MOWING EXPERIMENT BIOPHYS. DATA (FIFE)

Summary:

The Mowing Experiment Biophysical Measurements data set was collected to quantify the effects of grazing and nitrogen fertilization on primary productivity and plant chemistry. The data in this data set quantified the effects of foliage removal on plant net primary productivity (NPP), plant nutrient content and the effects of grazing pressure as simulated by mowing.

Mean values and their variances are reported. Standing crop values reflect treatment effects of removing biomass periodically, but the productivity levels show the inverse effects, suggesting plant compensatory growth mechanisms. Grazing intensity was defined as the amount of leaf area remaining following defoliation. The latter was manipulated experimentally by mowing at several heights. Grazing frequency was defined as the number of times foliage removal occurred in each year and included grazing and mowing history as well as current mowing frequency.

Table of Contents:

1. Data Set Overview:

Data Set Identification:

Mowing Experiment Biophys. Data (FIFE)
(Mowing Experiment Biophysical Measurements).

Data Set Introduction:

The data in this data set quantified the effects of foliage removal on plant net primary productivity (NPP), plant nutrient content and the effects of grazing pressure as simulated by mowing. Mean values and their variances are reported.

Objective/Purpose:

These data were collected to quantify the effects of grazing and nitrogen fertilization on primary productivity and plant chemistry.

Summary of Parameters:

Biomass production, plant nitrogen concentration, plant phosphorus concentration, total biomass.

Discussion:

The data in this data set quantified the effects of foliage removal on plant net primary productivity (NPP), plant nutrient content and the effects of grazing pressure as simulated by mowing.

Mean values and their variances are reported. Standing crop values reflect treatment effects of removing biomass periodically, but the productivity levels show the inverse effects, suggesting plant compensatory growth mechanisms.

Related Data Sets:

- Vegetation Biomass, Production and Consumption at Selected Sites.
- Exotech Surface Reflectances for the Mowing Experiment.
- Vegetation Species and Cover Abundance.
- Biophysical Properties of Vegetation.
- Root Biomass.

FIS Data Base Table Name:

MOW_BIOPHYS_DATA.

2. Investigator(s):

Investigator(s) Name and Title:

Dr. Tim R. Seastedt
University of Colorado

Title of Investigation:

The Influence of Grazing on Land Surface Climatological Variables.

Contact Information:

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Requested Form of Acknowledgment.

3. Theory of Measurements:

To evaluate the effects of frequency and intensity of defoliation on plant responses of native tallgrass prairie, grazing intensity was defined as the amount of leaf area remaining following defoliation. The latter was manipulated experimentally by mowing at several heights. Grazing frequency was defined as the number of times foliage removal occurred in each year and included grazing and mowing history as well as current mowing frequency.

4. Equipment:

Sensor/Instrument Description:

Hand clipper, motorized grass mower and spectrophotometer.

Collection Environment:

Ground-based.

Source/Platform:

Ground.

Source/Platform Mission Objectives:

Measure vegetation production and consumption.

Key Variables:

Standing crop, production, nitrogen content, and phosphorus content of grasses and forbs.

Principles of Operation:

Not available at this revision.

Sensor/Instrument Measurement Geometry:

Not available at this revision.

Manufacturer of Sensor/Instrument:

Not applicable.

Calibration:

Specifications:

Not applicable.

Tolerance:

Not applicable.

Frequency of Calibration:

Not applicable.

Other Calibration Information:

Not applicable.

5. Data Acquisition Methods:

The intensity and frequency experiments were done at one area close to but not on FIFE sites 6, 31, and 29 (SITEGRID 2123-MOW, 2139-MOW, and 0847-MOW). Both of these experiments were done in native tallgrass prairie. Both the frequency and intensity measurements were made within 10 meters of each other.

A detailed description of the plots, the quadrats and the sampling techniques used in these experiments is given in Turner et al. (1993).

Intensity experiment:

In 1987, a mowing intensity experiment was superimposed on 24, 10 x 5 m plots established in early 1985. Prior to the experimental treatments initiated in 1985, the site had not been grazed for 10 years. The site had been frequently burned in spring during this interval. The objective of these experiments was to estimate standing crop and the amount of foliage removal by mowing the plots. In 1987, these plots were used to create six replicates of the following mowing treatments: (1) unmowed (control), (2) mowed to 5 cm above ground level, (3) mowed to 10 cm, and (4) mowed to 20 cm. Mowing of the whole plots was conducted as needed to maintain vegetation at treatment heights, and all plots were mowed on each sampling date. Samples were obtained by hand clipping all vegetation within 0.1 square meter quadrats to ground level (for standing crop estimate) or above specified treatment heights (for use in production estimate), oven-drying to constant weight, and weighing. Samples were sorted into grass and non-grass components prior to drying.

A similar experiment was conducted in a planted brome field near site 2 (SITEGRID 1916-MOW, BROME). The experimental design was similar to the intensity experiment. Plots were mowed to the same heights as in the intensity experiments. Fertilizer was added to half of the plots. There were 3 replicates for the unfertilized plots at each of the 4 mowing heights (i.e., 5, 10, 20 cm and no mowing), and 3 replicates for the fertilized plots at each of the 4 moving heights. Each plot was treated with ammonium nitrate fertilizer at a rate of 10 [g N][m^2].

Frequency experiment:

In a separate mowing frequency experiment, also conducted in 1987, plots that had not been mowed or grazed for ten years were used. These plots were located adjacent to mowing intensity experiment plots and were burned on the same schedule as intensity experiment plots. The mowing frequency experiment consisted of 12, 10 x 5 m plots and 8, 10 x 10 m plots randomly assigned to create 5 replicates of the following mowing treatments: (1) unmowed (control), (2) mowed 1 time, (3) mowed 3 times, and (4) mowed 6 times during the growing season. All plots were mowed as close to the soil surface (approx. 2 cm) as possible. Above-ground standing crop was sampled by clipping at ground level in one 0.1 square m quadrat per plot just prior to mowing.

The procedure used to quantify the nitrogen and phosphorous content of plant samples is detailed in Turner et al. (1993).

6. Observations:

Data Notes:

Not available.

Field Notes:

None.

7. Data Description:

Spatial Characteristics:

The FIFE study area, with areal extent of 15 km by 15 km, is located south of the Tuttle Reservoir and Kansas River, and about 10 km from Manhattan, Kansas, USA. The northwest corner of the area has UTM coordinates of 4,334,000 Northing and 705,000 Easting in UTM Zone 14.

Spatial Coverage:

Below is a list of the FIFE sites that were mowed:

```
      STN    SITEGRID    NORTHING    EASTING    LATITUDE
      ---    --------    --------    -------    --------
150    1916-MOW    4330296     708270     39 05 56
151    0847-MOW    4332377     714419     39 06 58
152    2139-MOW    4329843     712789     39 05 37
      LONGITUDE     ELEVATION    COLOCATED
      ----------    ----------   ---------
-96 35 30        340         2,70,902
-96 31 12        415         29,52,829,929
-96 32 23        385         31
```

Spatial Coverage Map:

Not available.

Spatial Resolution:

Data were obtained within 0.1 square meter quadrats to ground level.

Projection:

Not available.

Grid Description:

Not available.

Temporal Characteristics:

Temporal Coverage:

The overall time period of data acquisition was from May 7, 1987 through October 28, 1987 during the IFCs.

Below is a list of the 14 dates in which mow biophysical data was collected. The number of observations for each day is also given.

OBS_DATE	NUM_OBS	OBS_DATE	NUM_OBS
07-MAY-87	5	11-AUG-87	5
26-MAY-87	5	18-AUG-87	5
16-JUN-87	6	31-AUG-87	6
24-JUN-87	5	14-SEP-87	5
08-JUL-87	5	05-OCT-87	5
17-JUL-87	5	27-OCT-87	3
07-AUG-87	3	28-OCT-87	6

Temporal Coverage Map:

Not available.

Temporal Resolution:

Usually 3 to 6 measurements were made per day. See the *Temporal Coverage Section*.

Data Characteristics:

The SQL definition for this table is found in the MOW_BIOP.TDF file located on FIFE CD-ROM Volume 1.

Parameter/Variable Name

Parameter/Variable Description	Range	Units
Source		

```
SITEGRID_ID
This is a FIS grid location code.                                              FIS
Site grid codes (SSEE-III) give
the south (SS) and east (EE) cell
number in a 100 x 100 array of 200
meter square cells.  The last 3
characters (III) are an instrument
identifier.
```

```
STATION_ID
The station ID designating the          150,                                  FIS
```

location of the observations.   151,
152

OBS_DATE
The date of the observations.   min = 07-MAY-87,   KSU
max = 28-OCT-87

MOW_HEIGHT   *
If this record is from the mowing   min = 0,   TAPE
height experiment, this column   max = 20   MEASURE
contains the mowed height of the
vegetation in cm, otherwise this
column is null.

MOW_FREQ   **
If this record is from the mowing   min = 0,   KSU
frequency experiment, the value is   max = 6
for the number of times the site
was mowed during the growing
season, otherwise this column is
null.

FERTILIZER
If this column is from the brome   F,   KSU
sites of the mowing height   N
experiment this column tells if
the site was fertilized, F for
fertilized, N for no fertilizer,
otherwise this column is null.

NUM_OBS
The number of experimental plots   min = 3,   KSU
in sample.   max = 6

MEAN_GRASS_BIOMASS
The mean above ground grass   min = 40.5,   KSU
biomass on the day of observation   max = 570.8
in g/m2.

STD_ERR_GRASS_BIOMASS
The standard error of the mean   min = 4.11,   KSU
grass biomass on the day of   max = 84.35
observation.

MEAN_FORB_BIOMASS
The mean forb (non-grass,   min = 0,   KSU
non-woody vegetation) above-   max = 77.8
ground biomass on the day of
observation in g/m2.

STD_ERR_FORB_BIOMASS
The standard error of the mean   min = 0,   KSU
forb biomass on the day of   max = 26.23
observation.

MEAN_TOT_BIOMASS
The mean total (grass + forb)   min = 87.1,   KSU
above ground biomass on the   max = 595.7
day of observation in g/m2.

STD_ERR_MEAN_TOT_BIOMASS
The standard error of the mean   min = 6.13,   KSU
total biomass on the day of   max = 102.71
observation.

MEAN_GRASS_PROD
The mean grass biomass produced   min = 237.5,   KSU
since beginning of growing season   max = 919
(standing crop + cumulative
harvest) in g/m2.

STD_ERR_GRASS_PROD
The standard error of the mean   min = 5.45,   KSU
grass biomass produced since   max = 84.35
beginning of growing season.

MEAN_FORB_PROD
The mean forb (non-grass,   min = 0,   KSU
non-woody vegetation) biomass   max = 77.8
produced since beginning of
growing season (standing crop
+ cumulative harvest) in g/m2.

STD_ERR_FORB_PROD
The standard error of the mean   min = 0,   KSU
forb (non-grass, non-woody   max = 45.65
vegetation) biomass produced since
beginning of growing season.

MEAN_TOT_PROD
The mean total (grass + forb)   min = 254.1,   KSU
biomass produced since beginning   max = 962.6
of growing season (standing crop
+ cumulative harvest) in g/m2.

STD_ERR_MEAN_TOT_PROD
The standard error of the mean   min = 1.44,   KSU

```
total (grass + forb) biomass          max = 102.71
produced since beginning of the
growing season.
```

```
GRASS_N2_CONC
The nitrogen concentration in         min = 0.532,
NITROGEN
grasses as percent dry weight.        max = 2.372
ANALYZER
```

```
STD_ERR_GRASS_N2_CONC
The standard error of nitrogen        min = 0.0277,              KSU
concentration in grasses.             max = 0.1919
```

```
GRASS_PHOS_CONC
The phosphorus concentration in       min = 0.056,               KSU
grasses as percent dry weight.        max = 0.271
```

```
STD_ERR_GRASS_PHOS_CONC
The standard error of the             min = 0.0084,              KSU
phosphorus concentration in           max = 0.0405
grasses.
```

```
FIFE_DATA_CRTFCN_CODE                        ***
The FIFE certification level of       CPI=Checked                FIS
the data.                             by Principal
Investigator
```

```
LAST_REVISION_DATE
The date the data was last            min = 12-JUL-90,           FIS
revised.                              max = 13-JUL-90
```

Footnotes:

* Mowing height treatment:

- 0 = unmowed control
- 5 = mowed to 5 cm above ground
- 10 = mowed to 10 cm above ground
- 20 = mowed to 20 cm above ground

** Mowing frequency treatment:

- 0 = unmowed control
- 1 = mowed one time during growing season

- 3 = mowed three times during growing season
- 6 = mowed six times during growing season

*** Decode the FIFE_DATA_CRTFCN_CODE field as follows:

The primary certification codes are: EXM Example or Test data (not for release) PRE Preliminary (unchecked, use at your own risk) CPI Checked by Principal Investigator (reviewed for quality) CGR Checked by a group and reconciled (data comparisons and cross checks)

The certification code modifiers are: PRE-NFP Preliminary - Not for publication, at the request of investigator. CPI-MRG PAMS data which is "merged" from two separate receiving stations to eliminate transmission errors. CPI-??? Investigator thinks data item may be questionable.

Sample Data Record:

SITEGRID_ID	STATION_ID	OBS_DATE	MOW_HEIGHT	MOW_FREQ	FERTILIZER	NUM_OBS
0847-MOW	151	16-JUN-87				6
0847-MOW	151	16-JUN-87	5			6
0847-MOW	151	16-JUN-87	10			6
0847-MOW	151	16-JUN-87	20			6

GRASS_BIOMASS_MEAN	GRASS_BIOMASS_ST_ERR	FORB_BIOMASS_MEAN
237.50	32.710	16.60
78.50	6.580	8.60
160.70	29.530	26.20
203.80	21.000	27.60

FORB_BIOMASS_ST_ERR	TOTAL_BIOMASS_MEAN	TOTAL_BIOMASS_ST_ERR
6.460	254.10	34.860
2.440	87.10	6.130
17.120	187.00	21.870
10.710	231.40	17.750

GRASS_PRODCTN_MEAN	GRASS_PRODCTN_ST_ERR	FORB_PRODCTN_MEAN
237.50	32.710	16.60
252.40	21.050	38.90
271.90	36.180	44.80
263.70	39.680	73.40

FORB_PRODCTN_ST_ERR	TOTAL_PRODCTN_MEAN	TOTAL_PRODCTN_ST_ERR	GRASS_N2_CONC
6.460	254.10	34.860	
15.090	291.40	29.810	
25.340	316.70	25.730	
36.880	337.10	68.100	

GRASS_N2_CONC_ST_ERR	GRASS_PHOS_CONC	GRASS_PHOS_CONC_ST_ERR

FIFE_DATA_CRTFCN_CODE	LAST_REVISION_DATE
CPI	12-JUL-90
CPI	12-JUL-90
CPI	12-JUL-90

8. Data Organization:

Data Granularity:

The overall time period of data acquisition was from May 7, 1987 through October 28, 1987 during the IFCs. Data were collected within 0.1 square meter quadrats to ground level. Samples were obtained by hand clipping all vegetation within 0.1 square meter quadrats to ground level (for standing crop estimate) or above specified treatment heights (for use in production estimate), oven-drying to constant weight, and weighing.

A general description of data granularity as it applies to the IMS appears in the EOSDIS Glossary.

Data Format:

The CD-ROM file format consists of numerical and character fields of varying length separated by commas. The character fields are enclosed with a single apostrophe. There are no spaces between the fields. Each file begins with five header records. Header records contain the following information: Record 1 Name of this file, its table name, number of records in this file, path and name of the document that describes the data in this file, and name of principal investigator for these data. Record 2 Path and filename of the previous data set, and path and filename of the next data set. (Path and filenames for files that contain another set of data taken at the same site on the same day.) Record 3 Path and filename of the previous site, and path and filename of the next site. (Path and filenames for files of the same data set taken on the same day for the previous and next sites (sequentially numbered by SITEGRID_ID)). Record 4 Path and filename of the previous date, and path and filename of the next date. (Path and filenames for files of the same data set taken at the same site for the previous and next date.) Record 5 Column names for the data within the file, delimited by commas. Record 6 Data records begin.

Each field represents one of the attributes listed in the chart in the *Data Characteristics Section* and described in detail in the TDF file. These fields are in the same order as in the chart.

9. Data Manipulations:

Formulae:

Derivation Techniques and Algorithms:

Total weight is the sum of grass and non-grass dry weight for a date and site. Cumulative above-ground biomass production was calculated for each plot by summing the estimates of biomass removed by previous mowing and the current standing crop at each date.

Mass of nitrogen (N) and phosphorus (P) incorporated into above-ground tissues was estimated by multiplying percent concentration and biomass.

Data Processing Sequence:

Processing Steps:

Not available at this revision.

Processing Changes:

None.

Calculations:

Special Corrections/Adjustments:

None.

Calculated Variables:

- Mass of nitrogen.
- Mass of phosphorous.
- Cumulative above-ground biomass production.

Graphs and Plots:

None.

10. Errors:

Sources of Error:

Not available at this revision.

Quality Assessment:

Data Validation by Source:

Not available at this revision.

Confidence Level/Accuracy Judgment:

The investigator places a high degree of confidence in the accuracy of these data.

Measurement Error for Parameters:

Standard errors were calculated for the variables, see the *Data Characteristics Section* for the ranges obtained.

Additional Quality Assessments:

FIS staff applied a general Quality Assessment (QA) procedure to the data to identify inconsistencies and problems for potential users. As a general procedure, the FIS QA consisted of examining the maximum, minimum, average, and standard deviation for each numerical field in the data table. An attempt was made to find an explanation for unexpected high or low values, values outside of the normal physical range for a variable, or standard deviations that appeared inconsistent with the mean. In some cases, histograms were examined to determine whether outliers were consistent with the shape of the data distribution.

The discrepancies, which were identified, are reported as problems in the *Known Problems with the Data Section*.

Data Verification by Data Center:

The data verification performed by the ORNL DAAC deals with the quality of the data format, media, and readability. The ORNL DAAC does not make an assessment of the quality of the data itself except during the course of performing other QA procedures as described below.

The FIFE data were transferred to the ORNL DAAC via CD-ROM. These CD-ROMs are distributed by the ORNL DAAC unmodified as a set or in individual volumes, as requested. In addition, the DAAC has incorporated each of the 98 FIFE tabular datasets from the CD-ROMs into its online data holdings. Incorporation of these data involved the following steps:

- copying the entire FIFE Volume 1, maintaining the directory structure on the CD-ROM.
- using data files, documentation, and SQL code provided on the CD-ROM to create a database in Statistical Analysis System (SAS).
- creating transfer files to transfer the SAS metadata database to Sybase tables.

Each distinct type of data (i.e. "data set" on the CD-ROM), is accompanied by a documentation file (i.e., .doc file) and a data format/structure definition file (i.e., .tdf file). The data format files on the CD-ROM are Oracle SQL commands (e.g., "create table") that can be used to set up a relational database table structure. This file provides column/variable names, character/numeric type, length, and format, and labels/comments. These SQL commands were converted to SAS code and were used to create SAS data sets and subsequently to input data files directly from the CD-ROM into a SAS dataset. During this process, file names and directory paths were captured and metadata was extracted to the extent possible electronically. No files were found to be corrupted or unreadable during the conversion process.

Additional Quality Assurance procedures were performed as follows:

- Statistical operations were performed to calculate minimum and maximum values for all numeric fields and to create a listing of all values of the character fields. During this process, it was determined that various conventions were used to represent missing values. (Note: no modifications were made to any data by the DAAC). In most cases, missing value identification conventions were discussed in the accompanying .doc file.

Based on a visual check of the minimum and maximum values, no glaring errors or holes were identified that might indicate errors introduced during CD-ROM mastering by the FIFE project or data ingest by the DAAC.

- Some minor inconsistencies and typographical errors were identified in some of the character fields and column labels, however, no modifications were made to the data by the DAAC.
- Some conversions of ASCII data were necessary to move the data from a DOS platform to a UNIX platform. Standard operating system conversion utilities were used (e.g., dos2unix).
- Much of the metadata required for archival is imbedded in the narrative documentation accompanying the data sets and extracted manually by DAAC staff who have read the .doc files provided on the CD-ROM and have hand entered this information into the metadata database maintained by the DAAC. QA procedures have been performed on these metadata to identify and eliminate typographical errors and inconsistencies in naming conventions, to ensure that all required metadata is present, and to ensure the accuracy of file names and paths for retrieval.
- Data requested for distribution to users are checked to verify that files copied from disk to other media remain uncorrupted.

As errors are discovered in the online tabular data by investigators, users, or DAAC staff, corrections are made in cooperation with the principal investigators. These corrections are then distributed to users. CD-ROM data are corrected when re-mastering occurs for replenishment of CD-ROM stock.

11. Notes:

Limitations of the Data:

Not available.

Known Problems with the Data:

None known at this revision.

Usage Guidance:

Not available at this revision.

Any Other Relevant Information about the Study:

The Exotech Surface Reflectances for the Mowing Experiment data (on FIFE CD-ROM Volume 1) were collected as a companion data set to the data described here. The sampling interval for these exotech data was more frequent than the mowing data. On some occasions the exotech was run the day before, the day of, and the day after the mowing of the plots. The Root Biomass data were also collected as a companion data set.

12. Application of the Data Set:

The data in this data set can be used to quantify the effects of foliage removal on plant net primary productivity (NPP), plant nutrient content and the effects of grazing pressure.

13. Future Modifications and Plans:

The FIFE field campaigns were held in 1987 and 1989 and there are no plans for new data collection. Field work continues near the FIFE site at the Long-Term Ecological Research (LTER) Network Konza research site (i.e., LTER continues to monitor the site). The FIFE investigators are continuing to analyze and model the FIFE data from the field campaigns to produce new data products.

14. Software:

Software to access the data set is available on the all volumes of the FIFE CD-ROM set. For a detailed description of the available software see the *Software Description Document*.

15. Data Access:

Contact Information:

ORNL DAAC User Services
Oak Ridge National Laboratory

Telephone: (865) 241-3952
FAX: (865) 574-4665

Email: ornldaac@ornl.gov

Data Center Identification:

ORNL Distributed Active Archive Center
Oak Ridge National Laboratory
USA

Telephone: (865) 241-3952
FAX: (865) 574-4665

Email: ornldaac@ornl.gov

Procedures for Obtaining Data:

Users may place requests by telephone, electronic mail, or FAX. Data is also available via the World Wide Web at http://daac.ornl.gov.

Data Center Status/Plans:

FIFE data are available from the ORNL DAAC. Please contact the ORNL DAAC User Services Office for the most current information about these data.

16. Output Products and Availability:

The Mowing Experiment Biophysical Measurements are available on the FIFE CD-ROM Volume 1. The CD-ROM filename is as follows:

\DATA\BIOLOGY\MOW_BIOP\1987grid.MBP

Note: capital letters indicate fixed values that appear on the CD-ROM exactly as shown here, lower case indicates characters (values) that change for each path and file.

The format used for the filenames is: *1987grid.sfx*, where *grid* is the four number code for the location within the FIFE site grid. The filename extension (*.sfx*), identifies the data set content for the file (see the *Data Characteristics Section*) and is equal to .MBP for this data set.

17. References:

Satellite/Instrument/Data Processing Documentation.

Nelson, D.W., and L.E. Sommers. 1980. Total nitrogen analysis of soil and plant tissues. J. of the Assoc. of Official Analytical Chemists. 63:770-778.

Journal Articles and Study Reports.

Dyer, M.I., C.L. Turner, and T.R. Seastedt. 1991. Influence of mowing and fertilization on productivity and spectral reflectance in Bromus inermis plots. Ecol. Appl. 1:443-452.

Gibson, D.J. 1988. Regeneration and fluctuation of tallgrass prairie vegetation in response to burning frequency. Bull. of the Torrey Botanical Club. 115:1-12.

Schimel, D.S., T.G.F. Kittel, A.K. Knapp, T.R. Seastedt, W.J. Parton, and V.B. Brown. 1991. Physiological interactions along resource gradients in tallgrass prairie. Ecology. 72:672-684.

Seastedt, T.R., J.M. Briggs, and D.J. Gibson. 1991. Control of nitrogen limitation in tallgrass prairie. Oecologia. 87:72-79.

Sellers, P.J., F.G. Hall, G. Asrar, D.E. Strebel, and R.E. Murphy. 1988. The First ISLSCP Field Experiment (FIFE). Bull. of the Am. Meteorological Soc. 69:22-27.

Turner, C.L., T.R. Seastedt, M.I. Dyer, T.G.F. Kittel, and D.S. Schimel. 1992. Effects of Management and Topography on the Radiometric Response of a Tallgrass Prairie. J. Geop. Res. 97:D17:18,855-18,866.

Turner, C.L., T.R. Seastedt, and M.I. Dyer. 1993. Maximization of above-ground grassland production: The role of defoliation frequency, intensity and history. Ecological Applications. 3(1):175-186.

Archive/DBMS Usage Documentation.

Contact the EOS Distributed Active Archive Center (DAAC) at Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee (see the *Data Center Identification Section*). Documentation about using the archive and/or online access to the data at the ORNL DAAC is not available at this revision.

18. Glossary of Terms:

A general glossary of terms can be found at the Carbon Dioxide Information Analysis Center (CDIAC) .

19. List of Acronyms:

CD-ROM Compact Disk (optical), Read-Only Memory DAAC Distributed Active Archive Center EOSDIS Earth Observing System Data and Information System FIFE First ISLSCP Field Experiment FIS FIFE Information System GSFC Goddard Space Flight Center ISLSCP International Satellite Land Surface Climatology Project KSU Kansas State University LTER Long Term Ecological Research Site, Konza Prairie ORNL Oak Ridge National Laboratory URL Uniform Resource Locator UTM Universal Transverse Mercator

A general list of acronyms be found at the Carbon Dioxide Information Analysis Center (CDIAC) .

20. Document Information:

May 6, 1994 (citation revised on October 14, 2002).

Warning: This document has not been checked for technical or editorial accuracy by the FIFE Information Scientist. There may be inconsistencies with other documents, technical or editorial errors that were inadvertently introduced when the document was compiled or references to preliminary data that were not included on the final CD-ROM.

Previous versions of this document have been reviewed by the Principal Investigator, the person who transmitted the data to FIS, a FIS staff member, or a FIFE scientist generally familiar with the data.

Document Review Date:

September 4, 1996.

Document ID:

ORNL-FIFE_MOW_BIOP.

Citation:

Cite this data set as follows:

Seastedt, T. R. 1994. Mowing Experiment Biophys[ical]. Data (FIFE). Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/55. Also published in D. E. Strebel, D. R. Landis, K. F. Huemmrich, and B. W. Meeson (eds.), Collected Data of the First ISLSCP Field Experiment, Vol. 1: Surface Observations and Non-Image Data Sets. CD-ROM. National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Maryland, U.S.A. (available from http://www.daac.ornl.gov).

Document Curator:

DAAC Staff

Document URL:

http://daac.ornl.gov