NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATION

HERBACEOUS WEED CONTROL

(Ac.)

CODE 315

DEFINITION

The removal or control of herbaceous weeds including invasive, noxious and prohibited plants.

PURPOSE

This specification provides additional guidance for the application of Herbaceous Weed Control (315).

DESIGN

Field scouting, weed identification, evaluating economic thresholds, and choosing appropriate control methods are basic to general weed management activities.

Control measures may include using cultural, biological, mechanical, and chemical control methods. Weed population suppression will be optimized when control measures are timed to susceptible life history stages of the weed species.

Guidance on timing and methods of weed control for noxious weeds in Nevada can be found in many references. Good general information is offered through the University of Nevada, Cooperative Extension http://www.unce.unr.edu/programs/agriculture/index.asp?ID=129

An effective weed management program will usually include more than one control method, and more than one application "event". Impacts of mechanical, biological, and cultural controls should be considered before relying on chemical controls. Avoid routine preventative weed control measures. Utilize spot treatments whenever practical.

Threatened and endangered species should be considered when designing an appropriate herbaceous weed control plan.

Cultural Control

Cultural methods of pest control are designed to break the infestation cycle by making the environment less suitable for weed survival. This may accomplished by:

- reducing favorable habitat of weeds;
- altering planting and harvesting patterns to disrupt in time and space habitat resources required by the weed(s);
- preventing the import of weed propagules;
- Enhancing the vigor of desired plants so they can better compete with weeds;
- Revegetation with desired, competitive plants.
- Examples of cultural controls include prescribed grazing, irrigation water management, nutrient management, and sanitation practices (cleaning equipment).

Biological Control

Biological controls use living organisms (natural enemies) to suppress populations of weeds. These include:

Predators − free living animals (insects, arthropods, birds, reptiles and mammals) that eat weeds.

Pathogens − disease causing microorganisms−including viruses, bacteria, fungi, and nematodes.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or the Field Office Technical Guide.

Extreme caution and care must be taken when designing a biological control program. Predators (including domestic livestock) and pathogens should only be introduced to the site after appropriate risk assessment has been completed. Contact the appropriate local or state officials to determine what insects or other vectors are approved for release on specific target plants.

Mechanical Control

These include mowing, tilling, hand pulling, prescribed burning, and screens placed in water conveyances (irrigation ditches, etc) to reduce weed seed movement by water.

Chemical Control

Chemical controls include various timing and application methods, including aerial, ground, and spot spraying.

When herbicides are identified as an alternative treatment, an environmental risk evaluation must be completed using Windows Pesticide Screening Tool (Win-PST).

Herbicides shall not be applied to weeds if the application promotes other invasive plants ***unless*** an appropriate revegetation practice is also applied.

Scouting of Weeds

One of the most critical parts of an effective weed management plan is identifying weeds and the infestation levels at which to treat them.

Scouting is the most effective way to identify weeds and their levels of infestation. Weeds are easiest to identify when they are flowering and therefore critical scouting periods are typically during the rainy season.

Other critical scouting periods are prior to a management application including weed control, prescribed grazing, nutrient management, and irrigation management, and before and after construction activities or other disturbances.

Alternatives Narrative:

An alternatives narrative may be required in a weed management plan. The alternatives narrative identifies resource concerns and provides an explanation of potential hazards caused by the interaction of soil and herbicides.

The alternatives narrative also provides alternatives to treating weed problems. The producer-selected alternatives are then documented on the Herbaceous Weed Control job sheet.

Mitigation Practices:

Where risk analysis tools identify intermediate to high potential hazards to humans or fish, mitigation practices that serve to minimize those risks are required to ensure the protection of water resources.

Minimizing groundwater contamination by leaching of an herbicide or associated metabolites are those practices that reduce or eliminate exposure or infiltration. Examples of these practices include reduced rates, foliar applications, spot applications, alternative herbicides, and alternative controls.

Mitigation practices for limiting surface water contamination by runoff of an herbicide or associated metabolite (including runoff of soil adsorbed herbicides) are those practices that minimize water runoff and soil erosion. Examples of these practices are prescribed grazing, residue management, crop rotation, irrigation water management, and filter or buffer strips.

Table 1 – “Mitigation Effectiveness Guide − Reducing Pesticide Impacts on Water Quality” may be helpful in identifying methods that will help to ensure minimization of potential problems.

Other Design Considerations

Consider the following IPM principles:

- Prevention, such as using weed-free seeds, transplants and hay, cleaning tillage and harvesting equipment between fields, irrigation screens, etc.
- Avoidance, such as using varieties competitive with weeds, crop rotation, prescribed grazing, etc.
- Monitoring, such as weed scouting, soil testing, weather forecasting, etc., to help target suppression strategies and avoid routine preventative weed control.
- Suppression, such as cultural, mechanical, biological and chemical controls, that can reduce a weed population or its impacts.

Chemical controls should be used judiciously in order to minimize environmental risk and non-target plant injury.

Producers will use the minimum level of herbaceous weed control necessary to meet their objectives for forage quantity, quality and accessibility.

Control applications will maintain or facilitate a vegetative successional state to accommodate target wildlife species requirements, will accommodate wildlife reproductive and other life-cycle requirements, and will not adversely affect threatened or endangered species or their habitats.

Adequate plant nutrients and soil moisture, including favorable organic matter, pH and soil conditions, should be available to reduce plant stress, improve plant vigor and increase desirable plants overall ability to compete with weeds.

On irrigated land, irrigation water management should be designed to minimize weed management environmental risk.

Where tillage is use as a control application, the number, sequence, and timing shall be coordinated with other sediment-control tactics and practices in order to minimize sediment losses to nearby surface water bodies.

Critical scouting periods for Herbaceous Weed Control may be used as a guideline for scheduling on-site weed infestation investigations.

Producers should be aware of neighboring fields where organic production is practiced in an effort to minimize any potential adverse herbicide impacts on those crops and associated certification.

Open mixing of chemicals shall not occur in the application field within a minimum of 100 feet of a well or surface water body.

Herbaceous Weed Control Plans

Plans will be developed for each management field in accordance with the herbaceous weed control and management standard and will include at a minimum:

- Management objectives;
- Plan map, soil map, and ecological site map (if applicable). If these maps are already in the conservation plan folder, do not duplicate them for the purposes of the Herbaceous Weed Control plan.
- Environmental risk analysis from WIN-PST reports (printed results);
- Weed management recommendations by weed species;
- An alternatives narrative that provides interpretation of the environmental risk analysis, including potential impacts on non-target animals, plants, and humans and identification of appropriate mitigation techniques;
- Identification of target weeds, infestation levels, and a strategy for monitoring weed pressure;
- Operation and maintenance instructions.

Completion of the 315-Herbaceous Weed Control job sheet addresses all of the above requirements and will be used in PIA when applying this practice.

OPERATION AND MAINTENANCE

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

- Review and update the plan periodically in order to incorporate new control strategies and technology, respond to grazing system and weed complex changes, and avoid the development of weed resistance;
- Maintain mitigation techniques identified in the plan in order to ensure continued effectiveness;
- Re-treat areas as needed to ensure control;
- Develop a safety plan for individuals exposed to chemicals, including telephone numbers and addresses of emergency treatment centers and the telephone number for the nearest poison control center;
- Follow label requirements for mixing/loading setbacks from wells, intermittent streams and rivers, coastlines, natural or impounded ponds and lakes, or reservoirs;

- Post signs according to label directions and/or Federal, State, Tribal, and local laws around fields that have been treated. Follow restricted entry intervals;
- Dispose of pesticides and pesticide containers in accordance with label directions and adhere to Federal, State, Tribal, and local regulations;
- Read and follow label directions and maintain appropriate Material Safety Data Sheets (MSDS). Material safety data sheets and pesticide labels may be accessed on the Internet at:

http://www.greenbook.net/ ;

- Calibrate application equipment before each seasonal use and with each major chemical change;
- Replace worn nozzle tips, cracked hoses, and faulty gauges;
- Maintain records of pest management control methods for at least two years. Pesticide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide

http://www.ams.usda.gov/science/sdpr.htm

- Recordkeeping Program and state specific requirements.

REFERENCES

Nevada Noxious Weed Field Guide, University of Nevada Cooperative Extension.SP-10-01

University of Nevada Cooperative Extension, Agriculture Programs, Weed Prevention and Management
http://www.unce.unr.edu/programs/agriculture/index.asp?ID=129

Table 1. Mitigation Effectiveness Guide – Reducing Herbicide Impacts on Water Quality

Note: This table identifies management techniques and conservation practices that have the potential to mitigate herbicide impacts on water quality. Not all techniques will be applicable to a given situation. Relative effectiveness ratings by herbicide loss pathway are "no effect" (blank); "slight effect" (+/-); "moderate effect" (++/--); and "significant effect" (+++/---). The table also identifies how the technique(s) functions. Effectiveness of any mitigation technique can be highly variable based on site conditions and design. Therefore, with guidance provided by the table, site-specific selection and design of mitigation technique(s) that are appropriate for identified resource concerns are left to the professional judgment of the conservation planner.

PEST MANAGEMENT MITIGATION TECHNIQUES	*PESTICIDE LOSS PATHWAYS*			***FUNCTION***
	LEACHING	*SOLUTION RUNOFF*	*ADSORBED RUNOFF*	
MANAGEMENT TECHNIQUES 1/				
Application Timing	+++	+++	+++	*Reduces exposure potential−delaying application when significant rainfall events are forecast can reduce pesticide transport to ground and surface water, application when conditions are optimal can reduce the amount of pesticide applied, also delaying application when wind speed is not in accordance with label requirements can reduce pesticide drift to surface water*
Formulations/Adjuvants	++	++	+	*Reduces exposure potential–formulations and/or adjuvants that increase efficacy allow lower application rates*
Lower Application Rates	+++	+++	+++	*Reduces exposure potential–use lowest effective rate*

Partial Treatment	+++	+++	+++	*Reduces exposure potential–spot treatment, banding and directed spraying reduce amount of pesticide applied*
Pesticide Label Environmental Hazard Warnings and BMPs	*Required* 2/	*Required*2/	*Required*2/	*Reduces exposure potential–label guidance must be carefully followed for pesticide applications near water bodies and on soils that are intrinsically vulnerable to erosion, runoff, or leaching*
Scouting and Integrated Pest Management (IPM) Thresholds	+++	+++	+++	*Reduces exposure potential–reduces the amount of pesticide applied*
Set-backs	+ +++	++	+	*Reduces exposure potential–reduced application area reduces amount of pesticide applied, can also reduce inadvertent pesticide application and drift to surface water*
Substitution – *Alternative pesticides* *Cultural controls* *Biological controls*		+++	+++	*Reduces hazard potential–use alternative pesticides with low environmental risk, substituting cultural (including burning and mechanical controls) and biological controls can reduce the need for pesticides*
CONSERVATION PRACTICES 3/				
Anionic Polyacrylamide (PAM) Erosion Control (Code 450)	-	+	+++	*Increases infiltration and deep percolation, reduces soil erosion*

Brush Management (Code 314)	+++	+++	+++	*Using non-chemical brush control often reduces the need for pesticides, pesticide use requires environmental risk analysis and appropriate mitigation–see Pest Management (Code 595)*
Conservation Cover (Code 327)	+++	+++	+++	*Retiring land from annual crop production often reduces the need for pesticides, builds soil organic matter*
Constructed Wetland (Code 656)	+	+	++	*Captures pesticide residues and facilitates their degradation*
Conservation Crop Rotation (Code 328)	++	++	++	*Reduces the need for pesticides by breaking pest lifecycles*
Cover Crop (Code 340)	+	+	++	*Increases infiltration, reduces soil erosion, builds soil organic matter*
Dike (Code 356)	++/--	++	++	*Reduces exposure potential–excludes outside water (++ leaching) or captures pesticide residues and facilitates their degradation (-- leaching)*
Diversion (Code 362)	+	+	+	*Reduces exposure potential–water is diverted*

Field Border (Code 386)		+	++	*Increases infiltration and traps adsorbed pesticides, often reduces application area resulting in less pesticide applied, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce inadvertent pesticide application and drift to surface water*
Filter Strip (Code 393)		++	+++	*Increases infiltration and traps adsorbed pesticides, often reduces application area resulting in less pesticide applied, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce inadvertent pesticide application and drift to surface water*
Forage Harvest Management (Code 511)	++	++	++	*Reduces exposure potential–timely harvesting reduces the need for pesticides*

Forest Stand Improvement (Code 666)	++	++	++	*Reduces the potential for pest damage and the need for pesticides*
Grade Stabilization Structure (Code 410)			++	*Traps adsorbed pesticides*
Grassed Waterway (Code 412)		+	++	*Increases infiltration and traps adsorbed pesticides (should be applied with Filter Strips at the outlet and on each side of the waterway)*
Grazing Land Mechanical Treatment (Code 548)	-	+	+	*Increases infiltration and deep percolation*
Hedgerow Planting (Code 422)			*(+) 4/*	*Reduces adsorbed pesticide deposition in surface water, also can reduce inadvertent pesticide application and drift to surface water*
Herbaceous Wind Barriers (Code 603)			*(+) 4/*	*Reduces wind erosion, traps adsorbed pesticides, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce pesticide drift to surface water*
Irrigation Land Leveling (Code 464)	++	+	++	*Reduces exposure potential–uniform surface reduces pesticide transport to ground and surface water*

Irrigation System, Microirrigation (Code 441)	++	+++	+++	*Reduces exposure potential–efficient and uniform irrigation reduces pesticide transport to ground and surface water*
Irrigation System, Sprinkler (Code 442)	++	++	++	*Reduces exposure potential–efficient and uniform irrigation reduces pesticide transport to ground and surface water*
Irrigation Water Management (Code 449)	+++	+++	+++	*Reduces exposure potential–water is applied at rates that minimize pesticide transport to ground and surface water, promotes healthy plants which can better tolerate pests*
Land Smoothing (Code 466)	+	+	+	*Reduces exposure potential–uniform surface reduces pesticide transport to ground and surface water*
Mulching (Code 484)	+	+/-	+/-	*Often reduces the need for pesticides, natural mulches increase infiltration and reduce soil erosion (+ solution and adsorbed runoff), artificial mulches may increase runoff and erosion (- solution and adsorbed runoff)*
Nutrient Management (Code 590)	++	++	++	*Promotes healthy plants which can better tolerate pests*
Pasture and Hay Planting (Code 512)	++	++	++	*Retiring land from annual crop production often reduces the need for pesticides, builds soil organic matter*

Prescribed Burning (Code 338)	++	++	++	*Often reduces the need for pesticides*
Prescribed Grazing (Code 528)	++	++	++	*Improves plant health and reduces the need for pesticides*
Range Planting (Code 550)	++	++	++	*Increases infiltration and uptake of subsurface water, reduces soil erosion, builds soil organic matter*
Residue Management, No-till and Strip-Till (Code 329)	+	++	+++	*Increases infiltration, reduces soil erosion, builds soil organic matter*
Residue Management, Mulch-Till (Code 345)	+	++	+++	*Increases infiltration, reduces soil erosion, builds soil organic matter*
Residue Management, Ridge Till (Code 346)	+	++	+++	*Increases infiltration, reduces soil erosion, builds soil organic matter*
Residue Management, Seasonal (Code 344)	+	+	+	*Increases infiltration, reduces soil erosion, builds soil organic matter*
Riparian Forest Buffer (Code 391)	+	+++	+++	*Increases infiltration and uptake of subsurface water, traps sediment, builds soil organic matter*
Riparian Herbaceous Cover (Code 390)	+	++	++	*Increases infiltration, traps sediment, builds soil organic matter*
Sediment Basin (Code 350)			++	*Captures pesticide residues and facilitates their degradation*
Stripcropping (Code 585)		+	+	*Increases infiltration, reduces soil erosion*
Structure For Water Control (Code 587)	-	++	+++	*Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation*

Subsurface Drainage (Code 606)	+	++	++	*Increases infiltration and aerobic pesticide degradation in the root zone *Note – avoid direct outlets to surface water*
Surface Drainage, Field Ditch (Code 607)	+	+	+	*Increases infiltration and aerobic pesticide degradation in the root zone*
Terrace (Code 600)	--	++	+++	*Increases infiltration and deep percolation, reduces soil erosion*
Tree and Shrub Establishment (Code 612)	+++	+++	+++	*Retiring land from annual crop production often reduces the need for pesticides, increases infiltration and uptake of subsurface water, builds soil organic matter*
Waste Storage Facility (Code 313)	+	++	++	*Captures pesticide residues*
Waste Treatment Lagoon (Code 359)		+++	+++	*Captures pesticide residues and facilitates their degradation*
Waste Utilization (Code 633)	++	++	++	*Increases soil organic matter*
Water and Sediment Control Basin (Code 638)	-	++	+++	*Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation*
Waterspreading (Code 640)	-	+	+	*Increases infiltration and deep percolation*
Well Decommissioning (Code 351)	+++			*Eliminates point source contamination*
Wetland Creation (Code 658)	+	+	+	*Captures pesticide residues and facilitates their degradation*
Wetland Enhancement (Code 659)	+	+	+	*Captures pesticide residues and facilitates their degradation*

Wetland Restoration (Code 657)	+	+	+	*Captures pesticide residues and facilitates their degradation*
Windbreak/Shelterbelt Establishment (Code 380)			*(++) 4/*	*Reduces wind erosion, reduces adsorbed pesticide deposition in surface water, traps adsorbed pesticides, also can reduce pesticide drift*
Windbreak/Shelterbelt Renovation (Code 650)			*(++) 4/*	*Reduces wind erosion, reduces adsorbed pesticide deposition in surface water, traps adsorbed pesticides, also can reduce pesticide drift*

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