**FY-XV-49**
**COMPARATIVE EVALUATION OF PRODUCTIVITY**
**OF PRIME AND NONPRIME SOILS**

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Land Reclamation Research Center

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**PARTICIPANTS**

| Sponsor | Cost Share |
|---|---|
| The Coteau Properties Company | $10,415 |
| The Falkirk Mining Company | 4,994 |
| BNI Coal, Ltd. | 2,954 |
| Knife River Coal Mining Company | 3,336 |
| NDSU/LRRC | 44,603 |
| ND Industrial Commission | 21,698 |
| Total | $88,000 |

**Project Schedule - 1 Year**
Contract Date - 1/14/94
Start Date - 1/14/94
Completion Date - 12/31/94

**Project Deliverables**
Status Report - 5/31/94✓
Status Report - 8/31/94✓
Final Report - 12/31/94✓

**OBJECTIVE / STATEMENT OF WORK**

The objective of this program is to compare the productivity of prime and nonprime topsoil materials in different topographic positions and to determine whether the separate handling of prime or nonprime topsoil is necessary. This is the third year of a proposed three-year study. Three separate tasks are proposed for this year:

Task 1 Monitor plant yield on the existing sites.

Task 2 The soils will be monitored for sodium absorption ratio, electrical conductivity, saturation percentage, soil moisture, texture, bulk density, hydraulic conductivity and water holding capacity. In addition, precipitation will be measured.

Task 3 Compilation of the data obtained in Tasks 1 and 2.

**STATUS**

The 1993 data is summarized as project LRC-XII-44. The sites at the Coteau Mine and the Falkirk Mine were planted on May 2 and May 3, 1994, respectively. The soil moisture status is monitored biweekly at both these sites. The Coteau plots were harvested on August 1 and the Falkirk plots on August 6, 1994. The samples were threshed and cleaned.

Analysis of the data showed reduced yields due to the low precipitation during the season. At the Falkirk site, yields from the three soil series did not differ significantly. Yields on the Coteau site soils did differ, with the Zahl soil producing a slightly lower yield than the Williams and Bowbells soils. Landscape position impacted yield on both the Falkirk and Coteau sites, with prime locations producing higher yields. Topsoil depth did not impact yield in 1994.

No difference has been found in yields from Bowbells and Williams soil, indicating that a mixture of these soils would not affect yield. Decreases in yield were found with the Zahl soil at both the Falkirk and Coteau sites. However, explaining the more complex interactions on the Coteau site will require more study.

The following tables present the yield comparisons on prime and nonprime landscape positions for the three soil types.

Table 5. Interaction table of wheat grain yields at the Falkirk site in 1994.

| **Soil** | **Landscape Position** | |
|---|---|---|
| | **Prime** | **Nonprime** |
| | bu/ac | |
| Bowbells | 34 | 26 |
| Williams | 39 | 32 |
| Zahl | 34 | 27 |

LSD (.05) = 11.

Table 6. Interaction table of wheat grain yields at the Coteau site in 1994.

| **Soil** | **Prime** | **Nonprime** |
|---|---|---|
| | bu/ac | |
| | **Cropland** | |
| Bowbells | 30 | 31 |
| Williams | 29 | 26 |
| Zahl | 29 | 22 |
| | **Rangeland** | |
| Bowbells | 35 | 20 |
| Williams | 40 | 19 |
| Zahl | 29 | 18 |

LSD (.05) = 6.