Rio Penasco Wetland Restoration Project
Design and Report

Rio Penasco wetland shortly after drainage

One of the drainage ditches dug in 2010

Thomas R. Biebighauser
Wetland Restoration and Training LLC
May 2, 2016

Contents

Introduction 3
Background 3
Purpose and Need 5
Wetland Restoration Design 6
Probability of Success 16
Proposed Action 20
Cattail & Reed Canary Grass 22
Mosquitoes 22
Heavy Equipment Requirements 23
Buried Utilities 24
Project Implementation 24
Budget 24
Public Involvement 25
About the author 26
Summary 26
Recommendations 26

Introduction

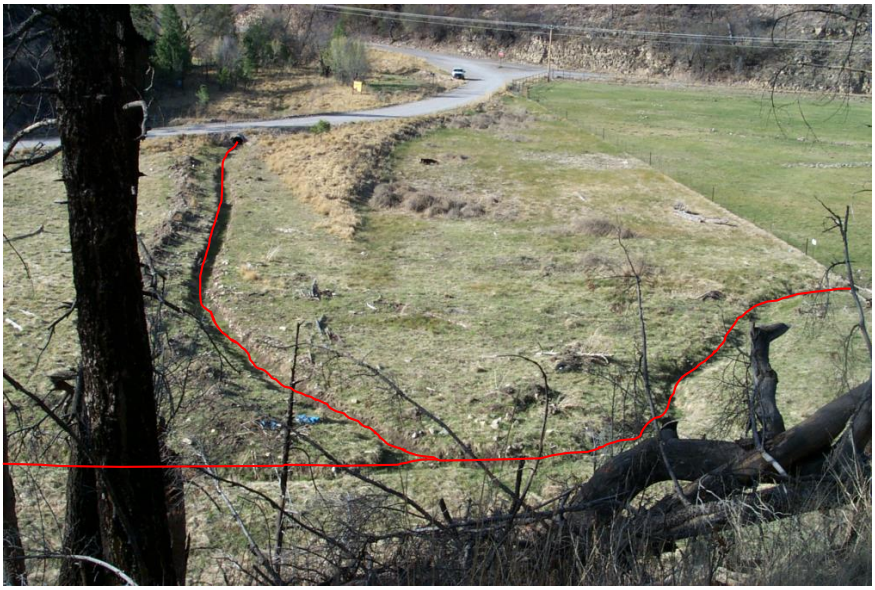
The Rio Penasco Wetland Restoration Project would restore damaged wetlands on National Forest System Land along Rio Penasco Creek. Actions would be taken to restore wet-meadow and ephemeral wetlands by filling ditches, removing soil, and by returning natural contours to the site. The management actions would restore populations of animals and plants that were present before drainage. The restored wetlands would appear attractive, and function as natural wetlands, requiring little, if any maintenance.

Background

The Rio Penasco Wetland is located on National Forest System Lands in Otero County, New Mexico. The wetland is part of the Sacramento Ranger District on the Lincoln National Forest. The area is located along the Prestridge Hill Road, between the intersections of the Upper Rio Penasco Road and the Rio Penasco Road (State Highway 130). Rio Penasco Creek forms the southern border of the wetland. The GPS coordinates of the approximate center of the Rio Penasco Wetland are: 13S 443946.64 3635440.66.

The following past human activities have affected the Rio Penasco Wetland:

1) Rio Penasco Creek once flowed thru the wetland in a braided, sheet-like pattern, saturating the soils in the wetland. A deep and straight channel was dug for the stream along the southern base of the hill. This was most likely done to dry the wetland so it could be farmed and grazed. One can see some of the remnant braided channels of Rio Penasco Creek by walking over the western portion of the wetland, and by examining old aerial photos of the wetland. Rio Penasco Creek is now acting like a ditch to collect, concentrate, and remove runoff and water from springs from the wetland. Erosional head-cuts advancing up Rio Penasco Creek are further drying the wetland by lowering the elevation of the water table.
2) Cox Canyon, which supplies water to the Rio Penasco Wetland, has been channeled and moved along much of its length, both upstream and downstream of the Rio Penasco Wetland. This channeling has caused head-cuts to form. The head-cuts located upstream from the wetland are causing erosion, and this soil and gravel is being carried downstream, and being deposited in the Rio Penasco Wetland. Head-cuts located downstream from the wetland are causing a deepening and widening of the stream channel, and this is lowering the elevation of groundwater in the Rio Penasco Wetland.



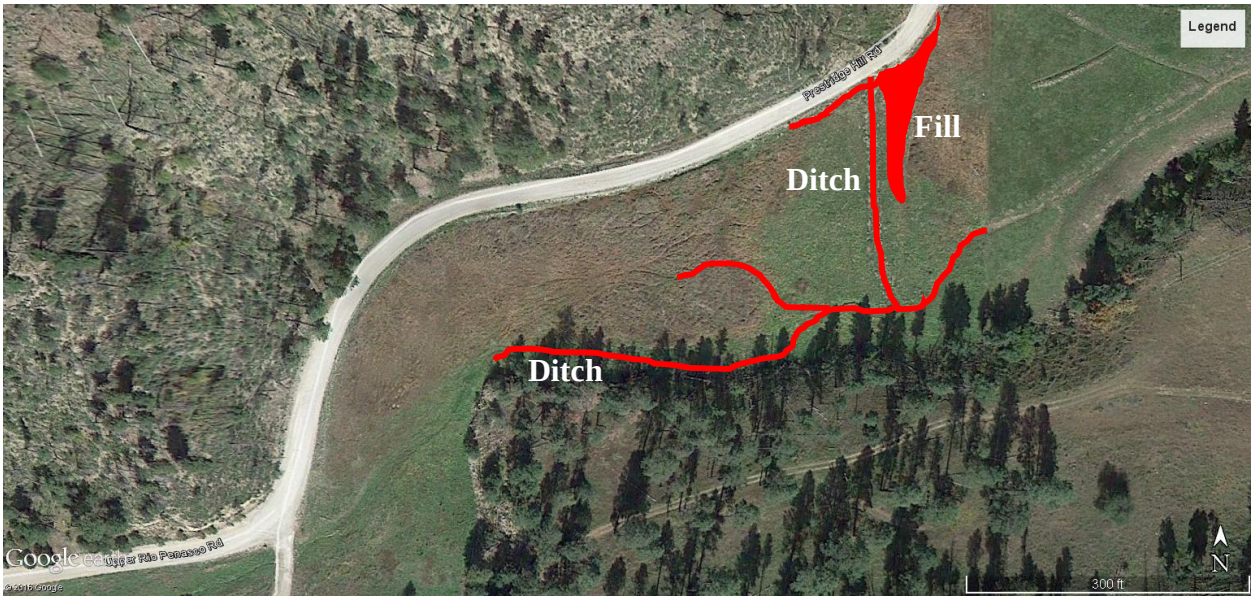
The deep ditches, shown by the red lines, carry water directly from Cox Canyon, drying the Rio Penasco Wetland

3) Fill has been placed in the Rio Penasco Wetland. The construction of the Prestridge Hill Road filled part of the Rio Penasco Wetland. The ditches dug along the edges of the Prestridge Hill Road divert water from the wetland. A ridge of soil placed along the ditch dug by the culvert for Cox Canyon diverts water that would normally enter the wetland. The piles of soil placed in the wetland are visible on the ground, and on aerial photos of the site. It is believed the fill is too permeable to use in filling the ditches. However, test holes would be dug in the fill to determine soil texture. The fill may be used to help fill the ditches if it contains enough clay.
4) The ditches that were dug in the Rio Penasco Wetland during 2010 are affecting the wetland by removing surface water runoff, water from springs, lowering the elevation of groundwater, causing erosion, and advancing head-cuts that are further lowering the elevation of groundwater in the wetland. The rubber-tired heavy equipment used to dig the ditches have compacted soils in the wetland. The drying of the wetland has appeared to reduce the presence and abundance of native wetland plants in the wetland.
5) Livestock use has affected the wetland by compacting soils, leveling tufts and mounds, and by filling shallow depressions. The compacted soils are less likely to absorb rainfall, and support a lower diversity of plants. Mammals that survive by digging burrows in the ground are less likely to do this in the compacted soils.

The author examined the Rio Penasco Wetland on the following dates:

1) August 25, 2010
2) September 14, 2011
3) March 16, 2013

The ditches were carrying water when visited on August 25, 2010. Water was seeping into the ditches from the sides of the ditches, showing that the ditches were removing water from springs, and from the ground. The sides of the ditches were eroding. An abundance of wetland plants, including sedges, rushes, and cattails were growing in the drained wetland at the time of the first visit.



This aerial photo shows the approximate location of ditches and soil fill placed in the Rio Penasco Wetland

Purpose and Need

The Rio Penasco Wetland Restoration Project would reverse damages caused by the digging of ditches and placement of fill in the wetland. The project would restore key features of the wetland, including flow from springs, the elevation of groundwater, presence of shallow depressions, hydric soils, non-compacted soils, tufts, mounds, and native plants that were present before drainage took place.

The restored Rio Penasco Wetland would return a diversity of native hydric (wetland) plants that were present prior to drainage. Areas of various soil saturation levels and inundation would be restored to provide conditions suitable for the colonization of a diversity of hydrophytic (wetland) plants.

The restored Rio Penasco Wetland would provide habitat to a diversity of animals. Habitat would be restored to support amphibians, reptiles, mammals, birds, and invertebrates once present in the wetland. The project would specifically restore habitat for the New Mexico Jumping Mouse, a federally threatened species, and the Long Tail Vole, a Forest Service Sensitive Species. The restored wetlands are also likely to provide habitat for the Northern leopard frog.

Restoring the Rio Penasco Wetland would control erosion, clean runoff, and return hydric soils. The erosion caused by head-cuts in the ditches would be stopped. Runoff entering the wetland would be cleaned of nutrients carried by soil erosion that is taking place upstream. The flow of water from springs and the elevation of groundwater would be repaired to return hydric soils and plants over the wetland.

Restoring the Rio Penasco Wetland would respond to direction from the U.S. Army Corps of Engineers to repair the damage caused by the digging of ditches and placement of fill in 2010.

Wetlands are considered to be the most biologically diverse of all ecosystems. Forty-three percent of all species listed as threatened or endangered in the United States by the U.S. Fish and Wildlife Service depend on wetlands for their survival. Experts report that less than one-half of the wetlands in the contiguous 48 United States remain. Over 36-percent of the wetlands in New Mexico were lost to drainage from the 1780s to 1980s.[1]

Wetland Restoration Design

A variety of techniques would be used to restore the Rio Penasco Wetland. The techniques have been developed by the author working to restore over 1,800 wetlands in 23-States, Canada, New Zealand, and Taiwan. The author has published 4-books describing the techniques to be used, and instructs an average of 1,000 people a year who work as engineers, biologists, botanists, landscape architects, and landowners, how to use these practices.

The Rio Penasco Wetland Restoration Project should be viewed as a *wetland restoration project, not a stream restoration project*. The main goal is to restore the wetlands, not to make the artificially dug ditches look like streams with defined beds and banks.

It is very possible that prior to digging the ditches at Rio Penasco, there was not a single ditch or stream with bed and banks in the valley. Rather, the floodplain was a mosaic of wet-meadow, ephemeral, emergent, shrub, and forested wetlands that were hydrologically connected.

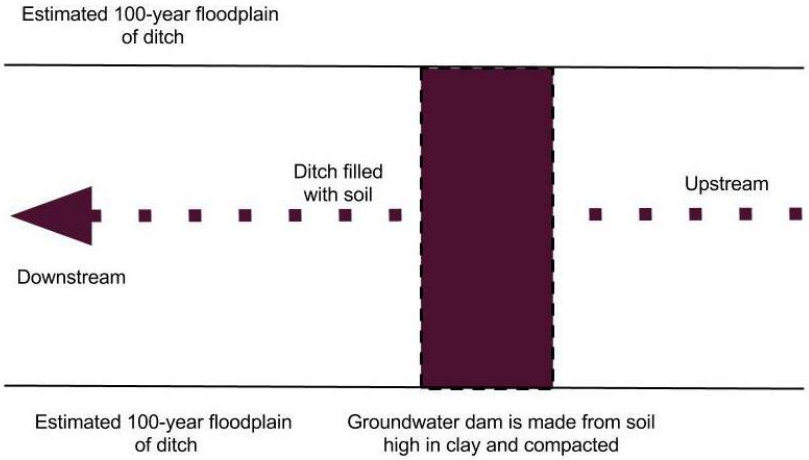
The ditches at Rio Penasco contain water because they are removing it from springs, the surface, and the ground. The soils in the wetland are no longer saturated because the ditches have done their job- removing water from the ground. This project would stop the bleeding by filling ditches and restoring natural contours on the site

Here are the main techniques that would be used to restore the Rio Penasco Wetland:

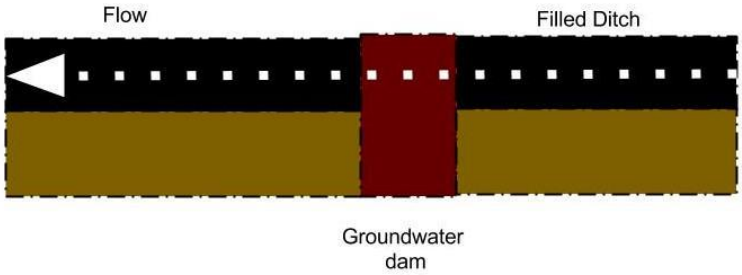
1) Groundwater Dams: Groundwater dams would be placed at strategic locations to restore the elevation of groundwater in the wetland. A groundwater dam is a narrow band of compacted clay soil, formed underground to interrupt permeable layers of soil and

[1] Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C. 21pp.

drainage structures. Groundwater dams would be placed on National Forest System lands, opposite the entrances of ditches dug on private land along the downslope border of the Rio Penasco Wetland. The construction of the groundwater dams would not make the adjoining private land any wetter.



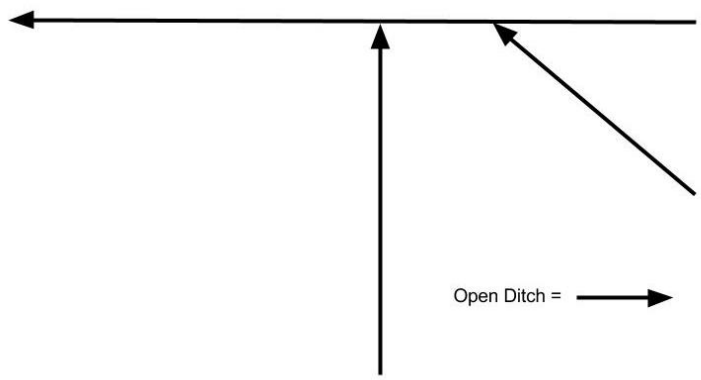
Groundwater dam used to slow the flow of water in a filled ditch-typical plan view



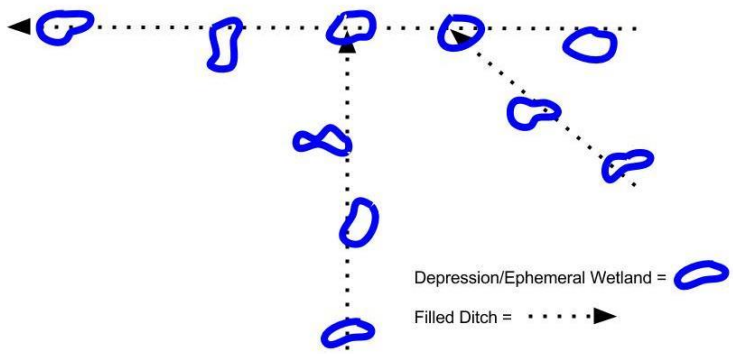
Groundwater dam used to slow the flow of water in a filled ditch-typical profile view

2) Ditch Filling: Ditches would be filled with soil of similar soil texture and compaction rates as what is generally present on either side of the ditch. Some of the soil used to fill the ditches would be obtained from the piles of soil present along the edge of the ditch. However, additional soil would be needed because the ditches and piles of soil must be cleaned of plants and roots before they are used. Water would continue to flow in the filled ditches if the soil used to fill the ditches were mixed with plants and organic material.

   Great care would be used when filling ditches near springs to make sure the flow from the spring is maintained. While ditches near springs would be filled, the soils near where the spring emerges would be loosened and shaped to maintain flow.

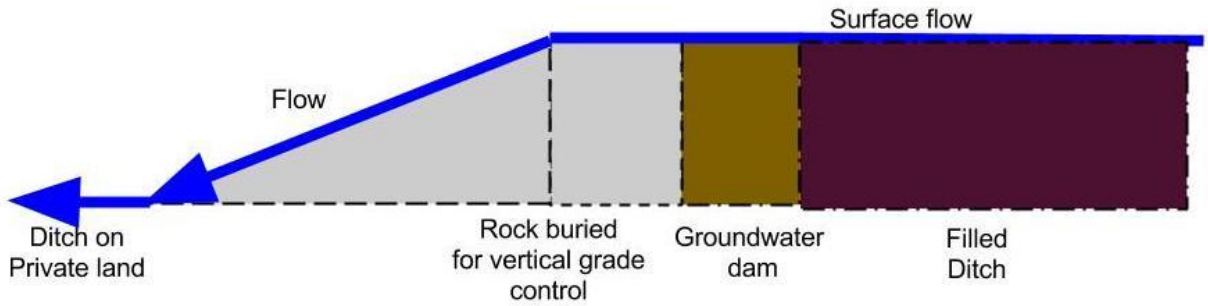


Open ditches-typical plan view

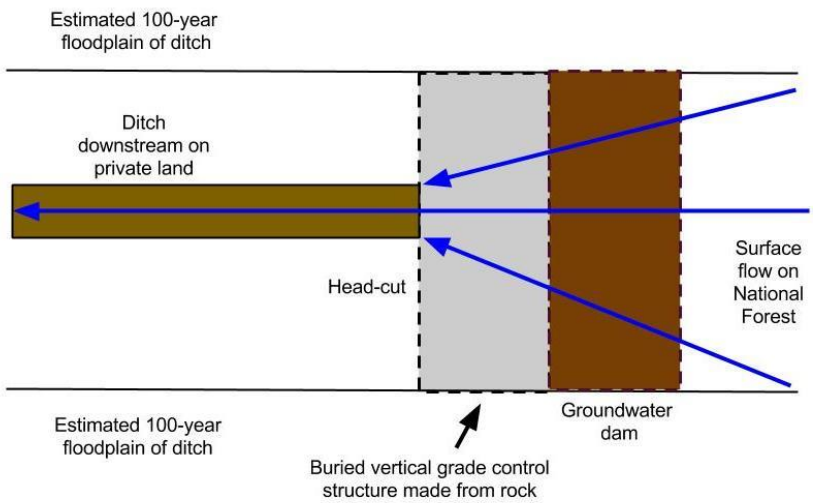


Filled ditches-typical plan view

3) Vertical Grade Control: Vertical grade control structures would be used to control head-cuts that are affecting or threatening the wetlands. These structures, made from rock, would be buried underground, and across the 100-year floodplain where water leaves the wetland. These structures would protect the wetland from being destroyed by head-cuts located downstream from the wetland. Vertical grade control structures would also be placed at the outlet of culverts carrying water into the wetland. This would be done to prevent head-cuts from advancing upstream when the culvert is replaced someday.



Constructed spillway used to transition water from National Forest System land onto private land (typical profile view)



Constructed spillway used to transition water from National Forest System land onto private land (typical plan view)

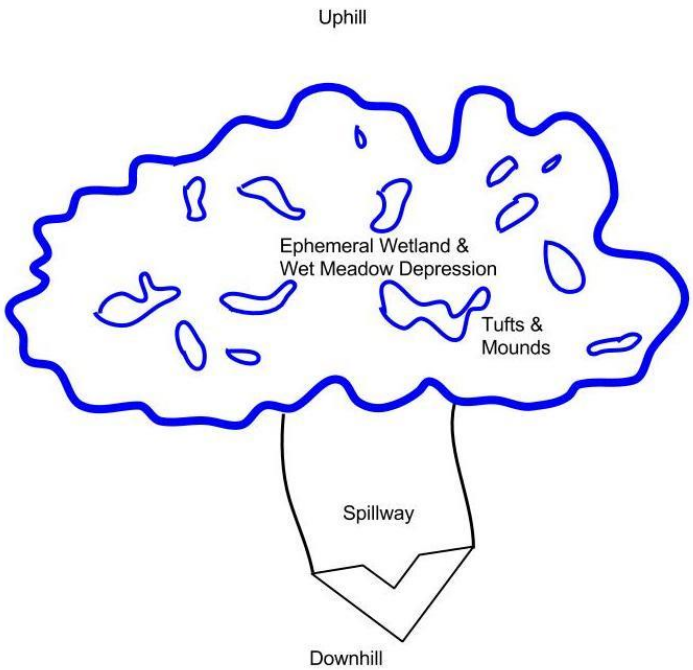
4) Spillway: Naturally appearing and functioning spillways would be used to transition water from National Forest System land onto neighboring private land. The spillways would be designed to prevent the flooding and erosion, both on National Forest System lands and on private lands. The spillways would be designed and built to form wet-meadow wetlands.

5) Fill removal: Soil placed within the Rio Penasco Wetland would be removed. The main area where soil would be removed is along the Prestridge Road, however, more areas may be identified during implementation and this soil would also be removed. The soil appears to have been placed in the wetland to serve as a levee, preventing water from Cox Canyon from spreading into the wetland.

The mound of soil (red perimeter), placed in the wetland as a diversion levee, would be removed as part of the Rio Penasco Wetland Restoration Project. The bank along the road would be shaped to have a safe-slope.

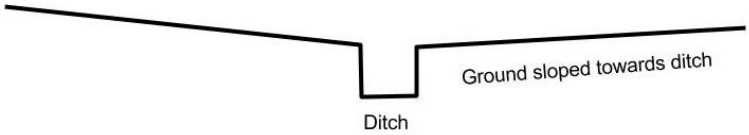
6) Shallow depressions: Small areas where soil is removed to fill ditches would be shaped into naturally appearing and functioning ephemeral wetlands. These shallow depressions would inject water into the ground, maintaining the elevation of groundwater, and supporting surrounding wet-meadow wetlands. These seasonal wetlands, called ephemeral wetlands, or vernal ponds, and are some of the rarest habitats in New Mexico. The shallow depressions would become wet-meadow wetlands when they dry. The ephemeral wetlands can be expected to support breeding populations of frogs, toads, salamanders, dragonflies, damselflies, fairy shrimp, tadpole shrimp, and other invertebrates.

   The ephemeral wetlands would be built so that would dry in late summer and fall season. This way they would not support bullfrogs or fish. The wetlands can be expected to contain water for varying lengths of time, so that in wet or dry years, some would provide conditions suitable for successful breeding of amphibians and invertebrates.

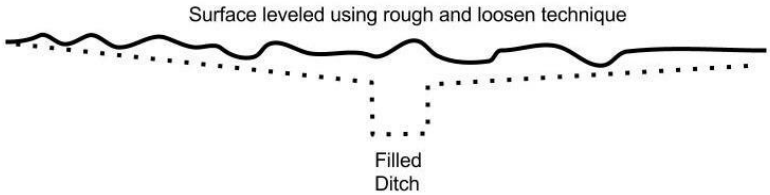


Ephemeral wetland & wet-meadow wetland made from depression where soil was removed to fill ditches (Typical plan view)

7) Sheet flow: The surface of the wetlands would be contoured to restore natural, sheet-pattern-flows of runoff over the wetland. The slopes formed to direct water into the dug ditches would be leveled, and prepared for planting using the rough and loosen technique.



Open ditch with ground surfaces sloped towards ditch-typical profile view



Filled ditch with surface leveled to provide a sheet flow of water-typical profile view

8) Soil loosening: Compacted soils would be loosened using the rough and loosen technique. The bucket of an excavator would be used to turn and loosen compacted soils to a depth of 24-36 inches. A series of naturally appearing shallow pits and mounds would be restored over the wetland area to support a diversity of plants. The loosened soils would not erode, and can be expected to provide habitat for burrowing mammals. It is important to remember that natural wetlands are not smooth, compacted, or sloped towards ditches like what is now present at Rio Penasco

Here the excavator uses the *rough and loosen* technique to loosen compacted soils on a wetland restoration project. The loosened soils are seeded and planted to native species, and mulched using wheat straw to control erosion.

9) Large woody debris: Large diameter logs, branches, and root masses would be placed in the restored wetlands to improve habitat for a diversity of plant and animal species. Branches of various diameters and lengths may be placed in the wetlands to provide egg attachment sites for amphibians, and improved habitat for invertebrates, and plants. Wood would be obtained and piled near the wetland restoration site in advance, so it can be placed by heavy equipment during restoration.

The log placed in this emergent wetland provides a loafing site for waterfowl.

10) Planting and seeding: Desirable native plants that may be disturbed by heavy equipment during restoration would be saved as part of construction, and later replanted in the restored wetlands. Large clumps of native plants and their roots would be removed and saved using the excavator. Topsoil would also be saved and spread over surfaces of restored wetlands. Native seeds in the topsoil are expected to geminate and grow when water returns to the wetland.

    Native species of wetland plants would be seeded and planted to restore a diversity of plants in the restored wetland. Seeds from native wetland plants growing in the Rio Penasco Wetland would be collected and sown by hand on areas of exposed soil. Other seeds and plants would be purchased. The species planted and seeded would favor flowering species used by pollinators, emphasizing the monarch butterfly. Nonnative plants would be removed and/or buried as part of the wetland restoration project.

    Exposed soils would be mulched using the straw from native plants if it's available, otherwise, wheat or oat straw would be used. Straw would be spread by hand on exposed soils in the restored wetland to control erosion, and to suppress nonnative plants. A straw blower would not be used because the rubber tires would cause unwanted compaction of the ground. Straw rarely contains weeds or nonnative plant species. Commercial hay would not be used. Hay is cut grass that often contains weeds and nonnative plants. However, hay that is cut from native species provides ideal mulch and would be used if it's available. Portions of the wetland that are restored would be seeded, planted, and mulched the same day they are completed.

The design prepared for the Rio Penasco Wetland Restoration Project shows the approximate locations of where the above described techniques would be used. The actual application and placement of each technique on the ground would be finalized during implementation of the project.

The Rio Penasco Wetland would be restored to support a diversity of plants, similar to this wet-meadow on the Sacramento Ranger District

This photo shows the Rio-Penasco Wetland on August 25, 2010. The photo was taken soon after the ditches were dug downhill from this site. The soils were still moist enough in the wetland to support a diversity of hydric plants

The elevation of groundwater in the Rio Penasco Wetland would be returned to levels present before drainage. The saturated soils can be expected to support a diversity of plants, like what is shown in this photo of the Rio Penasco Wetland on August 25, 2010.

Small and shallow ephemeral wetlands, surrounded by cattails, would be restored at Rio Penasco. This photo was taken on August 25, 2010, before the ditches completely drained the Rio Penasco Wetland.

Probability of Success

The restoration of the Rio Penasco Wetland can be expected to be successful. The author is available to be onsite guiding heavy equipment operators as they restore the wetland. The author has successfully restored similar wetlands across New Mexico, Arizona, California, and in arid regions of British Columbia. The techniques he has developed over 34-years of experience restoring wetlands are being used around the world.

These photos show some of the wet-meadow and ephemeral wetlands the author has restored in the Southwest, using the same techniques recommended for use at Rio Penasco:

These wet-meadow wetlands and ephemeral wetlands were restored in Bailey Canyon on the Sacramento Ranger District. The wetlands had been damaged by motor vehicles (Jack Williams photo)

The wet-meadow and small ephemeral wetland seen in this photo were restored at Ash Spring on the Coronado National Forest in Arizona (Abigail King photo)

This wet-meadow wetland was restored on the Coronado National Forest in Arizona at Ash Spring.

These wet-meadow, shrub-scrub, and ephemeral wetlands were restored at the Southwestern Research Station in Arizona.

The *rough and loosen* technique was used to establish this wet-meadow wetland from a waste pile of soil at the Southwestern Research Station near Portal, Arizona.

The emergent wetland (left) and wet-meadow wetland (right) were restored by disabling a ditch and a buried drain line at the Southwestern Research Station in Arizona. The wet-meadow is supplied with water from the emergent wetland. The site was a field dominated by nonnative plants before the project took place.

This wet-meadow wetland was restored at the Southwestern Research Station in Arizona. While the site does not contain a lush growth of plants, it does provide critical habitat for juvenile Chiricahua Leopard Frogs, a Federally Threatened species

This wet-meadow and emergent wetland were restored in arid Owyhee County, Idaho. The wetlands are less than one-year old in this photo.

Proposed Action

The Forest Service plans to restore the Rio Penasco Wetland. A naturally appearing and functioning mosaic of wet-meadow and ephemeral wetlands will be restored on the site. Actions will be taken to disable the system of ditches, diversions, filling, and sloping used to destroy the wetland. The flow from springs will be restored, compacted soils will be loosened, the elevation of surface and groundwater returned, and native plants established to restore habitat for a diversity of plants and animals.

The Rio Penasco Wetland will be restored using the techniques described in this plan and design prepared by Thomas R. Biebighauser, and would incorporate the techniques published in the following books he has written:

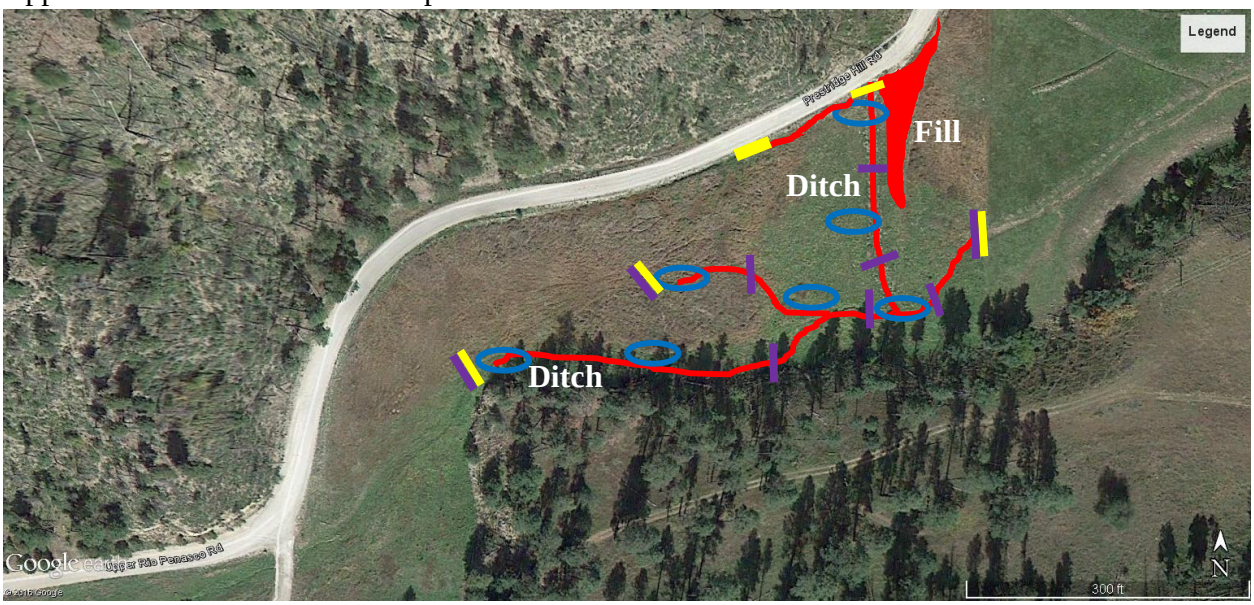
- *Wetland Drainage, Restoration, and Repair*[2]
- *Wetland Restoration and Construction – A Technical Guide.*[3]
- *Restoration of Forests, Grasslands, and Wetlands Damaged by Off-Highway Vehicles*[4]

[2] Biebighauser, Thomas R., 2007. Wetland Drainage, Restoration, and Repair, Lexington, KY, University Press of Kentucky, 241pp.
[3] Biebighauser, Thomas R., 2011. Wetland Restoration and Construction – A Technical Guide. The Wetland Trust, New York, 186pp.
[4] Eubanks, Ellen and Thomas Biebighauser. September 2014. *Restoration of Forests, Grasslands, and Wetlands Damaged by Off-Highway Vehicles.* 238 pages. USDA Forest Service. National Technology & Development Program, San Dimas, California. U.S. Government Printing Office: 2015-576-483/24032 Region No. 10.

Heavy equipment such as an excavator, dozer, and dump trucks will be used to fill ditches, contour soil, and remove soil as needed to restore the wetland. Heavy equipment would be cleaned prior to restoration to avoid introducing non-native plants. Nonnative plants growing on the project work area would be removed and/or buried as part of the project.

Springs will be identified and the flow from them restored into the wetlands. Slopes will be changed to return a sheet-pattern flow of water over the wetland. Compacted soils will be loosened so they absorb water, grow a diversity of plants, and provide burrowing habitat for mammals.

Approximate location of actions planned to restore the Rio Penasco Wetland.[5]



Fill and level ditches:
Ephemeral wetland depressions:
Buried Vertical Grade Control Structures:
Groundwater dams:
Soil fill to be removed:

Spillways and buried vertical grade control structures will be used to protect the wetlands from being destroyed in the future by erosional head-cuts, and to avoid flooding neighboring private lands.

The Rio Penasco Wetland will be restored *without* using these features that appear unnatural, and require maintenance:

1. No water control structures will be used.
2. No pipes will be used.
3. No pumps will be used.
4. No aerators will be used.

[5] Locations and quantities are approximate

5. No above ground dams will be built.

Desirable plants growing in the work area that may be damaged will be saved and replanted in the restored wetland. Topsoil will be saved and spread on the restored wetland where possible. This topsoil is expected to contain the seeds of native plants that will germinate and grow following restoration.

Thomas R. Biebighauser, or another wetland restoration expert, would be onsite directing heavy equipment operators in the restoration of the Rio Penasco Wetland. The project would be completed in partnership with the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service.

Restoration of the Rio Penasco Wetland will not damage trails, roads, culverts, or other improvements. The restoration of the wetland will not increase flooding of roads, trails, or neighboring properties.

Cattail & Reed Canary Grass

Actions would be taken to prevent nonnative cattails, reed canary grass, or other nonnative plants from dominating the restored wetland. These techniques to be used can be expected to prevent any one plant, native or nonnative, from taking over the restored wetland:

1. Populations of existing nonnative plants would be removed as part of construction.
2. Topsoil contaminated with nonnative plants would be removed.
3. Elevations within the wetland would be varied to include deep and shallow areas.
4. Ridges, mounds, tufts, scrapes, and pits would be restored across the wetland.
5. Exposed soils would be seeded and planted to a diversity of native plants and mulched.

The wetland would be monitored for possible colonization of nonnative plants following construction. Nonnative plants would be controlled to facilitate the establishment of an attractive diversity of native plants in the restored wetland.

Mosquitoes

The Rio Penasco Wetland Restoration Project can be expected to lower mosquito populations in the community. The dragonfly larvae, damselfly larvae, water boatman, water striders, frogs, toads, and salamanders living in the restored wetland can be expected to control mosquitoes in as little as one year. Swallows, bats, and adult dragonflies flying near the wetlands would consume adult mosquitos. The wetlands can be expected to become population “sinks” for mosquitoes.

Tiger salamander larvae, like the one shown here, can be expected to control mosquito larvae in the restored wetland

Heavy Equipment Requirements

Suitable size and types of heavy equipment with skilled operators are needed to restore the wetland. A Service Contract is recommended for hiring heavy equipment and operators for the work. Under a Service Contract, the machines and operators are hired by the hour to restore the wetland. The heavy equipment operators are directed by a wetland restoration expert who is onsite at all times while work is taking place. Under a Service Contract changes can be made to the wetland design without incurring long delays and additional costs.

The award of the Service Contract should be based on a combination of factors that include: ability to provide the required heavy equipment, performance operating heavy equipment, experience restoring wetlands, and price. The heavy equipment should be the size and type needed for restoring wetlands. Tom Biebighauser is available to help manage this project, which can include preparing a RFQ (Request for Quote) Service contract package.

Recommendations for heavy equipment are based on experiences restoring similar wetlands across North America. All pieces of heavy equipment should be onsite working at the same time. Each should be operated by an experienced individual who is interested in restoring wetlands for wildlife.

Excavator with operator
200 Series
CAT 320C or equivalent
Minimum 42-inch wide bucket (1.0yd^3) or larger
140HP Net or greater
46,000lbs or greater
Working thumb attachment

Dozer with operator
John Deere 550G or equivalent
80HP Net or greater
17,600lbs or greater

Dump Trucks with operators (2-needed)
Tandem or Triaxle Size

Buried Utilities

From a safety perspective, a check for buried utilities should be conducted prior to restoration of the Rio Penasco Wetland All buried utilities that are in the area must be marked so they can be avoided. The wetland cannot be built unless this critical step is completed. Heavy equipment work must not take place over buried electric, gas, phone, fiber optic, or water lines.

Project Implementation

Tom Biebighauser is available to assist with the implementation of the Rio Penasco Wetland Restoration Project. Tom would help train heavy equipment operators and agency personnel in the design and restoration of wetlands. Please contact him early to reserve dates for implementing the wetland project.

Budget

An estimated budget was prepared for implementing the Rio Penasco Wetland Restoration Project. The budget is based on the best information available at the time of preparing the design and plan for this project. The budget estimate is not based on actual quotes from contractors for supplies and heavy equipment use. The prices for these items can be expected to change after bids are received.

One main way reducing costs is to involve Tom Biebighauser in the implementation of this project. This would save a significant amount of money by eliminating the need to prepare a detailed land survey, engineering design, set of engineering plans, and construction contract for the project.

About the author

Tom Biebighauser is a Wildlife Biologist and Wetland Ecologist who has restored over 1,800 wetlands in 22-States, in Canada and New Zealand. He retired in 2013 after working 34-years for the U.S. Forest Service. Tom has designed and restored over 200-wetlands in arid regions of Arizona, British Columbia, California, Colorado, and New Mexico. He teaches practical, hands-on workshops where participants learn how to restore wetlands by becoming involved in the design and construction of naturally appearing and functioning wetlands. Tom has written 4-books about wetland restoration, and instructs college courses on the topic. He received the National Wetlands Award for Conservation and Restoration in 2015.

You are encouraged to visit http://picasaweb.google.com/tombiebighauser to see photos of the wetlands he has restored. Please visit www.wetlandrestorationandtraining.com for information about training offered in wetland restoration techniques.

Summary

The Rio Penasco Wetland may be successfully restored to reverse damage caused by ditching and filling. Effective techniques would be used to return the historic elevation of groundwater, flow from springs, hydric soils, diversity of native plants and animals to the wetland. Restoring the wetland would control erosion, recharge groundwater, improve habitat for animals, increase wildlife viewing opportunities, and add to the beauty of the community. The wetland may be restored at a reasonable price, and would require little, if any maintenance.

Recommendations

1. Obtain the approvals needed to complete the Rio Penasco Wetland Restoration Project.
2. Request funding to implement the project.
3. Schedule with Tom Biebighauser to direct the restoration of the wetland, and to provide training.
4. Order supplies in advance of construction.
5. Describe the project to the public, and to Forest Service personnel.
6. Ask Tom Biebighauser if you have any questions.

This design and plan was prepared by:

Thomas R. Biebighauser
Wildlife Biologist and Wetland Ecologist
Wetland Restoration and Training LLC
3415 Sugar Loaf Mountain Road
Morehead, KY 40351 USA

Phone: (606) 784-6175
Cell: (606)356-4569
www.wetlandrestorationandtraining.com
tombiebighauser@gmail.com