



CROSS WIND RIDGES

Florida Conservation Practice Standard 588 Guidance

Natural Resources Conservation Service, Florida

September 2015

Amount of Soil Loss Tolerable

If the purpose for implementing the practice standard is to reduce soil erosion from wind or reduce soil particulate emissions affecting air quality, the threshold for soil losses associated with current or proposed production practices is T.

Much lower levels of soil movement due to wind ($<T$) can result in significant crop damage. This is a more common problem in FL associated with wind than soil loss exceeding T. If the purpose is to protect growing crops from damage by windblown soil particles, the amount of soil movement that results in crop damage depends on the crop (Table 1).

Cross Wind Ridges can be formed with various pieces of equipment used in farming operations (Table 2) and should be considered a component of a conservation management system to reduce soil loss due to wind. Cross Wind Ridges themselves are not likely to last through the entire critical period, particularly on the sandy soils in FL, and will need to be combined with other practices in a conservation management system to reduce wind erosion, particularly for very susceptible crops.

Critical Periods for Wind Erosion

The critical period for wind erosion is between January and April for most of Florida due to dry soil conditions and winds. In Flagler, St. Johns, and Putnam Counties, the spring potatoes/cabbage production months are not an issue due to seep irrigation, but the months of May and June can be critical period for wind erosion due to lowered water table.

Ridge Orientation

Ridge orientation is based on the time period the ridge needs to be present and the predominant direction of erosive wind during the susceptible time period. Table 3 is adapted from the Florida Erosion Control Handbook and gives the predominant wind direction for various locations around Florida and South Georgia during January – April (and for some sites May and June).

To use this table, select the location on the table that is closest to the county where the field is located. If the time period of concern is only one month, then select the month and read over to the "Best" row direction and the "OK" row direction. If the time period is for longer than a single month and the prevailing erosive wind direction is not consistent, chose the wind direction and row direction preference that is most consistent for the entire time period unless the purpose is to protect sensitive crops. If the purpose is to protect sensitive crops, then chose the row direction that gives the most protection for the earliest part of the growing season. For example you want to prevent wind erosion on a field near Avon Park, Florida, during the fallow period of January - April. The erosive wind direction for that period is N-NNE and the "Best" row direction would be WNW-ESE and "OK" would be E-W. If a susceptible crop was to be grown during that period, the wind direction in January would be NNW, and the "Best" would be WSW-ESE and "OK" would be E-W.

Table 1. Soil loss (tons) due to wind tolerated by different crops.

Crop	Tolerance
Alfalfa (mature)	2
Alfalfa (seedlings)	0 - 0.5
Beans, Green/Snap/Lima	1
Beets	0 - 0.5
Broccoli	1
Buckwheat	T
Cabbage	1
Carrots	0 - 0.5
Celery	0 - 0.5
Citrus	2
Corn, Field/Sweet	2
Cotton	1
Cucumbers	1
Eggplant	0 - 0.5
Fallow	T
Flax	T
Flowers	0 - 0.5
Grain sorghum	T
Lettuce (all types)	0 - 0.5
Melons (all types)	0 - 0.5
Millet	T
Onion (<30 day old)	0 - 0.5
Onion (>30 day old)	2
Orchard Crops	2
Other Low	1
Other Moderate	2
Other Tolerant	T
Other Very Low	0 - 0.5
Peanuts	1
Peas, Green/Field	1
Peppers	0 - 0.5
Potatoes, Irish/Sweet	1
Small Grains (Oats/Rye/Wheat)	T
Soybeans	2
Spinach	0 - 0.5
Squash	0 - 0.5
Strawberries	0 - 0.5
Sunflower	2
Sweet Corn	2
Tomatoes	0 - 0.5

Table 2. Estimated Ridge Height and Spacing of Common Tillage Operations¹

Operation ² (name)	Ridge Ht. (in)	Ridge Sp. ³ (in)
Bed shaper	8	30
Bed shaper, 12 in	12	30
Bedder, hipper, hiller 12 in high	12	30
Bedder, hipper, hiller 15 in high	15	30
Bedder, hipper, hiller 18 in high	18	30
Bedder, hipper, hiller 8 in high	8	30
Chisel, st. pt. 12 in deep	4	30
Chisel, st. pt. 15 in deep	5	30
Chisel, st. pt.	3	30
Chisel, sweep shovel	3	30
Chisel, twisted shovel	6	30
Chisel-disk-harrow-packer (comb)	1	6
Cultipacker, roller	1.5	6
Cultivate, manually	3	30
Cultivator, field 6-12 in sweeps	2	30
Cultivator, field w/ spike points	2	30
Cultivator, hipper, disk hiller on beds	8	30
Cultivator, off bar w/disk hillers on beds	8	30
Cultivator, rotary	0.5	30
Cultivator, row, high residue	1	30
Cultivator, rowcrop, 1 in ridge	1	30
Cultivator, rowcrop, 3 in ridge	3	30
Cultivator, rowcrop, ridge till, pass 1	4	30
Cultivator, rowcrop, ridge till, pass 2	6	30
Disk, offset, heavy	4	13
Disk, offset, heavy 12 in depth	5	11
Disk, offset, heavy 15 in depth	6	13
Disk, offset, heavy	4	13
Disk, tandem heavy primary op.	4	11
Disk, tandem light finishing	1	9
Disk, tandem secondary op.	2	9
Do all	1	6
Do all, on beds	6	30
Drill, air seeder, sweep or band opener	2	12
Drill, deep furrow 12 to 18 in spacing	4	14

Table 2. Cont'd.

Operation ² (name)	Ridge Ht. (in)	Ridge Sp. ³ (in)
Drill, hvy, direct seed, DD opener	2	10
Drill, double disk, 7-8" w/packer (core)	1	7.5
Drill, hvy, direct seed, DD opnr w/row cleaner	2	10
Drill, semi-deep furrow 12 to 18 in spacing	3	14
Drill/airseed, dbl opnr w/flut coults 5x10 pr-row	2	10
Drill/airseed, DD	1	6
Drill/airseed, DD opener, w/ fert openers	2	10
Drill/airseed, double disk, w/ fluted coulters	2	8
Drill/airseed, hoe opener in hvy residue	3	12
Drill/airseed, hoe/chisel openers 12-15 in sp	3	14
Drill/airseed, hoe/chisel openers 6-12 in sp	3	8
Drill/airseed, offset DD openers	1	8
Drill/airseed, sing dsk op, w/fert opnrs, 7-10 sp	3	7.5
Drill/airseed, single disk open, 7-10 in sp	1	7.5
Drill/airseed, tee slot openers 7-10 in sp.	0.5	7.5
Drip tape injection shank	2	30
Drip tape injection shank on beds	8	30
Fert applic coulter, high press inject 12 in	1	12
Fert applic. anhyd knife 12 in	2	12
Fert applic. deep plcmt hvy shnk	3	12
Fert applic. shank low disturbance, 12 in	2	12
Fert. applic. anhyd knife 30 in	2	30
Fert. applic., strip-till 30 in	4	30
Furrow diker	8	30
Furrow shaper, torpedo	8	30
Hand pull crop	3	30
Harrow, coiled tine	1	6
Harrow, heavy	2	6
Harrow, heavy on heavy residue	2	6
Harrow, rotary	1	6
Harrow, spike tooth	1	6
Harrow, tine, on beds	8	30
Land plane	0.1	10
Lister, 40 in	8	40
Manure injector, liquid high disturb.30 inch	4	30
Manure injector, liquid low disturb.15 inch	3	15
Manure injector, liquid low disturb.30 inch	2	30
Middle buster, digger	8	30

Table 2. Cont'd.

Operation ² (name)	Ridge Ht. (in)	Ridge Sp. ³ (in)
Para-plow or para-till	3	30
Peanut digger	4	30
Planter, DD opener	2	30
Planter, DD opener on 12 inch high beds	10	30
Planter, DD opener on 15 inch high beds	14	30
Planter, DD opener on 18 inch high beds	16	30
Planter, DD opener on 8 inch high beds	6	30
Planter, DD opener w/fluted coulter	1	30
Planter, DD opener, 18 in rows	2	18
Planter, furrow opener in 4 inch deep furrows	5	14
Planter, furrow opener in 6 inch deep furrows	6	14
Planter, furrow opener in 8 inch deep furrows	8	14
Planter, in-row subsoiler	3	30
Planter, in-row subsoiler low disturbance	1	30
Planter, in-row subsoiler w/ residue mgr.	1	30
Planter, narrow slot w/coulter	1	30
Planter, ridge till	4	30
Planter, runner opener	3	30
Planter, small veg seed	1	30
Planter, small veg seed on 8 inch high beds	8	30
Planter, sprig conventional	1	12
Planter, sprig, no-till	3	12
Planter, strip till	2	30
Planter, sugarcane	2	54
Planter, transplanter, vegetable	2	60
Planter, transplanter, vegetable on 8 in beds	8	60
Planter, transplanter, vegetable, no-till	1	60
Planting, hand 10 percent dist.	1	30
Planting, hand 5 percent dist.	1	30
Planting, manual	1	30
Planting, manual on 8 inch high beds	8	30
Planting, no-til manually	1	30
Plow, disk	1	12
Plow, moldboard 10 inch depth	1	18
Plow, moldboard 6-7 inch depth	1	18
Plow, moldboard	1	18
Plow, moldboard, conservation	2	18
Plow, moldboard, up hill	4	18

Table 2. Cont'd.

Operation ² (name)	Ridge Ht. (in)	Ridge Sp. ³ (in)
Plow, reversible	1	18
Residue, row cleaner	1	30
Roller, corrugated packer 6x16	6	16
Roller, corrugated packer	1	6
Roller, on beds	8	30
Root rake	3	6
Rototiller, row cultivator	3	30
Sand fighter	1	6
Seedbed finisher	1	6
Seeder, corrugated packer	1	6
Shredder, flail or rotary, on beds	6	30
Stalk chopper, rotary	2	6
Stalk puller	1	6
Strip till bed conditioner	2	30
Striptiller w/middlebuster on beds	8	30
Subsoiler bedder (ripper/hipper)	8	30
Subsoiler	4	40
Subsoiler ripper, 24 to 40 in. deep	4	30
Subsoiler, in row	3	30
Sweep plow <40 in w/ mulch treader	2	30
Sweep plow 20-40 in wide	2	30
Sweep plow, wider than 40 in	2	60

¹This data table plagiarized with edits from NRCS, Nebraska

²The operations listed are the names used in RUSLE 2. If you do not find an operation you need and a substitute cannot be found in this table, look in the operation section of RUSLE2 or please contact the State Agronomist.

³Common ridge spacing has been added because RUSLE 2 data does not have spacing. Note for this practice ridge spacing **cannot exceed 4X ridge height during erosive periods**. Ridge spacing in the table that exceed this requirement are highlighted in **RED**. This means these tillage operations cannot be used with this practice unless the spacing of producer's equipment is different and does not exceed the 4X limitation.

Table 3. Prevailing wind direction by month and best and acceptable row directions to minimize wind erosion (adapted from Table 15, FL Erosion Control Handbook).

Measurement Location	Month	Direction Erosive Wind Comes From	Row Direction Preference to Prevent Wind Erosion	
			Best	OK
Avon Park	January	NNW	WSW-ENE	E-W
	February	NNE	WNW-ESE	E-W
	March	N	E-W	E-W
	April	NE	NW-SE	N-S OR E-W
Bainbridge, GA	January	NE	NW-SE	N-S OR E-W
	February	NNW	ENE-WSW	E-W
	March	NNW	ENE-WSW	E-W
	April	NE	NW-SE	N-S OR E-W
Cape Canaveral	January	NNW	ENE-WSW	E-W
	February	NW	NE-SW	N-S OR E-W
	March	NNW	ENE-WSE	E-W
	April	NW	NE-SW	N-S OR E-W
Daytona Beach	January	NNE	ESE-WNW	E-W
	February	NE	NW-SE	N-S OR E-W
	March	NE	NW-SE	N-S OR E-W
	April	ENE	NNW-SSE	N-S
	May (Flagler, Putnam, and St. Johns, only)	ENE	NNW-SSE	N-S
	June (Flagler, Putnam, and St. Johns, only)	ENE	NNW-SSE	N-S
Eglin AFB/Valparaiso	January	N	E-W	E-W
	February	NNW	WSW-ENE	E-W
	March	SSE	WSW-ENE	E-W
	April	S	E-W	E-W
Ft. Lauderdale	January	SE	NE-SW	N-S OR E-W
	February	SE	NE-SW	N-S OR E-W
	March	SE	NE-SW	N-S OR E-W
	April	E	N-S	N-S
Ft. Myers	January	NNE	WNW-ESE	N-S OR E-W
	February	SW	NW-SE	N-S OR E-W
	March	SW	NW-SE	N-S OR E-W
	April	ENE	NNW-SSE	N-S
Gainesville	January	W	N-S	N-S
	February	W	N-S	N-S
	March	W	N-S	N-S
	April	W	N-S	N-S
	May (Flagler, Putnam, and St. Johns, only)	W	N-S	N-S
	June (Flagler, Putnam, and St. Johns, only)	W	N-S	N-S
Homestead	January	WNW	NNW-SSE	N-S
	February	WNW	NNW-SSE	N-S
	March	W	N-S	N-S
	April	W	N-S	N-S

Table 3. Cont'd.

Measurement Location	Month	Direction Erosive Wind Comes From	Row Direction Preference to Prevent Wind Erosion	
			Best	OK
Jacksonville	January	NE	NW-SE	N-S OR E-W
	February	ENE	NNW-SSE	N-S
	March	W	N-S	N-S
	April	W	N-S	N-S
	May (Flagler, Putnam, and St. Johns, only)	W	N-S	N-S
	June (Flagler, Putnam, and St. Johns, only)	ENE	NNW-SSE	N-S
Lakeland	January	NW	NE-SW	N-S OR E-W
	February	SSW	WNW-ESE	E-W
	March	SSW	WNW-ESE	E-W
	April	WSW	NNW-SSE	E-W
Marianna	January	S	E-W	E-W
	February	SSW	WNW-ESE	E-W
	March	SSW	WNW-ESE	E-W
	April	SSW	WNW-ESE	E-W
Miami	January	ESE	SSW-NNE	N-S
	February	SE	SW-NE	N-S OR E-W
	March	SE	SW-NE	N-S OR E-W
	April	ESE	SSW-NNE	N-S
Orlando	January	NW	NE-SW	N-S OR E-W
	February	NW	NE-SW	N-S OR E-W
	March	NW	NE-SW	N-S OR E-W
	April	WNW	NNE-SSW	N-S
Pensacola	January	N	E-W	E-W
	February	NNE	WNW-ESE	E-W
	March	N	E-W	E-W
	April	NW	NE-SW	N-S OR E-W
Perry Field	January	N	E-W	E-W
	February	NNE	WNW-ESE	E-W
	March	NE	NW-SE	N-S OR E-W
	April	NNE	WNW-ESE	E-W
Sanford	January	N	E-W	E-W
	February	NW	E-W	N-S OR E-W
	March	NW	E-W	N-S OR E-W
	April	WNW	N-S	N-S
Sarasota	January	N	E-W	E-W
	February	N	E-W	E-W
	March	NNE	WNW-ESE	E-W
	April	NNE	WNW-ESE	E-W
Tallahassee	January	NNW	ENE-WSW	E-W
	February	N	E-W	E-W
	March	N	E-W	E-W
	April	N	E-W	E-W
Tampa	January	N	E-W	E-W
	February	NNW	ENE-WSW	E-W
	March	NNE	WNW-ESE	E-W
	April	ENE	NNW-SSE	N-S

Table 3. Cont'd.

Measurement Location	Month	Direction Erosive Wind Comes From	Row Direction Preference to Prevent Wind Erosion	
			Best	OK
Valdosta, GA	January	W	E-W	E-W
	February	NE	NW-SE	N-S OR E-W
	March	N	E-W	E-W
	April	NNE	WNW-ESE	E-W
Vero Beach	January	WNW	NNE-SSW	N-S
	February	WNW	NNE-SSW	N-S
	March	NW	NE-SW	N-S OR E-W
	April	ENE	NNW-SSE	N-S
Waycross, GA	January	WNW	NNE-SSW	N-S
	February	WNW	NNE-SSW	N-S
	March	W	N-S	N-S
	April	W	N-S	N-S
West Palm Beach	January	WNW	NNE-SSW	N-S
	February	WNW	NNE-SSW	N-S
	March	NW	NE-SW	N-S OR E-W
	April	WNW	NNE-SSW	N-S