aluoi Valley, Viet Nam** – Senior Scientist. Studies involved field investigations, laboratory analyses and preparation of two reports (October 1998 and April 2000) focussing on soils, food, human blood and breast milk. Recommendations were prepared in order to assist local authorities in reducing contaminant exposure and intake. Studies extended from 1994 to 2000. Studies were funded by various Canadian government agencies. **1994 to 2000**
 - **Hatfield general photos from Vietnam related to our research:**

1... THIS **ftp** LINK WILL OPEN 'ONLY' WITH THE **INTERNET**

EXPLORER BROWSER:

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3... Photos Hatfield 2000 Report:

<https://www.hatfieldgroup.com/wp-content/uploads/2020/05/cida849-agent-orange-v1-report-plates.pdf>

Initial Environmental Evaluation Studies

The following studies involved collection, analysis and interpretation of physical/chemical/biological data associated with aquatic systems located near proposed developments; these facilities had the potential for environmental disruptions due to physical and/or chemical factors related to construction/operation of the development.

Mining

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- **Lakefield Research** (a division of Falconbridge Limited), Lakefield, Ontario – Data analysis and synthesis focusing on benthic macroinvertebrate communities in Meadow and Fairless Creeks. **1992**
 - **Strathcona Mineral Services Limited** (Midway Project) – Project Manager; Principal Aquatic Scientist; Author. **1990**
 - **Corona Corporation** (Mt. Milligan Project) – Aquatic Scientist; Contributing Author. **1990**
 - **Minnova Inc.** (Samatsum Mountain Project) – Principal Aquatic Scientist; Contributing Author. **1988**
 - **Esso Minerals** – Principal Aquatic Scientist. **1988**
 - **Skyline Explorations Limited** – Contributing Author. **1987**
 - **Mascot Gold Mines Limited** (Hedley, British Columbia) – Project Manager; Principal Aquatic Scientist; Author. **1985**
 - **Utah Mines (Carbon Creek)** – Project Manager; Principal Aquatic Scientist; Contributing Author. **1982**
 - **Cadillac Explorations Limited** (Northwest Territories rivers and streams) – Project Manager; Principal Aquatic Scientist; Author. **1980 to 1982**
 - **Pan Ocean Oil Ltd.** (Yukon rivers and streams) – Principal Aquatic Scientist; Contributing Author. **1979**
 - **Erickson Gold Mines** (Yukon rivers and streams) – Principal Aquatic Scientist; Contributing Author. **1978**
 - **DuPont of Canada Explorations Limited** (Northern British Columbia streams) – Project Manager; Principal Aquatic Scientist; Author. **1976**
 - **Texas Gulf Inc.** (Northern British Columbia streams) – Project Manager; Principal Aquatic Scientist; Author. **1975**

Pipeline Construction

- **Foothills Pipeline Ltd.** (Yukon rivers and streams) – Field Scientist. **1979**

Thermal Power Plant

- **British Columbia Hydro** (Hat Creek) – Project Manager; Principal Aquatic Scientist; Contributing Author. **1980 to 1981**

Housing Development

- **Daon Development Corporation** (Vancouver, British Columbia) – Principal Aquatic Scientist; Contributing Author. **1975**

Oil Exploration

- **Panarctic Oils Limited** (High Arctic Islands) – Field Scientist. **1975**

Environmental Impact Assessment of Industrial Operations/Discharges

The following studies involved assessment of industries on aquatic environments (i.e., physical, chemical and biological), where physical/chemical issues related to the development may have impacted local environments. Dr. Dwernychuk served as Project Manager, Principal Aquatic Scientist and Author for all the following studies:

Mining

- **Noranda** (Bell Mine), Granisle, British Columbia. **1991**
- Expert witness re: impact of a supernatant spill into Babine Lake, British Columbia
- **Noranda** (Bell Mine), Granisle, British Columbia. **1988 to 1989**
- **Skyline Explorations Limited**, Vancouver, British Columbia. **1988 to 1989**
- **Corona Corporation Ltd.** (formally Mascot Gold Mines Ltd.), Vancouver, British Columbia. (Two studies). **1986 to 1987**
- **DuPont of Canada Explorations Limited**, Vancouver, British Columbia. **1982**
- **Highland Valley Copper**, Logan Lake, British Columbia. **1975 to 2002**

Pulp and Paper/Forest Industry

- **MacMillan Bloedel Limited**, Powell River, British Columbia. **1988 to 1989**
- **Quesnel River Pulp Company**, Quesnel, British Columbia. (Approximately 5 studies). **1982 to 1987**
- **Celgar Pulp Company**, Castlegar, British Columbia. (Approximately 4 studies). **1980 to 1988**
- Expert witness on Environmental Appeal Board Hearings (effluent impacts on the river receiving environment)
- **Skeena Cellulose Inc.**, Prince Rupert, British Columbia. (Approximately 11 studies). **1979 to 1989**
- **Manitoba Forestry Resources Limited**, The Pas, Manitoba. **1979 to 1980**
- **Crestbrook Pulp and Paper Ltd.**, Skookumchuk, British Columbia. **1979**
- **Canadian Forest Products Ltd.**, Port Mellon, British Columbia. **1978**
- **Proctor and Gamble of Canada Limited**, Grande Prairie, Alberta. **1977 and 1980**
- **Cariboo Pulp and Paper Company**, Quesnel, British Columbia. (approximately 12 studies). **1975 to 1987**
- **Prince George Pulp and Paper Limited**, Prince George, British Columbia. (Approximately 12 studies). **1975 to 1987**
- **Northwood Pulp and Timber Limited**, Prince George, British Columbia. (Approximately 12 studies). **1975 to 1987**

- **Intercontinental Pulp Company Limited**, Prince George, British Columbia. (Approximately 12 studies). **1975 to 1987**
- **Pacifica Papers**, Powell River, British Columbia. **1998 and 1999**
- Expert witness on Environmental Appeal Board Hearings (impacts of recovery and power boiler emissions on the marine environment).

Chemical Industry

- **Ocelot Ammonia Company**, Kitimat, British Columbia. **1989**
- **FMC of Canada Ltd.**, Squamish, British Columbia. **1975 to 1990**

Other Investigations

Pulp and Paper & Forest Industry/Organochlorines/Dioxins/Furans

- **International Finance Corporation (World Bank Group)**, Washington, DC – Expert Panel member reviewing the environmental impacts of two bleached Kraft pulp mill developments in Uruguay. **2006**
- **Project Director/Senior Aquatic Scientist** for pre-design and design phases of the Environmental Effects Monitoring program for each industrial complex related to the federal *Fisheries Act* (Cycle One: 1993-1996; Cycle Two: 1997-2000; Cycle Three: 2001-2004). Studies are required in the vicinity of all pulp and paper mills in Canada to assess environmental effects of wastewater discharges.
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Norske Skog Canada Limited (formerly Fletcher Challenge Canada), Crofton Pulp and Paper, Crofton, British Columbia
 - Norske Skog Canada Limited (formerly Fletcher Challenge Canada), Elk Falls Pulp and Paper, Campbell River, British Columbia
 - NorskeCanada, Port Alberni, British Columbia
 - NorskeCanada (formerly MacMillan Bloedel Limited), Powell River Division, Powell River, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Port Alice Operation), Port Alice, British Columbia
 - Canadian Forest Products Ltd., (formerly Northwood Pulp and Timber Limited), Prince George, British Columbia
 - Cariboo Pulp and Paper Company, Quesnel, British Columbia
 - Quesnel River Pulp Company, Quesnel, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Tembec Industries Inc. (formerly Crestbrook Forest Industries Ltd.), Cranbrook, British Columbia

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- Celgar Pulp Company Castlegar, British Columbia
 - Fiberco Pulp Inc., Taylor, British Columbia
 - Scott Paper Limited, New Westminster, British Columbia
 - Weyerhaeuser Canada Ltd., Kamloops, British Columbia
 - **Sandwell Inc., Vancouver, British Columbia** – Senior Aquatic Scientist on an Environmental Impact Statement regarding a greenfield pulpmill in Sabah, Malaysia. **1999**
 - **Project Manager and Principal Aquatic Scientist** for implementation of dioxin/furan trend monitoring studies in sediments and biological tissues collected from marine environments associated with each industrial complex. **1996 to 2006**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc., Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Norske Skog Canada Limited (formerly Fletcher Challenge Canada), Crofton Pulp and Paper, Crofton, British Columbia
 - Norske Skog Canada Limited (formerly Fletcher Challenge Canada), Elk Falls Pulp and Paper, Campbell River, British Columbia
 - Pacifica Papers Inc. (formerly MacMillan Bloedel Limited, Powell River Division), Powell River, British Columbia
 - **NLK Consultants Inc., Vancouver, British Columbia** – Project Manager, Principal Aquatic Scientist for a study involving a potential pulpmill in Central Kalimantan, Indonesia. **1994**
 - **Project Manager and Principal Aquatic Scientist** for implementation of dioxin/furan trend monitoring studies in sediments and biological tissues collected from marine environments associated with each industrial complex. **1993, 1994 and 1995**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
 - Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
 - MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
 - MacMillan Bloedel Limited, Alberni Pulp and Paper Division, Port Alberni, British Columbia

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- **Institute of Ecological Toxicology, Baikalsk, Irkutsk Region, Russia** – Invited to attend a symposium on "Environmental Chemistry and Toxicology of Chlorinated Organic Pollutants". **1990**
 - **Western Pulp Inc., Western Pulp Limited Partnership (Port Alice Operation), Port Alice, British Columbia** – Environmental overview of Neurotsos Inlet, related to pulpmill effluent discharges. **1992**
 - **Sandwell Inc., Vancouver, British Columbia** – Project Manager/Senior Environmental Scientist for an independent evaluation of an initial environmental assessment report (bleached Kraft pulpmill in Sumatra, Indonesia) submitted by an environmental consultant to Sandwell Inc. Dr. Dwernychuk was retained by CIDA through Sandwell to provide a critique on the document following a site visit and discussions with other project professionals. **1992**
 - **Project Manager and Principal Aquatic Scientist** for implementation of dioxin/furan trend monitoring studies in sediments and biological tissues collected from marine environments associated with each industrial complex. **1992**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
 - Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
 - MacMillan Bloedel Limited, Harmac Division, Nanaimo, British Columbia
 - MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
 - MacMillan Bloedel Limited, Alberni Pulp and Paper Division, Port Alberni, British Columbia
 - Campbell River Mills Ltd., Campbell River, British Columbia
 - **External Affairs and International Trade Canada** – Invited to attend and participated in a Pulp and Paper Trade Mission to Indonesia. Presentation of qualifications/experience, mill visits, and formal functions in Jakarta, Bali, and Surabaya. **1992**
 - **Weyerhaeuser Canada Ltd., Kamloops, British Columbia** – Data analysis and synthesis focusing on benthic macroinvertebrate communities of the Thompson River. **1991**
 - **H.A. Simons Limited, Vancouver, British Columbia** – Senior Aquatic Scientist on an Environmental Impact Assessment Study of a proposed pulpmill in East Kalimantan, Indonesia (PT Kiani Kertas, Jakarta, Indonesia). **1991 to 1994**

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- **Canadian Pulp and Paper Association** – Advisor to the industry on the design and implementation of the proposed federal regulations focusing on Environmental Effects Monitoring. **1991 to 1992**
 - **H.A. Simons Limited, Vancouver, British Columbia** – Initial Environmental Evaluation of a proposed greenfield pulpmill in East Kalimantan (PT Kiani Kertas, Jakarta, Indonesia). **1991**
 - **Project Manager and Principal Aquatic Scientist** for implementation of dioxin/furan trend monitoring studies in sediments and biological tissues collected from marine environments associated with each industrial complex. **1991**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
 - Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
 - MacMillan Bloedel Limited, Harmac Division, Nanaimo, British Columbia
 - MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
 - MacMillan Bloedel Limited, Alberni Pulp and Paper Division, Port Alberni, British Columbia
 - Raven Lumber, Campbell River, British Columbia
 - **Project Manager and Principal Aquatic Scientist** for dioxin/furan studies in biological tissues collected from remote regions along the British Columbia coast. **1991**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
 - Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
 - MacMillan Bloedel Limited, Harmac Division, Nanaimo, British Columbia
 - MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
 - MacMillan Bloedel Limited, Alberni Pulp and Paper Division, Port Alberni, British Columbia

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- **International Conference: Environmental Fate and Effects for Bleached Pulpmill Effluents; Stockholm, Sweden** – Co-authored a paper titled *Monitoring Environmental Effects of the Pulp and Paper Industry: A Regulatory Approach*. **November 1991**
 - **Project Manager and Principal Environmental Scientist** for baseline **organochlorine** contamination studies in the Fraser and Thompson Rivers (effluents, drinking water, sediments, biological tissues). **1990 to 1991**
 - Northwood Pulp and Timber Limited, Prince George, British Columbia
 - Prince George Pulp and Paper Limited, Prince George, British Columbia
 - Intercontinental Pulp Company Limited, Prince George, British Columbia
 - Cariboo Pulp and Paper Company, Quesnel, British Columbia
 - Weyerhaeuser Canada Ltd., Kamloops, British Columbia
 - **British Columbia Ministry of Environment, Victoria, British Columbia** – Project Manager and Principal Environmental Scientist for **dioxin/furan** sample collections: Lower Mainland/ Vancouver Island/Skeena/Interior Regions (pulp and paper/forest industry sites in addition to PCB storage sites, oil refineries, sewage sludge, municipal waste, biomedical waste). **1990 to 1991**
 - **Project Manager and Principal Environmental Scientist** for development and implementation of comprehensive effects monitoring of pulpmill effluents on the marine receiving environment of Howe Sound (effluents, receiving waters, bottom sediments, subtidal benthic macroinvertebrate communities, contaminant loading in biological tissues, etc.). **1990 to 1991**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc./Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - **Skeena Cellulose Inc., Prince Rupert, British Columbia** – Project Manager and Principal Environmental Scientist for development and implementation of comprehensive effects monitoring of pulpmill effluents on the marine receiving environment near Skeena Cellulose (effluents, receiving waters, bottom sediments, subtidal and intertidal benthic macroinvertebrate communities, macroalgae, contaminant loading in biological tissues, etc.). **1990 to 1991**
 - **Crestbrook Forest Industries Ltd., Cranbrook, British Columbia** – Project Manager and Principal Environmental Scientist for baseline **organochlorine** contamination studies in the Kootenay River (effluents, drinking water, receiving waters, sediments, biological tissues). **1990 to 1991**
 - **Project Manager and Principal Environmental Scientist** for environmental studies addressing **organochlorines** in the forest industry and their concentration in receiving waters, effluents, sediments and biological tissues (i.e., groundfish,

crab, prawns, clams, oysters) collected from marine receiving environments associated with the forest industry operations. **1990**

- Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
- Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
- MacMillan Bloedel Limited, Harmac Division, Nanaimo, British Columbia
- MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
- Raven Lumber, Campbell River, British Columbia
- **MacMillan Bloedel Limited, Alberni Pulp and Paper Division, Alberni, British Columbia** – Project Manager and Principal Environmental Scientist for environmental studies addressing organochlorines in pulp and paper discharges at Port Alberni (effluents, receiving waters, sediments and biological tissues). **1990**
- **United Nations Economic Commission for Europe – Task Force on the Environment, Baikalsk (Lake Baikal), USSR** – Presented studies on the effects of pulpmill effluents on receiving waters in British Columbia, Canada. Participated in Workshop and Task Force activities regarding a United Nations document on environmental impacts and prediction. **1990**
- **Orenda Forest Products Ltd., West Vancouver, British Columbia** – Project Manager and Principal Aquatic Scientist for environmental activities/assessments related to the proposed pulpmill near Stewart, British Columbia, subsequently relocated near Terrace, British Columbia. **1990**
- **Project Manager and Principal Environmental Scientist** for supplementary sampling and chemical analyses (organochlorines) on biological tissues collected from additional sites near each pulp and paper operation. **1990**
 - Fletcher Challenge Canada, Crofton Pulp and Paper, Crofton, British Columbia
 - Fletcher Challenge Canada, Elk Falls Pulp and Paper, Campbell River, British Columbia
 - MacMillan Bloedel Limited, Harmac Division, Nanaimo, British Columbia
 - MacMillan Bloedel Limited, Powell River Division, Powell River, British Columbia
- **Project Manager and Principal Environmental Scientist** for environmental studies in the Fraser River system addressing organochlorines in pulp and paper effluents (Western Canada pilot study related to the proposed federal environmental monitoring guidelines for Canadian pulp and paper mills). These studies focus on the chemical characterization of mill effluents, receiving river water and river bottom sediments, bioassays on raw effluents and dilution of ambient river water, benthic macroinvertebrate communities and fish tissue analyses involving enzyme activation tests and contaminant loads. **1989 to 1990**

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- Northwood Pulp and Timber Limited, Prince George, British Columbia
 - Prince George Pulp and Paper Limited, Prince George, British Columbia
 - Intercontinental Pulp Company Limited, Prince George, British Columbia
 - Quesnel River Pulp Company, Quesnel, British Columbia
 - Cariboo Pulp and Paper Company, Quesnel, British Columbia
 - Environment Canada
 - British Columbia Ministry of Environment
 - **Western Pulp Inc., Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia** – Project Manager and Principal Environmental Scientist for water quality studies and **dioxin/furan** studies on crab tissues collected from Howe Sound. **1989 to 1990**
 - **Western Pulp Inc., Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia** – Project Manager and Principal Environmental Scientist for **dioxin/furan** studies on dredgate material collected near the Western Pulp operation. An assessment of bottom materials for ocean dumping approval by Environment Canada. **1989 and 1990**
 - **Project Manager and Principal Environmental Scientist** for environmental studies addressing **organochlorines** in pulp and paper effluents (i.e., guaiacols, extractable organic halides, dioxins, furans) and their concentration in sediments and biological tissues (i.e., groundfish, crab, prawns, mussels) collected from marine receiving environments associated with pulp and paper operations. **1988 to 1989**
 - Howe Sound Pulp and Paper Limited, Port Mellon, British Columbia
 - Western Pulp Inc., Western Pulp Limited Partnership (Squamish Operation), Squamish, British Columbia
 - Skeena Cellulose Inc., Prince Rupert, British Columbia
 - **H.A. Simons Ltd., Vancouver, British Columbia** – Principal Environmental Scientist and Author for environmental impact assessment of a proposed bleached kraft pulpmill on Rio Uruguay, Argentina. On-site investigations were undertaken in Argentina and Uruguay. **1988 to 1989**
 - **Principal Environmental Scientist and Author** conducted visits to Sweden, Finland and West Germany to obtain environmental perspectives regarding **chlorinated organics** in pulpmill effluents. Government and industry agencies were interviewed (regulatory and research groups) to assess conditions in the Baltic Sea and Bay of Bothnia. **1988**
 - MacMillan Bloedel Limited, Vancouver, British Columbia
 - Fletcher Challenge Canada, Vancouver, British Columbia

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- Western Pulp Inc., Vancouver, British Columbia
 - Cariboo Pulp and Paper Company, Vancouver, British Columbia
 - **Northwood Pulp and Timber Limited, Prince George, British Columbia** – Project Manager, Principal Aquatic Scientist and Author for thermal profiling of the Fraser River near the effluent diffuser related to expansion of the mill facility. **1988**
 - **Skeena Cellulose Inc., Prince Rupert, British Columbia** – Project Manager, Principal Aquatic Scientist and Author for environmental impact studies and assessment of pulpmill effluent on water quality, subtidal and intertidal benthic invertebrates, intertidal macroalgae, sediments and fish utilization. **1987 to 1988**
 - **Crestbrook Pulp and Paper Ltd., Skookumchuk, British Columbia** – Principal Aquatic Scientist for studies examining the psychophysical impacts of pulpmill effluent colour (Kootenay River) on human observers randomly selected from Cranbrook, British Columbia. **1977**
 - **Turkish State Organization for the Pulp and Paper Industry, Ismit, Turkey** – Principal Aquatic Scientist and Author for biological and water quality studies of Karamik Lake, Turkey, prior to receipt of effluents from a proposed pulpmill complex. **1976**

Fisheries

- **Estudios Technicos Ltda., Bogota, Colombia** – Project Manager, Principal Aquatic Scientist and Author for study reviews focusing on hydroelectric reservoir clearance of forested areas and associated impacts on water quality and fish production. **1984**
- **Ladner Downs, Barristers and Solicitors, Vancouver, British Columbia**
- **Campney and Murphy, Barristers and Solicitors, Vancouver, British Columbia**
- Expert advisor to defense counsel for clients charged with the discharge of deleterious substances into fish-bearing waters. **1981**
- **Department of Fisheries and Oceans, Vancouver, British Columbia** – Authored a report on the effects of the proposed Kemano II project on chinook salmon resources of the Nechako River. **1975**

Impact Assessments

- **Peigan Nation, Brocket, Alberta** – Principal Aquatic Scientist and Author on Assessment of the effects of the proposed Oldman River Dam on fisheries resources, water quality, benthic communities and associated parameters of the Oldman River situated within the Peigan Reserve boundary. **1986**
- **Dene Nation, Yellowknife, Northwest Territories** – Principal Aquatic Scientist and Author for preparation of a training manual for winter and summer environmental monitoring addressing hydrocarbon, mining and road

developments in the north. Workshops and seminar sessions were held in Northwest Territories communities with local Dene people. **1985**

- **Dene Nation, Yellowknife, Northwest Territories** – Project Manager and Principal Aquatic Scientist for participation in the development and implementation of a major fisheries program in the Mackenzie River addressing potential contaminants in fish tissues. **1985**
- **N.D. Lea Associates, Vancouver, British Columbia** – Principal Aquatic Scientist and Contributing Author on Aquatic studies on the impact of the Annacis Bridge freeway alignment. **1982**
- **British Columbia Hydro, Vancouver, British Columbia** – Project Manager, Principal Aquatic Scientist and Contributing Author on pre-construction monitoring of fisheries and invertebrate fauna in Hat Creek and the Bonaparte River related to the Hat Creek power project. **1981**
- **Public Works Canada, Vancouver, British Columbia** – Principal Aquatic Scientist and Author on studies assessing the impact of improvements to the Fraser River shipping channel on benthic fauna. **1981**
- **Department of Supply and Services (Canada)** – Principal Aquatic Scientist and Author on studies reviewing the impact of linear facilities in northern ecosystems on aquatic habitats. **1979**
- **Twinriver Timber Limited, Terrace, British Columbia** – Project Manager, Principal Aquatic Scientist and Author on studies addressing the use of a logging canal by spawning salmonids. Examined sediment structure as a factor in limiting use of gravels for spawning. **1977**

Aquaculture Related Studies

- **Aquastar Services Limited and Farmers, Bangkok, Thailand** – Hatfield Consultants conducted extensive field studies and an Environmental Impact Assessment (EIA) of a large shrimp farming development in Ranot area of southern Thailand. The project supported 400 ha of shrimp ponds with plans to expand to 10,000 ha. The work involved assessment of land, freshwater and marine resources in the area, an evaluation of impacts of the project on these resources and the formation of a mitigation plan. An oceanographic computer model was developed by the study team for the west coast of the Gulf of Thailand to assist in the process. **1990**
- Dr. Dwernychuk was responsible for design and supervision of water quality and macroinvertebrate surveys and interpretation of impacts on these preceding resources. He also directed design of the mitigation plan. **1990 to 1992**
- **Canadian International Development Agency (CIDA), Ottawa, Ontario, Canada** – Contributing Aquatic Scientist for environmental review/assessment of aquaculture facilities (hatchery and marine grow-out sites) – Hong Kong, Thailand, Singapore and Indonesia. **1989 to 1990**

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- **Moore-Clarke Co. Inc., Vancouver, British Columbia, Canada** – Aquatic Scientist for site selection studies for hatchery and marine grow-out facilities in Chile (aerial and ground reconnaissance programs). **1988**
 - **Patagonia Salmon, S.A., Buenos Aires, Argentina** – Aquatic Scientist for pre-feasibility investigations regarding development of salmon farming operations and joint ventures in Argentina. **1988**
 - **Aqua Terra Technologies Limited, Victoria, British Columbia, Canada** – Contributing Aquatic Scientist and Author for feasibility studies on a land-based salmon farm in British Columbia. **1987**
 - **Salt Spring Aquafarms Ltd., Salt Spring Island, British Columbia, Canada** – Principal Aquatic Scientist for Training programs for salmon farm personnel regarding water quality control, experimentation and data analyses. **1987**
 - **Salt Spring Aquafarms Ltd., Salt Spring Island, British Columbia, Canada** – Principal Aquatic Scientist for design of *in situ* monitoring programs for a salmon farm in British Columbia. **1987**
 - **Hatfield International S.A., Puerto Montt, Chile** – Contributing Aquatic Scientist advising personnel in Chile. Activities involved water quality, administrative issues and general pollution control at joint venture salmon hatchery and marine grow-out sites. **1986 to 1988**
 - **Subsecretaria de Pesca, Fisheries Department, Santiago, Chile** – Executive Director for preliminary on-site field activities related to transplanting salmon to Chilean coastal waters. **1982**
 - **Electrowatt Consulting Engineers and Planners, Zurich, Switzerland** – Project Manager, Principal Aquatic Scientist and Author for studies on the fisheries potential of a hydroelectric reservoir for increasing fish as a Native food resource in remote areas of Nigeria. On-site activities in Nigeria were supplemented with literature reviews at Food and Agricultural Organization libraries in Rome, Italy. **1982**
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DRUMS OF AGENT ORANGE WITH DISTINCTIVE ORANGE BANDS



HUEY HELICOPTER AND FIXED WING AIRCRAFT SPRAYING AGENT ORANGE, SOUTHERN VIETNAM. VIEW RIVER BANK SPRAYING WITH AGENT ORANGE FROM A SPECIALLY EQUIPPED WATER CRAFT ...

<https://www.youtube.com/watch?v=wUZA0GAMmfI>



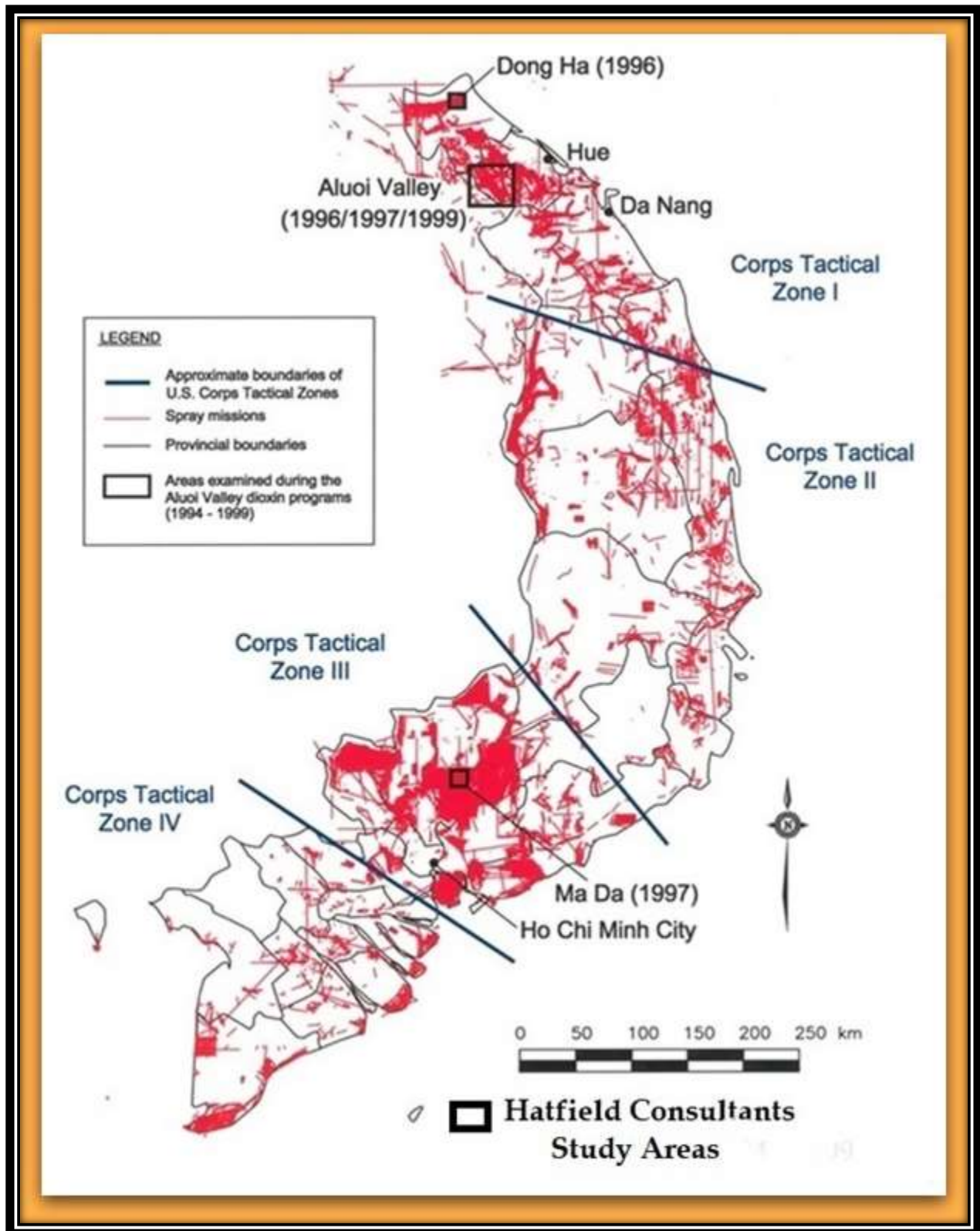
**BACK PACK AND TRUCK MOUNTED SPRAYING OF AGENT ORANGE,
SOUTHERN VIETNAM**



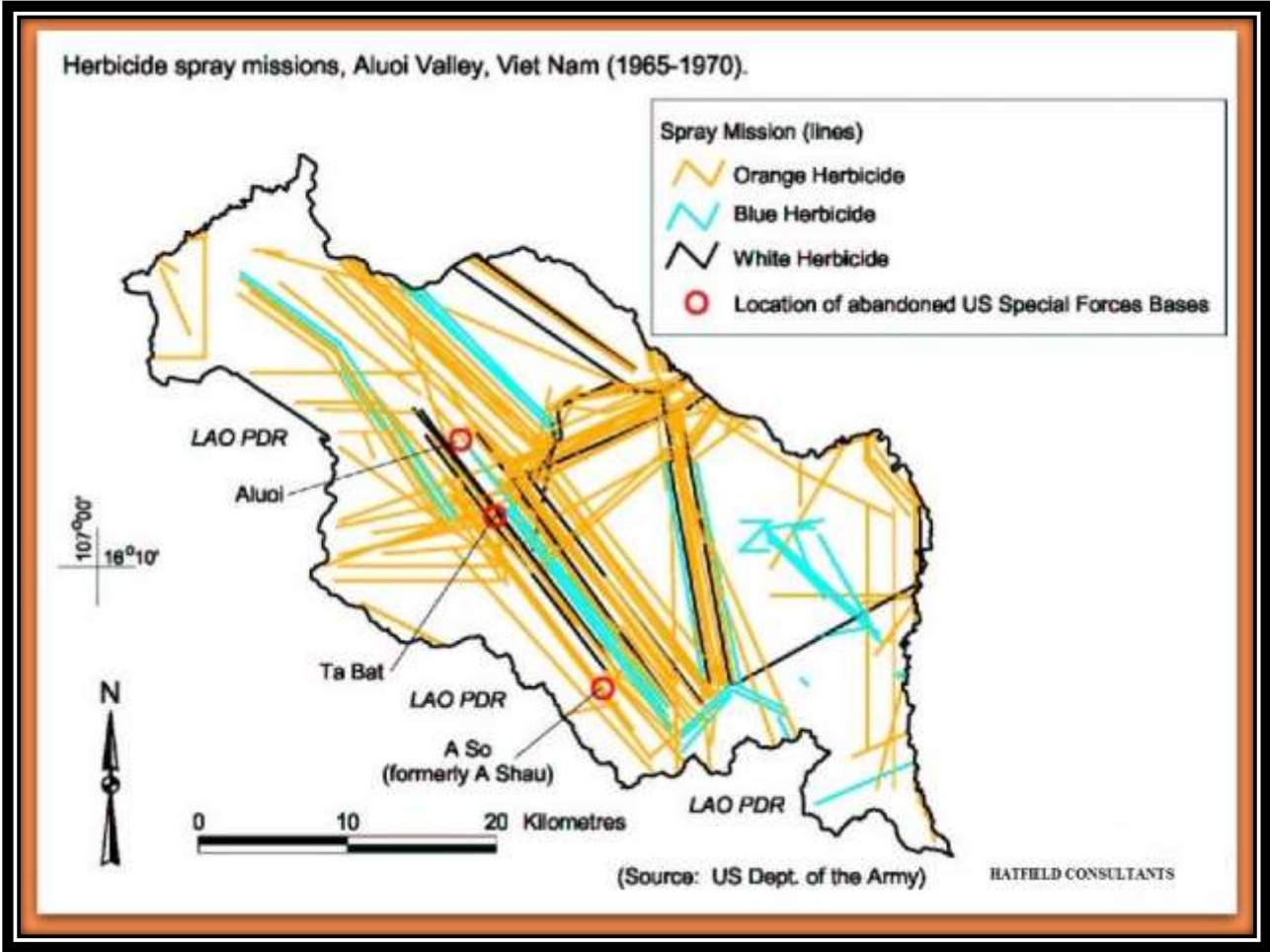
C-123 AGENT ORANGE SPRAY PLANES ON A SPRAY MISSION TRANSECT,
SOUTHERN VIETNAM



AGENT ORANGE SPRAY MISSIONS, SOUTHERN VIETNAM (1962 - 1971)



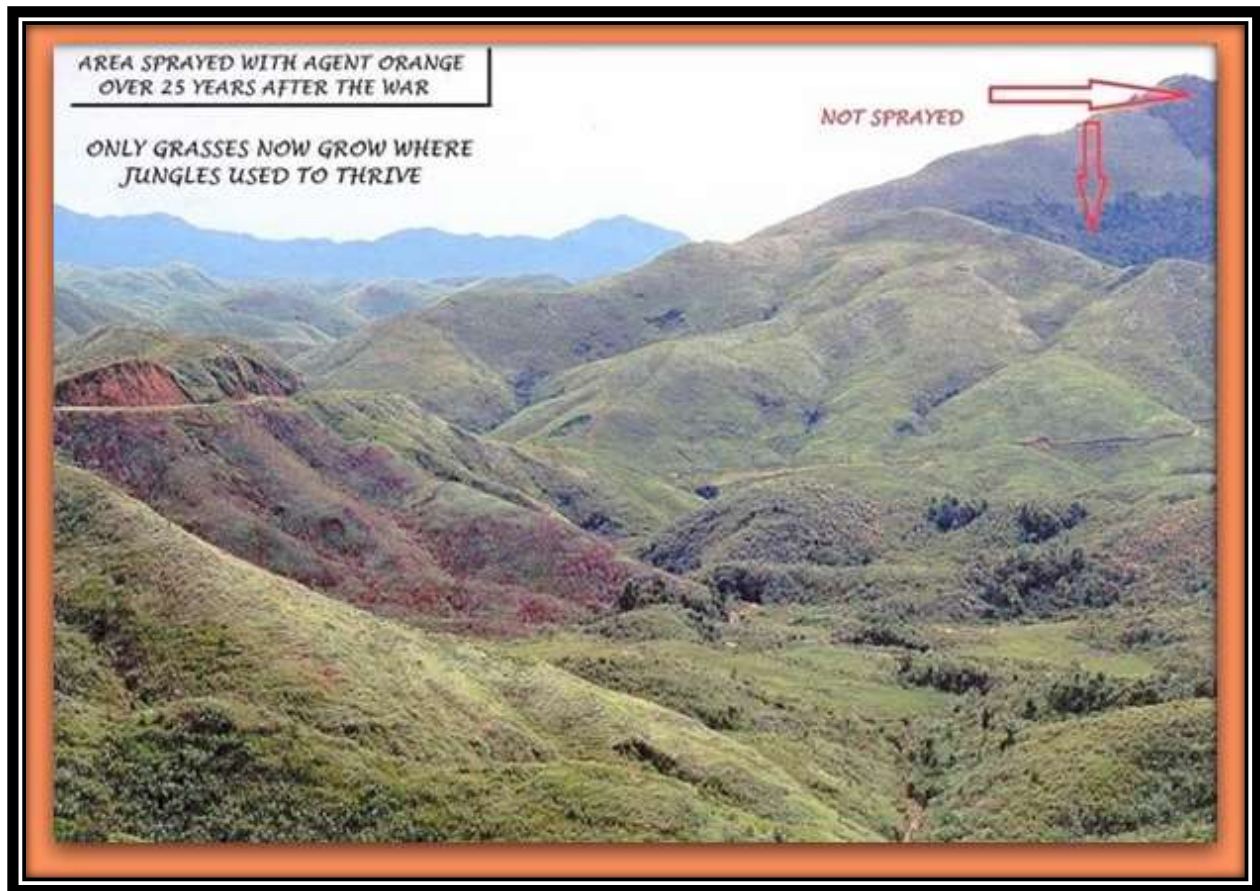
A LUOI VALLEY WHERE HATFIELD CONSULTANTS PERFORMED RESEARCH ON AGENT ORANGE SHOWING HERBICIDE SPRAY TRANSECTS AND LOCATION OF FORMER US SPECIAL FORCES BASES



AN AREA ADJACENT TO THE A LUOI VALLEY, SOUTHERN VIETNAM WHERE
HATFIELD CONSULTANTS INITIATED AGENT ORANGE INVESTIGATIONS
1994

THE A LUOI VALLEY WAS CALLED THE A SHAU VALLEY DURING
THE CONFLICT

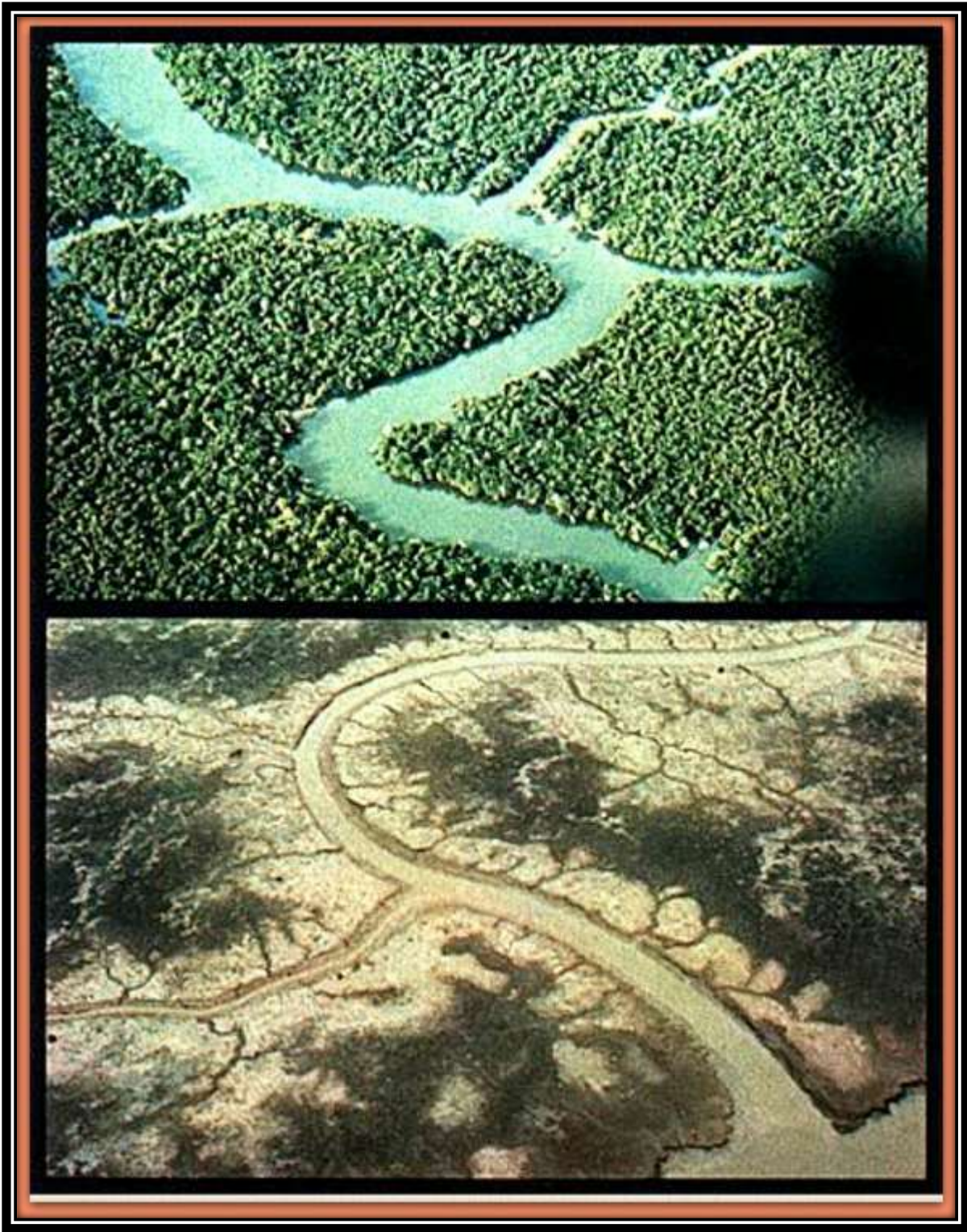
THE HAMBURGER HILL BATTLE OCCURRED IN THE A SHAU VALLEY



**BEFORE AND AFTER AGENT ORANGE SPRAYING OF JUNGLE FORESTS NEAR
THE A LUOI VALLEY, SOUTHERN VIETNAM**



**BEFORE AND AFTER AGENT ORANGE SPRAYING OF SOUTHERN VIETNAM'S
MANGROVE FORESTS**



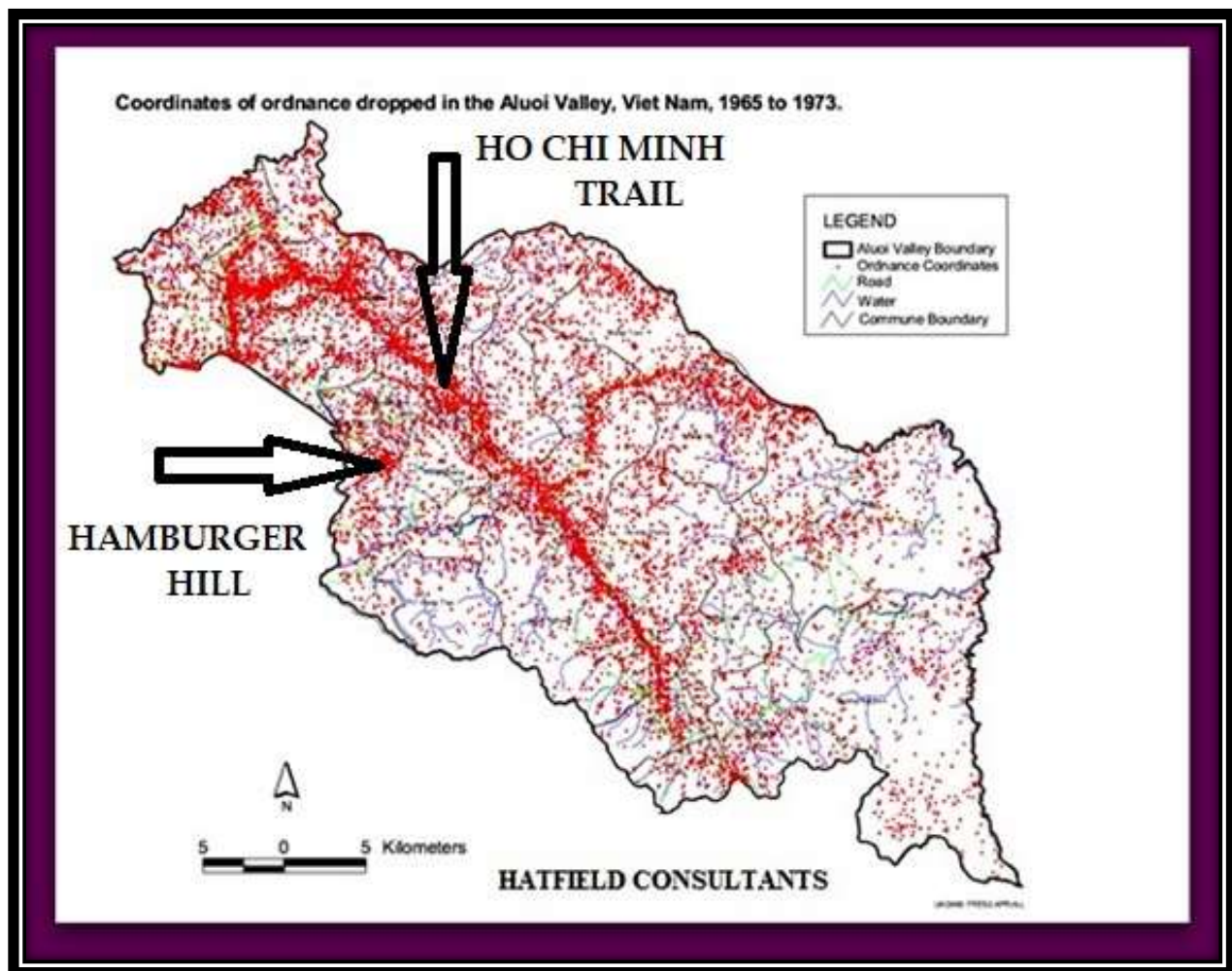
**HUMAN BLOOD AND BREAST MILK SAMPLING FROM LOCAL HILL TRIBES
PEOPLE BY THE HATFIELD CREW IN THE A LUOI VALLEY, SOUTHERN
VIETNAM**



SOIL CORE AND FISH SAMPLING IN THE A LOUI VALLEY, SOUTHERN VIETNAM. THROUGH LABORATORY ANALYSES IN CANADA, OF SAMPLES COLLECTED IN THE A LOUI VALLY, HATFIELD CONSULTANTS DETERMINED ELEVATED LEVELS OF DIOXIN IN HUMAN BLOOD, HUMAN BREAST MILK, SOIL CORES, AND FOODS (e.g., FISH AND DUCKS).



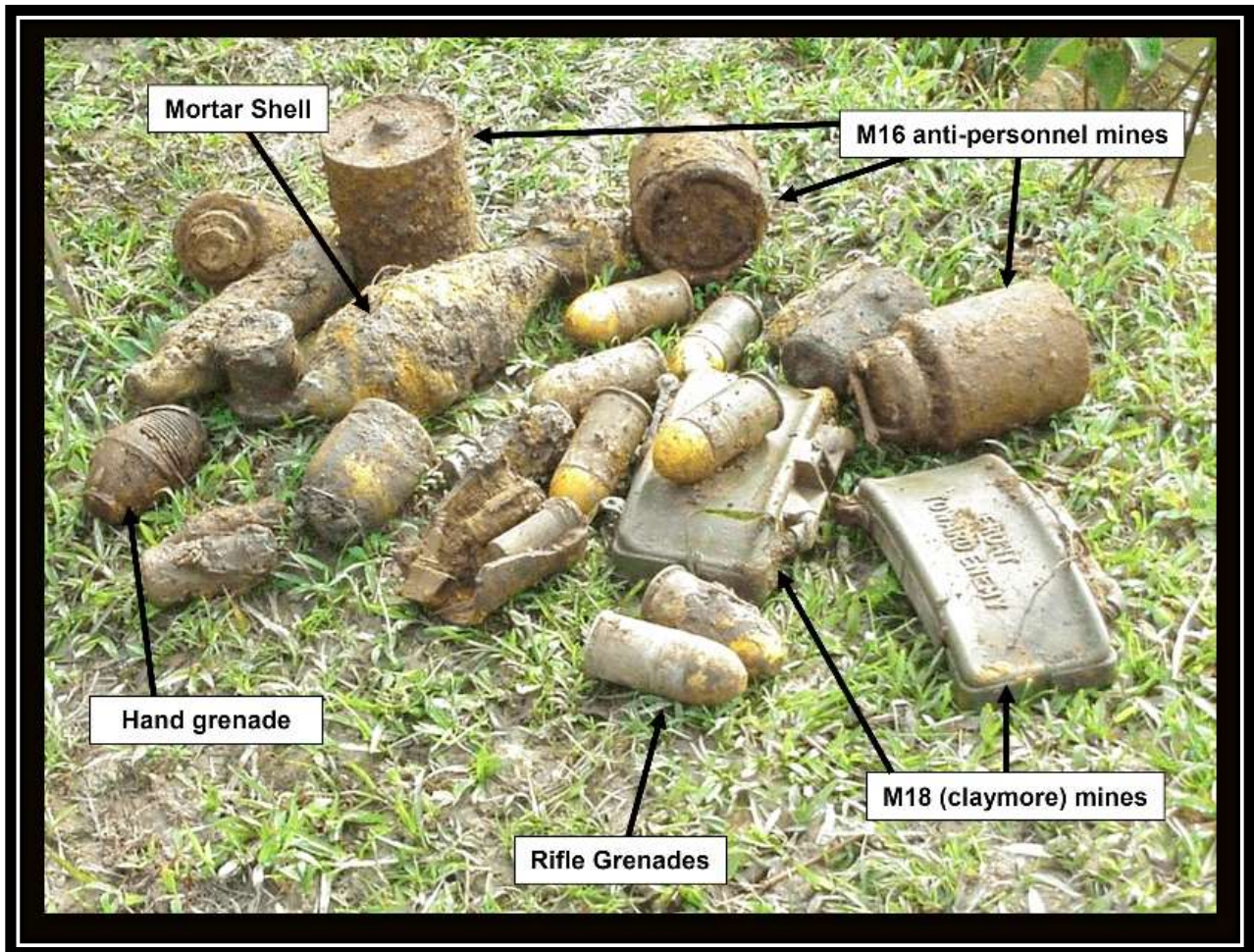
THIS IS THE A LUOI VALLEY WHERE HATFIELD CONSULTENTS PERFORMED AGENT ORANGE RESEARCH. NOTE THE AMOUNT OF ORDNACE DROPPED ON THE VALLEY. IT WAS NECESSARY FOR US TO RETAIN A DEMINING CREW TO CLEAR AREAS FOR SOIL CORING TO AVOID TRIGGERING UNEXPLOSED SUB-SURFACE BOMBS, GRENADES, AND/OR` MORTAR SHELLS.



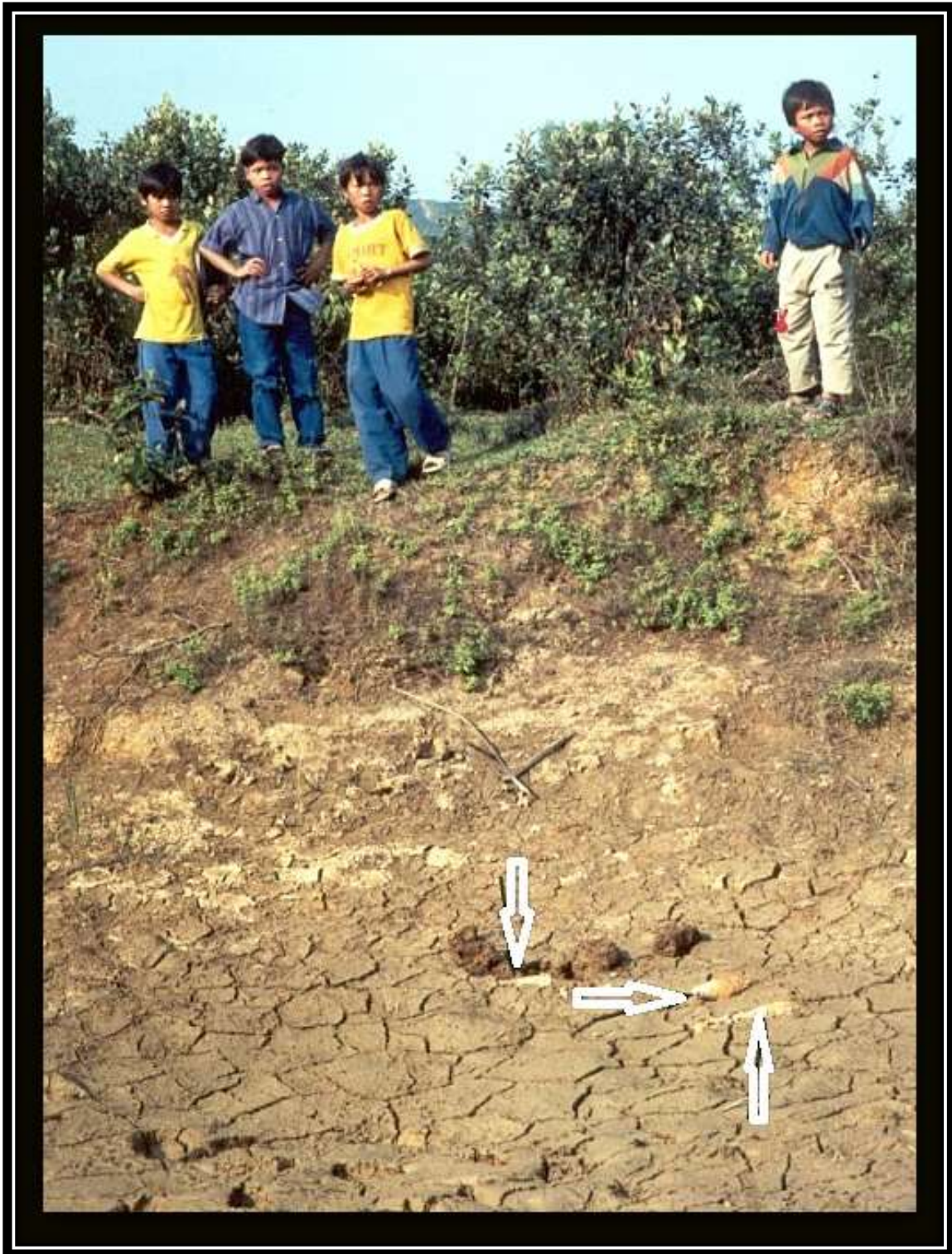
GERMAN GERBERA DEMINER EXAMINING 'LIVE' UNEXPLODED ORDNANCE ON HATFIELD CONSULTANTS STUDY AREA. GRENADES AND MORTAR SHELLS OFTEN LITTERED OUR SAMPLING SITES. IN HIGH RISK ZONES (NEAR HAMBURGER HILL) THE DEMINER WOULD CLEAR A WALKING TRAIL BEFORE WE COULD SAMPLE. ULTRA-SENSITIVE METAL DETECTOR TO THE RIGHT IN PHOTO.



EXAMPLES OF 'LIVE' UNEXPLODED ORDNANCE (UXO) COLLECTED BY THE DEMINING CREW FROM THE HATFIELD CONSULTANTS STUDY AREAS IN THE A LUOI VALLEY BEING PREPARED FOR DETONATION



CHILDREN FROM A NEARBY VILLAGE PLAYING ON THE EDGE OF A BOMB CRATER. NOTE THE THREE LIVE MORTAR SHELLS IN THE CRATER.



A 21-YEAR OLD VICTIM OF UNEXPLODED ORDNANCE BEING DETONATED WHILE DIGGING FOR AND COLLECTING SCRAP IRON NEAR ONE OF HATFIELD CONSULTANTS SAMPLING LOCATIONS IN THE A LUOI VALLEY. LOCAL VILLAGERS ASSIST THIS YOUNG MAN WITH FOOD AND LODGING. SINCE 1975, THERE HAVE BEEN ~39,000 FATALITIES AND ~66,000 INJURIES BY EXPLODING UXO IN SOUTHERN VIETNAM. IN EXCESS OF 400,000 ITEMS OF EXPLOSIVE ORDNANCE HAVE BEEN CLEARED AND DESTROYED BY NON-GOVERNMENTAL ORGANIZATIONS IN THE LAST DECADE. THERE ARE NO DATA ON THE NEUTRALIZING OF UXO BY VIETNAM'S MILITARY.

