

Technical Report No. 8  
MEMORANDA OF AGREEMENT  
AND PROCEDURES FOR  
WORKING ON FEDERAL LANDS OF THE USDA

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GRASSLANDS BIOME  
U. S. International Biological Program  
March 1970

ABSTRACT

This technical report contains examples of agreements, contracts and procedures and the resulting official paperwork that outlines the cooperation between Colorado State University, the United States Department of Agriculture and individual investigators, as part of the International Biological Program, Grassland Biome studies.

## INTRODUCTION

The method most commonly used to translate and preserve programs is the generation of paperwork, records and files. The principal documentation which acts as the framework for Grassland Biome research activities are included in this report.

## BASIC AGREEMENTS

This includes the Memoranda of Agreement with Federal Agencies in charge of experimental areas. The agreement which authorizes the use of parcels of land within the Central Plains Experimental Range for grassland ecosystem studies is contained in a Memorandum of Agreement between Colorado State University, the U.S. International Biological Program acting by, and through the Grassland Biome Director, and the Agricultural Research Service, Crops Research Division, USDA. (Appendix I).

Participation of individuals in studies on the Central Plains Experimental Range requires a waiver of liability (Appendix II).

Management of many investigators on a single site requires rules of behavior in order to protect the experimental area and to promote the safety of participating personnel. Examples of rules which have been used are shown in Appendix III.

The Memorandum of Understanding between the United States Department of Agriculture, Forest Service and the U.S. International Biological Program Committee acting through Colorado State University makes available and grants permission to use sections of the Pawnee National Grassland for research. Regulations, rules and stipulations are specifically detailed. (Appendix IV).

The form required by the Forest Service agreement is the "Application for Research Study Area on National Grassland". (Appendix V)

## MEMORANDA OF AGREEMENT WITH PARTICIPANTS

These subcontracts are written to provide guidance, policy procedures for payment, work statements, and a budget summary for the various investigators. The content and wording of these subcontracts is approved by the National Science Foundation, and is subject to change or revision or amendment during the grant period. There are three variations on the basic subcontract form.

- A) Comprehensive Network subcontracts between Colorado State University and other institutions. (Appendix VI).
- B) Pawnee Site subcontracts between Grassland Biome and Colorado State University departments. (Appendix VII)
- C) Pawnee Site subcontracts between Colorado State University and other institutions. (Appendix VIII).

## APPENDIX I

MEMORANDUM OF UNDERSTANDING  
BY AND BETWEEN  
COLORADO STATE UNIVERSITY  
THE U.S. INTERNATIONAL BIOLOGICAL PROGRAM COMMITTEE  
AND  
UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
CROPS RESEARCH DIVISION

THIS AGREEMENT is entered into by and between Colorado State University (hereinafter called "Colorado"), the U.S. International Biological Program, acting by and through the Grassland Biome Director (hereinafter called "BIOME") and the Agricultural Research Service, Crops Research Division, (hereinafter called the "Division").

WHEREAS, the U.S. International Biological Program (IBP) intends to conduct a Grasslands Research Program (GRP) and

WHEREAS, Colorado will administer the funds of the GRP and

WHEREAS, the Division will make available to IBP, as hereinafter set forth, parcels of land within the Central Plains Experimental Range (CPER) for assessment of primary and secondary production in a variety of ecosystems, including grasslands within CPER.

NOW THEREFORE in consideration of the mutual contributions by each party to the other, and to the general research to be undertaken, the parties hereto agree as follows:

DEFINITIONS

As used herein, the following definitions shall have the following meaning:

BIOME - Grassland Biome Project of the U.S. International Biological Program

Colorado - Colorado State University

Cooperators - Collectively, Colorado State University and U.S. International Biological Program

CPER - Central Plains Experimental Range

Division - Crops Research Division, Agricultural Research Service

GRP - Grassland Research Programs

IDP - International Biological Program

RSIC - Range Scientist in Charge

A. COLORADO AGREES TO:

1. Administer funds for BIOME.
2. Provide insofar as BIOME funds permit and at no cost to the Division, all real property improvements on CPER and all equipment and services, including power, required for GRP.
3. Secure prior written approval from the Range Scientist in charge (RSIC) of CPER for location, type of construction and improvements to be placed on CPER.
4. Upon completion of the IDP research project at CPER the Division shall have the option of requiring the removal within one year of all improvements installed for GRP and the restoration of CPER to its original condition, normal wear and tear excepted; or the transfer of title to all improvements to the Division at no cost in consideration for tenure. This shall include but not necessarily be limited to all buildings, power lines, roads, fences and wells.
5. Conform to the arrangements and determinations made by RSIC involving Colorado and any other cooperator of the Division at CPER.

B. BIOME AGREES TO:

1. Provide an effective organization and staff for programming GRP under the direction of the Grassland BIOME Director.
2. Plan the GRP.
3. Maintain research records for the GRP, plan the synthesis of results, and develop ecosystem models.

4. Utilize the facilities furnished and installed by Colorado at CPER under such rules and regulations concerning safety and welfare as are determined by RSIC including but not limited to unusual tours of duty, housing conditions, working conditions, and safety requirements. The utilization of facilities shall be subordinate to existing cooperative projects such as grazing privileges of the Crow Valley Livestock Cooperative Association.
5. Be subject to and abide by all regulations and rules promulgated for operation of CPER by the RSIC including regulation of such things as vehicular traffic, application of insecticides and fertilizers, setting of animal traps and instrumentations, soil removal and irrigation.

C. THE DIVISION AGREES TO:

1. Cooperate in the planning of GRP upon the request of BIONE, IBP or Colorado.
2. Provide upon the request of BIONE, Colorado or IBP, sites for improvements necessary to conduct the GRP within CPER. In the event of any disagreement as to site location, the decision of the Division and/or RSIC shall be final.
3. Provide ingress and egress rights, including easements for utilities, to all cooperating personnel of BIONE and others conducting research under IBP.
4. Compile and post regulations governing the use of CPER lands including location of instruments, traps, wells and other improvements.
5. Review all building and/or improvement plans required by BIONE for CPER lands and approve when in conformance to Division and RSIC design and construction requirements.
6. Make available to BIONE, IBP and Colorado, Division records of rainfall, wind, temperature and reference collection of plants.

D. IT IS MUTUALLY AGREED:

1. Any personnel of BIOC and/or Colorado using the CPER land or facilities in GRP will:
  - a. Not receive any Federal salaries except for Federal employees cooperating with IEP.
  - b. Except as noted above, not be considered employees of the Federal Government, and
  - c. Execute a statement and deposit the same with RSIC providing the Federal Government shall not be liable in any manner in event of an accident, injury, or illness that might be incurred during the course of their assignment at CPER. A specimen copy of waiver form is appended as Attachment B to this agreement.
2. Any party to this agreement shall be free to use in official correspondence any of the results obtained in the undertaking, giving due credit to the other parties. It is understood that no party will publish any results without consulting the others. Publication may be joint or independent as may be agreed upon, always giving due credit to the cooperation and recognizing within proper limits the rights of the individuals doing the work. In case of failure to agree as to manner of publication or interpretation of results, any party may publish data after due notice and submission of the proposed manuscripts to the others. In such instances the party publishing the data will give due credit to the cooperation but will assume full responsibility for any statements on which there is a difference of opinion.
3. Patents rights shall be in accordance with Attachment A appended hereto.
4. This Memorandum of Understanding is to define in general terms the basis on which the parties concerned will cooperate, and does not constitute a financial obligation to serve as a basis for expenditures. Each party



will handle and expend its own funds. Any and all expenditures from Federal funds in the Division made in conformity with the plans outlined in this Memorandum of Understanding must be in accord with Department Rules and Regulations and in each instance based upon appropriate finance papers. Expenditures made by Colorado or BIONE will be in accord with their rules and regulations.

Funds of a cooperating party shall not be expended by a Federal employee even though the cooperating party has no representatives stationed in the locality. In such cases, a Federal employee may handle the accounts but shall forward the vouchers to the authorized agent of the cooperating party for payment. Cooperating parties should not send checks payable to Federal employees or send them checks payable to "Cash" or "Bearer" for payments of local expenses.

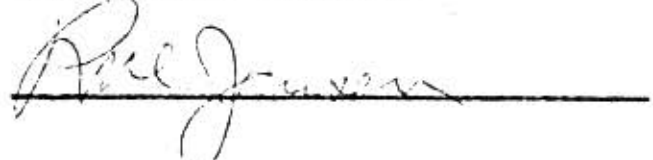
5. That the responsibilities assumed by the cooperating parties are contingent upon funds being available from which the expenditures legally may be met.

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, unless it be made with a corporation for its general benefit.

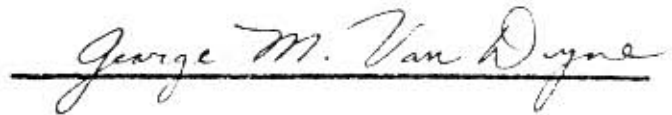
This Memorandum of Understanding shall become effective 1 June 1968, and shall continue indefinitely, but may be modified or discontinued at the request of any

party in writing. Requests for termination or any major change, shall be submitted to the other parties for consideration not less than 30 days in advance of the effective date desired.

COLORADO STATE UNIVERSITY



GRASSLAND BIOME DIRECTOR, IBP



UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE



Deputy Administrator for Farm Research



## APPENDIX II

WAIVER OF LIABILITY

As a cooperating party selected to participate in the International Biological Program at the Central Plains Experimental Range of the Crops Research Division, Agricultural Research Service, United States Department of Agriculture, I, \_\_\_\_\_, (name of individual), hereby acknowledge that I am in no way to be considered as an employee of the Federal Government, will not receive any salary from the Agricultural Research Service, and further acknowledge that the Federal Government is in no way liable in the event of an accident, injury, or illness that might be incurred during the course of my assignment to the Central Plains Experimental Range of the Agricultural Research Service at Nunn, Colorado.

\_\_\_\_\_  
(signature of individual)

\_\_\_\_\_  
(date)

APPENDIX III



# GRASSLAND BIOME

## U.S. INTERNATIONAL BIOLOGICAL PROGRAM

TO: All IBP Investigators, Research Assistants, and Technicians

FROM: Freeman H. Smith, IBP

THROUGH: Robert E. Bement, ARS

SUBJECT: Coordination

DATE: 23 May 1969

With the 1969 field season upon us this memo serves to establish some necessary ground rules to help coordinate research between and among ARS and IBP programs. The intent of these basic rules is to provide the framework for cooperation. Any additional suggestions for smoother operation are invited.

### Vehicle and Travel

1. When travelling on all county roads in the area keep to your right side of the road when negotiating a rise or hill. Approaching traffic cannot be seen from behind the many small rises and without this precaution, accidents are imminent.
2. All vehicle travel is absolutely restricted to the main roads marked on the attached map. The many "dinosaur tracks" used in past years are definitely not to be used.

With the number of researchers that are anticipated, the research area could quickly become a grand mess if vehicle travel were unrestricted.

### Cow Psychology and Etiquette

1. If possible try to avoid vehicle travel within the pastures during the first week of each month. Cattle are moved between pastures at this time.
2. If "caught" in front of or behind a moving herd please stop and wait until the herd has passed or until one of the range technicians motions you on. Cattle are moved only short distances so little time is lost.
3. Leave all gates open or closed as you find them. Often a single range technician will be moving cattle to a gate he has previously opened (or closed as the case may be).

### Plot Locations

1. All plots are to be marked with flat plates welded to a short stake; the stake is to be driven into the ground so the plate is flush with the ground surface. (Any sharp corners sticking up hidden by vegetation can cause serious injury to cattle, horses, or humans!)
2. To minimize disturbance of plot studies by conflicting use or treatment of the same physical area, it will be a requirement that all plots or points be located by distances (or distance and direction) from previously established points. A description of the system to be used and an example will be sent to each investigator.

### Waiver of Liability

A signed waiver of federal liability is required of all personnel that work on any IBP projects on the Pawnee Site. This includes assistants, workstudy, etc. Please have the attached forms filled out and returned to the attention of Pete Bieg, here at CSU, within a week.

### LITTERING, sm., FIREWORKS, sm.

All personnel should be aware of the effects of these two potentially dangerous species. . . . So, please keep small pieces of litter; tags, lunch papers, etc. collected until you go to a disposal. . . and exercise extreme caution with your smokes and matches. In particular, a grass fire in the fall completely eliminates winter grazing studies.

### Non-prairie dog holes

Any holes dug must be filled back in. If for any reason a hole must be kept open it must be covered.

### Pets

Please do not bring any pets into the field. The presence of so many investigators is enough of a disturbance to the ecosystem!

### Buzz-tails

Just a reminder. . . rattlesnakes!

CHEYENNE

APR 1964

TOP  
HWD

RESTRICTED ACCESS POADS

NUNN





# COLORADO STATE UNIVERSITY

DEPARTMENT OF FORESTRY AND NATURAL RESOURCES (6052)

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COLLEGE OF FORESTRY AND NATURAL RESOURCES  
NATURAL RESOURCE ECOLOGY LABORATORY

TO: All Pawnee Site Investigators

FROM: Freeman Smith and Bob Robinson, IBP Grassland Biome

SUBJECT: Plot locations

ATTACHMENT: Dates on which vehicle travel should be kept to a minimum

DATE: June 17, 1969

Plot and sample-point locations are referenced to a grid of witness stakes established on the Central Plains Experimental Range many years ago. In each 1/2 section pasture, there are 40 angle-iron stakes about 20 inches high on which the numbers are stamped.

The numbers begin with (1) in the northeast corner of the pasture and continue west to (5). The next row begins on the west end with (6) and continues east through (10). (Similar to the system of numbering sections in a township.) A schematic is attached. Witness stakes are approximately 500 feet apart east to west and 600-700 feet apart north to south. Distance from the fence to the first witness stakes in a row is random.

Following, is a brief description and an example for reserving points and plots, along with the field form to be completed.

SCHEMATIC EXAMPLE OF THE  
NUMBERING SYSTEM FOR WITNESS STAKES

5	4	3	2	1
6	7	8	9	10
15	14	13	12	11
16	17	18	19	20
25	24	23	22	21
26	27	28	29	30
35	34	33	32	31
36	37	38	39	40

## RESERVING PLOTS AND POINTS FOR IBP USE

In order to reserve plots and independent points for IBP use, the following information will be required:

1. The name of the person in charge of the plot.
2. The type of work for which the reserved area will be used, i.e., bird nests, infiltration, insect counts, etc.
3. The nature of the work: destructive or non-destructive.
4. The pasture location in terms of heavy-use field, moderate-use field, or light-use field.

A plot is to be reserved by defining each corner point of the plot. For an independent point, only one point is defined. The only restriction on the shape of the plot is that it is a convex figure.

#### Defining a point.

To define a point a distinct five-character name must be assigned to the point. The kind of point must also be defined with a P if it is a corner of a plot, or an I if it is an independent point. The specific location must be described in one of two ways: by measuring its distance from two different reference points, or by measuring its distance and direction from one reference point. A reference point may be one of the witness stakes in the field or a point which has already been defined.

If the distances from two different reference points are measured, the following information is required.

1. The five-character name assigned to the first reference point, e.g., FMS1.
2. The distance to that point (feet).
3. The five-character name assigned to the second reference point.
4. The distance to the second reference point.
5. An "L" if the point is on the left of the line from the first reference point to the second reference point, or an "R" if the new point is to the right of that line. For example, in the drawings below A would be assigned an "L" and point B would be assigned an "R".

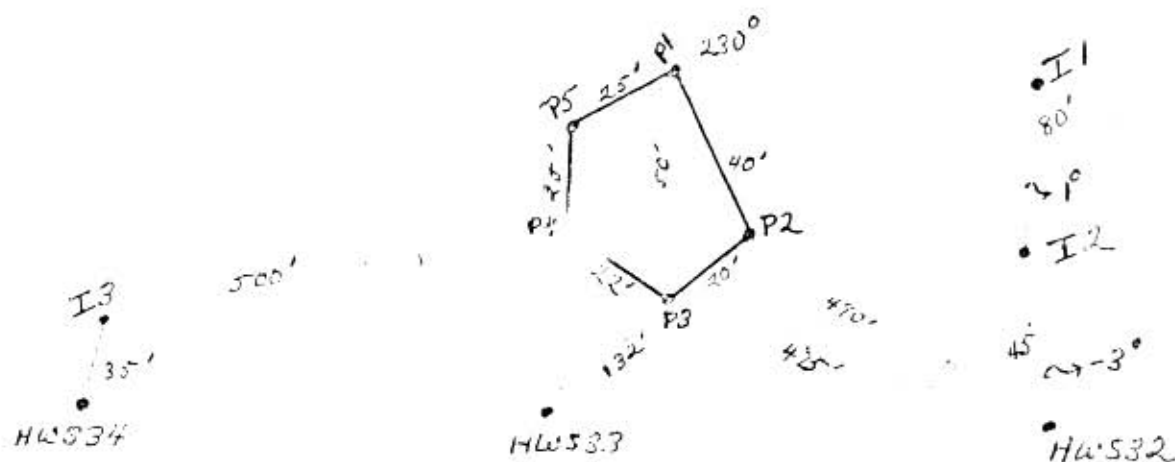


If the distance and the direction from one reference are measured, the following information is required.

1. An "A" to signify that the measurements are distance and direction rather than two distances.
2. The five-character name of the reference point, i.e., HWS32.
3. The distance to that point (feet).
4. The direction of the line from the reference point to the new point, measured in degrees from an azimuth of true north.  
(0° :: TRUE NORTH)

## EXAMPLE PREPARATION FORM

Let the following figure be an example of the plot and points to be reserved.



The points P1 - P5 are the corners of the plot. The points I1 - I3 are independent points, and HWS32 - HWS34 are witness stakes in the heavy-use field.

Since no other points have been defined, the first point, P3, is defined by measuring the distances to HWS32 and to HWS33. For P2 we may take advantage of the fact that P3 has already been defined. Therefore, one of the measurements is taken from P3 and the other is taken from HWS32. The point P1 is defined by measuring the two distances from P2 and P3. The point P5 is defined by measuring the distance and direction from P1. The distance is 25 feet and the angle is  $230^\circ$  (an azimuth of true north must always be used). P4 is defined by the distances from P5 and P3. The independent point I3 is defined by measurements from P4 and HWS34. I2 is defined by distance and direction from HWS32, and I1 is defined by the distance and direction from I2.

Note that on the form the points P1 - P5 have a P in column 2 because they are a part of the plot. The points I1 - I3 are designated as independent points with an I in column 2. Note also that the points defined with distance and direction are designated with an A in column 3 and the definition using two distances have a D in column 3.

## EXAMPLE PREPARATION FORM

REF FLOT 51367 164 TOP 1

Date of revision to change .....

Type of work for which this plot shall be used .....

Chart No. Description.....

Sounding reference.....

Reference block (date) of ..... Reference block (date) of ..... Reference.....

## Point-to-Point

From name of point	To, to long. lat. of point	Side of and direction D = point to, to, to	From all other points to, to, to	Distance in feet or miles	From all other points to, to, to (D = point to, to, to)	Distance in feet or miles from true north	Side, or left of true north from 180° to 360°
P3	P	D	HS33	132	HS32	475	L
P2	P	D	HS32	400	P3	20	R
P1	P	D	P3	50	P2	40	L
P5	P	A	P1	25		230	
P4	P	D	P5	25	P3	22	R
P3	P	D	P4	100	HS34	35	R
P2	P	A	HS32	45		-3	
P1	P	A	P2	50		1	

## IBP PLOT RESERVATION FORM

Name of person in charge.....

Type of work for which the plot will be used:.....

.....

Check one: Destructive..... Non-destructive.....

Pasture, check one: Light..... Medium..... Heavy.....

## Point Definition

Five-character name of new point	I, if ind. pt. P, if plot pt.	A = dist. and dir. D = two distances	Name of 1st reference point	Distance to 1st point	Name of 2nd reference pt. (blank for dist. & dir.)	Distance to 2nd pt. or Angle from true north	Right or left of true north from RP1 to RP2

## CENTRAL PLAINS EXPERIMENTAL RANGE

## 1969 Cattle Gathering Schedule

(Dates on which vehicle travel should be kept to a minimum)

JUNE	Monday afternoon Tuesday morning	June 2 June 3
JULY	Tuesday afternoon Wednesday all day Thursday morning	July 1 July 2 July 3
AUGUST	Thursday afternoon Friday morning	July 31 August 1
SEPTEMBER	Tuesday afternoon Wednesday all day Thursday morning	September 2 September 3 September 4
OCTOBER	Wednesday afternoon Thursday morning	October 1 October 2



APPENDIX IV

MEMORANDUM OF UNDERSTANDING BETWEEN  
THE UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE  
AND  
THE U.S. INTERNATIONAL BIOLOGICAL PROGRAM COMMITTEE  
ACTING THROUGH THE COLORADO STATE UNIVERSITY

WHEREAS, the U.S. International Biological Program Committee (IBP) in the interest of range research intends to conduct a grassland research program on lands within the Pawnee National Grassland and,

WHEREAS, the United States Forest Service is desirous of making available to the U.S. International Biological Program Committee the use of National Grassland lands for this purpose;

NOW THEREFORE, the United States Forest Service, herein referred to as the Forest Service, acting by and through the Forest Supervisor, Roosevelt National Forest; and Colorado State University, herein referred to as the University; the U.S. International Biological Program Committee herein referred to as IBP, acting by and through the Grassland Biome Director, agrees as follows:

A. THE FOREST SERVICE WILL:

1. Grant permission to the University and IBP, subject to all valid existing claims and to limitations included herein, to use for research lands under jurisdiction of the Pawnee National Grassland as shown on the attached map.
2. Cooperate fully with the University and IBP in all matters related to the use and administration of National Grassland land for research purposes. The Forest Supervisor hereby authorizes the Range Manager, Pawnee National Grassland, to represent the Forest Supervisor in all matters pertaining to the administration of lands covered by this Memorandum of Understanding, hereinafter referred to as memorandum.
3. Reserve the right to use and permit others to use any of the land involved in this memorandum for whatever purpose it may desire.
4. Designate upon request of the University or IBP, through their Program Representative, sites for improvements necessary to conduct the IBP within the Pawnee National Grassland. In the event of any disagreement as to site location, the decision of the Forest Service shall be final.
5. Cooperate in the planning of a grassland research program upon request of the University and IBP.

B. THE UNIVERSITY AND IBP WILL:

1. Prior to use and occupancy of National Grassland lands, designate in writing to the Forest Supervisor an individual to serve as Program Representative for the University and IBP, and require that all matters relating to such use of National Grassland lands will be taken up directly with the Range Manager.
2. Prior to conducting any research on National Grassland lands, submit to the Range Manager four (4) copies of an "Application for Research Study Area on National Grasslands" for each individual research program to be undertaken.
3. In recognition of the intensive use made of National Grasslands under the principal of multiple use, agrees to concurrent use by the public of all the National Grassland, but subject to such restrictions as the Range Manager and the Program Representative agree are necessary.
4. Do all in its power to prevent and suppress brush or grass fires on the lands falling within the scope of this memorandum and to require its researchers, employees, contractors, subcontractors, and employees of contractors or subcontractors to do likewise.
5. Obtain prior written permission from the Range Manager before construction of any improvement or before beginning any work.
6. Maintain improvements and premises to standards of repair, orderliness, neatness, sanitation and safety acceptable to the Range Manager and fully repair all damage, other than ordinary wear and tear to National Grassland lands, resulting from the exercise of the privilege authorized by this memorandum.
7. Upon termination of any research project, unless otherwise agreed under the provisions of Article C.4, remove within one year all improvements installed for that project and restore National Grassland land to its original condition, normal wear and tear excepted.
8. In exercising the privileges granted by this permit, comply with the regulations of the Department of Agriculture and all Federal, State, county, and municipal laws, ordinances or regulations applicable to the area or operations covered by this memorandum.

9. Be subject to and abide by all rules promulgated for operation of Pawnee National Grassland by the Range Manager including, but not limited to, regulations of such things as vehicular traffic, open burning, plot location markers, campsites, application of herbicides, pesticides and fertilizers, setting of animal traps, instrumentation, soil removal and irrigation.
10. Submit to the Forest Supervisor copies of all publications resulting from research conducted on National Grassland lands.
11. Agree to comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by or pursuant to the regulation of the U.S. Department of Agriculture (7 CFR, Part 15) issued pursuant to that Act, and hereby assures that in the operation and performance of this agreement to take immediately any measures necessary to effectuate this requirement. If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the permittee by the U.S. Department of Agriculture this assurance shall obligate the permittee, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the grantee for the period during which he retains ownership or possession of the property. In all other cases, this assurance shall obligate the grantee for the period during which the Federal financial assistance is extended to him by this agreement. This assurance is given in consideration of the Federal financial assistance extended in this agreement to the grantee by the U.S. Department of Agriculture. The grantee recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance. The permittee further agrees that the United States, in addition to any other rights and remedies provided by this assurance, the Civil Rights Act of 1964, or the Regulations issued thereunder, shall have the right to enforce this agreement by suit.

C. IT IS MUTUALLY AGREED:

1. That this memorandum will have no force or effect until accepted and signed by the Forest Supervisor, Roosevelt National Forest, Fort Collins, Colorado and the Grassland Biome Director, International Biological Program Committee, and the Vice President for Research, Colorado State University.

2. That this memorandum shall continue indefinitely, but may be modified or terminated by mutual agreement upon the request in writing of any of the parties hereto or when the Forest Supervisor determines the lands involved are needed for a higher public purpose or are no longer being used for the intended purpose.
3. That upon termination of this memorandum, the University will remove any improvements that have been erected. Prior to removal of the improvements, removal plans will be submitted for review and approval of the Forest Supervisor so that damage to the underlying real property may be held to a minimum. If mutual determination is made to leave said improvements in place, the University may transfer said improvements to the Forest Service.

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

By Ben F. Rice

Title Forest Supervisor

\_\_\_\_\_  
(Date)

COLORADO STATE UNIVERSITY

By Paul Jensen

Title Vice President for Research

\_\_\_\_\_  
(Date)

U.S. INTERNATIONAL BIOLOGICAL PROGRAM COMMITTEE

By George M. Van Dyne

Title Grassland Biome Director

\_\_\_\_\_  
(Date)

50

PATENT PROVISIONS  
(Public)

Any invention resulting from this cooperative work and made jointly by an employee or employees of the United States Department of Agriculture and the cooperator or an employee or employees of the cooperator shall be fully disclosed, either by publication or by patenting in the United States, and any such United States patent shall either be dedicated to the free use of the people in the territory of the United States or be assigned to the United States of America or be assigned to the cooperator, as may be mutually agreed upon by the parties hereto, provided, that in the event of assignment to the cooperator, the Government shall receive an irrevocable, nonexclusive, royalty-free license under the patent, throughout the world, to practice the invention for all governmental purposes, and, provided further, that non-exclusive, royalty-free licenses shall be issued by the cooperator to any and all applicants technically competent to make use of the patent, provided, that, where the assignment is to the Government, it shall be of the domestic patent rights. Where the domestic patent rights are so assigned, the United States Department of Agriculture shall have an option to acquire the foreign patent rights in the invention on which an application for a United States patent is filed, for any particular foreign country, said option to expire in the event that the Government fails to cause an application to be filed in any such country on behalf of the Government or determines not to seek a patent in such country within six months after the filing of the application for a United States patent on the invention. Where the domestic patent rights are assigned to the Government, but the foreign patent rights are retained by an employee, the employee shall grant to the Government a nonexclusive, irrevocable, royalty-free license in any patent which may issue thereon in any foreign country, including the power to issue sublicenses for use in behalf of the Government and/or in furtherance of the foreign policies of the Government, and said license shall also include the power to sublicense American licensees under Government-owned United States patents to practice the invention without payment of royalty or other restriction in any foreign country wherein a corresponding patent may issue to the employee or his foreign assignee. Any invention made independently by an employee or employees of the United States Department of Agriculture or by the cooperator or an employee or employees of the cooperator shall be disposed of in accordance with the policy of the United States Department of Agriculture or the cooperator, respectively, provided, that in the event the invention is made solely by an employee or employees of the cooperator, the cooperator shall grant or shall obtain from the assignee of any patent issued on said invention an irrevocable, nonexclusive, world-wide, royalty-free license for the Government, for all governmental purposes, and provided further, in the event the invention is made solely by an employee or employees of the cooperator, that unless the cooperator or his assignee has taken effective steps within three years after a patent issues on the invention to bring the invention to the point of practical application or has made the invention available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should retain the principal or exclusive rights for a further period of time, the Government shall have the right to require the granting of a license to an applicant on a nonexclusive, royalty-free basis.

## APPENDIX V

APPLICATION FOR RESEARCH STUDY AREA  
ON NATIONAL GRASSLAND

Title of Study \_\_\_\_\_

Project Leader \_\_\_\_\_ Address \_\_\_\_\_

Investigator(s) \_\_\_\_\_

Organization \_\_\_\_\_

Brief Description of Study (or attach project plan) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Location of Study Area (legal description to 40 acres - attach map showing location(s) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Duration of Study \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Description of Plot or Study Location Markers \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Modification of Landscape, Temporary Camps, Recording Stations, Vegetative Disturbance, Temporary Excavation(s), Access Ways, Improvements, Etc. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I have read and agree to follow the "Instructions for Use of National Grassland Lands for Research Purposes" as stated on the back of this application, and to conduct my research within the spirit of existing agreements between my agency and the Pawnee National Grassland.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Project Leader

Approval is hereby granted to conduct this study on National Grassland lands.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Range Manager, Pawnee National  
Grassland

Distribution:

Original - Pawnee N.G.

cc - Project Leader

IBP - Pawnee Site Director

Roosevelt N.F.



INSTRUCTIONS FOR USE OF NATIONAL GRASSLAND  
LAND FOR RESEARCH PURPOSES

1. The Range Manager, Pawnee National Grassland, will be notified of any significant modifications in the study procedure.
2. All study areas will be returned to a natural state at the completion of a study project.
3. The Range Manager, Pawnee National Grassland will be notified upon project completion.
4. Camps will be of the non-permanent type. Provisions will be made for adequate sanitation and fire prevention. Campsites will be restored to a natural condition following use.
5. Off-road vehicle travel will be held to a minimum. During periods of excessive soil moisture off-road travel will not be done.
6. Plot and location markers will not be used along roads unless they can be placed so that they are not generally visible to the travelling public. Paint splashes on rocks and use of high visibility paint, etc. will not be allowed.

#### APPENDIX VI

Comprehensive Network subcontracts between Colorado  
State University and other institutions.

## MEMORANDUM OF AGREEMENT

This Agreement is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_ by and between Colorado State University, (hereinafter referred to as party of the first part) and \_\_\_\_\_ (hereinafter referred to as party of the second part).

### WHEREAS:

The party of the first part is conducting a research project entitled "Analysis of Structure and Function of Grassland Ecosystems" (hereinafter referred to as the Project) under the sponsorship of the National Science Foundation, and desires to procure from the party of the second part for, and on behalf of, the Project, research, development, and consultant services as hereinafter set forth; and

### WHEREAS,

The party of the second part is willing to furnish such services under the terms and conditions hereinafter set forth;

### NOW THEREFORE,

In consideration of the premises, and the mutual agreements, hereinafter set forth, the parties hereby mutually agree as follows:

- I. Statement of Work  
The party of the second part agrees to furnish all necessary personnel, services and facilities and will conduct research services as described in Attachment A of this Agreement.
- II. Reports  
An acceptable interim report of research included in this Agreement will be submitted not later than October 15, 1970. This report shall include a summary of the research covered under this Agreement and any data arranged in the standard format not submitted prior to that date. Failure to submit a report acceptable to the Principal Investigator of the Project, Dr. G. M. Van Dyne, the Grassland Biome Director for the US IBP, may result in the termination of this contract at the discretion of the party of the first part. A final report will be submitted not later than December 31, 1970, unless a different date is agreed upon in writing by the parties involved in this Agreement. Additional interim reports as agreed upon may also be requested.

Publication of professional papers from data collected under this Agreement shall be the responsibility of the party of the second part when such publications can be done without reference to data collected by the Project or by other contractors of the Project. When publication requires the use of data or other information collected by, or techniques developed by, personnel other than those employed by the party of the second part, such publication will become the responsibility of all whose data, information, and/or techniques are involved. Publication will not necessarily require manuscript approval by all parties concerned but will require appropriate discussions between the party of the second part and the party of the first part of such things as authorship, credits, and data interpretation. In order to facilitate such interdisciplinary publications, the Project will maintain a central data and information bank, and data and information will be submitted to this bank by the party of the second part with reports specified by the terms of this Agreement.

### III. Patents

Whenever any invention, which is or may be patentable, is conceived or first actually reduced to practice in the course of this Agreement, the party of the second part shall furnish the party of the first part with complete information thereon. The Colorado State University shall have the right to determine whether or not and where a patent application shall be filed, and to determine the disposition of the invention and title to and rights under any application or patent that may result. The Colorado State University, in making such a determination, shall take into account the public interest and the equities of the parties concerned. In any case, the Colorado State University may arrange to have the invention described in a printed publication. The party of the first part and the party of the second part agree that the inventor or inventors will execute all documents and perform the necessary steps to carry out the determination of the Colorado State University.

### IV. Equipment

Title to all permanent equipment purchased or fabricated with funds under this Agreement will remain with party of the second part at the termination of this Agreement, unless specific exceptions are stated elsewhere in this Agreement. For the purposes of this Agreement, items with life expectancy of one year or more and/or an acquisition or fabrication cost of \$100 or more shall be considered permanent equipment.

V. Computer Software

The Colorado State University shall have the right to require the party of the second part, at no cost to the party of the second part, to duplicate, or permit others to duplicate, and deliver to the Colorado State University or to any person designated by the Colorado State University, any data accumulated in machine readable form and any computer programs, instructions or other software produced under this Agreement, which may, in the opinion of the Biome Director, be useful for research, education or other legitimate purposes by others; provided that no such requirement shall be imposed without affording the party of the second part a reasonable opportunity to correct errors or to document errors and ambiguities therein and remove such information as may have been obtained in confidence or which cannot be disclosed without violating the right of privacy of an individual to whom it pertains.

VI. Period of Performance

The period of performance for this Agreement will be September 1, 1969, to December 31, 1970, except where specified otherwise in Attachment A of this Agreement.

VII. Payment

The total amount of funds made available and reimbursable to the party of the second part under this Agreement will not exceed \$\_\_\_\_\_, and will be disbursed in general accordance with Attachment B of this Agreement, with the following restriction: Not more than 1/4 of these funds, not to exceed \$\_\_\_\_\_, shall be disbursed prior to January 1, 1970. While the party of the second part is free to alter the direction of the research when changes seem scientifically advantageous, the party of the second part will observe the following conditions in administering the Agreement:

1. Ordinary items of office equipment and furniture, air conditioners, and motor vehicles will not be charged to Agreement funds unless they have either been provided for in the budget summary or are approved by a subsequent letter from the party of the first part.
2. The amount provided for permanent equipment may not be exceeded without specific party of the first part approval.
3. No amounts may be spent from Agreement funds for salaries of the principal investigator or other senior personnel (faculty members in the case of academic institutions) in excess of those provided in the budget summary without specific approval of the party of the first part.
4. The party of the first part expects to be informed promptly by the party of the second part of any significant departures from the budget summary, not requiring prior approval of the party of the first part under the three preceding paragraphs.

Any major deviation from this schedule must have the written approval of Dr. G. M. Van Dyne, Project Leader. Indirect costs will be paid to party of the second part at a predetermined indirect cost rate of \_\_\_\_\_.

Party of the second part will submit vouchers for reimbursement to the party of the first part not more often than once each quarter. The final voucher must be submitted within 120 days after the termination date of this Agreement. It is also agreed that payment for no more than 80% of the actual costs incurred under this Agreement will be made prior to (a) delivery of the final report by party of the second part and acceptance of the final report by the party of the first part, and (b) fulfilling of the terms in paragraphs II, III, IV, and V of this Agreement.

Rate of expenditures and reimbursement described in this section may be modified in accordance with expenditure limitations imposed upon the party of the first part by the National Science Foundation.

VIII. Equal Opportunity

The party of the second part agrees that because of the Federal financial assistance involved in this project, opportunities will be provided to qualified persons without discrimination because of race, creed, color, or national origin.

IX. Revocation

This Agreement may be revoked in whole or in part by the party of the first part after consultation with the principal investigator of the party of the second part. Such revocation shall not affect any commitment which, in the judgment of the party of the first part, had become firm prior to the effective date of the revocation.

---

G. M. Van Dyne  
Principal Investigator  
Grasslands Biome Director, US IBP

Accepted:

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Rue Jensen  
Vice President for Research  
Colorado State University

## ATTACHMENT A

### SOIL NITROGEN INVESTIGATIONS

J. O. Reuss, Colorado State University

This research includes specific studies to provide information necessary for such an evaluation. These are: to provide quantitative information concerning the amount of nitrogen inputs by symbiotic and non-symbiotic fixing organisms; to characterize the present soil nitrogen status on selected key areas of the intensive site; and to determine nitrogen inputs through precipitation and runoff losses. In order to evaluate the amount of nitrogen entering the system it will be necessary to determine as nearly as possible the contribution of both symbiotic and non-symbiotic fixing organisms. Regular root examinations will be made on important species, with particular emphasis on *Opuntia* and *Artemisia* spp. The research will involve testing of the suitability of the acetylene reduction technique for the necessary quantitative measurements. This will be supplemented by results from the N-15 tracer technique. Based on these results, a relatively routine program of fixation studies will be undertaken using either or both methods. These studies will include use of various environmental conditions on cores containing representative species. Non-symbiotic studies will be conducted in the wetter areas that are intermittently anaerobic resulting in conditions favorable to measurable amounts of fixation. Key areas will be selected for intensive sampling. Particular attention will be given to microwatersheds, areas of high organic matter accumulation, and exclosures, but representative low organic matter areas will be included. Samples will be analyzed for total organic and extractable mineral nitrogen. Selected samples will be analyzed for fixed ammonium and the organic matter fractionated. Nitrate levels in the field would be closely monitored. By a critical comparison of the conditions necessary for losses to occur as determined in the laboratory and the conditions in the field, conclusions will be drawn concerning losses by this mechanism.

## ATTACHMENT B

September 1, 1969 through December 31, 1970

Institution: \_\_\_\_\_

Principal Investigator(s) \_\_\_\_\_

General area of work \_\_\_\_\_

A. Salaries and Wages  
Principal investigators

Research associates

Graduate research  
assistants

Technicians

Student labor

Salary total

B. Fringe Benefits

Total Salaries  
& benefits

C. Permanent Equipment

D. Expendable Supplies  
& Equipment

E. Travel (domestic)

F. Publication costs

G. Other costs  
computercontractual analyses  
subtotal

H. Total Direct Costs

I. Indirect Costs

J. TOTAL COSTS



#### APPENDIX VII

Pawnee Site subcontracts between Grassland Biome and  
Colorado State University departments.

## MEMORANDUM OF AGREEMENT

This Agreement is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_ by and between the U. S. International Biological Program Grassland Biome Study, (hereinafter referred to as party of the first part) and \_\_\_\_\_ (hereinafter referred to as party of the second part).

### WHEREAS:

The party of the first part is conducting a research project entitled "Analysis of Structure and Function of Grassland Ecosystems" (hereinafter referred to as the Project) under the sponsorship of the National Science Foundation, and desires to procure from the party of the second part for, and on behalf of, the Project, research, development, and consultant services as hereinafter set forth; and

### WHEREAS,

The party of the second part is willing to furnish such services under the terms and conditions hereinafter set forth;

### NOW THEREFORE,

In consideration of the premises, and the mutual agreements, hereinafter set forth, the parties hereby mutually agree as follows:

- I. Statement of Work  
The party of the second part agrees to furnish all necessary personnel, services and facilities and will conduct research services as described in Attachment A of this Agreement.
- II. Reports  
An acceptable interim report of research included in this Agreement will be submitted not later than December 15, 1969. This report shall include a summary of the research covered in this agreement and to date in the project and a projected plan for continuation of research for the period January 1, through December 31, 1970, under this agreement. Failure to submit a report acceptable to the Principal Investigator of the Project, Dr. G. M. Van Dyne, the Grasslands Biome Director for the US IBP, may result in the termination of this contract at the discretion of the party of the first part. A final report will be submitted not later than December 31, 1970, unless a different date is agreed upon in writing by the parties involved in this agreement. Additional interim reports as agreed upon may also be requested.

Publication of professional papers from data collected under this Agreement shall be the responsibility of the party of the second part when such publications can be done without reference to data collected by the Project or by other contractors of the Project. When publication requires the use of data or other information collected by, or techniques developed by, personnel other than those employed by the party of the second part, such publication will become the responsibility of all whose data, information, and/or techniques are involved. Publication will not necessarily require manuscript approval by all parties concerned but will require appropriate discussions between the party of the second part and the party of the first part of such things as authorship, credits, and data interpretation. In order to facilitate such interdisciplinary publications, the Project will maintain a central data and information bank, and data and information will be submitted to this bank by the party of the second part with reports specified by the terms of this Agreement.

III. Patents

Whenever any invention, which is or may be patentable, is conceived or first actually reduced to practice in the course of this Agreement, the party of the second part shall furnish the party of the first part with complete information thereon. The Colorado State University shall have the right to determine whether or not and where a patent application shall be filed, and to determine the disposition of the invention and title to and rights under any application or patent that may result. The Colorado State University, in making such a determination, shall take into account the public interest and the equities of the parties concerned. In any case, the Colorado State University may arrange to have the invention described in a printed publication. The party of the first part and the party of the second part agree that the inventor or inventors will execute all documents and perform the necessary steps to carry out the determination of the Colorado State University.

IV. Equipment

Title to all permanent equipment purchased or fabricated with funds under this Agreement will remain with party of the second part at the termination of this Agreement, unless specific exceptions are stated elsewhere in this Agreement. For the purposes of this Agreement, items with life expectancy of one year or more and/or an acquisition or fabrication cost of \$100 or more shall be considered permanent equipment.

V. Computer Software

The Colorado State University shall have the right to require the party of the second part, at no cost to the party of the second part, to duplicate, or permit others to duplicate, and deliver to the Colorado State University or to any person designated by the Colorado State University, any data accumulated in machine readable form and any computer programs, instructions or other software produced under this Agreement, which may, in the opinion of the Biome Director, be useful for research, education or other legitimate purposes by others; provided that no such requirement shall be imposed without affording the party of the second part a reasonable opportunity to correct errors or to document errors and ambiguities therein and remove such information as may have been obtained in confidence or which cannot be disclosed without violating the right of privacy of an individual to whom it pertains.

VI. Period of Performance

The period of performance for this Agreement will be September 1, 1969, to December 31, 1970, except where specified otherwise in Attachment A of this Agreement.

VII. Payment

The total amount of funds made available and reimbursable to the party of the second part under this Agreement will not exceed \$ \_\_\_\_\_, and will be disbursed in general accordance with Attachment B of this Agreement, with the following restriction: Not more than 1/4 of these funds, not to exceed \$ \_\_\_\_\_, shall be disbursed prior to January 1, 1970. While the party of the second part is free to alter the direction of the research when changes seem scientifically advantageous, the party of the second part will observe the following conditions in administering the Agreement:

1. Ordinary items of office equipment and furniture, air conditioners, and motor vehicles will not be charged to Agreement funds unless they have either been provided for in the budget summary or are approved by a subsequent letter from the party of the first part.
2. The amount provided for permanent equipment may not be exceeded without specific party of the first part approval.
3. No amounts may be spent from Agreement funds for salaries of the principal investigator or other senior personnel (faculty members in the case of academic institutions) in excess of those provided in the budget summary without specific approval of the party of the first part.
4. The party of the first part expects to be informed promptly by the party of the second part of any significant departures from the budget summary, not requiring prior approval of the party of the first part under the three preceding paragraphs.

Any major deviation from this schedule must have the written approval of Dr. G. M. Van Dyne, Project Leader. Indirect costs will be paid to party of the second part at a predetermined indirect cost rate of \_\_\_\_\_.

It is also agreed that payment for no more than 90% of the actual costs incurred under this Agreement will be made prior to (a) delivery of the final report by party of the second part and acceptance of the final report by the party of the first part, and (b) fulfilling of the terms in paragraphs II, III, IV, and V of this Agreement.

Rate of expenditures and reimbursement described in this section may be modified in accordance with expenditure limitations imposed upon the party of the first part by the National Science Foundation.

VIII. Equal Opportunity

The party of the second part agrees that because of the Federal financial assistance involved in this project, opportunities will be provided to qualified persons without discrimination because of race, creed, color, or national origin.

IX. Revocation

This Agreement may be revoked in whole or in part by the party of the first part after consultation with the principal investigator of the party of the second part. Such revocation shall not affect any commitment which, in the judgment of the party of the first part, had become firm prior to the effective date of the revocation.

---

G. M. Van Dyne  
Principal Investigator  
Grasslands Biome Director, US IBP

Accepted:

---

Rue Jensen  
Vice President for Research  
Colorado State University

## ATTACHMENT A

### SOIL NITROGEN INVESTIGATIONS

J. O. Reuss, Colorado State University

This research includes specific studies to provide information necessary for such an evaluation. These are: to provide quantitative information concerning the amount of nitrogen inputs by symbiotic and non-symbiotic fixing organisms; to characterize the present soil nitrogen status on selected key areas of the intensive site; and to determine nitrogen inputs through precipitation and runoff losses. In order to evaluate the amount of nitrogen entering the system it will be necessary to determine as nearly as possible the contribution of both symbiotic and non-symbiotic fixing organisms. Regular root examinations will be made on important species, with particular emphasis on *Opuntia* and *Artemisia* spp. The research will involve testing of the suitability of the acetylene reduction technique for the necessary quantitative measurements. This will be supplemented by results from the N-15 tracer technique. Based on these results, a relatively routine program of fixation studies will be undertaken using either or both methods. These studies will include use of various environmental conditions on cores containing representative species. Non-symbiotic studies will be conducted in the wetter areas that are intermittently anaerobic resulting in conditions favorable to measurable amounts of fixation. Key areas will be selected for intensive sampling. Particular attention will be given to microwatersheds, areas of high organic matter accumulation, and exclosures, but representative low organic matter areas will be included. Samples will be analyzed for total organic and extractable mineral nitrogen. Selected samples will be analyzed for fixed ammonium and the organic matter fractionated. Nitrate levels in the field would be closely monitored. By a critical comparison of the conditions necessary for losses to occur as determined in the laboratory and the conditions in the field, conclusions will be drawn concerning losses by this mechanism.

## September 1, 1969 through December 31, 1970

J. TOTAL COSTS

#### APPENDIX VIII

Pawnee Site subcontracts between Colorado State University  
and other institutions.



## MEMORANDUM OF AGREEMENT

This Agreement is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_ by and between Colorado State University, (hereinafter referred to as party of the first part) and \_\_\_\_\_ (hereinafter referred to as party of the second part).

### WHEREAS:

The party of the first part is conducting a research project entitled "Analysis of Structure and Function of Grassland Ecosystems" (hereinafter referred to as the Project) under the sponsorship of the National Science Foundation, and desires to procure from the party of the second part for, and on behalf of, the Project, research, development, and consultant services as hereinafter set forth; and

### WHEREAS,

The party of the second part is willing to furnish such services under the terms and conditions hereinafter set forth;

### NOW THEREFORE,

In consideration of the premises, and the mutual agreements, hereinafter set forth, the parties hereby mutually agree as follows:

- I. Statement of Work  
The party of the second part agrees to furnish all necessary personnel, services and facilities and will conduct research services as described in Attachment A of this Agreement.
- II. Reports  
An acceptable interim report of research included in this Agreement will be submitted not later than December 15, 1969. This report shall include a summary of the research covered in this agreement and to date in the project and a projected plan for continuation of research for the period January 1, through December 31, 1970, under this agreement. Failure to submit a report acceptable to the Principal Investigator of the Project, Dr. G. M. Van Dyne, the Grasslands Biome Director for the US IBP, may result in the termination of this contract at the discretion of the party of the first part. A final report will be submitted not later than December 31, 1970, unless a different date is agreed upon in writing by the parties involved in this agreement. Additional interim reports as agreed upon may also be requested.

Publication of professional papers from data collected under this Agreement shall be the responsibility of the party of the second part when such publications can be done without reference to data collected by the Project or by other contractors of the Project. When publication requires the use of data or other information collected by, or techniques developed by, personnel other than those employed by the party of the second part, such publication will become the responsibility of all whose data, information, and/or techniques are involved. Publication will not necessarily require manuscript approval by all parties concerned but will require appropriate discussions between the party of the second part and the party of the first part of such things as authorship, credits, and data interpretation. In order to facilitate such interdisciplinary publications, the Project will maintain a central data and information bank, and data and information will be submitted to this bank by the party of the second part with reports specified by the terms of this Agreement.

III. Patents

Whenever any invention, which is or may be patentable, is conceived or first actually reduced to practice in the course of this Agreement, the party of the second part shall furnish the party of the first part with complete information thereon. The Colorado State University shall have the right to determine whether or not and where a patent application shall be filed, and to determine the disposition of the invention and title to and rights under any application or patent that may result. The Colorado State University, in making such a determination, shall take into account the public interest and the equities of the parties concerned. In any case, the Colorado State University may arrange to have the invention described in a printed publication. The party of the first part and the party of the second part agree that the inventor or inventors will execute all documents and perform the necessary steps to carry out the determination of the Colorado State University.

IV. Equipment

Title to all permanent equipment purchased or fabricated with funds under this Agreement will remain with party of the second part at the termination of this Agreement, unless specific exceptions are stated elsewhere in this Agreement. For the purposes of this Agreement, items with life expectancy of one year or more and/or an acquisition or fabrication cost of \$100 or more shall be considered permanent equipment.

V. Computer Software

The Colorado State University shall have the right to require the party of the second part, at no cost to the party of the second part, to duplicate, or permit others to duplicate, and deliver to the Colorado State University or to any person designated by the Colorado State University, any data accumulated in machine readable form and any computer programs, instructions or other software produced under this Agreement, which may, in the opinion of the Biome Director, be useful for research, education or other legitimate purposes by others; provided that no such requirement shall be imposed without affording the party of the second part a reasonable opportunity to correct errors or to document errors and ambiguities therein and remove such information as may have been obtained in confidence or which cannot be disclosed without violating the right of privacy of an individual to whom it pertains.

VI. Period of Performance

The period of performance for this Agreement will be September 1, 1969, to December 31, 1970, except where specified otherwise in Attachment A of this Agreement.

VII. Payment

The total amount of funds made available and reimbursable to the party of the second part under this Agreement will not exceed \$\_\_\_\_\_, and will be disbursed in general accordance with Attachment B of this Agreement, with the following restriction: Not more than 1/4 of these funds, not to exceed \$\_\_\_\_\_, shall be disbursed prior to January 1, 1970. While the party of the second part is free to alter the direction of the research when changes seem scientifically advantageous, the party of the second part will observe the following conditions in administering the Agreement:

1. Ordinary items of office equipment and furniture, air conditioners, and motor vehicles will not be charged to Agreement funds unless they have either been provided for in the budget summary or are approved by a subsequent letter from the party of the first part.
2. The amount provided for permanent equipment may not be exceeded without specific party of the first part approval.
3. No amounts may be spent from Agreement funds for salaries of the principal investigator or other senior personnel (faculty members in the case of academic institutions) in excess of those provided in the budget summary without specific approval of the party of the first part.
4. The party of the first part expects to be informed promptly by the party of the second part of any significant departures from the budget summary, not requiring prior approval of the party of the first part under the three preceding paragraphs.

Any major deviation from this schedule must have the written approval of Dr. G. M. Van Dyne, Project Leader. Indirect costs will be paid to party of the second part at a predetermined indirect cost rate of \_\_\_\_\_.

It is also agreed that payment for no more than 90% of the actual costs incurred under this Agreement will be made prior to (a) delivery of the final report by party of the second part and acceptance of the final report by the party of the first part, and (b) fulfilling of the terms in paragraphs II, III, IV, and V of this Agreement.

Rate of expenditures and reimbursement described in this section may be modified in accordance with expenditure limitations imposed upon the party of the first part by the National Science Foundation.

VIII. Equal Opportunity

The party of the second part agrees that because of the Federal financial assistance involved in this project, opportunities will be provided to qualified persons without discrimination because of race, creed, color, or national origin.

IX. Revocation

This Agreement may be revoked in whole or in part by the party of the first part after consultation with the principal investigator of the party of the second part. Such revocation shall not affect any commitment which, in the judgment of the party of the first part, had become firm prior to the effective date of the revocation.

---

G. M. Van Dyne  
Principal Investigator  
Grasslands Biome Director, US IBP

Accepted:

---

Rue Jensen  
Vice President for Research  
Colorado State University

## ATTACHMENT A

### SOIL NITROGEN INVESTIGATIONS

J. O. Reuss, Colorado State University

This research includes specific studies to provide information necessary for such an evaluation. These are: to provide quantitative information concerning the amount of nitrogen inputs by symbiotic and non-symbiotic fixing organisms; to characterize the present soil nitrogen status on selected key areas of the intensive site; and to determine nitrogen inputs through precipitation and runoff losses. In order to evaluate the amount of nitrogen entering the system it will be necessary to determine as nearly as possible the contribution of both symbiotic and non-symbiotic fixing organisms. Regular root examinations will be made on important species, with particular emphasis on *Opuntia* and *Artichoke* spp. The research will involve testing of the suitability of the acetylene reduction technique for the necessary quantitative measurements. This will be supplemented by results from the N-15 tracer technique. Based on these results, a relatively routine program of fixation studies will be undertaken using either or both methods. These studies will include use of various environmental conditions on cores containing representative species. Non-symbiotic studies will be conducted in the wetter areas that are intermittently anaerobic resulting in conditions favorable to measurable amounts of fixation. Key areas will be selected for intensive sampling. Particular attention will be given to microwatersheds, areas of high organic matter accumulation, and exposures, but representative low organic matter areas will be included. Samples will be analyzed for total organic and extractable mineral nitrogen. Selected samples will be analyzed for fixed ammonium and the organic matter fractionated. Nitrate levels in the field would be closely monitored. By a critical comparison of the conditions necessary for losses to occur as determined in the laboratory and the conditions in the field, conclusions will be drawn concerning losses by this mechanism.

# ATTACHMENT B

September 1, 1969 through December 31, 1970

Institution:	_____	_____	_____	_____
Principal Investigator(s)	_____	_____	_____	_____
General area of work	_____			
A. Salaries and Wages				
Principal investigators	_____	_____	_____	_____
Research associates	_____	_____	_____	_____
Graduate research assistants	_____	_____	_____	_____
Technicians	_____	_____	_____	_____
Student labor	_____	_____	_____	_____
Salary total	_____	_____	_____	_____
B. Fringe Benefits				
Total Salaries & benefits	_____	_____	_____	_____
C. Permanent Equipment				
D. Expendable Supplies & Equipment	_____	_____	_____	_____
E. Travel (domestic)	_____	_____	_____	_____
F. Publication costs	_____	_____	_____	_____
G. Other costs	_____	_____	_____	_____
computer	_____	_____	_____	_____
contractual analyses	_____	_____	_____	_____
subtotal	_____	_____	_____	_____
H. Total Direct Costs	_____	_____	_____	_____
I. Indirect Costs	_____	_____	_____	_____
J. TOTAL COSTS	_____	_____	_____	_____