BRUSH CONTROL/MANAGEMENT

Please note that the content of this BMP needs to be re- formatted into the following headers:

- **Applicability**
- **Description**
- **Implementation**
- **Scope & Schedule**
- **Measuring Implementation and Determining Water Savings**
- **Cost-Effectiveness Considerations**
- **References for Additional Information**
- **Determination of the Impact on Other Resources**
- **Acknowledgments**

Applicability

This BMP, where appropriately based on regional factors and site location characteristics, is a potential means of reducing evapotranspiration by brush species (such as ashe juniper, mesquite, and salt cedar) in order to enhance water yield, improve soil conservation, protect water quality, and manage invasive species.. It is intended for use by landowners in riparian areas or on upland areas (rangeland,pastureland, hay lands) where sufficient rainfall or water exists as determined by a feasibility study prepared in accordance with the Texas State Soil and Water Conservation Board ("TSSWCB")Water Supply Enhancement Program (WSEP) policies. This BMP is intended for use with governmental financial incentive programs.

Description

Brush Control/Management includes the removal, reduction or manipulation of nonherbaceous plants by mechanical methods, chemical treatment, biological control, prescribed burning, or combinations of these methods to achieve the desired plant community. Prescribed grazing may be applied to ensure desired response from the above treatments. Chemical treatments should be applied in accordance with USD Natural Resources Conservation Service (NRCS) and TSSWCB recommendations and in a manner consistent with the product label so as to protect water quality and non-target plant or animal species.
To be considered a water conservation BMP a Brush Control/Management project should:

1) Demonstrate water savings. The project should be able to provide probable and measurable water yield benefits, and reasonable hydrologic goals considering local conditions before should be established implementation.
2) Be cost-effective.
3) Be compatible with the natural soil profile and conditions. Excessive removal of brush or removal of brush in areas that have thin soil profiles or steep slopes can lead to severe erosion. This can negatively impact water quality downstream and remove important soil microorganisms from the site.
4) Be compatible with natural vegetation. Before removal of brush, the vegetation appropriate for restoration of the area should be identified, and whether or not the restoration can occur naturally or if it needs to be augmented with planting should be assessed.

5) Maintain or promote affected wildlife. A properly designed brush management/control project can provide habitats for a variety of wildlife species, including endangered species.
6) Incorporate an effective maintenance plan. Maintenance of the brush management/control area is critical to ensure continuance of water yield enhancement.

Implementation

A Brush Control/Management plan should be developed for each pasture, field, or management area where Brush Control/Management will be applied. The Brush Control/Management plan should include the following information:

1) Existing brush canopy cover and targeted percent canopy cover.
2) Maps or drawings showing areas to be treated and areas to be left undisturbed.
3) For mechanical methods:
    a. Types of equipment to be used
    b. Dates of treatment
    c. Equipment operating instructions
    d. Techniques or procedures to be followed
4) For chemical treatment:
    a. Herbicide name
    b. Rate of application or spray volumes
    c. Acceptable dates of application
    d. Mixing instructions (if applicable)
    e. Application techniques, timing considerations or other factors that must be considered to ensure safe, effective application, including available manufacturer's literature and/or instructions and NRCS or TSSWCB guidelines. The chemical will be used in a manner consistent with the product label so as to protect water quality and nontarget plant and animal species.
5) For biological control methods:
    a. Kind of biological agent or grazing animal to be used
    b. Timing, duration and intensity of grazing or browsing
    c. Desired degree of grazing or browsing used to achieve control/management of the target species
    d. Special precautions or requirements when using insects or plants as control/management agents

Brush Control/Management will be planned and applied in a manner to meet wildlife habitat requirements and consider wildlife concerns.

Schedule

Brush Control/Management projects are typically multi-year in scope to achieve initial removal levels and then require follow-up treatments every three to five years (depending on the brush

species being controlled). A Brush Control/Management project can be scheduled over several years.

Scope

Brush Control/Management for water conservation is typically applicable to nonirrigated land in areas with sufficient rainfall, as determined by feasibility studies, where brush has become established and presents a problem or in riparian areas (land adjacent to water courses).

Documentation

To document this BMP, plans and specifications for each field scheduled for Brush Control/Management will be prepared and may include narratives, maps, and/or drawings. These documents may contain the following items:

1) Maps or aerial photographs of the field prior to brush treatment;
2) Maps or aerial photographs of the field one or more years after brush treatment;
3) Method used for Brush Control/Management and receipts for materials or contract work;
4) For chemical treatments, records should be kept of specific names and types of chemicals used, application rates, and total amounts used;
5) Estimates of the percent canopy cover prior to treatment; and
6) Estimates of the percent canopy cover one or more years after treatment.

Determination of Water Savings

Accurate determination of the quantity of water salvaged by Brush Control/Management requires expert analysis. In general, control/management of salt cedar in riparian areas has the potential to salvage significantly more water per acre treated than control/management of brush on uplands. However, there is significantly more land in Texas with brush infestation in upland areas as compared to riparian areas. The NRCS in cooperation with the Texas AgriLife Research through the TSSWCB reported that expected water yields for various levels of control/management of brush (i.e. mesquite, Ashe juniper) in upland areas range from 0.34 to 0.55 ac-ft per year per acre (net).[1] It was estimated that the annual amount of water salvaged from salt cedar control/management in riparian areas along the Pecos River in West Texas at 5 to 8 ac-ft per acre treated.[2e]

Cost-Effectiveness Considerations

Texas A&M University at College Station, Department of Agricultural Economics, found that "present values of total upland brush control costs per acre range between $35.57 and $203.17" for a time period of ten years, and the cost of "added water" between $14.83 and $35.41 per acre-foot averaged for the same time period.[3] The USDA-NRCS Environmental Quality Incentives Program for Texas provides partial funding for eligible mechanical brush control and management projects. The TSSWCB WSEP provides partial funding for a number of brush control/management projects, primarily in West Texas. It was reported that the cost for chemical

treatment of salt cedars on the Pecos River in West Texas using aerial application of between $183 and $189 per acre and a resulting cost for the salvaged water of $7.90 to $8.22 per acre-foot using a conservative estimate of the effective life of the treatment of 3 years.[2] The cost of salvaged water per acre-foot in other locations may be significantly different.

References for Additional Information

1) Thirteen (13) *Brush Control and Water Yield Feasibility Studies* conducted on various watersheds. Performed by multiple entities for the TSSWCB WSEP. Published between 1999 and 2012. Accessible from http://www.tsswcb.texas.gov/reports#feasibility.
2) *The Pecos River Ecosystem Progress Report*, Texas AgriLife Extension Service, http://pecosbasin.tamu.edu/media/1932/2002_progress_reports.pdf, Hart, Charles, 2002.
3 Dumke, L., B. Maxwell, and J.R. Conner. 2003. *Assessing the Economic Feasibility of Brush Control to Enhance Off-Site Water Yield*, Department of Agricultural Economics, Texas A&M University, College Station. In Bednarz, S.T., et al. *Brush Management / Water Yield Feasibility Study for Four Watersheds in Texas* (Chapter 2). Texas Water Resources Institute, AgriLife Research. TR-207.
4) *Conservation Practice Standard for Brush Management*, Code 314, USDA - Natural Resources Conservation Service, January 2013.
5) *Brush Management, "Myths and Facts",* Environmental Defense, 2003, 17 p. Ball, Laura and Melinda Taylor.
6) *Brush Management, "Myths and Facts",* Environmental Defense, 2003, 17 p. Ball, Laura and Melinda Taylor.
7) Archer, S.R., K.W. Davies, T.E. Fulbright, K.C. McDaniel, B.P. Wilcox, and K.I. Predick. 2011. *Brush Management as a Rangeland Conservation Strategy: A Critical Evaluation*. In Briske, D.D. [ed]. *Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps* (Chapter 3). USDA, NRCS.
8) Jones, C.A., and L. Gregory. 2008. *Effects of Brush Management on Water Resources*. Texas Water Resources Institute, AgriLife Research. TR-338.
9) Saleh, A., H. Wu, C.S. Brown, F.M. Teagarden, S.M. McWilliams, L.M. Hauck, and J.S. Millican. 2009. *Effect of brush control on evapotranspiration in the North Concho River watershed using the eddy covariance technique*. J. Soil and Water Conserv. 64(5): 336 – 349.
10) Sheng, Z., A.K. McDonald, C. Hart, W. Hatler, and J. Villalobos. 2007. *Quantity and Fate of Water Salvage as a Result of Saltcedar Control on the Pecos River in Texas*. Texas Water Resources Institute, AgriLife Research. TR-304.