



HEALTH AFFAIRS

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

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From Major Douglas J. Kernett
SAF/PAMS
Washington DC 20330

DEPARTMENT OF DEFENSE (DOD)
HERBICIDE ORANGE STATUS REPORT

The name, Herbicide Orange, comes from an identifying orange stripe painted on the drum of this particular herbicide, which was made up of equal portions of the commercially-available herbicides 2,4-D and 2,4,5-T. These herbicides have been used extensively in agriculture and forest management in the United States (US) as well as worldwide for almost four decades. Only 2,4,5-T has been implicated as causing any potential health problems due to the presence, in low concentrations, of a toxic contaminant, dioxin, formed as the result of the normal manufacturing process.

Basically, herbicides were used in Vietnam in a major role to deny cover, and minimally, to deny crops to the enemy. At the request of the President of the Republic of Vietnam (RVN), the use of herbicides was approved by the President of the US.

This was done only after testing in Florida, Hawaii and South East Asia in the period 1962-1965. The herbicides used had the desired effects of improving visibility and were then believed to be harmless to humans. From 1965 to 1970, extensive aerial spraying was carried out over approximately 10% of the land mass of the RVN, dispensing 11,300,000 gallons of Herbicide Orange in over 3,000 separate missions. This was carried out under the code name, "Ranch Hand". Each mission was carefully approved in matching procedures within the US and RVN chains of command. The missions were generally carried out in remote or enemy-controlled areas as a result of the military need to improve observation of enemy activity and to reduce the potential for ambush. The missions were flown under strict meteorological and operational conditions which minimized the drift of the herbicide. To the extent that troop movements were timed to foliage destruction, the troops would not normally enter the sprayed area for one to two months when Orange exhibited its maximum defoliation effect. US and RVN commanders were also warned to keep their troops out of the target area at the time of spraying so that groundfire might be safely returned by fighter aircraft protecting the spraying mission.

In a typical spraying of the jungle, tests show that only 6% of the herbicide reached the ground. At normal rates of application, this equals 4 millionths of a pound per acre of the

contaminant, dioxin. Repeated testing shows that dioxin is rapidly detoxified by exposure to daylight in a matter of days. Pure dioxin which has penetrated below the surface of the soil will persist for years, though it too slowly detoxifies.

From 1965 on, there are detailed computerized records of the date, location and amount and type of herbicide used in fixed-wing, "Ranch Hand", aerial spraying. The enclosed copies of maps, which were drawn from the records of the spraying missions, show the location of all "Ranch Hand" defoliation and crop destruction missions from 1965 to 1971. In addition, herbicides were used around US and RVN base perimeters, again to deny concealment to the enemy for ambush and attack. There are few detailed records of this use of herbicide, which was applied by hand sprayers or from tracked vehicles and small helicopters. Also, during 1967-69, small quantities of herbicide were applied along the southern border of the Demilitarized Zone (DMZ) in Korea. This was applied by hand sprayers and from trucks by Korean Army personnel. No US troops are known to have been involved or exposed.

Because of increasing concern about the ecological and environmental and possible health effects of Herbicide Orange, its use was curtailed in April 1970 and then discontinued altogether by June 1970. Other herbicides continued in use into 1971. All remaining DoD stocks of Herbicide Orange, including

that returned from Vietnam (2.2 million gallons), were consolidated on Johnson Island and later (1977) safely incinerated at sea under the guidance of the Environmental Protection Agency (EPA). An extensive study of the use and effects of herbicides in Vietnam was conducted by the National Academy of Sciences (NAS) and was reported to Congress in 1974. That study did not identify any specific health problems.

One of the components of Herbicide Orange, 2,4,5-T, contains, as an unavoidable contaminant of its normal manufacturing process, TCDD, or dioxin, a very toxic chemical. In large acute doses in humans, such as result from an industrial manufacturing accident, there is a confirmed adverse effect on the skin. There are suggestions, also, that there are effects on the liver, as well as the central and peripheral nervous systems. The skin manifestation of dioxin exposure, chloracne, appears as a severe, widely distributed rash similar to, but generally much worse than, adolescent acne. It is distinguishable from the very common fungus rashes and skin diseases so prevalent with duty in the tropics.

A recently released study by Monsanto Chemical Company of an accident which occurred in 1949 at their Nitro, West Virginia facility has not shown an excess of deaths, cancer or heart disease, as compared to the general US population, for 122 male workers who were conclusively proven to be exposed to dioxin.

Studies of other similar accidents, including the one at Seveso, Italy in 1976, are being conducted. In animal studies, preliminary results show dioxin to be capable of causing cancer, fetal death and congenital defects but, to date, these effects have not been demonstrated in humans. The reproductive effects have so far been observed only in pregnant female rats and mice from large doses of dioxin, but not in rabbits, sheep or monkeys. There are marked species differences in sensitivity to dioxin's effects.

The present concerns about Herbicide Orange use in RVN center not on large acute exposures, but on the possibility of ill health arising from low levels of exposure to aerially sprayed herbicides. Much of the difficulty arises from the fact that there is so little concrete information about exposure, especially at low dose levels, and its consequences. There are no known, proven human effects on health or reproduction from exposure to low levels of 2,4,5-T or dioxin. The health complaints voiced by those who believe they may have been exposed to Herbicide Orange do not fall into any discernible pattern; nor is there any significant marker or unusual condition such as chloracne, the rare skin condition which is a uniform sign of large, acute exposures to dioxin, to serve as a specific clue that low level exposure may have occurred. For instance, with exposure to asbestos and polyvinyl chloride, the remarkably consistent high incidence of otherwise very rare cancers substantially hastened the association of exposure to these substances and

subsequent ill health. Such has not been the case with dioxin. So, for the moment, there is no scientifically proven evidence that exposure to dioxin in very low doses leads to ill health or genetic defects. However, the matter is not being allowed to rest there.

There are many studies presently being carried on, both in and outside the Government, which are designed to investigate many of the unknown aspects of herbicide exposure. The lack of definitive information has heightened public and private concern about the possible human effects of exposure to dioxin. Within the DoD, the Air Force has proposed a study of the 1,200 men from "Ranch Hand" who performed the aerial, fixed-wing spraying of herbicides in Vietnam. The protocol for this study will be carried out only after careful scientific screening by independent, expert panels. The protocol ~~is presently being~~ ^{has been} evaluated by the National Research Council of the National Academy of Sciences. Additionally, the Veterans Administration (VA), at Congressional direction, will conduct a similar epidemiological study of ground troops who served in the RVN. These studies will take several years to complete, but they offer the best hope of definitive solutions to the questions for which there are no answers at present.

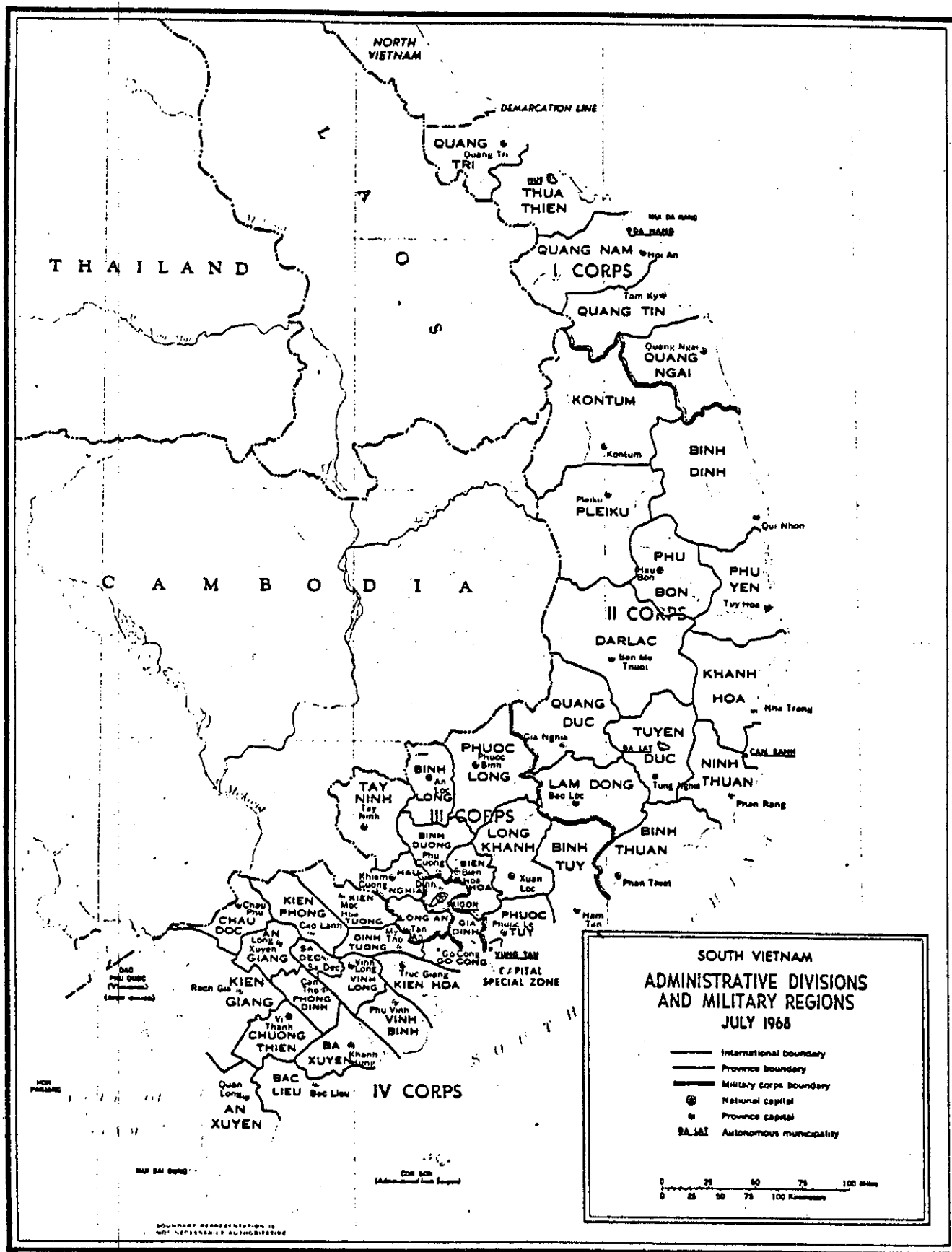
Critical to the VA study and to concerned individuals will be information about whether a given individual was actually exposed to aerially sprayed Herbicide Orange. Information is not now available which will conclusively locate a given individual

or his military unit with sufficient precision to state whether or not he was exposed. Military unit and personnel records are presently being surveyed to find out how this may be accomplished, at what cost, and how long it will take. To determine exposure, it would be necessary to accurately place some 2.5 million men for each of the 365 (or more) days that they were in the RVN. As might be imagined, it is a formidable task and will take time. So, for the moment, it is not possible to tell an individual whether or not he or his unit was exposed. We know, based on the state of military records which were compiled and handled under combat conditions, that it will never be possible to identify and place every individual who served in the RVN. Nor will it be possible to identify, from the records, individuals who might have been exposed to perimeter spraying.

Individuals who have unresolved health concerns may contact their nearest Veterans hospital or regional office, or military medical facility if they are still on active military duty. Each agency has a standardized approach for examining and advising such individuals. Any eligible individual who needs medical treatment will receive it whether or not Herbicide Orange exposure is proven or relevant.

All of the involved Federal agencies having an interest in Herbicide Orange are actively involved in an Interagency Work Group to Study the Possible Long Term Health Effects of Phenoxy Herbicides and Contaminants, which was recently created by the President. This Task Force will oversee, monitor, guide and

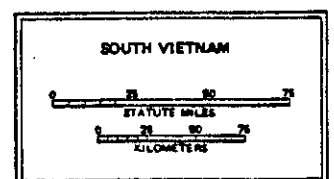
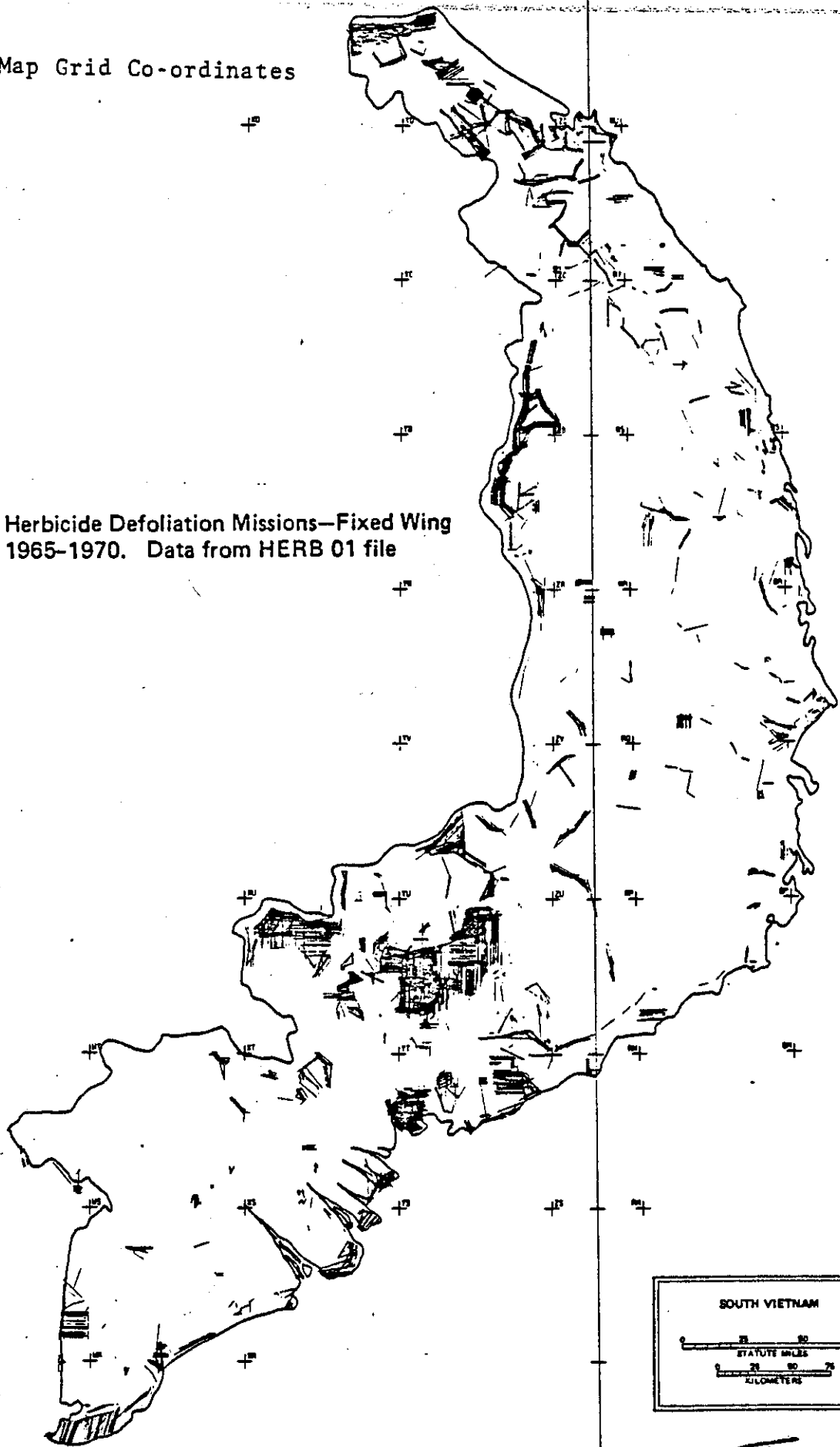
direct the Government's effort in this regard and is actively dedicated to improving our understanding of Herbicide Orange and other herbicides in commercial use.



MAP I

XD - Map Grid Co-ordinates

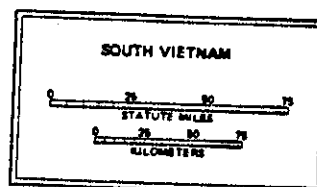
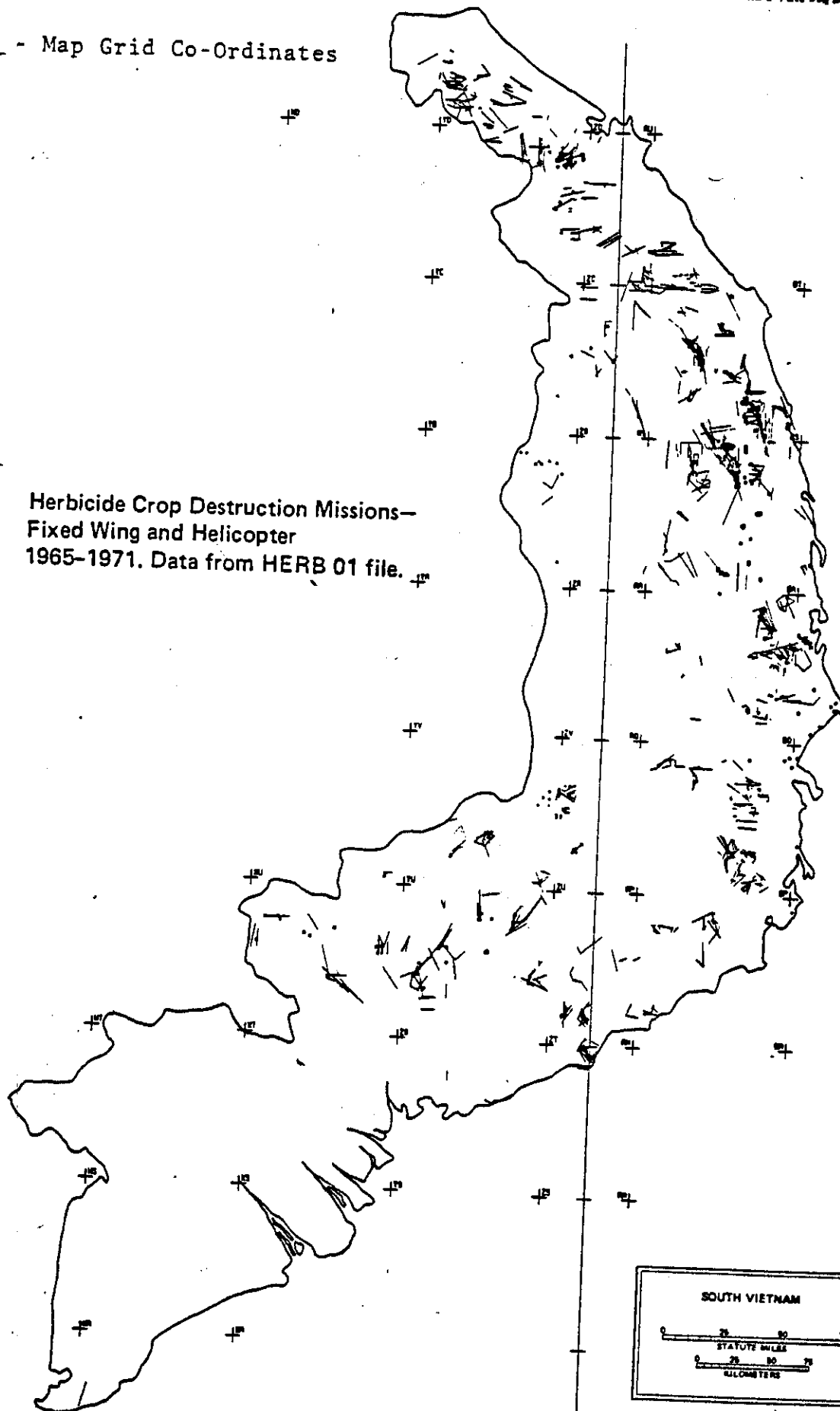
Herbicide Defoliation Missions—Fixed Wing
1965-1970. Data from HERB 01 file



MAP II

XD - Map Grid Co-Ordinates

Herbicide Crop Destruction Missions—
Fixed Wing and Helicopter
1965-1971. Data from HERB 01 file.



MAP III