NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

PEST MANAGEMENT

(Acre)
CODE 595

DEFINITION

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species), that directly or indirectly cause damage or annoyance.

PURPOSES

This practice is applied as part of a Resource Management System (RMS) to support one or more of the following purposes:

- Enhance quantity and quality of commodities.
- Minimize negative impacts of pest control on soil resources, water resources, air resources, plant resources, animal resources and/or humans.

CONDITIONS WHERE PRACTICE APPLIES

Wherever pests will be managed.

CRITERIA

General Criteria Applicable to All Purposes

A pest management component of a conservation plan shall be developed as a component of a conservation plan (refer to Caribbean Area Pest Management Worksheet).

All methods of pest management must comply with Federal, State, and local regulations, including management plans for invasive pest species, noxious weeds and disease vectors. Compliance with the Food Quality Protection Act (FQPA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); "Ley de Plaguicidas" of the Commonwealth of Puerto Rico; U.S. Virgin Islands (USVI) Pesticide Control Act; Worker Protection Standard (WPS); and Interim Endangered Species Protection Program (H7506C) is required for chemical pest control.

Pesticides classified as "restricted use" can only be purchased and applied by certified applicators, who maintain a licenses and certification in Puerto Rico with the Department of Agriculture and in USVI with the Department of Planning and Natural Resources.

Integrated Pest Management (IPM) shall be incorporated into planning alternatives, where available, to maintain pest populations below economically damaging levels while minimizing harmful effects on human health and the environmental. IPM suppression systems include biological controls, cultural controls and the judicious use of chemical controls.

A set of management techniques and conservation practices recommended to mitigate the environmental risk of pest management are listed in Table 1.

Integrates pest management with the other components of the conservation plan.

Clients shall be instructed to pay special attention to all environmental hazards and site-specific application criteria listed on pesticide labels and contained in publications of the Agricultural Extension Service, University of Puerto Rico and Cooperative Extension Service of the University of the Virgin Islands.

Additional Criteria to Protect Quantity and Quality of Commodities

Crop production technical guides of the Agricultural Experiment Station of the University of Puerto Rico, named in Spanish as "Conjuntos Tecnológicos", incorporates IPM principles for most commodities produced in the Islands. For example; "Conjunto Tecnológico para la Producción de Café" describes various IPM techniques for Coffee crop.

Additional Criteria to Protect Soil Resources

The type, number and timing of tillage operations shall be managed to maintain soil loss at or below the soil loss tolerance (T) or other soil loss objective and to maintain soil quality. The Revised Universal Soil Loss Equation shall be used to estimate sheet and rill erosion.

Clients shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in soil that may negatively impact non-target plants, animals and humans.

Additional Criteria to Protect Water Resources

Pest management environmental risks, including the impacts of pesticides in ground and surface water on humans and non-target plants and animals, must be evaluated for all identified water resource concerns. The WIN-PST Soil/Pesticide Interaction which is generated from Windows Pesticide Screening Tool (WIN-PST) shall be used in pest management plans to evaluate environmental risks. The risks are determined by the potential off site movement of pesticides due to site conditions. The combine interaction of soil series and pesticides properties and characteristics are rated from high to very low in addressing the potential of the pesticide to be transported via leaching, solution runoff or particulate runoff.

When a pest management alternative has a significant potential to negatively impact important water resources, (e.g. drainage area of a drinking supply) an appropriate set of mitigating practices and management techniques must be put in place to address risk to humans and non-target aquatic and terrestrial plants and wildlife. Mitigating practice(s) should be recommended for pesticides alter-native with WIN-PST "Extra High", "High" or "Intermediate" soil/pesticide risk ratings. Table I contain a list of management techniques and conservation practices effects on pesticide loss pathway and resource concern.

Follow special attention to pesticide label instructions for limiting pesticide residues in leachate and runoff that may negatively impact non-target plants, animals and humans.

The number, sequence and timing of tillage operations shall be managed in conjunction with other sediment control tactics and practices, in order to minimize sediment losses to nearby surface water bodies.

Additional Criteria to Protect Air Resources

Clients shall be encouraged to pay special attention to pesticide label instructions for minimizing volatilization and drift that may negatively impact non-target plants, animals and humans.

Additional Criteria to Protect Plant Resources

Clients shall be encouraged to pay special attention to pesticide label instructions including those directed at:

- Preventing misdirected pest management control measures that negatively impact plants (e.g., removing pesticide residues from sprayers before moving to the next crop and properly adjusting cultivator teeth and flame burners).
- Appropriate climatic conditions, crop stage, soil moisture, pH, and organic matter in order to protect plant health.
- Limiting pesticide residues in soil that can carry over and harm subsequent crops.

Additional Criteria to Protect Animal Resources

Clients shall be encouraged to pay special attention to pesticide label instructions that minimize negative impacts to animals.

Additional Criteria to Protect Humans

Clients shall be encouraged to pay special attention to pesticide label instructions that minimize negative impacts to humans.

CONSIDERATIONS

If commodity-specific IPM is not available, the following IPM principles should be considered:

- Prevention, such as using pest-free seeds and transplants, cleaning tillage and harvesting equipment between fields, irrigation scheduling to avoid situations conducive to disease development, etc.
- Avoidance, such as using pest resistant varieties, crop rotation, trap crops, etc.
- Monitoring, such as pest scouting, soil testing, weather forecasting, etc. to help target suppression strategies and avoid routine preventative pest control.
- Suppression, such as cultural, biological and chemical controls, that can reduce a pest population or its impacts. Chemical controls should be used judiciously in order to minimize environmental risk and pest resistance.
- Adequate plant nutrients and soil moisture, including favorable pH and soil conditions, should be available to reduce plant stress, improve plant vigor and increase the plant's overall ability to tolerate pests.
- On irrigated land, irrigation water management should be designed to minimize pest management environmental risk.

PLANS AND SPECIFICATIONS

The pest management component of a conservation plan shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s). (For guidance in developing a plan see the Caribbean Area Pest Management Plan Worksheet.)

As a minimum, the pest management component of a conservation plan shall include:

1. Conservation plan and soil map or sketch
2. Crop and target pest information
3. Environmental impact evaluation of the pesticide management

a) Identify resource concern(s) that may be impacted

b) Locate sensitive resources and setbacks

c) Use WIN-PST soil pesticide interaction report

4. Interpretation of the environmental risk analysis and identification of appropriate mitigation techniques.

a) Describe and evaluate pest management alternative

b) Recommends mitigation techniques to address resource concerns identified

5. Operation and maintenance requirements.

OPERATION AND MAINTENANCE

The pest management component of a conservation plan shall include appropriate operation and maintenance items for the client. These may include:

- Applicators must be certified to apply restricted use pesticides.
- Review and update the plan periodically in order to incorporate new IPM technology, respond to cropping system and pest complex changes, and avoid the development of pest resistance.
- Maintain mitigation techniques identified in the plan in order to ensure continued effectiveness.
- Develop a safety plan for individuals exposed to chemicals, including telephone numbers and addresses of emergency treatment centers for individuals exposed to chemicals and the telephone number for the nearest poison control center.
  - Poison Center - San Jorge Hospital (787) 726 – 5676, 726 - 5660
- For advice and assistance with emergency spills that involve agrichemicals, the local emergency telephone number should be provided.

- Environmental Quality Board,
  Environmental Emergency Division
  (787) 766 – 2823
- State Emergency Management Agency

  (787) 724 – 0124
- Chemtrec – 1- 800 – 424 - 9300

- The Federal Worker Protection Standards (WPS) covers pesticide used in the production of agricultural plants on farms, forest, nurseries, and green houses. The WPS requires producers to reduce risk to employees by providing the following: safety training, safety poster, access to label information, exclude workers form treated areas by following restricted entry labels. The local Agricultural Extension Service office has training material available.
- Minimize exposure to chemicals, wear proper clothing, and use safety equipment as appropriate.
- Follow label requirements for mixing/loading setbacks from wells, intermittent streams and rivers, natural or impounded ponds and lakes, or reservoirs.
- Post signs according to label directions and/or federal, state, and local laws around sites that have been treated. Follow restricted entry intervals.
- Minimize exposure of livestock and wildlife to consumption of pesticide granules, wettable and dusts.
- Dispose of pesticides and pesticide containers in accordance with label directions and adhere to federal and local regulations. Triple rinse pesticide containers and add rinsate to spray solution. Clean application equipment after each use and apply rinsate to an approved site according to label directions.
- Store pesticides in original containers in a locked, well ventilated weather resistant building. Post warning signs on or around the building. Dispose of pesticide containers according to label directions and adhere to local regulations.
- Read and follow label directions and maintain appropriate Material Safety Data Sheets (MSDS).
- Calibrate application equipment according to Extension and/or manufacturer recommendations before each seasonal use and with each major chemical change.
- Replace worn nozzle tips, cracked hoses, and faulty gauges.
- Avoid application on windy days. Follows label recommendation for drift reduction.
- Maintain records of all pesticide application. Records for restricted use pesticides should be kept for at least two years. Pesticide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide Record Keeping Program, Commonwealth of Puerto Rico Department of Agriculture, Agrologic Laboratory and USVI Commissioner of the Department of Conservation and Cultural affairs. Minimum required information includes brand or product name, EPA registration number, acres treated, crop and site treated, application date, and name and certification number of certified applicator.

Table 1. Practice Summary Guide for Pesticide Losses

Best Management Practices	Pesticide Losses			Comments
	Leaching	Adsorption	Runoff	
Conservation Cover	H(-)	H(-)	H(-)	Land is retired from agricultural production
Conservation Crop Rotation	M(-)	M(-)	M(-)	Pesticide use is reduced, increase or reduction vary with crop selected
Contour Farming	L(+)	L(-)	L(-)	Infiltration increased (higher in coarse texture soils) , runoff reduced,
Contour Orchard	L(-)	L(-)	L(-)	Runoff is slightly reduced
Deep Tillage	L to M(+)	L(-)	L(-)	Runoff is reduced but increases leaching when pan layer is shatering
Field Border	0	L(-)	L(-)	Buffer actions reduces runoff and suspended sediment
Filter Strip	L(+)	H(-)	M(-)	Reduces runoff and increase sedimentation, leaching slightly increase
Grassed Waterway	L(-)	M(-)	L(-)	Reduces offsite particles transport
Hillside Ditch	0	M(-)	M(-)	Reduces runoff and increase sedimentation inside ditches
Irrigation Water Management	L to M(-)	L(-)	L(-)	Reduces in runoff and suspended sediments, and leaching off root zone
Grazing Land Mechanical Treatment	L (+)	M(-)	M(-)	Runoff is reduced but increases leaching when pan layer is shatter
Residue Management, No Till	0	H(-)	H(-)	Reduces runoff and organic matter increases adsorption of pesticides
Residue Management, Mulch Till	0	M(-)	M(-)	Reduces runoff and organic matter increases adsorption of pesticides
Residue Management, Seasonal	0	M(-)	L to M(-)	Reduces runoff and organic matter increases adsorption of pesticides

Best Management Practices	Pesticide Losses			Comments
	Leaching	Adsorption	Runoff	
Pest Management				
Lower Application Rate	H(-)	M(-)	M(-)	Highly effective with soluble pesticides
Partial Substitution	H(-)	M(-)	M(-)	Use pesticide with lower environmental risk
Partial Treatment	M(-)	H(-)	H(-)	Banding and direct spraying, effective with strongly adsorbed pesticides
Formulation	M(-)	M(-)	M(-)	Effects may vary with soils and pesticide characteristics and properties
Soil Incorporation	L(+) to M(-)	M(-)	M to H(-)	Increases leaching of soluble pesticides in coarse texture soils
Application Timing	H(-)	H(-)	H(-)	Proper time of application reduces pesticides losses
Set-back	H(-)	H(-)	H(-)	Pesticides losses decreases with greater distance to water body
Nutrient Management	H(-)	H(-)	H(-)	Plant health and vigor improvement reduces the use of pesticide
Prescribed Grazing	H(-)	H(-)	H(-)	Grass health and vigor improvement reduces the use of pesticide
Riparian Forest Buffer	0	H(-)	H(-)	Intercepts pesticides adsorbed in sediment and dissolved in water
Vegetative Barrier	0	H(-)	H(-)	Reduce runoff and intercepts pesticides attached to soil particles
Row Arrangement	0	L(-)	M(-)	Reduces runoff and increase sedimentation

Legend: H – High (+) Increase effect
M – Moderate (-) Decrease effect
L – Low (0) No effect