United States Department of Agriculture

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RANGE TECHNICAL NOTE NO. NM-105

SUBJECT: ECS – The "Hemi Exclosure" a new tool for Riparian Protection.

Purpose: To distribute information to area and field offices.

Effective Date: Effective when received.

Filing Instructions: File in office reference library also maintained on New Mexico NRCS web page.

Bill Zeedyk of Zeedyk Ecological Consulting located in Sandia Park, N.M & Nina Wells who is an Environmental Scientist with New Mexico Environment Department, Surface Quality Bureau located in Santa Fe, N.M. developed a new technique for protecting riparian vegetation from livestock impacts. This new technique is called the Hemi Exclosure after its hemispherical shape as installed on the outside edge of stream meanders.

Attached is the technical paper authored on the topic as installed on the Rio De Las Vacas near Cuba, NM. This technology is offered as a lower cost option as compared to complete riparian corridor fencing to promote vegetation recovery and protection. In addition to lower cost, access to other portions of the channel and banks can be maintained.

In adapting this design to other locations note the details of the area that are important to insuring function of the structure. They are; mean depth of channel at 1.5 feet. Bank heights, cutbank side of meander bends range from 2.5 to 4 feet. Distance from top of streambank to fence ranged from 10 to 25 feet depending on site characteristics.

If you have any questions on this information please contact John Tunberg, State Rangeland Management Specialist at (505)761-4488 or Marcus Miller, State Wildlife Biologist at (505)761-4432 or Steve Lacy, Geomorphologist at (505)761-4439.

GEORGE CHAVEZ
State Resource Conservationist

The "Hemi-Exclosure" – A New Tool for Riparian Protection

By Bill Zeedyk & Nina Wells

Introduction

Fourteen 'hemi-exclosures" were installed during June, 2008 along two miles of the Rio de las Vacas, Cuba Ranger District, Santa Fe National Forest to control livestock browsing on woody shrubs. Significant reduction in browsing intensity was apparent by September, 2008 as compared with unfenced streambanks. Hemi-exclosures are riparian fences that protect only the landward side of the streambank. The effectiveness of hemi-exclosures was tested along the cutbank edge of meander bends where pool depths generally exceeded one foot at base flow.

The Concept

The concept of the hemi-exclosure is based on observations by Bill Zeedyk, Nina Wells and Julie Walker that cattle tend to browse woody streambank vegetation while approaching from the terrace side rather than by approaching from the channel. Cattle tend to avoid the deeper pools with high banks, thus intense browsing pressure is focused on vegetation available from the terrace edge and on lower inboard banks at meander bends and riffle areas. Exploiting this behavioral trait of cattle offers an opportunity to protect a riparian component while accommodating other uses.

Stream Characteristics

Rio de las Vacas is a fourth order, Rosgen C or E channel type with a bankfull width of 20 feet and a mean depth of 1.5 feet. Bank heights, cutbank side of meander bends range from 2.5 to 4 feet. Dominant woody vegetation consists of thin-leafed alder, three willow species, and Wood's rose and narrow-leafed cottonwood.

Fence Construction

Cedar posts, 6" by 8' were set at bank's edge and exclosure corners, with 6' T-posts placed at 16-foot intervals between cedar posts. Post holes were drilled with track-mounted power auger. Posts were set using "dead – men" for supports to avoid use of guy wires. Fencing consisted of 36-inch field wire suspended 18" above ground level yielding a fence height of 4.5 feet. Distance from top of streambank to fence ranged from 10 to 25 feet depending on site characteristics. Above-ground height permits overbank flows to pass under fence with minimal damage. Where possible, end posts were set among alder clumps to discourage cattle from gaining entrance around the tips of exclosures.

Advantages

Use of hemi-exclosures avoids the need to string wire across the stream, avoiding potential loss during flood events and reducing both construction and maintenance costs. Riparian fences are often cut or vandalized where stream access for recreational use is blocked.

When hemi-exclosures are used in lieu of full exclosures, streambanks remain open to easy access by fisherman and others, thus reducing the temptation to vandalize the fences. Livestock and people can easily cross the stream at riffles, avoiding the deeper pools.

Acknowledgements
This experiment was conducted by Zeedyk Ecological Consulting, LLC. under contract with New Mexico Environment Department, Surface Water Quality Bureau. Fencing was installed by Steve Carson, Rangeland Hands, Inc.

Initial maintenance and supplemental planting were performed by Albuquerque Wildlife Federation, New Mexico Wilderness Alliance and New Mexico Trout. Authors wish to express appreciation to USDA Forest Service, Santa Fe National Forest for their support and cooperation in the project.

Authors:

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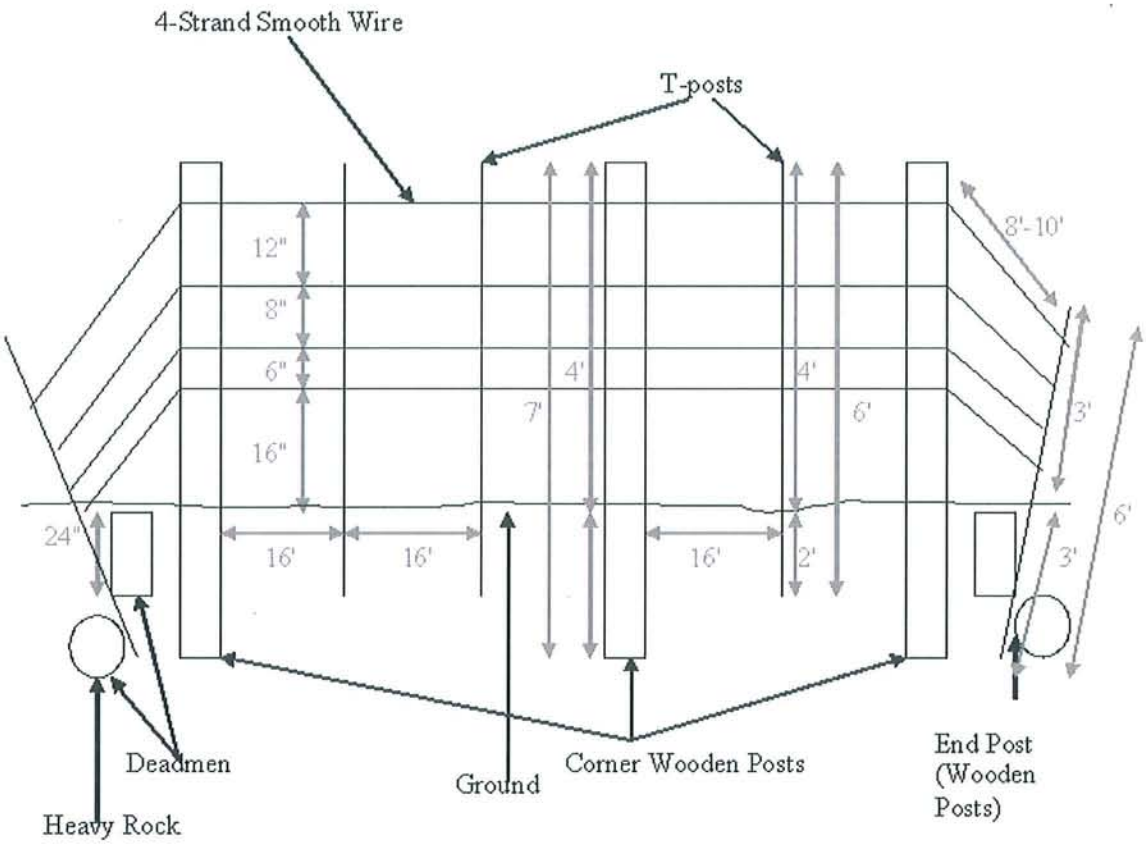
Hemi Exclosure protects outside curve of Rio de las Vacas in the Jemez watershed.

Hemi-Exclosure Specifications 12/13/06