

LINE TRANSECT RESIDUE AND COVER ESTIMATES

CONSERVATION MANAGEMENT SHEET

AGRONOMY SERIES May 1997



Natural Resources Conservation Service

Michigan



Line Transect showing method for estimating ground cover

What is a Line Transect?

A Line Transect is a field measurement technique that has been proven effective in estimating the percent of ground surface covered by plant residue. It is most accurate when the residue is lying flat on the soil surface and is evenly distributed across the field. Also, it may be used to estimate crop residue, live plant cover and other ground cover at any time.

How a Line Transect Works

A marked cable, line, or tape measure is placed across the surface of a field for which an estimate of the percentage of ground cover is desired. Careful observation of the number of marks which occur above various types of ground residue and/or cover may be counted and extrapolated into an estimate of protective cover for the entire field. This is then used

to predict the impact on sheet and rill erosion.

Where a Line Transect Applies

A Line Transect method of estimating the amount of plant residue, or ground cover, remaining on the surface of a field may be used at any time it is necessary, or desirable to know the amount of residues and cover on that field. Typically, it is applied to agricultural fields shortly after a field has been planted into an annual small grain or row crop, usually before crop emergence.

Where to Get More Assistance

Additional local assistance may be obtained from the local office of a Michigan Conservation District or the USDA Natural Resources Conservation Service (NRCS) office at:

Design Criteria

Design Elements:

1. A commercially available 50- or 100-foot-long cable, line, or tape measure with 100 equally spaced beads, knots, or other graduations over which to sight may be used.
2. The cable, line, or tape measure will be tautly stretched across the surface of a representative portion of the field on which an estimate of plant residue and ground cover is being made. The line may be perpendicular to the row direction or in a direction at least 45 degrees off the row direction. End rows, field borders, and parts of the field that are not representative of the entire field should be avoided. Measurement location should be randomly selected. The cable, line, or tape measure must not be moved during the following procedure.
3. Walk along the cable, line, or tape measure stopping at each mark. Sight directly down across the edge of a single, selected point on the mark (i.e., a small portion of the mark about the size of a needle point-corner, top edge, etc. of the mark). **Use the same reference point on each mark.**

Considerations for Design

1. Count all of the marks along the cable, line, or tape measure (100 total) for which only the selected reference portion of the mark (not any other part of the mark) is directly above plant residue, living or dead, or *other surface cover*.

NOTE: Surface cover is defined as any material in contact with the soil surface that might intercept raindrops and slow surface runoff. Surface cover includes rock fragments, live vegetation, and particles of plant (or other) residue. Crop residue must be attached to the surface or be of sufficient size that it will intercept raindrops and not be removed by runoff. [RULE OF THUMB: Count only surface cover particles that are 3/32 inch in diameter, or larger.] The number of possible marks counted (out of 100 total) equals the percent of ground covered by plant residue and/or other ground cover.

2. Repeat the Transect 3-5 times in a single field and average the results for and estimate of plant residue and/or ground cover on the field. Five transects are recommended on each field.

NOTE: Three transects will provide an estimate accurate to within +/-32 percent of the mean. Five transects will provide an estimate to within +/-15 percent of the mean. (Example: an averaged estimate of five measurements which suggest a plant residue and/or ground cover of 50% on a field can be expected to actually be estimated between 42.5% and 57.5% at the 95% confidence level.

Other Considerations

A number of effects to environmental conditions will occur from cultural operations used on fields where a Line Transect field measurement technique is used to estimate the percent of plant residue and/or ground cover that is there. A consideration of these effects will allow for incorporation of companion planning elements to achieve an ecosystem-wide conservation plan for the area in which the plant residue and/or ground cover estimates are made. Effects which may be considered include: sheet and rill erosion, wind erosion, ephemeral gully(tons/ac/yr.), tillage, crusting, infiltration, organic matter maintenance, soil compaction, plant productivity, plant health and vigor, etc.

Natural Resource area(s) expected to be addressed by the use/application of this conservation sheet:

Soil, Water, Air, Plants,
 Animals, Human Socio-economics.

Maintenance

The cable, line or tape measure used must be kept repaired. All marks must be present and visible.

For More Information

Additional information about the application and use of the Line Transect method to estimate the percent of plant residue and/or ground cover on a field may be obtained from the world wide web (<http://www.minrcs.usda.gov>).

Field Residue Estimates

Date: ____/____/____

Assisted by: _____

1. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

2. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

3. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

4. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

Client and Location: County _____

Client Name: _____

Township : _____

Farm name _____

Field No. _____ Tract No. _____

5. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

6. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

7. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

8. Field Number: _____ Field Crop: _____
Field Condition: Idle, Fallow, No-tilled,
 Plowed, Disked, Dragged, Planted
 Cultivated, Manure, Other _____

Marks counted (each transect)

_____, _____, _____, _____, _____ = ____ / 5 =
Estimated plant residue and/or ground cover _____%.

.....

This Conservation Information Sheet

Prepared By:

Jerry Grigar, Jr. State Agronomist USDA NRCS (MI)
Michigan's sUPerior Watershed Team USDA NRCS (MI)

Technical Review By: Dr. Jerry Lemunyon

USDA NRCS *Grazing Lands Institute (TX)*

Reference/File Indexes

Topic Application:

- Construction
- Design
- Fact
- Information
- Management
- _____

Resource Series:

- Agronomy
- Biology
- Engineering
- Forestry
- Hayland
- Livestock
- Pastureland
- Recreation

FOCS (MI) Reference Number:

CS _____

References:

- USDA NRCS Ag Handbook 703
- USDA-NRCS National Agronomy Manual
- USDA-NRCS RUSLE Handbook
- USDA NRCS (MI) Conservation Practice Associations:
 - # 327 Conservation Cover
 - # 329A Residue Mgt. No-till and Strip Till
 - #329B Residue Mgt. Mulch Till
 - #329C Residue Mgt. Ridge Till
- USDA NRCS (MI) Associated Conservation Sheets:

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited basis apply to all programs). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA Office of Communications at (202) 720-5881 (Voice) or (202) 720-7808 (TDD). To file a complaint, write the Secretary of Agriculture, USDA, Washington, DC 20250, or call (202) 720-7327 (Voice) or (202) 720-1127 (TDD). USDA is an equal opportunity employer.