COOPERATIVE riparian RESTORATION

Full Stream Ahead

November/December 2010

News and Highlights of Creeks and Communities: A Continuing Strategy for Accelerating Cooperative Riparian Restoration

"Riparian Management Capacity and Creeks & Communities – Never More Relevant"

A message from
Steve Smith, NRST Team Leader

Dear colleagues and friends,

Greetings from Prineville! As we embark on yet another new year, my thoughts are occupied with how our work may be affected by the challenging economic and political climate we find ourselves in. Unless you have been living in the proverbial *cave* for the past few years, you are aware that virtually every organization (both private and public) is facing serious economic challenges. If not already occurring, it is likely that these challenges will eventually result in funding and staff limitations. You will recall that the theme of our 2010 meeting was "Evolution of the Creeks and Communities Strategy: Staying Relevant to Agencies and Communities." Because of these challenges, now more than ever, it is important for us to emphasize our relevancy as riparian-wetland practitioners, to agencies and communities. We should remind decision makers that we have expertise in managing some of the most sensitive and valuable resources on earth – aquatic and riparian-wetland systems. We are all aware that these systems are facing escalating pressure to provide values for a larger and more diverse population. I don't think I need to remind folks that while there are substitutes for many things we depend on in life, there is no substitute for water and the aquatic and riparian-wetland habitat it creates and maintains.

Here is a short statement we should remember and share: ***Riparian-wetland areas are generally sensitive, produce some of the most vital and diverse resource values on the planet, and connect organisms, communities, and management entities like no other natural resource we manage.*** We have known for quite some time that streams and wetlands are barometers of healthy watersheds and can be effectively used as "management indicator zones;" therefore, riparian-wetland areas should be among the highest priorities for management. For these reasons, as we consider what to limit or de-emphasize in response to economic constraints, our capacity to manage riparian-wetland areas should not be among them.

continued on next page

That being said, I cannot comprehend a diminishing need for resource professionals who understand and can effectively manage these valuable **"*management indicator systems*."** On the contrary, there is a clear need to continue, and even increase the emphasis on riparian-wetland areas and promote activities to expand our collective capacity to successfully manage these important resources. This has been a core tenant of the Creeks and Communities Strategy for over 15 years and I believe we would do well to highlight these truths to agencies and communities within our own areas of influence in the coming years.

Thanks for all you do and if any of you ever need us to provide letters of support or telephone calls on your behalf for your work in Creeks and Communities, please let us know. I can be reached at 541-416-6703 or steven_smith@blm.gov.

Sincerely,

Steve

National Landscape Conservation System Summit

November 15-19, 2010, Las Vegas, Nevada

The National Riparian Service Team (NRST) was asked to participate in a recent gathering to commemorate the 10th anniversary of the BLM National Landscape Conservation System (NLCS). The summit was marked by a visit from Secretary Salazar, who, after addressing several hundred BLM employees and non-government stakeholders, signed a Secretarial Order elevating NLCS to the level of directorate within BLM. At the summit, NLCS was applauded as an incubator of innovation for developing a new model of conservation in the 21st century. This new model mirrors the BLM multi-use mission by balancing resource protection and use; preserving the history, culture, and resources of these unique landscapes; integrating emerging and high quality scientific inquiry and information into management decisions; building and sustaining community involvement and partnerships; and engaging youth in the management of NLCS lands.

Director Abby also addressed the group, as did a number of past and current managers involved in the development of the NLCS and representatives from several stakeholder organizations. Aside from a few presentations, the Summit was mainly a working meeting where attendees divided into focus groups to address the topics listed below. The BLM will use the input from this process to help inform and guide strategic and operational planning for NLCS.

- Sustainability: Resource Protection and Use
- Integrating Science and Management
- Building and Sustaining Partnerships
- Raising Public Awareness of the NLCS
- Engaging the Public in the NLCS through Education and Interpretation
- Connecting with Local Communities, and Engaging Youth

As reflected in the list above, the NLCS is committed to community involvement and shared stewardship of these important areas. To that end, the NLCS is continuing to partner with the NRST to provide services aimed at improving the ability of land managers and stakeholders to collaboratively address riparian-wetland resource issues within these units. This is an opportunity for training and mentoring in the general principles and practices of collaborative problem solving as well as riparian assessment, management and monitoring. **NLCS units are encouraged to consider NRST assistance and may contact Susan Holtzman, NRST Coordinator, at 503-808-2987, with any questions.**

FIELD NOTES: Interpreting Knicks

By Mark Gonzalez

Item 16 on the Proper Functioning Condition (PFC) lotic checklist states: “System is vertically stable.” Channel stability is so important in many types of streams that a ‘no’ response to this one item is sufficient reason to rate reaches above a knickpoint as functional at-risk, even when all other attributes are given ‘yes’ responses and the reach would otherwise rate in proper functioning condition. Because of the importance given to knicks on the proper function of some streams, I want to share some thoughts on the topic of vertical stability, knicks, and PFC ratings.

Definitions

First a brief review of terminology: knick, knickzone, knickpoint, headwall, and headcut. A **knick** constitutes a generic term for a change in the slope or longitudinal profile of a stream channel. A steepened segment of the profile might be the result of changes in bedrock lithology (e.g., a waterfall over a resistant lithology), gradient changes at a confluence where sediment transported by a tributary accumulates in the main channel resulting in lower gradient above the deposits and higher gradients across the accumulation (Schumm, 2005, pp 25-26, and figure 3-4 therein); or a meander cutoff that locally increases slope over a greatly shortened stream segment (Gonzalez, 2001). A knick is customarily called a **knickpoint** if the change in bed elevation is localized, discrete, and marked by a vertical scarp (Figure 1); or a **knickzone**, if the change in bed elevation is more widespread and is distributed over a channel segment (Schumm, 2005, pp 25-26, and figures 3-4 therein).

A vertical scarp, face, or drop in the bed of an alluvial channel is commonly referred to as **headcut**. A headcut is also applied to the vertical scarp at the upper end of a gully. In alluvial streams, headcuts tend to migrate upstream, sometimes in spectacular fashion, for miles. The upstream, migratory process of a eadcut is referred to as **headcutting** (Figure 1).

Some investigators treat headcut and headwall as synonymous. However, glacial geologists have long used the term **headwall** to refer to the steep wall of a cirque. In civil engineering (and this has implications for riparian hydrologists), a **headwall** refers to a retaining wall placed at the outlet of a culvert. The semantics might be minor, but my bias is to reserve the term “headwall” for use in glacial landforms and to apply the term “headcut” to fluvial landforms; though few would ever confuse the two features or mistake their provenance. However, I would concede that a vertical scarp in bedrock or some other resistant lithology within the channel (see Figure 2 for an example) could be referred to as a headwall if there is no evidence of active or potential headcutting through the scarp.

The Consequences of Vertical Instability

Why is an incised channel any different than an “at-grade” channel? If a stream channel is incised, then many riparian processes are likely impaired. Incision of a channel triggers a chain reaction of riparian misfortunes, including:

- Concentration of stream energy within an incised channel with little to no opportunity to dissipate energy in overbank environments; which leads to
- An increase in-channel erosion, channel instability, and sediment transportation;
- A cessation of overbank flooding, which causes a loss of groundwater recharge (especially of shallow alluvial aquifers);
- A decrease or total loss of obligate and facultative riparian plants when there is no longer a mechanism for bank storage of water; and
- A decrease in water quality when there is little or no riparian vegetation to trap sediment and to stabilize banks.

PFC Ratings

To the practitioners of the PFC protocol, the presence of a knickpoint or knickzone becomes just reason to rate an otherwise properly functioning stream as functional—at risk. The capacity for knickpoints to migrate upstream great distances rapidly is well documented. For example, the knick shown in Whitetail Creek (Figure 3) is documented as travelling several miles since the 1940s. The migration of knickpoints can be especially rapid:

- In unconsolidated, fine-grained alluvial valleys and channel beds;
- In soils and alluvium with high sodium adsorption ratio; and
- Where shallow groundwater discharges into a headwall (Figures 3 and 4)

The texture of alluvium is relevant to assessing the risk of headcutting and channel incision. Unconsolidated sand and gravel are highly susceptible to erosion. Clay-rich sediments may or may not have high internal strength and cohesion. Boulder and cobble beds may be well armored and generally resistant to channel erosion.

Chemistry of soil and alluvium can affect the potential and rate of incision. Sodium ions can disperse clays, inhibit flocculation (i.e. to form lumps or masses), and lead to poor soil structure (Sposito, 1989). Sodium-rich soils can behave like granular sugar and appear to dissolve when wet. Sodic soils have low internal strength and knick points can migrate rapidly through them when they become wet.

Groundwater seeps increase the internal pore pressure of soil and sediments. If the pressure is high enough, individual particles become suspended in water and are easily eroded from a channel's bed and banks. If the bank erosion is great along a headcut, sapping (or undermining) occurs, the headcut may become undercut, banks are cantilevered, and the knickpoint moves upstream as a result of roof collapse (Figure 4).

On the other end of the spectrum, some apparent knickpoints are exceedingly stable. They are unlikely to migrate upstream, or do so in small measures in response to rather rare, high-magnitude low-frequency events. Waterfalls over resistant bedrock can be exceptionally stable, even when the adjacent reaches are dominated by alluvial deposits (Figure 2). Some stream channel types, such as coarse-textured (boulder, cobble substrates) Rosgen-type (Rosgen, 1996) "Aa," "A," and "B" channels, are inherently full of cascades, step-pool structures, and riffles that in no way suggest instability (Figure 5).

Figure 1. Knickpoints are localized, distinct, vertical changes in bed elevation. Where knickpoints migrate upstream, they are commonly called "headcuts." Headcuts in fine-textured alluvium are especially prone to rapid, upstream migration, or headcutting. The headcut is the vertical scarp that disrupts the general slope of a channel or gully. *Buckhorn Draw, Little Missouri National Grassland, North Dakota*.

Interpretations
Whereas a knickpoint in fine-grained alluvium is easy to detect; knickzones related to sediment lobes and to meander cutoffs can be less obvious. Location and existence of such knickzones may not be evident from examining the channel alone, but typically requires examination of features on the floodplain and/or adjacent terrace.

Comparison of landforms, channel geometry, and channel size above and below knicks can provide clues on whether the knick has degraded riparian function or is likely to do so. For example, a channel that is an entrenched Rosgen-type “F” channel with low sinuosity and steep gradient below a knick point is a model of the change that is likely to occur to an un-incised Rosgen-type “C” channel above the knickpoint.

When evaluating the risk posed by a knick, let space serve as a substitute for time. That is, compare the riparian function upstream and downstream of the knick. The assumption is that knicks migrate upstream; therefore, the condition of the riparian segment downstream of the knick is likely a good predictor of the future condition of the riparian segment upstream. What hydrologic, geomorphic, or biologic differences exist between upstream and downstream segments? If the stream looks and functions the same above and below the knick, the risk is low and the functionality rating might be the same. Such a situation is typical along Rosgen-type “A” and “B” channels above and below steps (Figure 5). If the stream looks and functions differently, then the segments upstream of the knick are likely at risk of losing functionality.

Although knicks generally necessitate attention, do not assume that all knicks are inherently deleterious to riparian function. Careful analysis of landforms, channel morphology, and riparian vegetation conditions are required prior to making a final determination of the checklist item and assigning the final reach rating.

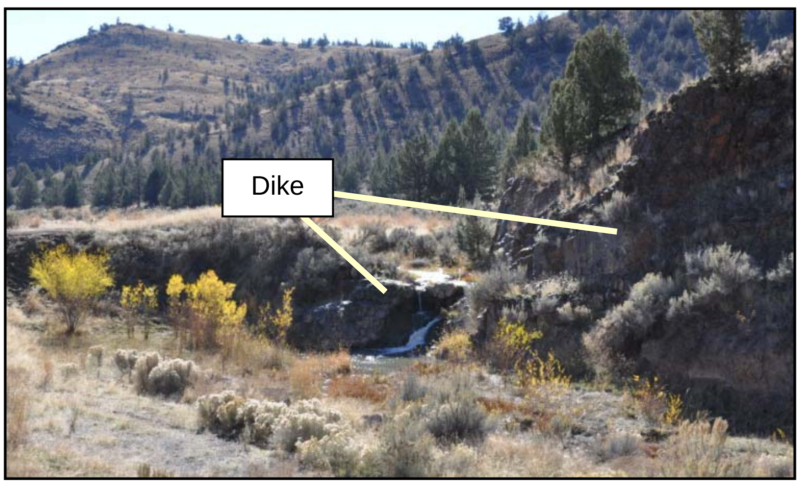

Figure 2. A basaltic dike traverses the channel and creates a 3 m scarp and a waterfall. The lithology is resistant to erosion and will likely persist for centuries. The vertical scarp is not a headcut, per se, as there is no visible evidence of headcutting. This is a stable vertical anomaly in the stream’s longitudinal profile; but it should not be interpreted as causing vertical instability of the channel or of compromising functionality of the reach immediately upstream. *Bear Creek, Crook County, Oregon.*

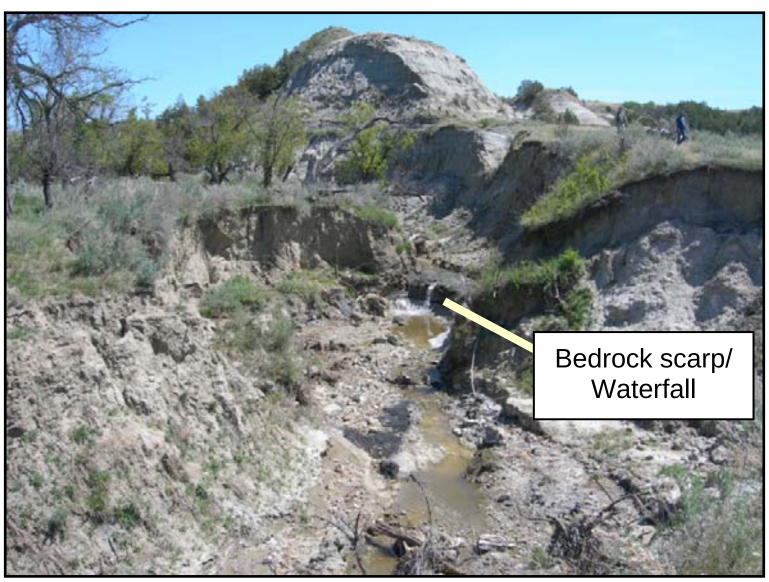

Figure 3. This knick is complex and distributed across bedrock (shown at small waterfall in center of photograph) and alluvium (out of view and several hundred meters upstream of waterfall). Groundwater seepage can contribute to headcutting by increasing the hydrostatic pressure, decreasing cohesiveness of alluvial deposits, and eroding particles from the headwall to create cantilevered banks that erode by bank collapse. *Whitetail Creek, Little Missouri National Grassland, North Dakota.*

Figure 4. Groundwater seepage increases hydrostatic pore pressure and decreases soil strength. Seepage can facilitate bank erosion, undercut headcuts, and produce cantilevered banks, which fail by roof collapse. This seep is discharging through unconsolidated sand and is retreating several feet per year. Lack of stabilizing vegetation and high incidence of cattle trampling prevents banks from stabilizing with riparian vegetation. *Unnamed spring, Pfingsten-Olson Allotment, Sheyenne National Grassland, North Dakota.*

Figure 5. Rosgen-type “B2” channel shows step-pool morphology in a boulder-lined channel. The steps are part of a repeating pattern and illustrate a stable knick in the longitudinal profile of this channel type. Therefore, these steps are not headcuts. They are not especially mobile and are not prone to rapid headcutting. Presence of cascades and step-pool morphology in “A” and “B” channels is the norm. When the stream channel is vertically stable, the answer to item 16 would be “yes.” *Davis Creek, Oregon.*

References

Gonzalez, M.A., 2001. Recent formation of arroyos in the Little Missouri Badlands of southwestern North Dakota, Geomorphology 38:63-84.

Rosgen, D., 1996. Applied River Morphology, Wildland Hydrology, Pagosa Springs, Colorado.

Schumm, S.A., 2005. River Variability and Complexity. Cambridge University Press, Cambridge, England, 220 p.

Sposito, G., 1989. The Chemistry of Soils, Oxford University Press, New York, 277 p.

Riparian Function Workshops – San Antonio River Basin, Texas

You know how one thing leads to another…working with the Nueces River Authority in Texas led to connecting with Myfe Moore who lives in the San Antonio River Basin. As a result, Myfe requested assistance from the Texas Riparian Team and National Riparian Service Team to conduct three one-day riparian awareness workshops in her area. The workshops, held September 25-27, were sponsored by the San Geronimo Nature Center, Helotes Creek Nature Center, and San Antonio River Road Neighborhood Association. Steve Nelle (Natural Resources Conservation Service (NRCS), Wildlife Biologist), Wayne Elmore (Full Stream Consulting, Riparian Specialist), and Janice Staats (National Riparian Service Team, Hydrologist) provided instruction. Each day, a set of presentations were given indoors followed by field site visits to different areas based on permission from landowners who had healthy riparian areas and allowed the field portion of the workshop to be conducted their property, something we all appreciated.

Fifty-nine people attended the workshops including private landowners, engineering consultants, and individuals from NRCS, National Park Service, U.S. Army, Texas Parks and Wildlife, San Antonio River Authority, Greater Edwards Aquifer Alliance, Trinity University, MacArthur High School, The Montessori School of San Antonio, Salado Creek Foundation, Texas Master Naturalists, Texas Land Heritage Program, Saturday Rafters (recreation group), and Olmos Park.

From this experience, there are lessons for us all to think about as we implement the Creeks and Communities Strategy (see http://www.blm.gov/or/programs/nrst/creeks.php):

When we find key people/organizations in a community, like Myfe, to provide outreach and sponsorship for riparian workshops and activities, we are able to reach a large and diverse audience while keeping our workloads more manageable.

There is a need for a one-day riparian awareness training handout that has riparian function information commensurate with what is presented. Technical Reference 1737-15 is not always the appropriate handout for all audiences.

Because demand is high and increasing, the Texas Riparian Team, primarily NRCS employees, is partnering with Texas Parks and Wildlife so that State Biologists can help with state-wide riparian awareness training. If demand for services is high, bring State agencies into the Network.

Teachers and professors are interested in sharing riparian information with their students, and need assistance from resource professionals. Share "*Holding onto the Green Zone*" materials with your local educators and offer to be visiting instructors in their classroom and at a local field site if possible. http://www.blm.gov/wo/st/en/res/Education_in_BLM/riparian_module.html

Full Stream Ahead

Is there something you would like to see in a future issue of *Full Stream Ahead*? If so, send an email to **nrst@blm.gov**. The NRST utilizes this newsletter to share highlights, news and hot topics that pertain to the Creeks and Communities Strategy. This newsletter is for the entire network and we encourage you to send in ideas, questions and articles for us to publicize.

THE CONSENSUS INSTITUTE

'Thriving in Times of Scarcity' module

February 22 – 24, 2011 ♦ Phoenix, Arizona

Thriving in Times of Scarcity is a three-day workshop where participants will learn skills and processes needed to manage behaviors and conflicts that result from moving from an environment of plenty to one of scarcity.

Participants will engage in group activities to address: What is the evidence of scarcity in your internal/ external environment? What is the evidence that there is plenty? What are the worst possible outcomes of not addressing, confronting, or adapting the issue of scarcity? What are the beliefs and behaviors that you observe in times of plenty? What is your view of the financial situation you are confronted by in your environment? What conditions are needed to move ahead? What is the richness each group brings to the situation? How can we make the best happen?

This module will also include an overview of the basic process of seeking consensus among groups, and a review of the common generators of conflicts within our environment.

WHEN
February 22 - 24, 2011 (Tuesday - Thursday)
8am-5pm each day

WHERE
Sheraton Crescent Hotel
2620 West Dunlap Avenue
Phoenix, Arizona 85021
602.371.2802
www.sheratoncrescent.com

MEETING
Phoenix-A conference room
(floor plan on hotel website under 'meetings & events)

LODGING
A block of sleeping rooms are on hold at the Sheraton Crescent Hotel for $126.00/night plus tax

The cut-off date for the guaranteed within government per diem rate
is February 1, 2011

Call central reservations at 1.800.325.3535

When you make your reservation mention you are with the group
for the 'Consensus Institute rate'

REGISTRATION
To register for this course call or email (include your contact information).
You will receive a confirmation notice

Contact:
Diane Nelson
BLM - National Training Center
602.906.554
dcnelson@blm.gov

"Healthy Streams Through Bringing People Together"

Recent Website Posts

Creeks and Communities Biennial Network Meeting Report and Executive Summary

Since 1998, Network meetings have been an integral part of implementing the Creeks and Communities Strategy. The biennial meetings are both developmental and working meetings designed to increase and enhance the ability of the Network to be effective in management and implementation of the initiative while meeting participating agencies goals. The 2010 meeting theme was "***Creeks and Communities: Staying Relevant to Agencies & Communities"*** and the agenda included presentations coupling theory and principle with on-the-ground practices and examples. A full meeting report and executive summary can be found at the following website http://www.blm.gov/or/programs/nrst/biennial.php. The report serves as a repository of the information presented at the meeting and provides a reference for people seeking additional details in their area of interest. The report consists of a synopsis of each of the PowerPoint presentations, case studies, panels and general discussions, and showcases the cooperative work being done by Network members and their partners in riparian restoration and management in the Western United States and Canadian provinces.

FY2010 Creeks and Communities Network Accomplishment Report

The Creeks and Communities Network Accomplishment Report is a compilation of the activities of the National Riparian Service Team, Agency Coordinators, and State Riparian Teams in the areas of place-based assistance, training, special projects, outreach, education, and program management. The FY2010 report can be found at http://www.blm.gov/or/programs/nrst/accomp.php.

COOPERATIVE
riparian
RESTORATION

The National Riparian Service Team can be contacted at:

NRST
3050 NE 3rd Street
Prineville, Oregon 97754
(541) 416-6700
Email: nrst@blm.gov
http://www.blm.gov/or/programs/nrst/