

# **LIST OF CONSERVATION MANAGEMENT PRACTICES**

**MAY 20, 2004**

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
<b>CROPLAND -LAND PREPARATION / CULTIVATION</b>			
Alternate Till	Rotate tillage leaving residue on soil	Tilling alternate rows for weed management allows for approximately 50% reduction in field activity. Stabilizes soil surface, reduces soil compaction	Tillage of alternate rows, of vineyard and orchards, thereby reducing passes across field.
Bed-row size or spacing	Increase or decrease the size of the planting area bed (can be done for field and permanent crops)	Reduces the number of passes and soil disturbance by increasing plant density/canopy thru reduction of row width, overhead vineyard production systems, containment of PM within canopy	Planting multi- rows on a wide bed, e.g. tomatoes or melons 2- rows on 60", Narrow row planting of cotton can reduce two to three cultivation passes; overhead vineyard system of vineyards can reduce cultivation and pesticides by shading unwanted vegetation that reduces the need for cultivation and pesticides, other planting systems may have similar benefits, including but not limited to using 80" wide-bed system as well as a 60"system for either cotton or vegetable planting.
Chemigation/Fertigation	Application of chemicals thru an irrigation system	Each application reduces the need to travel in-field for application purposes. Reduces the number of passes and soil disturbance, increases efficiency for application	During irrigation, add herbicide or fertilizer through water application; also includes aerial application
Combined operations	To combine equipment, to perform several operations during one pass	Reduction in the number of passes necessary to cultivate the land will result in fewer disturbances to the soil. Other benefits are reduction of soil compaction and time to prepare fields, both of which can be precursors to additional tillage requirements	Combining cane cutting, disking and flat- furrowing in a single pass for vineyards, use of one- pass till equipment in ground preparation or crop tillage, cultivation and fertilization of field crop in a single pass
Conservation irrigation	To conserve the quantity of water use, e.g.: drip, sprinkler, buried/underground line	Conserves water, reduces weed population, which in turn reduces the need for tillage and reduces soil compaction.	Use drip, or buried line (including permanent or semi-permanent line) in crop production, use of pressure bombs, water flow meters or soil monitoring devices to avoid over-irrigation, using irrigation management consultants, adopting the use of Evapo-transpiration factors

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Conservation tillage (e.g.: no tillage, minimum tillage)</b>	Types of tillage that reduce loss of soil and water in comparison to conventional tillage	Reduces the number of passes, soil disturbance. It improves soil because it retains plant residue and increases organic matter.	Converting to no or low till operations, implement reduced till activities, adding soil/ water amendments to improve resource and reduce tillage needs
<b>Cover crops</b>	Use seeding or natural vegetation/regrowth of plants to cover soil surface	Reduces soil disturbance due to wind erosion and entrainment.	Plant or allow volunteer vegetation to grow in crop without tilling under thereby reducing tillage and increasing stabilizing of that portion of soil
<b>Equipment changes/Technological improvements</b>	To modify the equipment such as combines, cotton pickers, tilling and harvesting equipment, increase equipment size, modify land planing and land leveling, matching the equipment to row spacing, grafting to new varieties or technological improvements	Reduces the number of passes during an operation, therefore reducing soil disturbance.	Convert from conventional raisin operation to D.O.V. or overhead, grafting to new varieties, increase harvester head size to reduce passes, increase tillage equipment size to reduce passes and flame cultivation
<b>Fallowing land</b>	temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program)	Eliminates entire operation/passes or reduces activities.	Leaving a portion of field untilled , Install an NRCS approved practice.
<b>Floor management</b>	Smoothing and flattening the soil surface after nut harvest to remove post-harvest residue; maintain clean, smooth, firm floor throughout season by elimination of disking	Reduces passes thru elimination of disking	Maintain level floor, chemical treatment, use one-pass tillage practices, irrigation or otherwise firming of soil to prevent P.M.

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
<b>Integrated Pest Management</b>	A decision process which uses a combination of techniques including organic, conventional, biological farming practices to suppress pests problems	Reduces use of herbicide/pesticide therefore reducing number of passes for spraying, reduced soil compaction , reducing the need for additional tillage, creates beneficial insect habitat, reducing the need for spray passes.	Monitoring crop for pests to accurately and effectively apply control measures, use county Farm Advisor thresholds for spray timing, incorporate biological practices into farming operation to reduce need for spraying
<b>Mulching</b>	Applying or leaving plant residue or other material to soil surface	Reduces entrainment of PM due to winds, reduces weed competition thereby reducing tillage passes & compaction.	May include organic material, gypsum, lime, humus, pre-plant ground covers or plastic mulches for vegetables
<b>Night farming</b>	Operate at night where practical when moisture levels are higher and winds are lighter	Decreases the concentration of PM emissions during daytime, increased ambient humidity reduces PM during high emissions periods	Increased humidity increases soil surface moisture thereby helping contain P.M. emissions from tillage.
<b>Non tillage / Chemical tillage</b>	Use flail mower, low volume sprayers, use heat delivery system ( as harvest pre-conditioner)	Reduces soil compaction, stabilizes soil through elimination or reduction of soil tillage passes	Leaving residue on surface after mowing, using pre-emergent or contact herbicides, scorching of weeds or foliage, mulch to smother weed competition. Semi-permanent crops e.g.: alfalfa will require no tillage.
<b>Organic Practices</b>	Use biological control methods, use non-chemical control methods	Reduces chemical use, thereby reducing passes	Organic certification, biological controls mulches, humus,
<b>Precision farming (GPS)</b>	e.g.: GPS, using satellite navigation to calculate position in the field, therefore manage/treat selective area	Reduces overlap, allows operations during inclement weather conditions and at night.	Install overlap reduction technology, pass markers, variable rate application technology, use petiole and soil sampling to reduce unnecessary applications
<b>Time of planting</b>	To modify the time of planting	Assists in distributing PM10 emissions to a period when there's less PM concentration.	When possible plant early season,i.e. tomatoes, sugar beets, vegetables, some tree varieties, includes seasonality and time of day.
<b>Transgenic crops</b>	Use of GMO or Transgenic crops	Reduces need for tillage or cultivation operations, reduces soil disturbance.	May include genetically altered seed, nematode resistant rootstock, grafting
<b>Transplanting</b>	Planting plants already in a growth state	Reduces soil disturbance and number of passes compared to using seeding	Instead of direct seeding, use transplants to avoid tillage; viable in vegetable crops

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
<b>CROPLAND-HARVEST</b>			
<b>Baling/Large Balers</b>	Using balers to harvest crop	Reduce P.M. emissions from chopping, truck passes, residue burning	Bale forage, grain stubble, or crop residue
<b>Combined operations</b>	To combine equipment, performing several operations during one pass	Reduction in number of passes necessary to harvest the crop, will result in fewer disturbances to the soil and reduced soil compaction.	Boil buggys, bankout wagons, bulk movement of commodity from field, gondolas, combined shredding and incorporation
<b>Continuous tray/D.O.V., New drying techniques for dried fruit</b>	Any technology to reduce labor and tillage	Reduces the number of equipment passes, field entry, and soil erosion	Will reduce passes in field because of change in technology to dry fruit, i.e. terracing and throwing back in raisin operation
<b>Equipment changes/Technological improvements</b>	To modify the equipment such as combines, cotton pickers, tilling and harvesting equipment, increase equipment size, modify land planing and land leveling, matching the equipment to row spacing, and technological improvements	Reduces the number of passes during an operation, therefore reducing soil disturbance.	Convert cotton operation from 2 to 4 or greater. Convert from conventional raisin operation to D.O.V. or overhead, changing variety, increase harvester head size to reduce passes, increase tillage equipment size to reduce passes
<b>Fallowing land</b>	temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program)	Eliminates entire operation/passes or reduces activities.	remove or leave out an area of farm from planting to reduce need for tillage pesticide application, harvest requirements
<b>Floor management</b>	Smoothing and flattening the soil surface after nut harvest to remove post-harvest residue; maintain clean, smooth, firm floor throughout season by elimination of disking	Allows for proper calibration of harvest equipment to reduce soil surface disturbance.	Maintain level floor, chemical treatment, use one-pass tillage practices, irrigation or otherwise firming of soil to prevent P.M.
<b>Green Chop</b>	The harvesting of a forage crop without allowing it to dry in the field.	Reduces multiple equipment passes in-field, reduces soil disturbance, reduces soil compaction, reduces dust emissions from dry materials.	Alfalfa, winter forage, silage corn.

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Hand harvesting</b>	Harvesting crop by hand	Reduces soil disturbance due to machinery passes.	use where practical, may be the only option for fresh fruit and vegetables
<b>Night Harvesting</b>	Implementing cultural practices at night, or at times of high humidity.	Reduces P.M. by operating when ambient air is moist, thereby reducing emissions.	Increased humidity may increase soil surface moisture thereby helping contain P.M. emissions from tillage.
<b>No burning</b>	Switching to a crop/system that would not require waste burning	Reduces emissions associated with burning	Non- burning may include eliminating burning of paper tray drying materials
<b>Pre-Harvest soil preparation</b>	Applying a light amount of water or stabilizing material to soil prior to harvest ( when possible)	Reduces P.M. emissions at harvest	A light application of water to soil prior to garlic harvest, to help control dust.
<b>Shed Packing</b>	Packing commodities in a covered or closed area	Reduces field traffic, thereby reducing P.M. emissions	Moving crops out of field, by way of bulk transport systems, to a designated pack area.
<b>Shuttle system/larger carrier</b>	multiple bin/trailer	Haul multiple or larger trailers/bins per trip thereby reducing emissions through reduced passes.	Boll buggys,cotton modules versus trailers, bankout wagons, gondolas, bulk movement of commodity from field

## CROPLAND-OTHER

<b>Alternate Till</b>	Rotate tillage, leaving residue on soil	Tilling alternate rows for weed management allows for approximately 50% reduction in field activity. Stabilizes soil surface, reduces soil compaction, reduces windblown dust.	Tillage of alternate rows, of vineyard and orchards, thereby reducing passes across field.
<b>Application Efficiencies</b>	Use compact, low volume, or concentrate quantity with spray equipment, aerial applications, use micro-heads or infrared spot sprayer, electrostatic sprayers	Reduces soil compaction, passes, and chemical usage	Low volume sprayer heads, photosynthetic i.d heads, hand- spot spraying, variable rate applicators & shielded sprayers, to reduce spray emissions and apply spray to desired pest.
<b>Baling/Large Balers</b>	Using balers to harvest crop	Reduce P.M. emissions from chopping, truck passes, residue burning	Bale forage, grain stubble, or crop residue.
<b>Bulk materials control</b>	Minimize visible dust emissions from bulk materials	Reduces entrainment of fugitive dust	To apply water or suitable chemical/organic , or cover the bulk materials with tarps, plastic or suitable material, or construct wind barriers surrounding the bulk materials

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Chemigation/ Fertigation</b>	Application of chemicals thru an irrigation system	Each application reduces the need to travel in-field for application purposes. Reduces the number of passes and soil disturbance, increases efficiency for application	During irrigation, add herbicide or fertilizer through water application; also includes aerial application.
<b>Conservation irrigation</b>	To conserve the quantity of water use, e.g.: drip, sprinkler, buried/underground line	Conserves water, reduces weed population, which in turn reduces the need for tillage and reduces soil compaction.	Use drip, or buried line (including permanent or semi-permanent line) in crop production, use of pressure bombs, water flow meters or soil monitoring devices to avoid over-irrigation, using irrigation management consultants, adopting the use of Evapo-transpiration factors
<b>Cover crops</b>	Use seeding or natural vegetation/regrowth of plants to cover soil surface	Reduces soil disturbance due to wind erosion and entrainment, improves water penetration, increases organic matter, improves soil tilth	Plant or allow volunteer vegetation to grow in crop without tilling under thereby reducing tillage and increasing stabilizing of that portion of soil
<b>Fallowing land</b>	temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program)	Eliminates entire operation/passes or reduces activities.	Remove or leave out an area of farm from planting to reduce need for tillage pesticide application, harvest requirements
<b>Grinding/Chipping/ Shredding</b>	Grinding prunings and orchard removals, instead of burning, incorporate to soil, to reduce emissions	Reducing P.M. from burning crop residues.	Using Bio-mass, chippers rather than burning to grind broken or downed limbs, flailing of vegetation instead of tilling, send prunings, and/or orchard removal material to power co-gen plants, compost residue and use for soil amendment, or, incorporate into soil.
<b>Integrated Pest Management</b>	A decision process which uses a combination of techniques including organic, conventional, biological farming practices to suppress pests problems	Reduces use of herbicide/pesticide therefore reducing number of passes for spraying, reduced soil compaction, reducing the need for additional tillage, creates beneficial insect habitat, reducing the need for spray passes.	Monitoring crop for pests to accurately and effectively apply control measures, use county Farm Advisor thresholds for spray timing

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Irrigation Power Units</b>	Use cleaner burning engines, electric motors (CMP only applicable if engines are cleaner than current rule requirements)	Reduces P.M. and NOx emissions.	New Tier II engines, electric motor, other alternative fuels.
<b>Mulching</b>	Applying plant residue or other material to soil surface or incorporating into soil.	Reduces entrainment of PM due to winds, reduces weed competition thereby reducing passes, compaction.	May include organic material, gypsum, lime, humus, pre-plant ground covers
<b>Night farming</b>	Operate at night where practical when moisture levels are higher and winds are lighter	Decreases the concentration of PM emissions during daytime, increased ambient humidity reduces PM during high emissions periods, reduces PM10 precursors.	Increased humidity increases soil surface moisture thereby helping contain P.M. emissions from tillage. Night time spraying.
<b>No burning</b>	Switching to a crop/system that would not require waste burning	Reduces practices associated with pruning and chipping	Non- burning may include; pesticide and seed containers, weeds, prunings, other residual crop residues.
<b>Non tillage / Chemical tillage</b>	Use flail mower, low volume sprayers, e.g.: use heat delivery system for cotton defoliation	Reduces soil compaction, stabilizes soil through elimination or reduction of soil tillage passes	Leaving residue on surface after mowing, using pre-emergent or contact herbicides, scorching of weeds instead of tilling, mulch to smother weed competition
<b>Organic Practices</b>	Use biological control methods, use non-chemical control methods	Reduces chemical use	Organic certification, biological controls mulches, humus.
<b>Permanent Crops</b>	Having an established permanent crop	Reduces incidence of wind blown dust	Trees, Vines or certain semi-permanent field crops
<b>Reduced pruning</b>	Reduce frequency of pruning (e.g.: one time per year, or every other year)	Reduces soil disturbance due to machinery passes and reduce fuel use.	Topping, hedging, alternate row pruning, alternate year pruning

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Soil amendments</b>	Organic or chemical materials applied to the soil for improvement (e.g.: gypsum, lime, polyacrilamide)	Increase moisture retention, reduce soil compaction, stabilize soil.	May include Organic material, gypsum, lime, humus,pre-plant ground covers
<b>Soil incorporation</b>	Disking residues and/or soil incorporation of residue	Reduces emissions from burning.	May include disking of chips or crop residue at site, movement to other points on farm or other farms for incorporation, use chips or grindings for bio-mass, humus
<b>Sulfur - reduction or elimination of dusting</b>	Organic chemical used to control disease in crop, ornamental and home and gardens	Reduced dry particulates.	Control disease through alternative measures such as, wettable sulfur, biological or other controls
<b>Surface roughening</b>	Leaving soil surface as it stands or clods of soil when fallow, preparing planting surface perpendicular to wind direction	Reduces entrainment of PM due to winds	Till perpendicular to predominate wind direction. Can be used in the SJV especially during the high wind period such as March -June to reduce geologic emissions.
<b>Transgenic crops</b>	Use "herbicide-ready"	Reduces soil disturbance and weeding passes, and lessens drift.	May include genetically altered seed, nematode resistant rootstock, grafting
<b>Wind barrier</b>	Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land	Reduces entrainment of PM due to winds	Plant various wind breaks around farmstead with plants such as, oleanders, euclpyus,juniper native grass.

## CROPLAND- UNPAVED ROADS

<b>Chips / Mulches</b>	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements and see Agriculture Improving Resources (AIR) Partner's list of products	Reduces entrainment of fugitive dust	Application of suppressant to areas meeting the vehicle trips per day threshold
<b>Organic Materials</b>			
<b>Polymers</b>			
<b>Road oil</b>			
<b>Sand</b>			

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Gravel</b>	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
<b>Mechanical Pruning</b>	Using a machine instead of hand labor to prune	Reduced vehicle trips, thereby reducing P.M. emissions	Pruning style can include tree hedging, topping, summer pruning, trimming, vineyard hedging or other mechanical pruning operations
<b>Paving</b>	To pave currently unpaved roads	Prevent dust from vehicle traffic	To pave unpaved roads
<b>Restricted Access</b>	To restrict public access to private roads	Reduces vehicle traffic and thus reduces associated fugitive dust	To install a device which will limit use of road on or surrounding an operation
<b>Speed Limits</b>	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed meaning reducing speed reduces dust	Posting speed limits on or surround the operation
<b>Track out control</b>	Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road	Reduces entrainment of fugitive dust	Accomplished by maintaining sufficient length of paved/ graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of a grizzly to dislodge debris from tires and undercarriage of vehicles leaving site.
<b>Water</b>	Application of water to unpaved roads and traffic areas	Reduces entrainment of fugitive dust	Application of water to areas meeting a vehicle trip threshold
<b>Wind barrier</b>	Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land	Reduces entrainment of fugitive dust due to winds	Plant various wind breaks around farmstead with plants such as, oleanders, eucalyptus, juniper native grass or tillage perpendicular to field till, etc

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
<b>CROPLAND- UNPAVED VEHICLE/EQUIPMENT TRAFFIC AREAS</b>			
<b>Chips / Mulches</b> <b>Organic Materials</b> <b>Polymers</b> <b>Road oil</b> <b>Sand</b>	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements	Reduces entrainment of fugitive dust	Application of suppressant to areas meeting the vehicle trips per day threshold
<b>Gravel</b>	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
<b>Paving</b>	To pave currently unpaved areas	Prevent dust from vehicle traffic	To pave unpaved areas
<b>Restricted Access</b>	To restrict public access to private roads	Reduces vehicle traffic and thus reduces associated fugitive dust	To install a device which will limit use of road on or surrounding an operation
<b>Speed Limits</b>	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed meaning reducing speed reduces dust	Posting speed limits on or surround the operation
<b>Track out control</b>	Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road	Reduces entrainment of fugitive dust	Accomplished by maintaining sufficient length of paved/ graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of a grizzly to dislodge debris from tires and undercarriage of vehicles leaving site.
<b>Water</b>	Application of water to unpaved roads and traffic areas	Reduces entrainment of fugitive dust	Application of water to areas meeting a vehicle trip threshold

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Wind barrier	Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land	Reduces entrainment of fugitive dust due to winds	Plant various wind breaks around farmstead with plants such as, oleanders, eucalyptus, juniper native grass or tillage perpendicular to field till, etc

## CROPLAND-Glossary of terms

Alternate	To do activity in an every-other-month rotation, or every-other row fashion
Bed, Bed Row	A surface prepared for the planting of seeds or crop
Chemigation	Applying chemicals through an irrigation system
Disturb, Disturbance	To work the soil in a fashion where it would no longer be in a firm or stable state
Disc,Disk,Disking	An implement designed and used, when pulled behind a tractor, mixes soil and eliminates weeds
Equipment	Implement of farm husbandry including but not limited to; tractor, disk, plow, spray machine,cultivator,trailer.
Fertigation	Applying plant nutrients through an irrigation system
Floor	The area of ground that is between the width of trees or vines. Also called the centers.
Non-Tillage	A system whereby the soil is not moved through mechanical means
Tillage	Using an implement to disturb the soil surface or sub-surface

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
<b>POULTRY OPERATIONS - MANURE HANDLING &amp; STORAGE</b>			
<b>Time of manure spreading</b>	To spread the manure at a time that would help reduce the amount of PM10 released in the air	Reduces the amount of fugitive dust released in the air	To spread manure during cooler times of day such as morning or evening and during times of low wind.
<b>Cleanout frequency</b>	To adjust the frequency of cleanouts from the houses	Reduces particulates released from poultrylitter/manure accumulating or stored inside houses. The less disturbance and handling of the litter/manure, the less emissions. Any time poultry bedding material is moved, some of the bulk material may become airborne. The bedding may be used for several grow out cycles before it becomes so laden with waste that it is unsuitable for continued use. Optimizing the reuse of the bedding material can reduce the number of material transfers, thus the opportunity for some of the material to become airborne. Implementation of this CMP implies that the generation of dust will become a factor in the determination to perform a house clean-out, and more reuse of bedding is anticipated.	To allow bedding materials and manure to remain in the house for multiple flocks or grow out cycles, or to decrease the frequency of house cleanouts to minimize dust emissions.
<b>Outdoor Storage</b>	To use of a structure design to store the bulk materials (e.g.: used poultry litter/manure) or to securely cover the bulk materials if it must be stored outdoors not within any enclosure	Prevents contact with precipitation and prevents windblown dispersion. Poultry litter consists mainly of light organic materials such as rice hulls or wood shavings. During a poultry house cleanout the used litter is scrapped out of the house and left in piles outdoors. If left in these outdoor piles for extended periods, winds can cause material to become airborne. Any technique that will shield the litter from wind will prevent or reduce the amount of material becoming airborne. Securely tarping the piles will protect the used litter from precipitation and windblown dispersal until the liter can be removed from the ranch. A partially enclosed structure, with walls situated in the prevailing wind direction, may be used to protect used litter stored onsite from precipitation and windblown dispersal.	To employ a structure design to store used poultry litter (manure and bedding material) onsite or to cover the bulk materials with tarps, plastics or suitable materials.

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
---------------------	-------------	----------	----------

## POULTRY OPERATIONS - FEEDING

<b>Boot or sock</b>	Feed is loaded into the feed storage bins by employing a sock or boot on the feed delivery truck auger	To reduce the release of particulates	Use of a sock or boot on the delivery truck auger
---------------------	--	---------------------------------------	---

## POULTRY OPERATION - OPEN AREAS

<b>Vegetation</b>	Maintaining some vegetation, such as native grasses, on vacant land	Reduces windblown dust.	Allowing vegetative material to grow on vacant sections of the operation
<b>Reduced tillage</b>	To reduce the number of tillings	Reducing soil disturbance by stabilizing soil surface	Leaving residue on surface after mowing, using pre-emergent or contact herbicides, scorching of weeds instead of tilling, mulch to smother weed competition
<b>Windblocks</b>	To establish a perimeter physical barrier to reduce windblown dust.	Disrupts the erosive flow of wind over unprotected areas thus helping to reduce fugitive dust	Use of perimeter physical barriers or vegetation barriers to disrupt wind flow
<b>Dust suppressants</b>	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VII for additional requirements	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc

## POULTRY OPERATION - UNPAVED ROADS

<b>Gravel</b>	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
<b>Access restriction</b>	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
<b>Pavement</b>	To pave currently unpaved areas	Reduces entrainment of fugitive dust	To pave unpaved roads to prevent dust from vehicle traffic

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Dust suppressants</b>	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VII for additional requirements.	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc
<b>Speed reduction</b>	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed so reducing speed reduces dust	Posting speed limits on or surround the operation
<b>Track out control</b>	Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road	Reduces entrainment of fugitive dust	Accomplished by maintaining sufficient length of paved/ graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of a grizzly to dislodge debris from tires and undercarriage of vehicles leaving site.
<b>Vegetation</b>	To establish or maintain natural vegetation	Vegetation prevents wind erosion	Allowing vegetative material to grow on vacant sections of the operation

## POULTRY OPS. - UNPAVED VEHICLE/EQUIPMENT TRAFFIC AREAS

<b>Access restriction</b>	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
<b>Gravel</b>	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
<b>Pavement</b>	To pave currently unpaved areas	Reduces entrainment of fugitive dust	To pave unpaved areas to prevent dust from vehicle traffic

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Dust suppressants	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc
Vegetation	To establish/maintain natural vegetation or vegetation to prevent wind erosion	Vegetation prevents wind erosion	Allowing vegetative material to grow on vacant sections of the operation

## DAIRY OPERATIONS - CORRAL/ MANURE HANDLING

Sprinkling of open corral	Ensure adequate corral surface moisture level to prevent visible dust emissions. *This measure is not recommended for lactating cows	Stabilizes soil surface allowing for fugitive dust reduction. Sprinkling provides higher moisture content and causes soil compaction rather than loose, dry dirt being kicked up in the air by animal movement action.	Installation of sprinklers or other watering devices to maintain an adequate moisture level
Frequent scraping and or manure removal	Removal of manure from open corrals	Reduces potential for dust disturbance caused by animal's hoof action by maintaining minimal amount of dry dust on corral surface.	Prevent build up of powdery dust in designated areas
Freestall housing	Use of freestall housing	Reduction in amount of generated dust. Concrete floor for manure deposition allows cleaning of manure through a flushing system, also the manure would already be in a high moist state.	Use of freestall
Fibrous layer in dusty areas	Addition of fibrous material to working pens	Prevents dust disturbance and dust entrainment by retaining moisture	Adding wood chips or other materials to sorting alleys and high traffic areas to hold moisture and keep down dust disturbance, and putting damp manure solids right off of the separator into the heifer pens on a daily basis and working it with a rotary harrow. Applies to heifers
Pull-type Manure harvesting equipment	Using a pull-type piece of equipment to leave an even corral surface	Stabilizes soil surface allowing for fugitive dust reduction by avoiding floor depression for dust accumulation and accumulation of dry soil/manure.	Piece of equipment should allow operators to leave an even corral surface of compacted manure on top of the soil. Pulling blades will do better than pushing blades
Scraping/harrowing	Scraping/ harrowing in morning hours when moisture is higher.	Reduction in amount of generated dust by retaining moisture.	Scraping/ harrowing in early morning when moisture is higher

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Shaded areas in open corrals	Animals in open pens will loaf in shade areas increasing stocking density and reducing dust	Reduction in amount of generated dust by retaining moisture.	Providing shaded areas for animals to loaf in

## DAIRY OPERATIONS - OVERALL MANAGEMENT/FEEDING

Bulk materials control	Minimize visible dust emissions from bulk materials	Reduces entrainment of fugitive dust	To apply water or suitable chemical/organic , or cover the bulk materials with tarps, plastic or suitable material, or construct wind barriers such as a 3-sided structure surrounding the bulk materials (e.g.: feed commodity storage barns)
Feeding near dusk	Feeding young stock during evening hours	Reduce dust-generating behaviors. For example, young stocks at dairies tend to play when temperature cools off. By feeding them at a later time breaks that activity pattern.	Feeding animals during the evening hours when conditions will generate less dust
Wet feed during mixing	To increase moisture feed levels	Avoid excessive dust.	Addition of water or moist supplements to reduce the amount of generated dust
Place wet material in feedwagon first before mixing	Mix wet feed with dry feed for suppression.	Avoid excessive dust.	Place wet material into feedwagon fist to suppress dust generation
Downwind shelterbelts/ boundary trees	Planting rows of vegetation around facility and surrounding to create a barrier for air exiting from the facilities	Reduces windblown dust.	Use of perimeter barriers or vegetation to disrupt the wind flow

## DAIRY OPERATIONS - UNPAVED ROADS

Dust suppressants	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc
-------------------	--	--------------------------------------	--

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Gravel	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
Speed reduction	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed so reducing speed reduces dust	Posting speed limits on or surround the operation
Access restriction	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
Pavement	To pave currently unpaved areas	Prevent dust from vehicle traffic	To pave unpaved roads
Track out control	Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road	Reduces entrainment of fugitive dust	Accomplished by maintaining sufficient length of paved/ graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of a grizzly to dislodge debris from tires and undercarriage of vehicles leaving site.
Speed Bumps	Installation of mechanisms to slow traffic	Dust emissions from unpaved road are a function of speed so reducing speed reduces dust	To install physical devices which slow down the speed of traffic
Appropriate equipment and vehicles	Using trip appropriate vehicles	Reduces the amount of generated dust	Using four wheelers or electric carts rather than trucks for routine trips
<b>DAIRY OPS. - UNPAVED VEHICLE/EQUIPMENT TRAFFIC AREAS</b>			
Dust suppressants	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
<b>Gravel</b>	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
<b>Access restriction</b>	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
<b>Speed reduction</b>	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed so reducing speed reduces dust	Posting speed limits on or surround the operation
<b>Pavement</b>	To pave currently unpaved areas	Prevent dust from vehicle traffic	To pave unpaved roads
<b>Appropriate equipment and vehicles</b>	Using trip appropriate vehicles	Reduces the amount of generated dust	Using four wheelers or electric carts rather than trucks for routine trips

## **FEEDLOT OPERATIONS - PENS/MANURE HANDLING**

<b>Sprinkle</b>	Ensure adequate pen surface moisture level to prevent visible dust emissions	Stabilizes soil surface allowing for fugitive dust reduction. Sprinkling provides higher moisture content and causes soil compaction rather than loose, dry dirt being kicked up in the air by animal movement action.	Installation of sprinklers or other watering devices to maintain an adequate moisture level
<b>Frequent scraping and or manure removal</b>	Removal of powdery dust	Reduces potential for dust disturbance caused by animal's hoof action by maintaining minimal amount of dry dust.	Prevent build up of powdery dust in designated areas
<b>Fibrous layer in working areas (for alley, etc.)</b>	Addition of fibrous material to areas	Prevents dust disturbance.	Adding wood chips or other materials to sorting alleys and high traffic areas to hold moisture and keep down dust disturbance, and putting damp manure solids right off of the separator into the heifer pens on a daily basis and working it with a rotary harrow. Applies to heifers
<b>Pull-type Manure harvesting equipment</b>	Using a piece of equipment to leave an even corral surface	Stabilizes soil surface allowing for fugitive dust reduction by avoiding floor depression for dust accumulation and accumulation of dry soil/manure.	Piece of equipment should allow operators to leave an even corral surface of compacted manure on top of the soil. Pulling blades will do better than pushing blades

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Shade for animal	Animals in open pens will loaf in shade areas increasing stocking density and reducing dust	Reduction in amount of generated dust by retaining moisture.	Providing shaded areas for animals to loaf in

## FEEDLOT OPERATIONS - OVERALL MANAGEMENT/FEEDING

Bulk materials control	Minimize visible dust emissions from bulk materials	Reduces entrainment of fugitive dust	To apply water or suitable chemical/organic , or cover the bulk materials with tarps, plastic or suitable material, or construct wind barriers such as a 3-sided structure surrounding the bulk materials (e.g.: feed commodity story barns)
Feeding near dusk	Feeding during evening hours	Reduce dust-generating behaviors. For example, animals tend to play when temperature cools off. By feeding them at a later time breaks that activity pattern.	Feeding animals during the evening hours when conditions will generate less dust
Wet feed during mixing	To increase moisture feed levels	Ability to avoid excessive dust	Addition of water or moist supplements to reduce the amount of generated dust
Place wet material in feedwagon first	Mix wet feed with dry feed for suppression	Ability to avoid excessive dust	Place wet material into feedwagon fist to suppress dust generation
Downwind shelterbelts/ boundary trees	Planting rows of vegetation around facility and surrounding to create a barrier for air exiting from the facility	Reduces windblown dust	Use of perimeter barriers or vegetation to disrupt the wind flow

## FEEDLOT OPERATIONS - UNPAVED ROADS

Dust suppressants	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc
-------------------	---	--------------------------------------	--

PRELIMINARY CMPs	DESCRIPTION	BENEFITS	EXAMPLES
Gravel	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
Access restriction	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
Speed reduction	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed so reducing speed reduces dust	Posting speed limits on or surround the operation
Pavement	To pave currently unpaved areas	Prevent dust from vehicle traffic	To pave unpaved roads
Track out control	Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road	Reduces entrainment of fugitive dust	Accomplished by maintaining sufficient length of paved/ graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of a grizzly to dislodge debris from tires and undercarriage of vehicles leaving site.
Appropriate equipment and vehicles	Using trip appropriate vehicles	Reduces the amount of generated dust	Using four wheelers or electric carts rather than trucks for routine trips

## FEEDLOT OPERATIONS - UNPAVED VEHICLE/EQUIPMENT TRAFFIC AREAS

Dust suppressants	Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VII for additional requirements	Reduces entrainment of fugitive dust	To use a variety of products: water application, hygroscopic suppressants (road salts), petroleum emulsions, adhesives, polymers emulsions, and bituminous materials (road oil). Water or chemical dust suppressants will bind soils. r, sodium chloride, road oil, chippings from farm, etc
-------------------	---	--------------------------------------	--

<b>PRELIMINARY CMPs</b>	<b>DESCRIPTION</b>	<b>BENEFITS</b>	<b>EXAMPLES</b>
Gravel	Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained	Reduces entrainment of fugitive dust	To add a layer of washed gravel, rock, or crushed rock
Access restriction	To restrict public access to private roads	Reduces vehicle traffic and thus reduces particulates emissions	To install a device which will limit use of road on or surrounding an operation
Speed reduction	Enforcement of speeds that reduce visible dust emissions	Dust emissions from unpaved roads are a function of speed so reducing speed reduces dust	Posting speed limits on or surround the operation
Pavement	To pave currently unpaved areas	Prevent dust from vehicle traffic	To pave unpaved roads
Appropriate equipment and vehicles	Using trip appropriate vehicles	Reduces the amount of generated dust	Using four wheelers or electric carts rather than trucks for routine trips