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FISH AND WILDLIFE
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RECEIVED
VENTURA, CA

Colleen Sculley
U.S. Fish & Wildlife Service
Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003

RE: Ohlone Tiger Beetle and Controlled Burning of Marshal Field at UCSC Campus

Dear Colleen:

This letter describes the findings of my one-day, site assessment of habitat conditions for the Ohlone Tiger beetle (OTB), *Cicindela ohlone* (Coleoptera: Cicindelidae) in Marshall Field at the University of California Santa Cruz (UCSC) campus. I visited this area, located in the northern portion the UCSC campus, at the request of Dean Fitch, Grounds Superintendent for the UCSC physical plant, and you. The purpose of my visit was to determine if the proposed controlled burns of Marshall Field might adversely affect the OTB. The remainder of this letter reports on my habitat assessment methods, presents my findings, and offers a few preliminary recommendations for the planned burn in the summer of 2000 and for OTB monitoring in 2001 and beyond.

Background Information.

The OTB is associated with grassland habitat, especially sites that still support a grassland flora characterized by a fair proportion of native bunchgrasses. Adult OTBs actively hunt in the footprint-sized areas of bare or sparsely vegetated ground between the tufts of the bunchgrasses. Adults and larvae dig burrows at the margins of these footprint sized barrens. They also hunt, thermoregulate, and conduct other behaviors along trails or other localized areas of bare ground.

In contrast, grasslands characterized by a dense cover of annual grasses or shrubs and trees usually do not provide suitable habitat for the OTB. Similarly, barren or sparsely vegetated areas that are shaded by taller trees or shrubs during part of the daytime activity period of the adult OTBs or that are too rocky constitute poor quality habitat. Meadows that are inundated with ponded water during the beetle's late winter and early spring activity period are probably not suitable habitat.

Habitat Assessment Methods.

My initial site visit was on March 31, 2000, while adult OTBs were still active. A second site visit was on April 27, during which time I met with you, Dean Fitch, and Bruce Beck of the California Department of Forestry & Fire Protection (CDF&FP).

During my first site visit, I hiked throughout the main Marshall Field and lower Marshall Field meadows that are located off of Chinquapin Road and east of Empire Grade Road. I also hiked throughout the UCSC meadows that lie west of Empire Grade. I searched for OTB adults and burrows, and preliminarily identified portions of the grassy meadows that were more likely to support the OTB. I did not survey the most northern portion of Marshall Field at the northern border of the UCSC campus.

Habitat Assessment Results.

OTB adults and burrows were observed along several secondary dirt trails that meander through the two meadows that lie east of Empire Grade, as well as areas immediately adjacent to these trails. One burrow was noted in an area of recently disturbed ground. No adult beetles or burrows were observed in areas characterized by denser growth of grasses and forbs. Although Chinquapin Road is a dirt road, it has been covered with gravel and no beetles or burrows were observed along it. Similarly, no OTBs or burrows were observed on the UCSC property located on the west side of Empire Grade between that road and Wilder State Park.

Figures 1 – 4 are photographs that illustrate habitat conditions in Marshall Field. Figure 1 shows a secondary trail that parallels the Empire Grade Road where OTB adults and burrows were observed. Figure 2 illustrates lower-growing, somewhat more sparsely vegetated grassland in the foreground, with taller, denser grassland in the middle of the photo and forest in the background. Areas of shorter, sparser grassland provide potentially suitable habitat for the OTB in Marshall Field, especially if adjacent to trails or other areas of bare ground. Figure 3 illustrates a portion of Chinquapin Road with denser grassland vegetation. Figure 4 illustrates bike riders resting along a secondary trail, just north of Chinquapin Road, in a location where OTB adults and burrows were observed.

Figures 5 and 6 are aerial photographs of Marshall Field and lower Marshall Field that were provided by Dean Fitch. The dotted lines and polygons on both photos illustrate areas where I observed OTB adults or burrows or would expect to find them based on the presence of suitable habitat conditions (i.e., trails, barrens, or sparsely vegetated grassland).

Evaluation of Proposed Burn Activities.

As Dean Fitch and Bruce Beck explained during our site meeting on April 27th, the meadows of Marshall Field and lower Marshall Field have been burned in most years since the late 1970's. Subsequent to our April meeting, Dean sent me copies of a couple of reports that provide some history on prior burns in this area. I've attached copies of these reports to my letter.

The controlled burns have been used as training exercises for the campus, CDF&FP, and other local fire districts. In some years, most or all of both meadows have been burned, while in other years, only one meadow or portions thereof were burned. In

the attached letter from Dean Fitch, he notes that in addition to the burns, the perimeter of the meadows have been disced or mowed annually.

Prior burns at Marshall Field have probably benefited the OTB, at least to some degree, by reducing thatch and maintaining sparse vegetative cover in portions of these meadows. These burns may have also reduced the distribution and abundance of certain invasive annuals, as well as shrubs and trees, which if left unchecked would eventually become dominant in the OTB's habitat.

The controlled burns have usually occurred in mid to late summer. They are relatively cool fires at a time of year when the OTB is in its earthen burrow below the surface of the ground. For these reasons, I suspect the likelihood of OTB individuals being injured or killed by the fire, smoldering embers, or smoke is probably minimal, but this should be confirmed by future research and monitoring.

Recommendations for Monitoring.

The controlled burns at Marshall Field have undoubtedly played a role in determining the plant species present and their abundance. In the absence of fire, trees and shrubs would likely quickly colonize the open meadows, including areas utilized by the OTB. A cursory examination of the resident grasses and forbs in portions of the meadows that are OTB habitat revealed that a mixture of natives and introduced plants currently grow in the meadows. I am aware that in some plant communities the time of year when a fire occurs can favor the establishment of various native plants and discourage introduced species. Similarly, the frequency of fire (i.e., once a year vs. once a decade, etc.) can influence the species composition and abundance of target species. I suggest that this factor be further investigated to determine if the timing of the annual burning and frequency of the burns should be altered to favor management of the meadows in a manner that would increase the abundance of bunch grasses and other sparsely vegetated areas, conditions that would improve habitat values for the OTB.

This may require an experimental approach to the controlled burns. For example, it would be useful to establish some plots, each perhaps about one acre in size, within Marshall Field to gather data for comparison of different burn treatments over time to gain insight as to any effects on the OTB as well as plant species composition and abundance. I have assumed that with various fire districts participating in the controlled burn, the fire-fighting manpower and equipment would be available to set up such plots, but we need to discuss the practicality of this proposal with Bruce Beck. Some plots would be burned annually, others every other year, etc., and the time of year for a burn might vary for specific plots. Such an experimental design would allow a more rigorous analysis of the findings using various statistical tests. Depending upon the number of plots, several years of data may be needed to perform the statistical analyses. Initially, the burn findings would be correlated with presence/absence or possibly abundance of the OTB and its burrows. I would need to review the literature and contact other individuals more knowledgeable about fire ecology to offer more specific recommendations on an experimental design, but I would be willing to do this.

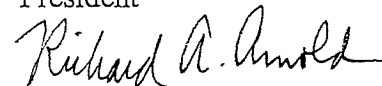
For the 2000 controlled burn, I suggest that fire trucks and other vehicles avoid driving or parking on the foot trails where OTB adults or burrows were observed during my habitat assessment. Figures 5 and 6 of this report identify such areas. Similarly, staging areas should avoid these trails. If the controlled burn includes the burning of brush piles, tree limbs or trunks, or other slower burning materials, I suggest that the piles be located along Chinquapin Trail rather than in the grassy meadows.

Finally, because my one-day survey was conducted towards the end of the OTB's 2000 adult activity period, additional surveys conducted throughout the beetle's entire activity period would be helpful to confirm my initial observations. In addition, I suggest that the northern portions of Marshall Field, which were not included in this assessment, should also be examined, as OTB is known from that meadow, which I think may have a greater proportion of bunch grasses. Such a survey would provide baseline information as to where adults and burrows were observed throughout the entire Marshall Field meadow complex. Once a more complete understanding of the beetle's distribution throughout the entire Marshall Field meadow complex is available, I can provide more specific recommendations for monitoring the beetle in burned vs. unburned areas to assess the effects of controlled burns on the OTB, and identify sectors where habitat management should be focused. Initially, I believe that beetle monitoring should probably focus on presence/absence and spatial distribution of adult OTBs and burrows to ascertain if the controlled burns are affecting the OTB. The use of an experimental survey design that is tied to the burn plots, as well as unburned portions of Marshall Field, would allow the use of various statistical tests to analyze the findings and substantiate management recommendations.

In conclusion, I can't find any compelling reason to not allow the controlled burn activity in the summer of 2000. It would be useful for UCSC and CDF&FP to establish a record that documents the areas burned and when the burns occur so this information can be reevaluated once the beetle's biology is more completely understood. Some of the background information provided by Dean Fitch (see attachments) discusses past burn activities. Ideally, it would be helpful to put the historical information and further burn data into a geographic information system (GIS) to facilitate the analysis and management of Marshall Field. Based on the history of fire management at Marshall Field, some form of fire management may prove to be beneficial for management of the OTB and its habitat, not only there but elsewhere throughout the beetle's limited geographic range.

Sincerely,

Richard A. Arnold, Ph.D.
President



Attachments

Cc: Dean Fitch, UCSC
Bruce Beck, CDF&FP



Fig. 1 Path parallel to Empire Grade where OTB adults and burrows were observed

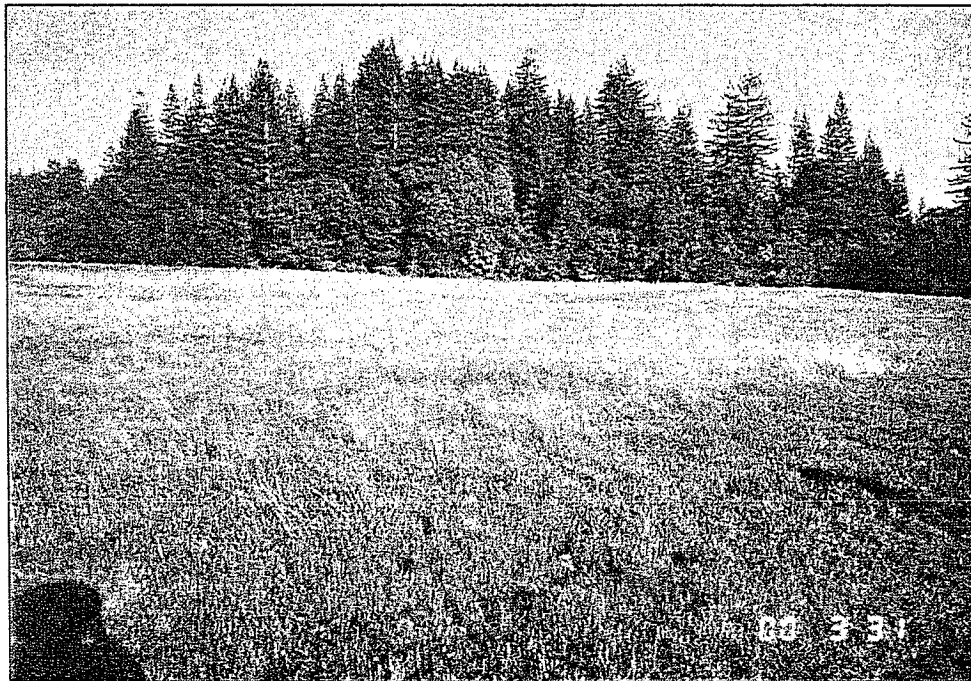


Fig. 2 Marshall Field at Chinquapin Trail looking south

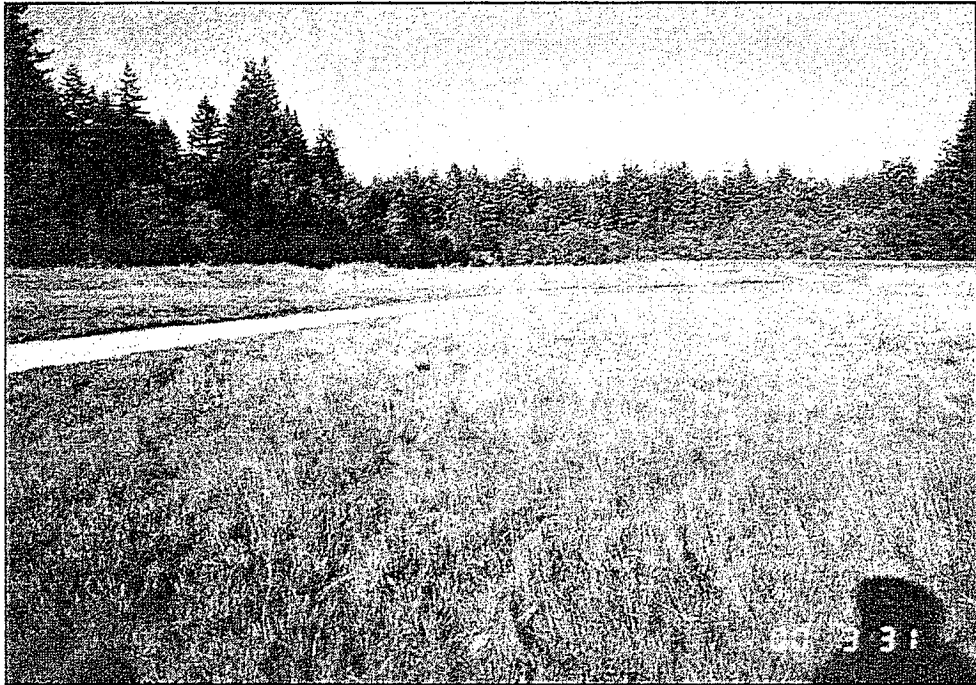


Fig. 3 Chinquapin Trail



Fig. 4 Bike riders resting along trail with OTB adults and burrows off of Chinquapin Trail

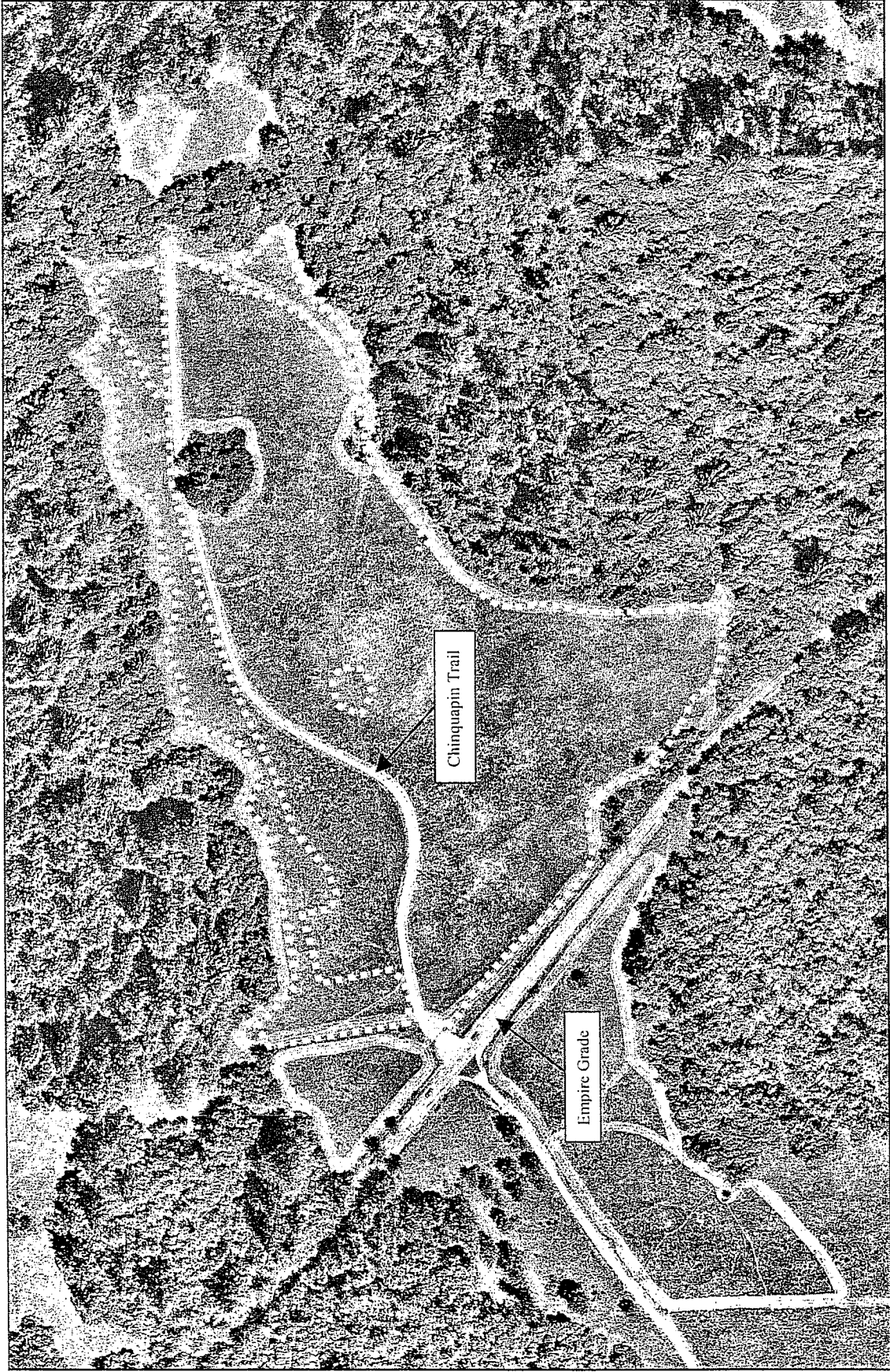


Fig. 5 Marshall Field
(dotted lines show areas where OTB adults, larval burrows, or potential habitat were observed)

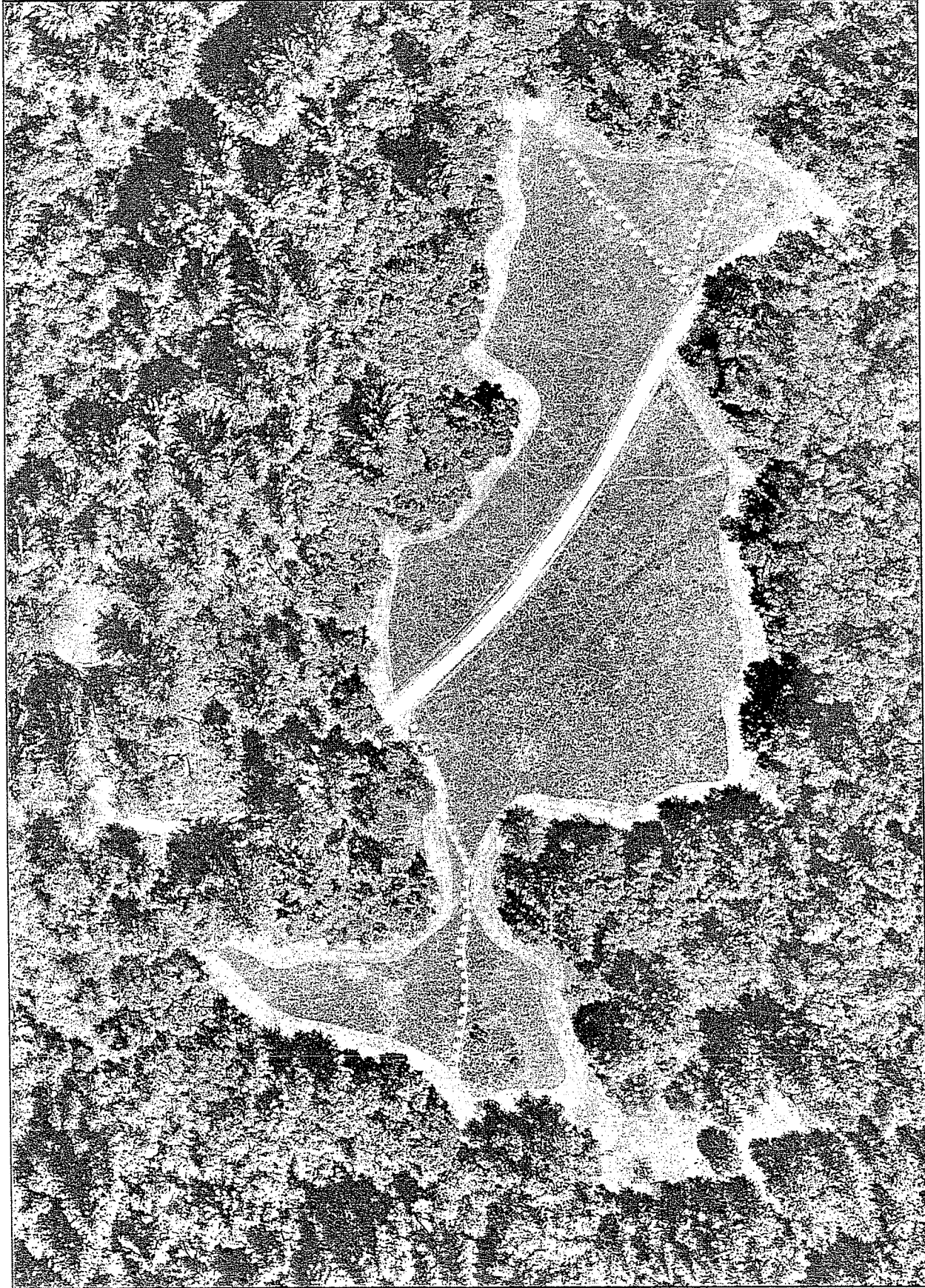


Fig. 6 Lower Marshall Field
(dotted lines show areas where OTB adults, larval burrows, or potential habitat were observed)