

## Data Repository Item 2006133

TABLE DR1. LOCATION OF BISON HERDS, MEAN ENAMEL  $\delta^{13}\text{C}$  VALUES, MEAN ANNUAL TEMPERATURES (MAT), MEAN ANNUAL PRECIPITATION (NOAA, 2003), AND MEASURED ABUNDANCE OF C<sub>4</sub> BIOMASS

| Locality                               | # bison measured | Enamel $\delta^{13}\text{C}$ (‰ PDB) | MAT (°C) | MAP (mm) | Vegetation type    | Site of biomass measurement | Measured C <sub>4</sub> (%)*) |
|--|------------------|--------------------------------------|----------|----------|--------------------|-----------------------------|-------------------------------|
| National Bison Range                   | 4                | -11.9 ± 0.2†                         | 8.0      | 457      | Mountain Grassland | Same                        | < 1 <sup>1</sup>              |
| Theodore Roosevelt National Park       | 6                | -9.5 ± 0.6                           | 6.8      | 422      | Mixed Prairie      | Dickinson, ND               | 22 <sup>2</sup>               |
| Yellowstone National Park              | 2                | -11.4*                               | 4.1      | 390      | Mountain Grassland | Same                        | < 3 <sup>3</sup>              |
| Ordway Prairie Preserve                | 5                | -9.9 ± 0.2                           | 6.3      | 496      | Mixed Prairie      | Same                        | 28 - 49 <sup>4</sup>          |
| Badlands National Park                 | 9                | -9.5 ± 1.2                           | 7.6      | 458      | Mixed Prairie      | Cottonwood, SD              | 24 <sup>2</sup>               |
| Wind Cave National Park                | 8                | -7.9 ± 0.3                           | 7.7      | 440      | Mixed Prairie      | Same                        | 33 <sup>4,5,6</sup>           |
| Fort Niobrara National Wildlife Refuge | 8                | -5.5 ± 0.9                           | 9.2      | 571      | Sandhills Prairie  | Niobrara Valley Preserve    | 70 <sup>7</sup>               |
| Tallgrass Prairie Preserve             | 6                | -2.9 ± 1.4                           | 15.2     | 1080     | Tallgrass Prairie  | Same                        | 95 <sup>2,4</sup>             |
| Wichita Mountains Wildlife Refuge      | 9                | -1.9 ± 0.7                           | 15.1     | 788      | Mixed Prairie      | Lawton, OK                  | 84 <sup>8,9</sup>             |

\*References: <sup>1</sup>Lommasson and DeNio, 1940, <sup>2</sup>Sims et al., 1978, <sup>3</sup>Feranec, 2004, <sup>4</sup>Tieszen, 1994, <sup>5</sup>Iowa Cooperative Wildlife Research Unit, 1981; <sup>6</sup>Tieszen et al., 1988, <sup>7</sup>Steuter et al., 1995, <sup>8</sup>Follett et al., 1997, <sup>9</sup>Tieszen et al., 1997.

†Values that have been corrected for the shift in the  $\delta^{13}\text{C}$  of atmospheric CO<sub>2</sub> caused by burning of fossil fuels (Marino and McElroy, 1991).

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TABLE DR2. THE  $\delta^{13}\text{C}$  VALUES OF ENAMEL FROM BISON THIRD MOLARS

| Sample number*                                | Year collected | Enamel $\delta^{13}\text{C}^\dagger$<br>(‰ PDB) | Calculated C <sub>4</sub> in diet<br>(%) |
|---|----------------|---|--|
| <u>National Bison Range</u>                   |                |   |  |
| MVZ-91039                                     | 1905           | <b>-10.9</b> (-12.2)                            | 1  |
| MVZ-99970                                     | 1938           | <b>-10.7</b> (-11.8)                            | 4  |
| MVZ-99971                                     | 1938           | <b>-10.4</b> (-11.5)                            | 6  |
| MVZ-116960                                    | 1948           | <b>-10.9</b> (-12.0)                            | 3  |
| <u>Theodore Roosevelt National Park</u>       |                |   |  |
| 03TR-01                                       | 2003           | <b>-8.7</b>                                     | 26                                       |
| 03TR-02                                       | 2003           | -9.0  | 24                                       |
| 03TR-03                                       | 2003           | <b>-9.7</b>                                     | 19                                       |
| 93TR-01                                       | 1993           | -10.0   | 17                                       |
| 93TR-02                                       | 1993           | -9.9  | 18                                       |
| 93TR-03                                       | 1993           | -9.9  | 18                                       |
| <u>Yellowstone National Park</u>              |                |   |  |
| MVZ-44125                                     | 1929           | <b>-10.0</b> (-11.2)                            | 9  |
| MVZ-44132                                     | 1925           | <b>-10.3</b> (-11.5)                            | 6  |
| <u>Ordway Prairie Preserve</u>                |                |   |  |
| 03ORD-01                                      | 2003           | -9.8  | 19                                       |
| 03ORD-02                                      | 2003           | <b>-9.6</b>                                     | 20                                       |
| 03ORD-05                                      | 2003           | -10.0   | 17                                       |
| 03ORD-07                                      | 2003           | -10.1   | 16                                       |
| 03ORD-08                                      | 2003           | <b>-9.7</b>                                     | 19                                       |
| <u>Badlands National Park</u>                 |                |   |  |
| 02BL-01                                       | 2002           | <b>-11.2</b>                                    | 9  |
| 02BL-02                                       | 2002           | <b>-9.1</b>                                     | 24                                       |
| 02BL-03                                       | 2002           | -8.4  | 29                                       |
| 02BL-04                                       | 2002           | <b>-9.4</b>                                     | 21                                       |
| 02BL-06                                       | 2002           | <b>-10.3</b>                                    | 15                                       |
| 02BL-07                                       | 2002           | <b>-10.8</b>                                    | 11                                       |
| 02BL-08                                       | 2002           | -8.1  | 31                                       |
| 02BL-09                                       | 2002           | <b>-8.1</b>                                     | 31                                       |
| 02BL-10                                       | 2002           | <b>-10.2</b>                                    | 16                                       |
| <u>Wind Cave National Park</u>                |                |   |  |
| 02WC-01                                       | 2002           | -7.8  | 33                                       |
| 02WC-02                                       | 2002           | <b>-7.9</b>                                     | 32                                       |
| 02WC-03                                       | 2002           | -8.2  | 30                                       |
| 02WC-04                                       | 2002           | -7.9  | 32                                       |
| 02WC-06                                       | 2002           | -8.1  | 31                                       |
| 02WC-11                                       | 2002           | -7.8  | 33                                       |
| 03WC-01                                       | 2003           | -8.0  | 31                                       |
| 93WC-04                                       | 1993           | -7.2  | 27                                       |
| <u>Fort Niobrara National Wildlife Refuge</u> |                |   |  |
| 03FN-01                                       | 2003           | -5.7  | 48                                       |
| 03FN-02                                       | 2003           | -6.6  | 41                                       |
| 03FN-03                                       | 2003           | -5.4  | 50                                       |
| 03FN-04                                       | 2003           | -5.4  | 50                                       |
| 03FN-05                                       | 2003           | <b>-6.3</b>                                     | 44                                       |
| 03FN-07                                       | 2003           | -6.5  | 42                                       |
| 03FN-10                                       | 2003           | -4.4  | 57                                       |
| 03FN-11                                       | 2003           | <b>-4.0</b>                                     | 60                                       |
| <u>Tallgrass Prairie Preserve</u>             |                |   |  |
| 03TG-01                                       | 2003           | -2.8  | 69                                       |
| 03TG-02                                       | 2003           | <b>-1.6</b>                                     | 77                                       |

|  |      |             |    |
|--|------|-------------|----|
| 03TG-11  | 2003 | <b>-4.8</b> | 54 |
| 03TG-12  | 2003 | -1.8        | 76 |
| 03TG-14  | 2003 | -4.5        | 56 |
| 03TG-15  | 2003 | <b>-2.0</b> | 74 |
| <b><u>Wichita Mountains National Wildlife Refuge</u></b> |      |             |    |
| 03WM-01  | 2003 | -1.2        | 80 |
| 03WM-02  | 2003 | <b>-2.8</b> | 69 |
| 03WM-03  | 2003 | -1.4        | 79 |
| 03WM-05  | 2003 | -2.1        | 74 |
| 03WM-06  | 2003 | -1.7        | 76 |
| 03WM-10  | 2003 | -1.7        | 76 |
| 03WM-11  | 2003 | <b>-2.7</b> | 69 |
| 03WM-14  | 2003 | -1.1        | 81 |
| 03WM-20  | 2003 | <b>-2.7</b> | 69 |

\*Samples labeled “MVZ” are from the Museum of Vertebrate Zoology, University of California, Berkeley.

†Numbers in bold represent samples run in duplicate. Numbers in parentheses represent values that have been corrected for shift in the  $\delta^{13}\text{C}$  of atmospheric  $\text{CO}_2$  due to burning of fossil fuels.