April 15, 1965

Mr. Richard Borden
Boone & Crockett Club
Great Meadows Road
Concord, Mass.

Dear Dick:

I was sorry we didn't have an opportunity to visit at greater length at the Wildlife Conference. This is always a hectic time for me and it was especially so this year as I had a touch of the "executive flu". Will be back to normal just as soon as I get into the field.

Under separate cover I am sending you our Sixth Annual Report on the grizzly bear work. This summer will be the last year of intensive research and then we will taper down within the next few years. I am enclosing an outline which illustrates the scope of the work and shows those areas in which we have obtained comprehensive data to date and those areas in which we are still lacking certain information.

In spite of contributions from many sources to the grizzly bear project, we are still in need of funds to do the type of job we have envisioned. Since the grizzly is a threatened species, I feel it would be amiss if we did not gather all the basic data we can get at this time. It therefore is still quite essential that the Boone and Crockett Club support the project for another year.

I wish I could tell you just how valuable this support has been. I am sure I cannot adequately do this until we have gotten out a monograph on the grizzly which I hope to do one of these days.

I realize that your organization would prefer to support a study to get it under way and then lend your support elsewhere once the study has gotten well started. I certainly concur in this objective but I do wish to stress that in the case of these threatened species, it is imperative that we get all of the data we can possibly get at the time we have a team of workers trained and organized, and public and state agencies behind us. My thinking is that we should do as thorough a job as possible because a similar opportunity may not present itself again. If the grizzly is eventually lost, it certainly will not be for a lack of having known the biological and ecological facts.

Please convey my deepest appreciation to the Board for their support.

I am enclosing a copy of Bio Science. I imagine you have already seen it but if not, you and the Board might enjoy reading the short note on radiotracking grizzlies.

Kindest personal regards,

John J. Craighead,
Leader

JJC:AB

P. S. I have been corresponding with Maurice Hornocker and the lion study is progressing real well. I plan to join Maurice in the Idaho Primitive Area next month.

April 15, 1965

Mr. John A. Carver, Jr.
Assistant Secretary of the Interior
U.S. Dept. of the Interior
Washington, D.C.

Dear Mr. Carver:

We have completed six years of study of the grizzly bear in Yellowstone National Park and the progress report on the work during 1964 will be forwarded to you in the very near future.

We plan to conduct intensive work again this year and this will then terminate the intensive phase of the study. However, we plan to continue gathering certain types of vital data for a period of several more years.

I hope that you will be able to support this project to the extent of $6,700 as you did during the fiscal year of 1964-65. This financial help has been invaluable and will be particularly necessary for another year. We also hope that after 1965 we can cut down on the volume of work so that support from the National Park Service will not be necessary.

I am enclosing an outline which shows the comprehensive nature of the work we have conducted, those areas in which we have rather complete data at the present time and those areas where it is still necessary to gather additional information.

I think this will be one of the most intensive studies ever conducted on a threatened species and I feel certain the final results will be highly valuable to the National Park Service.

If you have any questions concerning the study, please do not hesitate to contact me. I am particularly grateful for the fine support you have given us.

Respectfully yours,

John J. Craighead,
Leader

JJC:AB

March 2, 1965

Dear Dr. Rankin:

National Science Foundation grant G-13173, an Ecological Study of the Grizzly Bear, terminates June 30, 1965.

During the course of the study, conducted in Yellowstone National Park, 199 different grizzly bears have been captured, immobilized and individually marked and a total of 348 grizzlies has been handled. A mass of data on many aspects of grizzly bear ecology has been accumulated and these data are currently being tabulated and analyzed. The enclosed outline shows how the information is being organized. Most of the major headings will constitute comprehensive papers involving six consecutive years of data.

In order to continue the work through the summer of 1965, we wish to request a 6 months' extension. An extension at this time would enable us to continue observations of individually marked animals strengthening our data in all areas but especially those data pertaining to breeding age, delayed implantation, causes of mortality, growth and development, hibernation behavior and life tables.

Field work will begin June 1, and continue through October of 1965. A comprehensive summary of major findings will be submitted in the near future.

Respectfully submitted,

John J. Craighead
Project Leader

Frank C. Craighead
Co-Investigator

enclosure

Proposal For 6 Months Extension of Study Ecology of The Grizzly Bear G15173

Initiated by the:

Montana Cooperative Wildlife Research Unit
Montana State University
Missoula, Montana

Principal Investigators:

John J. Craighead
Montana Coop. Wildlife Research Unit
Professor of Bio-ecology
Montana State Univ.

Frank C. Craighead
Research Associate
Montana State Univ.

Approved by:

Robert W. Conrad, Dean
College of Arts & Science
Montana State Univ.

Robert Johns
President
Montana State Univ.

Proposed Budget

Personnel:

Student Assistant - 3 mo. salary - - - - - - - - - - - -	900.00
Stenographer - - - 1 mo. salary - - - - - - - - - - - -	350.00

Consumable Supplies:

Hypodermic darts for Cap. Chur gun - - - - - - - - - - -	200.00
Gas & Oil ---vehicle travel within Yellowstone Natl. Park- - - - - - - - - -	240.00

Budget Requested	$ 1,690.00
Social Security - - - -3%	37.50
Public Employment Retirement System---4%	50.00
Cost for 6 months period	$ 1,777.50
20% overhead cost	355.50
TOTAL BUDGET- 6 mo.	$ 2,133.00

Ecology of the Grizzly Bear in Yellowstone
A Listing of Subjects Where Comprehensive Data Have Been Gathered
Under N.S.F. Grant G-13173

I. Introduction

A. Early history of the grizzly

1. Populations and geographic range
2. Early food habits
3. Exploitation and control

B. Purpose and objectives of the research

C. The study area

D. Comparison of Study Area with other grizzly bear habitats

E. Physical description of the grizzly bear (general)

F. Taxonomic review

II. General Research Methods

A. Capturing, marking and recapturing

B. Observation of color-marked animals

C. Handling animals

D. Specimens

III. Size and structure of the population

A. Enumeration

B. Sex, age

C. Annual changes in composition

D. Population density

IV. Productivity

A. Breeding segment of population

B. Cubs produced

C. Yearlings surviving

D. Desertions, orphaning, adoptions

E. Relation of population structure to productivity

F. Ovarian analysis as an indicator of reproductive rate

V. Mortality

A. By sex and age

B. Causes of annual mortality

C. Annual increment as related to annual mortality

D. History of marked families (Genealogy)

E. Individual Case histories

VI. Reproductive Behavior

A. Breeding behavior

B. Breeding interval of females

C. Relation of breeding behavior to weaning of offspring

D. Age of weaning

E. Relation of breeding behavior to dominance behavior

VII. Breeding Age

A. Relation of breeding behavior to breeding age

B. Relation of breeding age to population dynamics and population structure

VIII. Delayed Implantation

A. Interval between breeding and presence of blastocysts

B. Interval between formation of blastocyst and resumption of embryonic development

C. Gestation period

IX. Range and Movement

A. Movement determined by recapture and field observation

B. Movement in relation to biological requirements

C. Home range and seasonal ranges

D. Induced movement

E. Dispersion

F. Ecological separation - black bear

X. Homing Instinct

A. Homing to den sites, food sources, breeding areas

XI. Social Structure and Population Behavior

A. Dominance hierarchy and behavior

B. Adult male - adult female interaction

C. Effect of dominance behavior on population behavior.

XII. Individual Behavior Traits

A. Adult animals

B. Sub-adults

C. Behavior in relation to man

D. Behavior in relation to animal condition, season of the year, predation, competition

XIII. Behavior traits by sex and age

XIV. "Hibernation" Behavior

A. Den construction

B. Pre-hibernation behavior

C. Post-hibernation behavior

D. Re-use of den sites and den areas by family groups

XV. The Senses

A. Behavior as related to senses of sight, smell and hearing

B. Use of senses in hunting, fighting, mating, evasive action, foraging

XVI. Pelage Changes

A. With sex and age

B. Seasonal

XVII. Growth and Development

A. Individual variation

B. By age class and sex

C. As related to orphaning, weaning, aggressiveness

D. Maximum, minimum, and average values for growth and development

E. Pre-hibernation fat increase and post-hibernation fat loss.

F. Growth curves for individual bears from cub to six years old

XVIII. Tooth emergence and Tooth Development

XIX. Pathology

A. Pathology as related to mortality, behavior, and population dynamics

XX. Parasites

A. External and internal

B. Parasites and grizzly bear ecology

XXI. Chemical Analysis of Milk

XXII. Chemical Composition of Blood

A. As related to arteriosclerosis

B. As related to sex, age, hibernation

XXIII. Food Habits

A. Seasonal

B. Individual variation

C. As related to man's activities (garbage dumps and camps)

XXIV. Habitat Requirements

A. Spacial requirements

B. Requirements of cover, food, den sites

XXV. Bear-Man Relationships

- A. In wilderness areas
- B. In and around campgrounds and feeding areas
- C. Behavior when trapped, drugged, tracked, cornered, surprised, baited

XXVI. Specific Research Methods and Technics

- A. Field observational methods
- B. Observational sites and areas
- C. Quantitative observations

XXVII. Capturing and Marking

- A. Description and evaluation of methods
- B. Recaptures

XXVIII. Immobilizing and Anesthetizing

XXIX. Techniques of Aging

- A. Foot and dental measurements
- B. Tooth sectioning
- C. Data from known-age bears

XXX. Mortality by generations

- A. Life tables
- B. Life equations - life table analysis

XXXI. Management Suggestions

XXXII. Appendix

- A. List of marked grizzlies
- B. List and history of marked families
- C. List of biological specimens