Thank you so much for registering and/or participating in the webinar "Low-Tech Wet Meadow Restoration: Reading the Landscape" on July 22, 2020. Please find the recording of this presentation here. Here is a PDF of the presentation. Feel free to forward onto any colleagues that may be interested in this information.

This webinar is approved for continuing education units by the Society for Range Management. If you are interested in this please download the CEU form here. Contact hannah.nikonow@iwjv.org for confirmation of attendance and signature.

Two of the publications/resources on the restoration methods discussed in the webinar were:
NRCS Technical Note: https://tinyurl.com/y9b6keaa
Quivira Coalition: https://quiviracoalition.org/techguides/

With 402 participants on this webinar there were so many fantastic questions. Here below are the questions that were answered in the last 30 minutes of the webinar as well as those we didn't have time for. Shawn Conner took the time to answer those remaining questions for you. If we missed your question or you would like more detail, please contact Shawn <shawnc@bio-geo.com>, Jeremy <jeremy.maestas@usda.gov>, or Mandi <mandi.hirsch@iwjv.org>.

Best wishes in your meadow restoration endeavors!

Questions from webinar that speakers answered:

- What is the best way to monitor the water table in these wet meadows?
- How many of these techniques require permits or cultural resources surveys?
- If there was a stage 0, wouldn't that be apparent in the soils, and observable, in a degraded system?
- As the presenters note, these deteriorated areas are very widespread. As more knowledge is gained and the techniques are spread, there's still the challenge of funding and implementing the work on the scale needed. Any thoughts on how to scale this up?
- What typically causes a headcut to start; grazing or are there numerous causes? Are there any suggestions for prevention of headcuts? Please discuss any follow up and/or maintenance needs that might be needed for the structures discussed.
- Can Jeremy touch on the NRCS' ecological site descriptions and updating "loamy bottom" to "wet meadow" descriptions, where appropriate, to help get people to recognize where certain areas might be able to restored to riparian/ wetland habitats.
- Do you recommend using materials for restoration that exist within the site? For example I have seen where large and medium rock structures erode around over 10-20 years due to fine sediments and in areas where these large hardened structures and rocks don't exist.
- What about using BDA's or PALS instead of rock or is the use of rock more important for long-term function?

- Are there circumstances where you would recommend a wait and see approach such as where small headcuts are present but recent changes in grazing management are leading to improved ecological conditions. If so, how would you approach this in terms of timeframes and monitoring techniques?
- Could you share examples or experience of application in challenging areas like greasewood flats? In some cases, where greasewood conversion has happened from a wetter system, this has led to soil salinization so recolonization by plants might be challenging.
- What can you share with us about long-term success. As we develop a plan we will need to communicate with regulatory folks about long-term O&M as well as lifecycles as well as budget for O&M.

Questions from webinar that speakers did not have time to answer and provided written responses:

- Can you please talk a bit about the aquatic species of these systems and how this work impacts them? Many of the drainages we work in are ephemeral and intermittent streams without a lot of aquatic life. Where you have perennial water, some consultation with aquatic specialists in your area might be a good idea.

- At what point is the perennial flow too high? or are you targeting more intermittent streams? Low tech structures can be used in perennial systems as well, especially BDA's and PALS and other woody structures. The type of handbuilt rock work we discussed in this webinar is primarily for ephemeral/intermittent systems but can also be used in small perennial streams maybe with flow under a foot deep.

- When closing roads that are starting to act as gullies, what is a good first step to stop the water? We have been ripping the roads and putting down slash on them or building water bars in the past, is this a good start? Great start. Maybe think about the location of waterbars to drain water into areas with increased potential to grow good stuff and not into erosive locations. Also plugs in the channel and rerouting water onto adjacent surfaces is another thing to think about.

- How much of an issue has water rights been in the restoration projects shown in this presentation? Depends on the location and how folks up and downstream feel or perceive the treatments. Typically in intermittent and ephemeral channels, the concern has been low. We feel like it is always a good idea to discuss and educate downstream users about treatment efforts and objectives. These treatments actually store water in the soil for longer which can lead to improved baseflows and provide water longer into the growing season.

- To what extent to you see invasive/noxious weeds (e.g., Canada thistle, others) proliferating as a result of structure placement, creating new issues. Has this been a

problem? We have seen Canada thistle actually get too wet and die out! Sometimes pretreatment of a site might be warranted depending on the infestation. We have been very aware of our efforts and noxious weeds. We pay attention to the rock source and delivery and take standard precautions designed to limit the importation of weed seeds, and staging areas are cleaned up and reseeded and monitored. Just some things to think about regarding weeds.

- Some landowners we work with state that their cows help to keep the channelization down from stomping and being present in the wetland - in other words spreading out the water versus channelized concentrated flow - is there any truth to that? Some truth to this. However, there might be other detrimental effects from stomping out a channel in an area (eg shortcutting a meander pattern for example) or severe hummocking.

- Are there wildlife positive aspects to headcuts ie: insect "apartment holes" or wildlife that burrows sideways in headcuts. Are these headcuts necessary for insect/wildlife to some degree? How do we be mindful of this? It is always good to be mindful of other potential unintended impacts from restoration treatments. However, there are no shortage of cut banks, headcuts, and other bare soil areas on rangelands so this is unlikely to be a limiting factor for rodents, insects, etc. On the flip side, wet meadows are very rare (<1% of the west) yet 80% of wildlife use them during their life cycle so the benefits of treating a headcut often outweigh any potential downside.

- When you look at these mesic areas do you address any issues with the health of the uplands? Always good to pay attention to what is going on in the upland as well. Water flows down hill, and thus noting upland aspects will also help you better read what the whole landscape is telling you. Maintaining healthy plants, with vigorous roots, is crucial to proper hydrologic function. Healthy roots help the water infiltrate and move slowly through the watershed versus running off fast and creating concentrated flow paths in the uplands.

- With regards to headcuts, is there a specific thing to look for in a landscape before the traditional headcut structure begins - so that we might prevent the typical waterfall/channelization before it starts? I'm picturing a deep pothole or a cattle wallow in a wet meadow. Great observation and yes. Some of those deep potholes or wallows in wet meadows over time can become connected and form an actual gully. Like connecting the dots on the landscape. Monitoring over time if those areas are actively degrading and expanding might help you head off the problem before a full channel is formed.

- If you create T & E habitat that becomes occupied, will you be given any regulatory relief? I would encourage you to contact your local US Fish & Wildlife Service partner to explore this. There are regulatory tools designed to protect landowners who voluntarily

encourage T&E species on their lands. NRCS' Working Lands for Wildlife has many great examples of this.

- Can you talk a bit more about how to select install locations when working in large reaches of the system. I found I always need an aerial view to really help me select just where to place the structures. What else can I do to help me select those install locations? Aerial photos are fantastic resources! Bill would say you need to walk up and down the reach many times with an open mind. Some things to look for are these: Are there opportunities to spread water out on the floodplain as sheet flow? Are there obvious headcut locations that need to be preserved to maintain areas above them? Are there locations where one or a few structures can give you a large area of impact (ie what sites give you the biggest bang for your buck) Just some ideas to consider.

- In addition to rock, do you also strategically add plantings? What kind of treatments are suggested for "putting water back" away from trails/road where a gulley has already formed? Adding plantings can be a great idea to speed up plant recruitment and be beneficial. What specific structure types that are used to "put the water back" really depends on the site, the gully size and substrate, where you are putting the water back too etc. Some of the readings might be helpful to determine specific treatment types.

- What about cellular confinement geotextial systems? Sorry, I don't have an answer to this.

- Is there a good list/clearinghouse for grant opportunities for this kind of work? Not a really a single clearinghouse but here are a few sources that fund this kind of work:
    - NRCS Farm Bill - NRCS conducts this work under Conservation Practice 643
    - NFWF Rocky Mountain Rangelands Program
    - USFWS Partners Program

- Will there be future webinars on methods of restoration? We are always offering training opportunities on this type of work. I'd encourage you to follow www.PartnersInTheSage.com and www.SageGrouseInitiative.com and join their newsletters to find out about more webinars like this. One upcoming opportunity is listed below:
    - Low-Tech Process-Based Restoration of Riverscapes - Virtual Workshop (FREE) - Aug. 11-14, 2020. This 4-day workshop will cover low-tech methods for restoration including Beaver Dam Analogues (BDAs) and Post-Assisted Log Structures (PALS).