

**HABITAT ASSESSMENT AND STATUS SURVEYS  
FOR THE OHLONE TIGER BEETLE  
AT THE KINZLI PROPTERY  
IN SANTA CRUZ, CALIFORNIA**

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## INTRODUCTION

The 67.6-acre Kinzli property, located in the city of Santa Cruz, CA, recently was put on the market. Although the property is currently undeveloped, it is zoned for residential use. The property consists of two adjacent parcels, a 52.179-acre parcel (APN 002-301-01) and a 15.379-acre parcel (APN 002-041-04). The first parcel is zoned RS-5, meaning that it could accommodate residences on a minimum parcel size of 5-acres, while the second parcel is zoned R-1-10, meaning that it could accommodate single-family residences on a minimum lot size of 10,000 ft.<sup>2</sup>.

Lori Poliski and Paul Gross, of Woodinville, WA, have an option to purchase the property, which is located west of Western Drive and south of Meder Street. Although formal site plans have not been prepared, it is my understanding that the couple plan to build a single-family residence and accessory dwelling unit at the site, plus a barn to house a few horses. The remaining acreage will be used for grazing the horses.

Entomological Consulting Services, Ltd. was hired to conduct a habitat assessment and status survey for the Ohlone Tiger beetle ("OTB") at the Kinzli property. This beetle is known scientifically as *Cicindela ohlone* (Coleoptera: Cicindelidae). These surveys were undertaken because the Kinzli property is situated next to the Bombay property, which is a known location for the beetle. Also, since the U.S. Fish & Wildlife Service (2000) has recently proposed to recognize the beetle as an endangered species, information on the status of this beetle at the Kinzli property is needed for project planning and permitting. This report discusses the findings of my habitat assessment and status surveys for the OTB. In addition, background information on the beetle is presented.

## BACKGROUND INFORMATION

This section summarizes available information about the taxonomy, identification, distribution, habitat, biology, and conservation of the OTB. Information from related species of tiger beetles is often discussed, particularly when specific information for the species of concern is lacking.

### **Taxonomy.**

Tiger beetles are generally treated as a family, the Cicindelidae, in the insect order Coleoptera; however, some entomologists prefer to recognize tiger beetles as a subfamily (Cicindelinae) or tribe (Cicindelini) of the ground beetle family, Carabidae. Thus, all of these names are encountered in the entomological literature.

The Ohlone Tiger beetle was described in 1993 by Freitag, Kavanaugh, and Morgan (1993). Dr. Richard Freitag is a coleopterist (i.e., an entomologist who studies beetles) who specializes in tiger beetles. Dr. David Kavanaugh is a coleopterist who specializes in ground beetles. Mr. Randall Morgan is a local naturalist, who specializes in the flora and fauna of Santa Cruz County, and is the person who discovered the Ohlone Tiger beetle and first recognized that

it might represent a new species.

Their description of this new species was based on specimens collected from three sites in west central Santa Cruz County between 1987 and 1992. These three sites included an old marine terrace in Soquel, the Meder Street (i.e., Bombay property) location in Santa Cruz, and the Marshall Field portion of the upper campus of the University of California, Santa Cruz. Subsequent to the authors' submission of their paper, a fourth site supporting the beetle was discovered above the Vine Hill Elementary School in Scotts Valley, and a fifth site was discovered at Pogonip Park next to the UC Santa Cruz campus. As discussed later in this report, my discovery of the OTB at the Kinzli property is the sixth known location for this species.

### **Species Description.**

Adult tiger beetles possess elongate, cylindrical bodies. They are usually brightly colored, often with a metallic or iridescent sheen. Their eyes and sickle-shaped mandibles (i.e., jaws) are very prominent. Together, their eyes and head are wider than the thorax. They possess long, cursorial legs that are characterized by numerous spines. Adults are typically about 15-25 mm. in length.

*Cicindela ohlone* is most closely related to *C. purpurea*, but can be distinguished from this and related species by its overall size, the color and maculation patterns on its thorax and elytra, and its genitalic features. The OTB's body color is a brilliant green, with gold maculations. Freitag, Kavanaugh, and Morgan (1993) illustrate the maculation pattern characteristic of *C. ohlone* and the diagnostic features of its genitalia. In addition, the winter-spring activity period of the OTB is distinctive, as most tiger beetles in coastal California are active in the spring and summer months (Nagano 1980).

Larvae of tiger beetles are much more uniform in appearance than adults. They have an eruciform (i.e., grub-like) appearance. The head and pronotum are strongly chitinized, and the fifth abdominal segment possesses a pair of medial hooks that are used as anchors to secure the larvae as they reach out from the tunnel to ambush prey. The larvae of *C. ohlone* have not been described.

### **Distribution.**

Of the approximately 110 species of tiger beetles that have been described in North America (Boyd and Associates 1982), *Cicindela ohlone* exhibits one of the most restricted geographic ranges. Prior to my survey at the Kinzli property, it had been reported from only five locations in central and western Santa Cruz County.

Although the potential exists for it to occur in other locations in the county supporting similar habitat, to date the beetle has not been found in other similar areas checked. This species appears to be restricted to coastal terrace situations, at low to mid-elevations (less than 1,200 feet), located between the crest of the Santa Cruz Mountains and the Pacific Ocean.

### **Habitat.**

*Cicindela ohlone* inhabits areas characterized by remnant stands of native grassland.

California oatgrass (*Danthonia californica*) and Purple needlegrass (*Stipa pulchra*) are two native grasses known to occur at all five sites. Within these grasslands, the beetle has been observed primarily on level ground, where the vegetation is sparse or bare ground is prevalent. The substrate at each known beetle location consists of shallow, poorly drained clay or sandy clay soils that have accumulated over a layer of bedrock known as Santa Cruz Mudstone (Freitag, Kavanaugh, and Morgan 1993).

#### **Biology.**

Specific biological and life history information for *C. ohlone* is not known. Similarly, the egg, larval, and pupal stages of *C. ohlone* have not been described. However, all tiger beetles share some general biological characteristics, which are summarized in this section.

The diurnally active adults and larvae of *C. ohlone* are associated with sunny areas of bare or sparsely vegetated ground. Adults run rapidly in and near the larval habitat. They are strong flyers for short distances. Because they are cold-blooded, are active during the winter and spring months, and favor microhabitats that are sparsely vegetated and can become quite warm during their activity period, adults and larvae typically spend a considerable portion of their daily activity thermoregulating.

Collection records indicate that adult *C. ohlone* are active from January through April. Specific dates when beetles have been observed range from January 29th through May 3rd (Freitag, Kavanaugh, and Morgan 1993; Morgan, personal communication; Arnold, personal observation).

Both adults and larvae of tiger beetles are opportunistic predators that feed on smaller, soft-bodied insects and invertebrates. Adults possess good visual acuity and are found on sunny glades of bare or sparsely vegetated soil, where they actively search for potential prey. In contrast, larvae remain in their tunnels, and ambush prey that wander within their striking distance. Specific prey items of *C. ohlone* are not known, but prey for other species of tiger beetles have been identified as ants, adult and larval flies (Diptera), tiny insects, small beetles, and worms (Laroche 1974). These and other small, soft-bodied insects and invertebrates are likely prey items of *C. ohlone*.

The larvae of most tiger beetles occur in a narrower range of microhabitats than their adult stages, probably because they tolerate less variation in many physical factors, especially soil moisture, soil composition, and temperature (Pearson 1988; Shelford 1907 and 1909). All known larvae construct a tunnel-like burrow at sites where eggs were laid by the mother beetle. Larvae of other tiger beetle species that live in grasslands typically build their tunnels at the edges of the bare or sparsely vegetated portions of the grassland where adult beetles are most commonly observed (R. Freitag, personal communication). Tunnel length varies depending on the larval developmental stage, species, season, and substrate, but ranges from 15 to 200 centimeters (Pearson 1988; Willis 1967). Larvae of some tiger beetles require two years to complete their development (Lindroth 1974).

Richard Freitag (personal communication) states that tiger beetle species related to *C.*

*ohlone* construct larval tunnels that average about 50 centimeters in length. Although the tunnels of most closely related species are usually constructed perpendicular to the surface of the ground, a few are known to construct tunnels at an acute angle.

Pupation takes place in the larval burrows. The upper portion of the larval burrow is usually sealed off by the larva when it moults or prepares to pupate.

### **Conservation.**

The three describers of this new beetle species noted that because of the beetle's apparent restriction to clay-based, marine terraces, which support native grassland remnants in the coastal mid-Santa Cruz County area, much of its former habitat within this portion of the Santa Cruz County and similar areas in neighboring San Mateo and Monterey counties, had already been converted for development or other land uses before the new beetle was recognized as a new species. For this reason, Freitag, Kavanaugh, and Morgan (1993) suggest that it is unlikely that the OTB will be found in many other places.

Because developments or other land uses have been proposed for at least two of the five known OTB locations, the describers have advised the U.S. Fish & Wildlife Service that it should evaluate the possibility of recognizing the OTB as an endangered or threatened species. The U.S. Fish & Wildlife Service (2000) has recently proposed to recognize the OTB as an endangered species.

Nationally, two eastern taxa of tiger beetles are recognized as endangered species. Five of the 17 taxa of tiger beetles that are candidates or species of concern for federal protection under the Endangered Species Act (U.S. Fish & Wildlife Service 1994b) occur in California.

## **PROJECT SITE DESCRIPTION**

Figure 1 is a contour map of the Kinzli property. The upper terrace supports two grassy meadows. The northern meadow is dominated primarily by annual grasses and other introduced plants, while the southern meadow is characterized by several rock outcrops and thinner soils with a greater proportion of native grasses and forbs. The canyons and slopes on the property are characterized by a mixture of coastal sage scrub, some woodland, and introduced broom. A riparian corridor follows the drainage near the western border of the property. Cattle graze on the property as well as the neighboring Bombay property.

## **SURVEY METHODS**

I first visited the project site on March 31<sup>st</sup>, 2000, and surveyed the entire project site by hiking. A second visit occurred on April 4<sup>th</sup>. Although I had planned to spend additional time surveying for the beetle at the property, my surveys had to be terminated prematurely because of an emergency medical condition. Thus I was unable to observe the OTB until the end of its spring 2000 activity period.

As the tiger beetle is strictly associated with grassland vegetation, I looked for barrens or areas of sparse vegetation, preferably characterized by native bunch grasses and other native plants, which are favored by the OTB. If such areas were found, I then examined the ground for evidence of larval burrows and searched for adult beetles. The timing of my visits coincided with the latter portion of the OTB's 2000 activity period based on my observations of the OTB at other nearby localities this spring.

### **HABITAT ASSESSMENT AND STATUS SURVEY RESULTS**

OTB adults and burrows were observed along two sets of tire tracks/cattle trails in the northwestern portion of the property (Figure 1). This is the only portion of the site where OTBs were actually observed. Both the beetle and its burrows were observed from just below the terrace to the gated entrance to the property at Meder Street.

The OTB prefers barren or sparsely vegetated areas in grassland habitats dominated by bunchgrasses. Such habitat was observed in the lower portion of the northern meadow, as well as the central and southern portions of the terrace. These portions of the Kinzli property are characterized by rock outcrops with thin soils around the periphery of the outcrops and terrace. In addition, a few cattle trails traverse this portion of the property and are characterized by barren or sparsely vegetated ground. Prior to my first site visit, hay had been spread along the main cattle trail in the central portion of the site so no OTBs were observed utilizing this portion of the site. A couple of potential OTB burrows were observed along the main cattle trail in the southern meadow portion of the site (Figure 1).

The canyon walls and bottoms are either too steep for the OTB or too heavily vegetated for the OTB to utilize them. Indeed, no OTBs or burrows were observed in these areas. The invasive shrub, broom, has colonized portions of the canyons and canyon walls. Similarly, other portions of the property dominated by coastal sage scrub, woodland, or riparian vegetation are too heavily vegetated to provide suitable habitat for the OTB.

Figures 2 and 3 are photographs from near the central portion of the terrace that illustrate the grassland habitat conditions at the property, looking to the north (Figure 2) and to the south (Figure 3). Figure 4 illustrates one pair of the tire tracks/cattle trails in the northwestern portion of the property where OTB adults and burrows were actually observed. Figure 5 illustrates the south central portion of the property, where the rock outcrops and thin soils represent potential habitat for the OTB.

### **RECOMMENDATIONS FOR PROJECT PLANNING**

As OTB adults and burrows were observed along the tire tracks/cattle trails in the northwestern portion of the property, development or improvements in this portion will need to be carefully designed to avoid impacts to the OTB and its habitat. Even though no OTBs were

observed in the central and southern portions of the property, I recommend that the siting of dwellings, associated structures, and other improvements be limited to the northern meadow portion of the property. If grazing activities occur in the central and southern portions of the site, this management activity would probably help to improve habitat values for the OTB in these portions of the site. Once OTBs could become established in the central and southern portions of the property, the northwestern portion of the site could be improved to provide better access to the new dwellings.

I should caution the buyers that the habitat management efforts will be somewhat experimental as the biology of the OTB is still poorly understood. Nonetheless, at the Bombay property, some of the best habitat for the OTB occurs in a portion of that site which is moderately grazed by horses. In general, grazing has proven to be a useful management technique to favor native plants and habitats. The timing and intensity of grazing need to be monitored to favor the native plants and improve habitat values for indigenous species such as the OTB.

Also, if the U.S. Fish & Wildlife Service (USFWS) designates the OTB as a threatened or endangered species, a permit for incidental take of the beetle may need to be obtained from that federal agency. Such permits typically take about 6 months to 1 year to be processed after the permit application is filed. USFWS requires that a conservation plan be submitted with the permit application. The conservation plan must discuss the following topics:

- a) impacts likely to result from the proposed taking of the species for which permit coverage is requested;
- b) measures that will be implemented to monitor, mitigate for, and minimize impacts;
- c) funding that will be made available to undertake such measures;
- d) procedures to deal with unforeseen circumstances;
- e) alternative actions considered that would minimize or not result in take; and
- f) additional measures the USFWS may require as necessary or appropriate for purposes of the plan.

Because of the size of the property and the planned low-intensity use by the buyers, it should be possible to acquire an incidental take permit as long as the aforementioned constraints and conservation issues are adequately addressed in the site planning and conservation plan. I also recommend that you or the buyers contact the Ventura office of the USFWS to informally discuss this situation and arrange for a site visit by one of their biologists as soon as possible. Colleen Sculley is the entomologist on staff there and would be an appropriate person to contact initially. Her telephone number is (805) 644-1766, ext. 221. Her address at USFWS is 2493 Portola Road, Suite B, Ventura, CA 93003.

If you need assistance in preparing a conservation plan and application for an incidental take permit, I have prepared several for other clients and would be pleased to assist you with these tasks. I would also be pleased to assist you and the buyers with any other issues related to the OTB.

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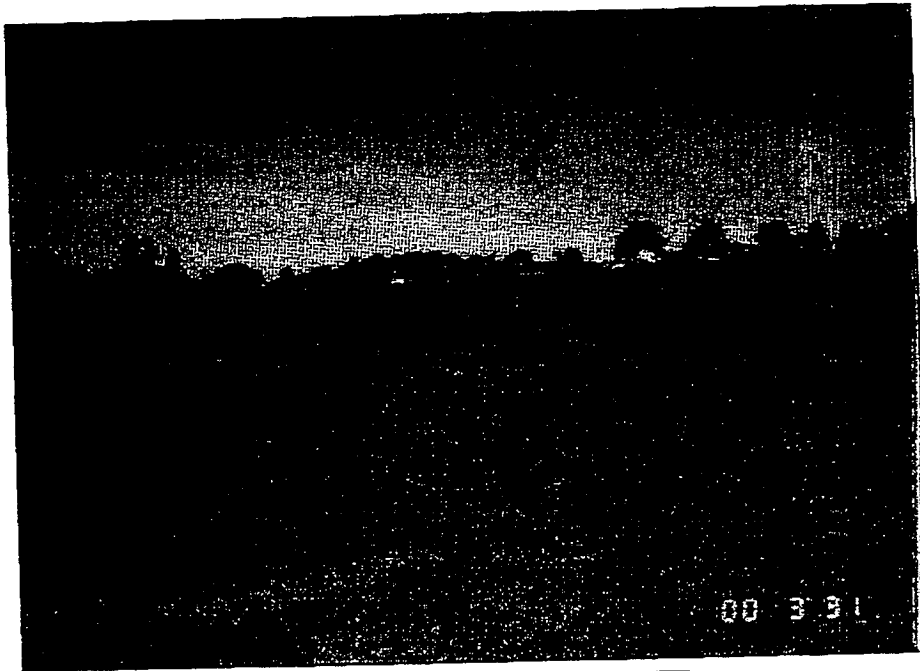


Fig. 2 Kinzli property looking north

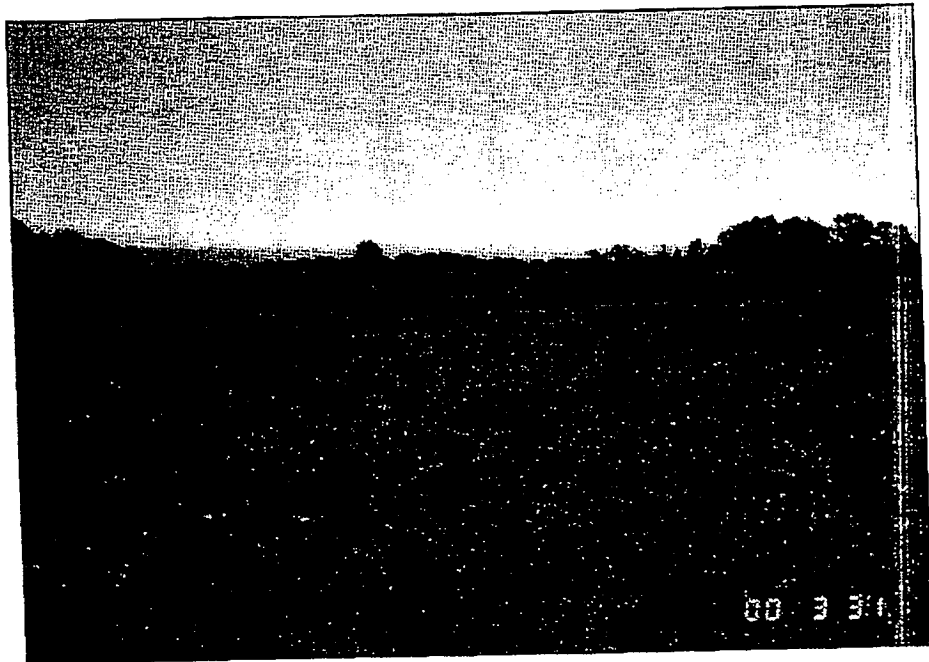


Fig. 3 Kinzli property looking south

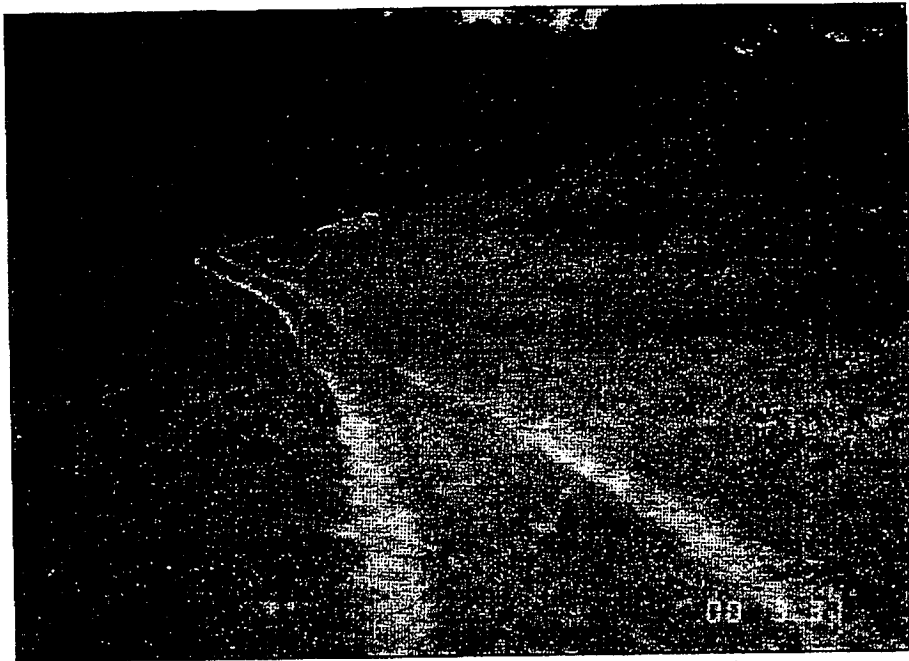


Fig. 4 OTB habitat along tire tracks

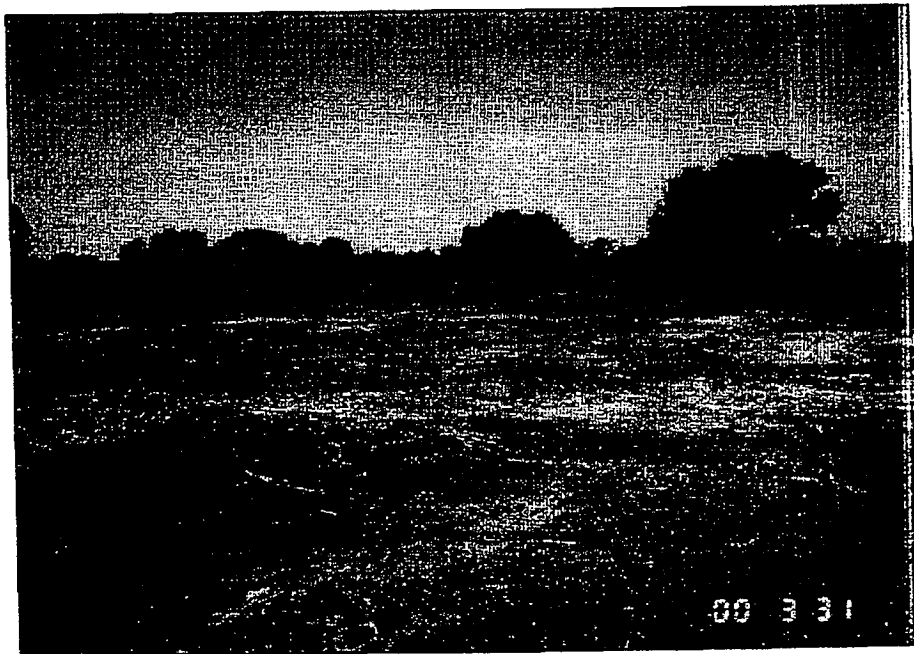


Fig. 5 Potential OTB habitat in central and southern portion of Kinzli property

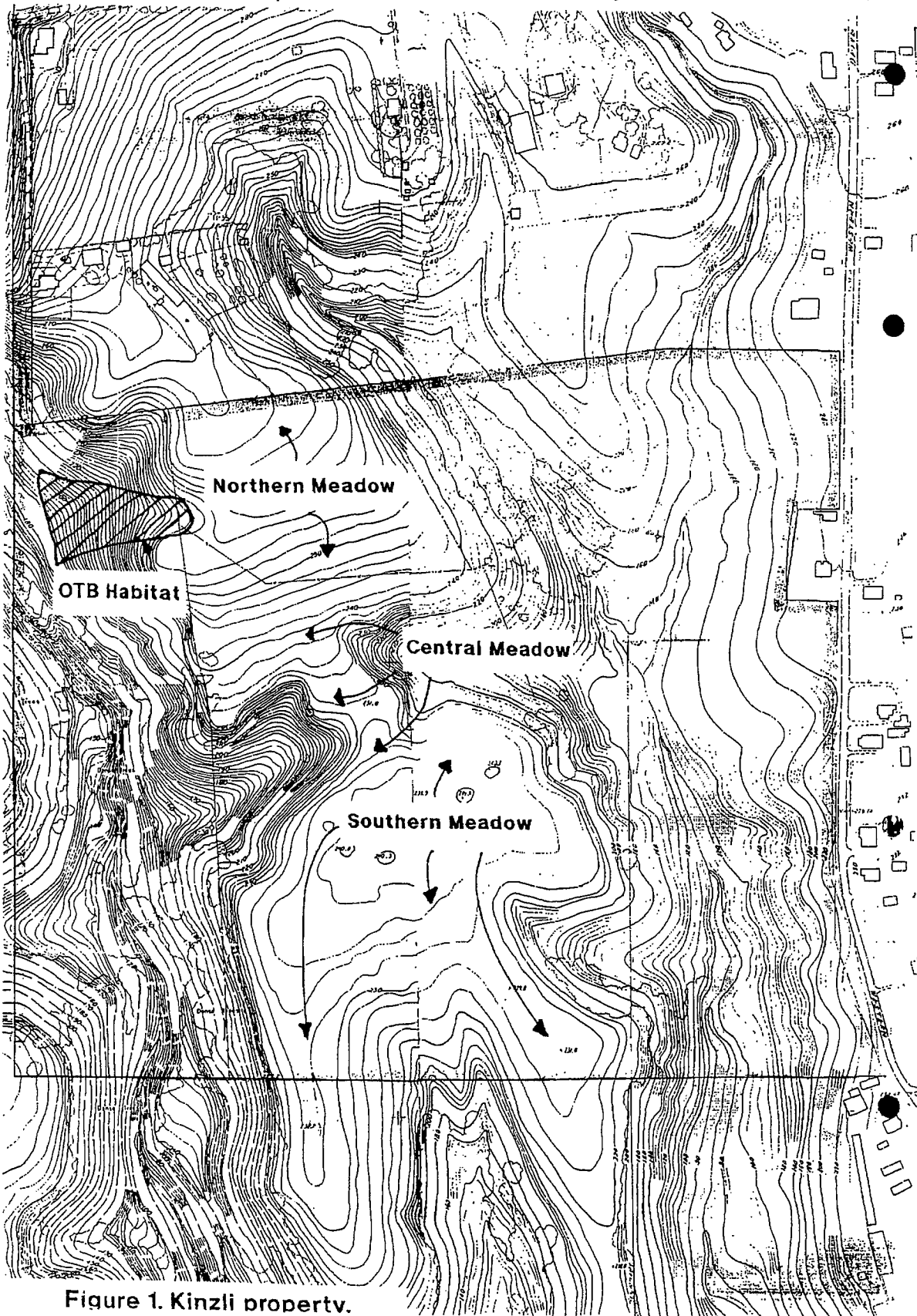


Figure 1. Kinzli property.