

CROTALUS VIRIDIS SUBSPECIES

IN THE IDAHO PRIMITIVE AREA

SPRING COTTON BIRD  
BENDER  
1957  
BOND  
SUBSPECIES  
CROTALUS  
1957

JOEL BENDER  
University of Idaho  
217 North Almon #3  
Moscow, Idaho 83843

## CROTALUS VIRIDIS Subspecies In The Idaho Primitive Area

### INTRODUCTION

Rattlesnakes occur from southern Canada to central Argentina and inhabit highly diversified ecological surroundings. Thirty-one existing species and seventy subspecies are recognized. Nearly half of the accepted subspecies of rattlesnakes have been described within the last 35 years (Klauber, 1972). In the state of Idaho, three subspecies of rattlers can be found. The northern pacific rattlesnake (Crotalus viridis oregonus) occurs in extreme west Idaho. In a small eastern section of the state lives the prairie rattlesnake (Crotalus viridis vividis), and in southern Idaho, the great basin rattlesnake (Crotalus viridis lutosus).

Figure 1 represents the ranges of these subspecies occurring in Idaho. This is the most recent map available and the Idaho Primitive Area has been drawn in to show its relationship to the ranges. It is interesting to note that the ranges of subspecies oregonus, viridis, and lutosus supposedly occur within the primitive area boundaries. However, a map of such a large scale fails to illustrate specific detail of the subspecies' ranges within the primitive area. In fact, according to this map, the Taylor Ranch area is beyond the range of any rattlesnakes. What then is the subspecies of rattlesnake that is so commonly sighted there? The IPA is such a high relief, mountainous region that it is not possible to even speculate as to the subspecies inhabiting this area.

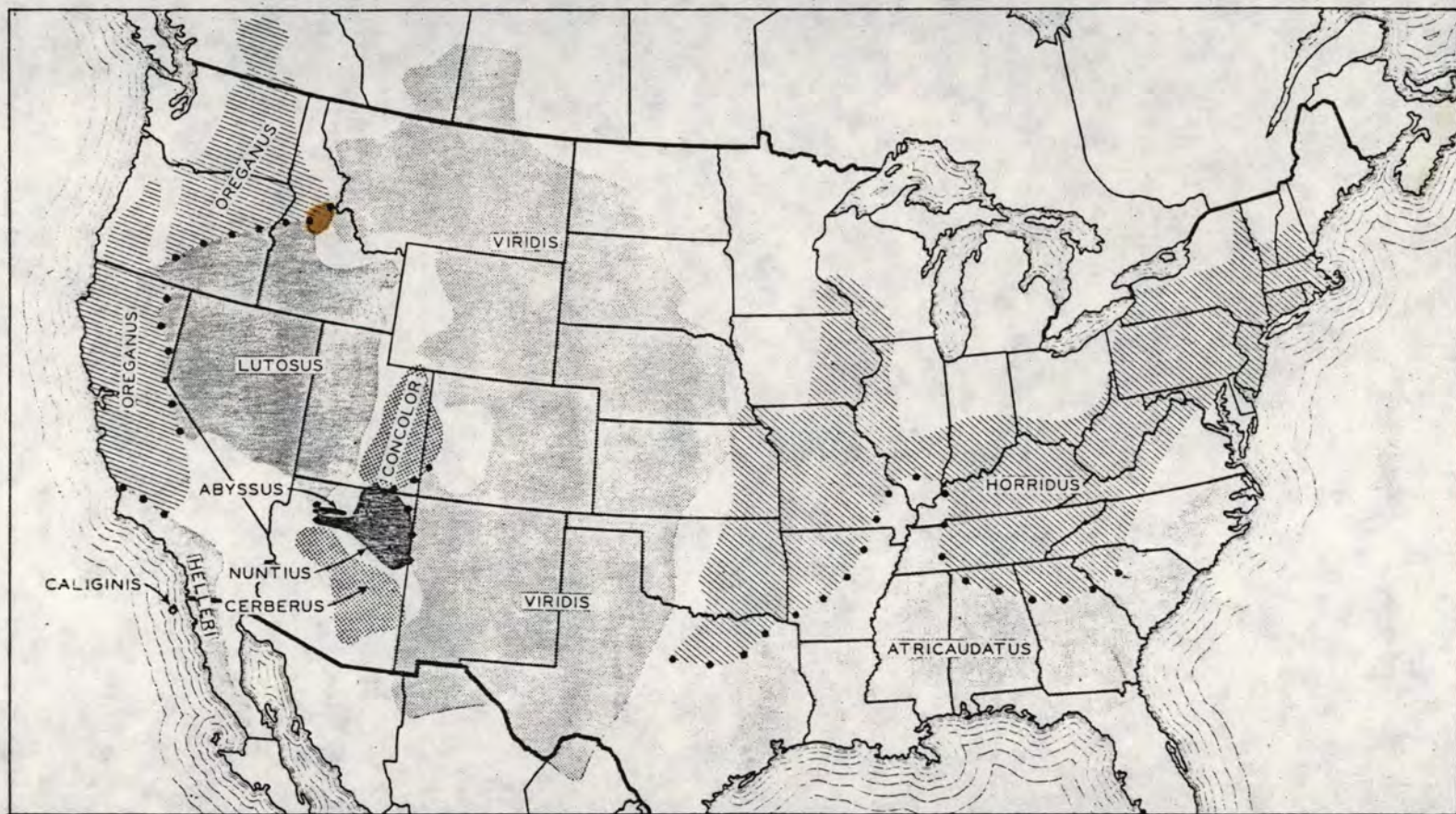


Fig.1 Ranges of C.viridis viridis, C.v.lutosus, and C.v.oreganus. Solid circles along boundaries between subspecies indicate areas of intergradation. The colored area represents the Idaho Primitive Area. After Klauber (1972).

## OBJECTIVES

The need for a detailed review of Idaho rattlesnake subspecies becomes obvious considering the nonexistence of literature on the rattlesnakes in the IPA. Rattlers are known to occur along the Big Creek and Middle Fork (Salmon) River drainages, but information as to subspecies present and range boundaries is unavailable. The lack of knowledge of the rattlesnakes in the IPA has led to this proposal and to the following goals and objectives:

- 1) Determine the subspecies along the Big Creek and Middle Fork (Salmon) River drainages, and map their location and range. (See figure 2).
- 2) Map locations of den sites along Big Creek near Taylor Ranch and determine approximate population numbers.
- 3) Study the distances rattlesnakes disperse after emerging from their dens.
- 4) Record general habitat preferences and behavioral characteristics.
- 5) Collect specimens from various locations for further study--namely for taxonomic purposes, body fat content, and toxicity levels. The latter two studies are currently being conducted by researchers at the University of Idaho. Lowell Diller is researching body fat utilization, and Darwin Vest is determining toxicity levels in rattlesnakes.

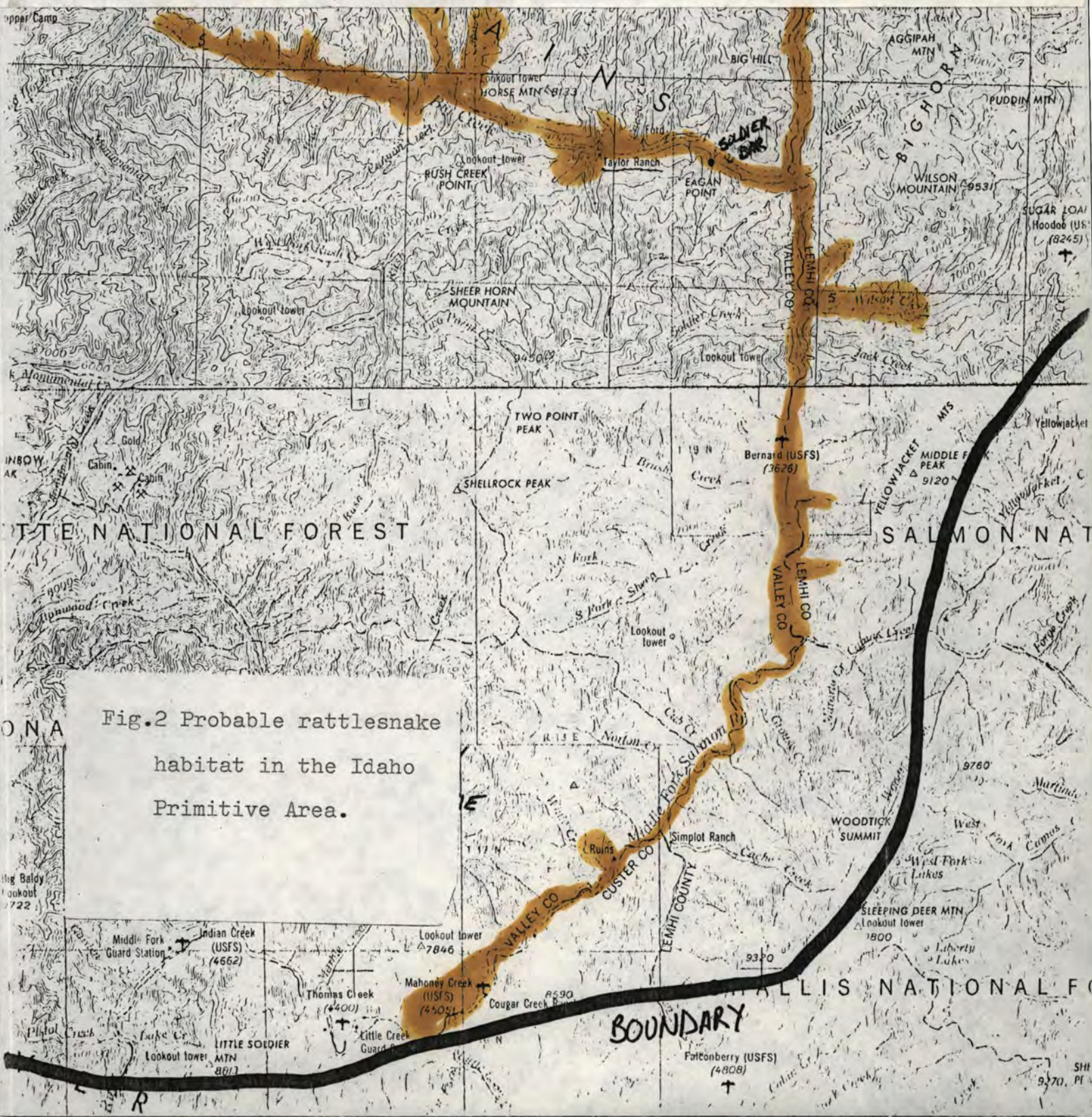


Fig.2 Probable rattlesnake habitat in the Idaho Primitive Area.

STATE OF KNOWLEDGE

The subspecies oreganus, viridis, and lutosus exhibit distinct physical differences in scale patterns and coloration (Klauber, 1972). However, they share many similar behavioral characteristics which may allow them to be found throughout the IPA.

The substrate preferences are all basically dry, rocky conditions. C. v. viridis has been found in almost every niche including rocky bluffs, flat rock, and rocky hillsides. C. v. oregonus is usually found near rivers, on bluffs or cliffs above lakes, and in interior valleys or slopes. C. v. lutosus prefers southern exposures among volcanic boulders or hillsides, low foothills, and sides of mountains (Wright & Wright, 1957).

All the rattlesnakes of this latitude congregate to overwinter in a den. Usually a large number (100+) can be found at a den site. However, Lowell Diller, Department of Biology researcher at the University of Idaho, has informed me that if an area provides a large abundance of denning sites (mainly rocky talus slopes), then the rattlesnakes may tend not to congregate in one area but rather be dispersed in small groups throughout the rocks. The emergence of rattlesnakes from their den in the spring depends primarily on temperature. Another rattlesnake researcher in the Department of Biology, Darwin Vest, reports from his experience that approximately three warm days of 60° temperature or above are needed to stimulate the snakes to emerge. Temperatures of this sort should begin sometime in April-May. Fitch and Glading (1947) reported that

C. v. oregonus in the San Joaquin Range emerged between March 16 and April 11 over a three year study. It can be expected that subspecies oregonus will emerge at a later date because of Idaho's higher latitude and colder temperatures. Vetas (1951) found that C. v. lutosus near Salt Lake City emerged as early as April 12, but peaks of emergence occurred from May 3 to the 23. A. M. Jackley (1947) reports that subspecies viridis in South Dakota emerges from April 25 to May 15.

Another important characteristic of these subspecies is elevation range. The Taylor Ranch area is a little less than 4,000 feet, while the Middle Fork of the Salmon ranges from approximately 5,000 feet in the south to less than 4,000 feet in the north. Wright and Wright (1957) report the elevation range of C. v. lutosus from 4,000 to 9,000 feet, C. v. oregonus--3,000 to 12,000 feet, and C. v. viridis from 2,000 to 10,000 feet.

As can be seen from the above information, it is theoretically possible for any of these subspecies to be found throughout the IPA. It is also just as possible for the three subspecies to have intergrated ranges within their primitive area habitat.

#### METHODS

As previously mentioned, temperature primarily dictates when hibernating rattlesnakes will be emerging from the dens. Emerging rattlers exhibit a lying-out period where they congregate enmasse around the den entrance to absorb the sun's heat. Darwin Vest says the rattlesnakes will tend to remain in the lying-out state for two

to three weeks or until the temperature consistently remains above freezing at night. After that, the snakes begin to disperse in all directions.

To determine the den locations, it is necessary to find the snakes as they are lying-out. Basically, it is all a matter of proper timing. The Taylor Ranch manager, Arlow Lewis, will be flying out the end of March and he should be able to provide information as to weather conditions in April-May and the approximate dates he usually begins to see rattlesnakes. The lying-out period should provide enough leeway to get in and locate the dens. It has also been cleared with pilot Dr. Ken Sowles to fly in when conditions are conducive. I plan to concentrate the den search to two to three miles either side of the Taylor Ranch along Big Creek. Dr Wini Kessler has informed me of a den site at Soldier Bar (about one mile downstream from the ranch). It will also be possible to approximate population numbers at each site.

The study of dispersal distances will also begin at the den. I plan to mark rattlesnakes at the dens and subsequent recapture or sightings will determine the distances traveled. One to two dens will be concentrated on along Big Creek. During the lying-out period, the capture of a large number of the population should be possible. The more I can mark the better, but I feel I need to have at least 25-30 rattlers marked to have a successful sighting later in the summer. To mark the snake, I will color-coat the rattles with spray paint (different color per den) which neither harms nor hinders the snake. The paint will remain all summer and



will not be affected by shedding. Once the snakes have dispersed, the colored rattle will make sighting and, therefore, mapping of the distances traveled much easier. I also plan to keep records on the approximate age of the marked rattlers. The two groups will be: (1) First year snakes--born last fall, having a button on the end of the tail, (2) Second year snakes and older. I would like to see if any correlation exists between age and dispersal distance. Klauber (1972) indicates that rattlesnakes travel probably less than a mile from their dens and that spring migration is likely to be downhill to the valleys and rocky outcrops.

Also during this initial fly in, additional information and objectives will be gained. First and foremost, the subspecies of rattlesnake can be determined for the immediate area. Second, Lowell Diller, Ph.D. candidate, is studying the fat utilization by rattlesnakes. Basically, he would like to determine whether fat is utilized during hibernation or during reproduction in the fall. Specimens will be collected and flown out for further study.

The above objectives are not crucial to the study of rattlesnakes in the area. I would like very much to conduct den and dispersal studies, but because of weather conditions and lack of available time, I may not arrive at the ranch during ideal conditions. However, the remaining objectives are much more valuable and take precedence during summer.

The most important information will be found by the studies along the river drainages. The probable habitat of rattlesnakes along the Big Creek and Middle Fork is indicated by colored areas

in Figure 2. Surveys of this area will determine: (1) If the snakes are there, (2) the subspecies present, (3) the general habitat and behavioral characteristics. The substrate, slope conditions, aspect, elevation, and other peculiar characteristics of the habitat utilized will be identified. This colored region encompasses a large sample of rattlesnake habitat in the IPA and presumably I will encounter some subspecies overlap or intergradation. Specimens will be collected at various locations in this region for further taxonomic study. Some of these snakes will be brought back to the University of Idaho for toxicity research being conducted by Darwin Vest.

A closer study will be conducted on the rattlesnakes around the Taylor Ranch. I plan to study daily habits such as sunning period in the morning, place of shelter during the heat of the day, and patterns of movement.

#### RESEARCH SCHEDULE

These studies and objectives have been presented in somewhat of a chronological order, but I would like to further clarify the schedule. There will be approximately 100 study days which have been divided into:

- 1) The location of the dens and the marking of the rattlesnakes will be conducted sometime in April-May. Also, some specimens will be brought back for further study and subsequent subspecies determination.
- 2) Once the semester is over, I will fly back in as soon as possible. The snakes will already have dispersed from the

dens and therefore I will begin by searching for the marked snakes. This will also allow some observation of daily habits and exploration along Big Creek. This search will last approximately 2 1/2 weeks.

- 3) The following 1 1/2 weeks will be spent on the daily study of the rattlers around the ranch.
- 4) At this time, all snakes will be well dispersed and I will start my exploration of the Big Creek and Middle Fork. Once Big Creek is completed, I plan to start north on the Middle Fork and work south. This represents the major part of the summer--about 5-6 weeks.
- 5) Remaining time will be accounted for by inclement weather, travel time, and any further study of the rattlesnakes in the area.

#### RESOURCES REQUIRED

- 1) 1 pair collecting tongs
- 2) Paint
- 3) 6 or more collecting bags, deep cloth sacks
- 4) 12 containers to house rattlers from various locations and to be used to fly specimens out.
- 5) Topographic maps to record information

SUMMARY

The Idaho Primitive Area represents one of the prime rattlesnake research sites in the country. Not only may three subspecies of rattlesnakes have ranges overlapping in this region, but also no specific literature is available concerning them. The information gathered would be of great value and interest to the scientific community. This study will be submitted to Copeia for publication, and similar information will be provided to the Forest Service in the IPA.

There is no place for amateurs when working with a poisonous snake such as a rattler. Although I am no expert, I have <sup>the</sup> knowledge and experience to work with these animals. I have asked for recommendations from persons who have seen me work with rattlesnakes and they appear on the following pages.

Again, the information that could be gathered this summer would be invaluable. I would welcome comments and criticisms of this proposal and will be more than willing to discuss them with those persons concerned.



University of Idaho

College of Letters and Science  
Department of Biological Science  
Moscow, Idaho/83843  
Phone (208) 885-6280

March 26, 1979

To Whom It May Concern:

I have known Joel Bender, since he has been in Idaho, through a mutual interest in snakes. During this time he has demonstrated a good knowledge of snake handling and rearing. He knows the proper procedure to handle a rattlesnake, so that neither the handler nor the snake will be injured. In my opinion, he has the most important of all attributes for the safe handling of venomous snakes, which is a high respect for the snake without undue fear.

Joel's experience with snakes extends from early childhood, during which time he has continuously collected and reared snakes. Since coming to Idaho he has collected rattlesnakes locally and is familiar with their behavior and habitat.

Sincerely,

*Lowell V. Diller*

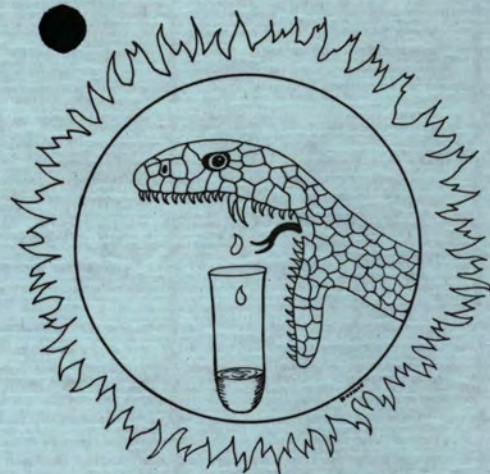
Lowell Diller  
Ph.D. Candidate in Zoology  
with specialty in Herpetology

LD:hs

# Venomatrium Research Laboratories

P.O. Box 3435

Moscow, Idaho 83843



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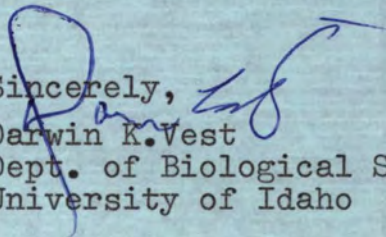
To Whom It May Concern;

I have been acquainted with Mr. Joel Bender over the past year and have found him to exhibit a high degree of interest and motivation relevant to the subject of natural sciences, particularly those pertaining to the study of reptiles.

Mr. Bender has indicated a serious interest in rattlesnakes and has demonstrated an ability to safely and intelligently handle and deal with these reptiles.

Following discussions with him it is my opinion that he would be well suited to undertake field studies of these serpents and may indeed be able to contribute much to our understanding of them, as they pertain to the natural history of the state of Idaho.

I whole-heartedly recommend Joel for a study project of this nature.

Sincerely,  
  
Darwin K. Vest  
Dept. of Biological Sciences  
University of Idaho

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