

APPENDIX B

Bureau of Reclamation
Espanola Dike Project

FINAL MITIGATION & MONITORING PLAN

1. SUMMARY:

The work described in this plan is the Espanola Dike Project – Miscellaneous Work, Middle Rio Grande, New Mexico. After 1970, Reclamation re-constructed a dike (repaired breaches) on the west side of the Rio Grande. The dike is located approximately 8 miles north of Espanola, between El Guique Diversion Dam (River Mile 277.5) and San Juan Diversion Dam (River Mile 275.3), approximately 2.2 miles. U.S. Geological Survey (USGS) quad name (township/range/ section(s)) is as follows: Township 22, Range 08E, Sections 26 and 35. The dike was originally built through the River Maintenance Program after 1940 for flood protection upstream of San Juan Pueblo and designed to pass 5,000 cfs (with a 3 foot freeboard), or a 5 year event in the Rio Grande. Placement of the dike has restricted flows in the arroyos west of the Rio Grande from directly entering into the Rio Grande. These arroyos include Estaca Arroyo, Lopez Arroyo, and Borrego Arroyo. The U.S. Bureau of Reclamation (Reclamation) has authority for maintenance of the Rio Grande river channel between Velarde, New Mexico, and Caballo Reservoir under the Flood Control Acts of 1948 and 1950. The existing dike is approximately 10 feet high with a 2:1 slope and top width varying from 15-30 feet. After the dike was constructed, water has ponded west of the dike on the adjacent properties from storm runoff, arroyo flows and irrigation ditch overflows. This dike has forced arroyo flows to be routed along the toe on the west side of the dike until an outlet is found at a lower elevation or these flows seep into the ground. Provisions for routing the water through the existing dike are necessary so that the flows are allowed to drain directly into the river at the downstream end of the arroyos. Water from the El Guique Acequia (acequia) flows through existing inverted concrete pipes or corrugated metal pipes (cmp's) under all three arroyos. There are also two wasteway structures that divert water from the acequia into the Estaca and Borregos Arroyos. These two wasteway structures cannot be fully utilized without inundating adjacent landowner properties. Because land easement has been difficult to acquire, construction will only occur on Borregos Arroyo this year. Installation of the open channel structures in the Borregos Arroyo can only be scheduled around irrigation season (November 2005 to March 2006) because of acequia wasteway flows which are diverted into the arroyo.

2. RESPONSIBLE PARTIES:

- a. Applicant: Connie Rupp, Albuquerque Area Manager, Bureau of Reclamation
- b. Entity for financial responsibility: Bureau of Reclamation
- c. Applicants agent: Robert Maxwell, Environmental Protection Specialist, Bureau of Reclamation
- d. Preparer of the proposal/plan: Robert Maxwell (Environmental Protection Specialist) and Renee Davis (Civil Engineer), Bureau of Reclamation

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3. PROJECT REQUIRING MITIGATION:

a. Location: Township 22, Range 08E, Sections 26 and 35, Southwest Quarter (Northing 1856719 ft, Easting 1694830 ft).

b. Brief summary of overall project: Borregos Arroyo is scheduled to be constructed beginning December 2005 - March 2006. The arroyo easement is approximately 97 feet wide between El Guique Acequia and the Rio Grande. An open channel lined with riprap will be constructed from El Guique Acequia to the dike, approximately 1500 feet. The new channel will have a 10 feet bottom width, berms approximately 6 feet high with 3:1 inside slopes and 2:1 outside slopes. Two 5 feet diameter cmps will be installed through the dike to the Rio Grande, approximately 110 feet. Riprap will be encased in concrete at the inlet and placed in gabion baskets at the outlet end of the pipes. The design also includes an 18 inch diameter cmp to be installed approximately 200 ft upstream of the north boundary of Borregos to prevent flows north of the arroyo from eroding the new channel berms. The 18 inch diameter cmp is approximately 127 feet long with a flapgate at the outlet. This cmp will route the upstream wetland high water flows through the existing dike directly into the river. Also refer to summary in #1 above.

4. MITIGATION GOALS AND OBJECTIVES:

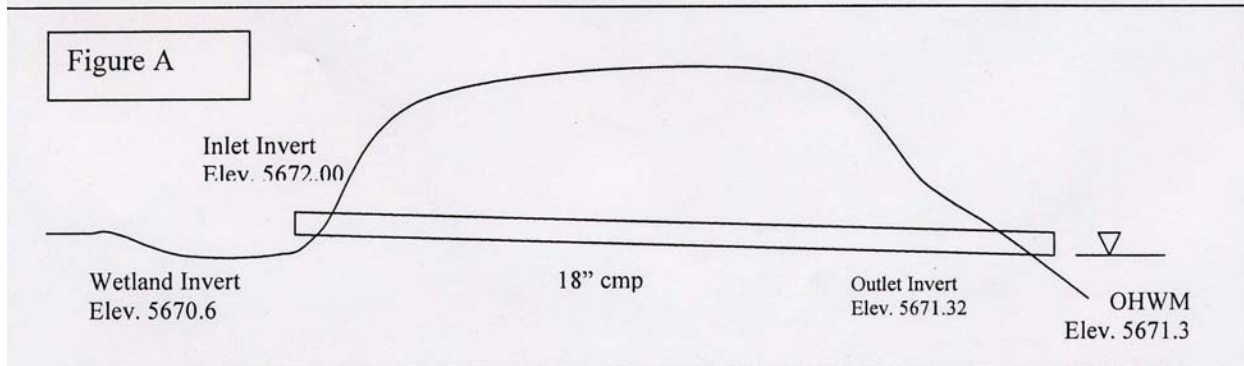
a. Impact Site: Reclamation has identified 12 cottonwood trees, including rootballs, within the Borregos Arroyo easement that will be removed.

1. Potential Effects to Wetland Site #1 (see drawing): Ecosystem Management, Inc. has conducted a wetland delineation study in the area north of Borregos Arroyo. Approximately one acre jurisdictional wetland exists between Lopez and Borregos Arroyos adjacent to the dike (UTM Coordinates for the northern and southern boundaries are in NAD27, zone 13N respectively; Northing 3,995,773 and Easting 404,619; Northing 3,995,518 and Easting 404,537). The wetland is bound on the east side by the dike and on the west side by higher ground creating a 250 meter long swatch of cattail and curly dock. The dike separates the arroyos and wetland from the Rio Grande. Water that flows down the arroyos is impounded behind the dike and contributes to the wetland hydrology of the site. The site qualifies as a man-induced wetland. It was determined that the boundary between wetland and upland is distinct along the dike to the east and the upland to the west. The wetland delineation stopped at the property fenceline, approximately 195 feet north of Borregos Arroyo. The south boundary of the wetland makes a more gradual transition from wetland to upland. Minimal disturbance to Wetland Site #1 will occur at the south boundary as a result of installation of the new 18 inch cmp.

This wetland is fed by the water table, stormwater runoff from adjacent property, stormwater flows from Lopez Arroyo (upstream of wetland) and seepage from the river. There will be minimal to no impacts to this wetland. Wetland will discharge into the Rio Grande when the water elevation reaches 5672.00 feet, before inundating the adjacent landowner property.

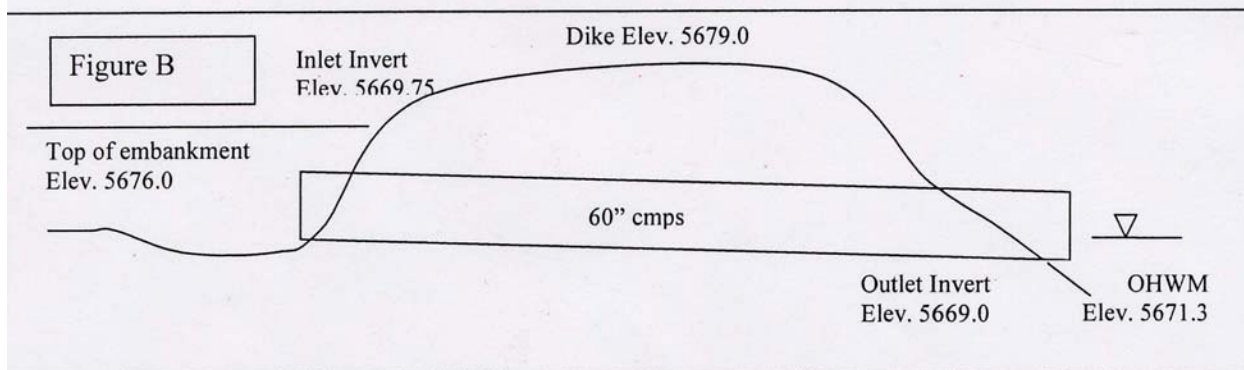
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The inlet invert of the 18" cmp is at Elevation 5672.00 and the bottom elevation of the wetland at approximately 5670.68. The elevation for the original highwater mark (OHWM) was determined in the field by COE and NM State Environmental Department and is approximately 5671.25 (see Figures A and B below for the 18" and 60"cmps). Riprap protection is to be place at the outlet end of the pipe (see drawings).



The OHWM is at elevation 5671.3. Quantities below the Ordinary Highwater Mark (OHWM) for the 18" cmp are as follows:

- Riprap = 2.0 Cu. Yds.
- Gravel Bedding = 1.0 Cu. Yds.
- Excavation = 3.0 Cu. Yds



The OHWM is at elevation 5671.3. Quantities below the OHWM for the 60" cmps are as follows:

- Riprap = 8.0 Cu. Yds.
- Gravel Bedding = 4.0 Cu. Yds.
- Excavation = 13.0 Cu. Yds.

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2. Potential Effects to Wetland Site #2: Wetland Site #2 is an area of approximately 100 ft by 200 ft, located on the southeast corner of Mark Roschke's property, (UTM Coordinates are in NAD27, zone 13S respectively: Northing 3,995,299 and Easting 404,363). There will be no disturbance to Wetland Site #2.

This wetland is fed by the water table, stormwater runoff from adjacent property and seepage from the river. No impacts to this wetland will occur. The invert elevation of the wetland is lower than the invert of an existing 12" diameter cmp, which is at elevation 5671.1. The elevation of the OHWM is 5671.3 feet.

- b. Mitigation Site: Mitigation Site #1 for cottonwood pole planting will be on an adjacent landowner's (Mark Roschke) property south of Borregos Arroyo. The location where 120 cottonwood poles will be planted is between the following UTM coordinates (NAD17, zone 13S) respectively; Northing 3,995,640 and Easting 403,935; Northing 3,995,804 and Easting 404,020, which is approximately 665 ft in length (see revised drawing). Cottonwood poles will be planted at a ratio of ten poles per one cottonwood tree. Survival rate is expected to be 80% or better to allow for mortality and wildlife. Poles will be planted in January to March 2006, when they are still dormant. Reclamation has an agreement with the landowner for continued access onto property to monitor the condition of the cottonwood poles. The existing access road will be used, as shown on the drawings

A backhoe with an auger will be used to dig the hole to plant the 10-12 feet cottonwood poles. For protection a 4 feet high wire fence (or equivalent) will be staked around the pole. The landowner currently has a drip system along the acequia where the cottonwood poles are to be planted. As the cottonwood poles mature, they will become self sustaining. Monitoring the mitigation site will be by visual observation after they are planted for three to five years or until performance standards have been successfully achieved according to COE. The landowner will also monitor the site on the weekends.

- c. Waste material: If the spoil area is filled to the existing ground elevation, then any additional waste material will be spread evenly on top of the dike and on the west slope of the dike between the 18" diameter cmp and 60" diameter cmps (within the 195 feet).
 - d. Erosion protection and seeding: Silt fence will be place along the north and south boundary of the arroyo, as necessary, to prevent erosion during construction. Fiber material log filled with compost, haybails or a small berm will be placed on the east side of the dike to prevent erosion into the Rio Grande. All disturbed areas will be reseeded with native grass, including the spoil area.

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5. BASELINE INFORMATION FOR IMPACT AND PROPOSED MITIGATION SITES:

a. Location:

1. Refer to application and #3 above (see drawings).
2. See attached vicinity map(s).
3. See Figures 1 & 2 on the attached preconstruction report of the New Mexico map and the topographic map.

b. Classification: Rio Grande and Borregos Arroyo. Natural Resource Conservation Services' classification for this area is 18-Abiquiu-Peralta complex (see typical profile in Appendix B of the report). The impact site is within the Abiquiu-Peralta complex. The mitigation site may also include classification 39-Fruitland sandy loam. Classifications for soil samples #1-4 are: Clayey Sand, Brown (SC); Silty Clay, Brown (CH); Silty Clay, Brown (CL); and Organic Clay, Brown (OH).

c. Quantify: NRCS information lists the composition to be 50% Abiquiu & similar soils, 40% Peralta & similar, and 10% contrasting inclusions for #18. The composition for #39 is 85% Fruitland & similar soils and 15% contrasting inclusions.

d. Assessment method used: Engineering and environmental field assessments.

e. Existing hydrology:

1. Water budget: Stream flow data close to the project area is the Embudo NM gauging station. Runoff is approximately 5 cubic feet per second (cfs). The El Guique Acequia wasteway overflow is approximately 5 cfs. The principal spillway at the Soil Conservation Service (SCS) Dam Site No. 4 will drain the reservoir only when a volume is produced by a 25 year event.
2. Hydroperiod: unknown
3. Historical hydrology: A peak flow frequency study was conducted for regulated and unregulated peak flows for selected return periods on the Middle Rio Grande. The analysis includes 10 stream gauge stations. The regulated flows in the Rio Grande represent the return period and peak flows, respectively, for the Embudo gauge site as follows: 2 yr – 4,360 cfs; 5 yr – 7,920 cfs; 10 yr – 10,560 cfs; 25 yr – 14,110 cfs; 50 yr – 16,860 cfs; and 100 yr – 19,660. These flows were used when calculating the water surface elevation in the Rio Grande at the confluence of Borregos Arroyo. Also refer to Historical Information and Data in the preconstruction report. The impact and mitigation sites were considered a floodplain area before the SCS Dam Site No. 4 was built.
4. Contributing drainage area: Tributaries of the Rio Grande and particularly the SCS Dam Site No. 4 and the wasteway flow from the El Guique Acequia.
5. Results of water quality analysis: N/A (sediment from the El Guique Acequia wasteway, quality and quantity unknown).

f. Existing vegetation: Dominant vegetation would be shrubs, Russian Olives, and cottonwood trees.

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- g. Existing soils: See #5 (b) and (c) above for soil classification from the Natural Resources Conservation Service. From observation, the soil is a very sandy silt loam with bedrock within the arroyo easement.
- h. Existing wildlife habitat/use:
1. Protection of the southwestern willow flycatcher territories would not be affected by this project.
 2. Bald eagle habitat would not be impacted by this project.
- i. Threatened/Endangered Species: Southwestern willow flycatcher territories and the bald eagle habitat would not be impacted by this project.
- j. Historic and current land use: The project site is within the Borregos Arroyo easement. Adjacent land is private grazing and agricultural land that is irrigated from the El Guigue Acequia.
- k. Current Owners: The Borregos Arroyo will be maintained and operated by the El Guigue Commissioner and the Waterboard Commission.
- l. Watershed context/surrounding land use:
1. The watershed associated with this project is within the Borregos Arroyo drainage system.

6. MITIGATION SITE SELECTION AND JUSTIFICATION:

- a. Site Specific objectives: The mitigation objective is to plant 120 cottonwood poles.
- b. Watershed/regional objectives: Control stormwater runoff and ponding on private land.
- c. Describe mitigation project contributions to aquatic resource functions: N/A
- d. Describe likely future adjacent land uses: Private land used for agriculture.
- e. Site selection practicability: To perform mitigation on site will cost more, and require more work than doing it off site.
- f. Practicability of on-site or in-kind options: N/A
- g. Mitigation site restrictions, easements, rights of way: There are no restrictions for access to the mitigation site for the Bureau of Reclamation.

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- h. Sustainable and self maintaining mitigation design: The landowner has a drip system along the acequia where the cottonwood poles are to be planted and will become self maintaining.
- i. USFWS: Not required.
- j. Cultural Resources: Has been cleared by Reclamation Archeologist.

7. MITIGATION WORK PLAN:

- a. Site Boundary maps: See drawings for mitigation site.
- b. Timing of mitigation: During construction between January to March 2006.
- c. Grading Plan: N/A
- d. Construction methods: A backhoe with an auger will be used to dig the hole to plant the cottonwood tree poles. A chicken wire fence (or equivalent) will be installed around the pole for protection (see attachment "Revegetating Southwest Riparian Areas – Steps for Successful Pole Planting).
- e. Construction schedule: December 2005 – March 2006
- f. Planned hydrology: N/A
- g. Planned Vegetation: Cottonwood tree poles planted at a ratio of 10:1.
- h. Pest Plant Removal: N/A
- i. Planned Soils: N/A
- j. Planned habitat features: N/A
- k. Planned buffers: N/A
- l. Other Planned Features: N/A
- m. Construction Monitor: Reclamation Construction Representative will be on site during construction.

8. PERFORMANCE STANDARDS:

- a. Identify success criteria: Survival rate expected to be 90% or better.
- b. Set target ranges for identified parameters: N/A

9. SITE PROTECTION AND MAINTENANCE:

- a. Long-term legal protection instrument: N/A

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- b. Responsible parties: Bureau of Reclamation
- c. Maintenance plan schedule: Site visit once a month until poles have been established and then once a year for 5 years.
- d. Invasive species/noxious weed control plan: During construction, spray and wash down the equipment prior to moving backhoe from project site to mitigation site. After construction has been completed, visit site once a month to determine if there are noxious weeds on site. Spray noxious weeds from a backpack with arsenal once a year, for 5 years if there is re-growth.

10. MONITORING PLAN:

- a. Responsible parties: Bureau of Reclamation
- b. Data to be collected and reported: Information to be reported on monitoring data sheets.
- c. Assessment tools and methodologies: Visual observation
- d. Format for reporting monitoring data: See "Reclamation Plant Monitoring Report" format attached.
- e. Provide monitoring schedule: Landowner will monitor site on the weekends. Weekly during construction, once a month, after construction until cottonwood poles have been established and once a year for 5 years.

11. ADAPTIVE MANAGEMENT PLAN:

- a. Identify party(ies) and responsibilities: Bureau of Reclamation
- b. Discuss design relative to potential challenges: N/A
- c. Potential remedial measures: N/A
- d. Performance standard modification procedures: N/A

12. FINANCIAL ASSURANCES:

- a. Identify party responsible for and contents of each assurance: Bureau of Reclamation is responsible to establish and manage the financial assurance for the construction phase, maintenance, monitoring, remedial measures/adaptive management, and project success.
- b. Specify types of assurances: Bureau of Reclamation under the Middle Rio Grande Project.

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- c. Assurance review schedule: N/A

13. FORMAT:

- a. Reports/Proposals: Progress and monitoring reports will be submitted as required. Reclamation will follow Mitigation Guideline in section E.3 for Monitoring Reports.
- b. Figures: Refer to preconstruction report and attachments.
- c. List of tables, schedules, and maps to be submitted: Refer to preconstruction report and attachments.

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**ADDENDUM to APPLICATION
to
MITIGATION PLAN**

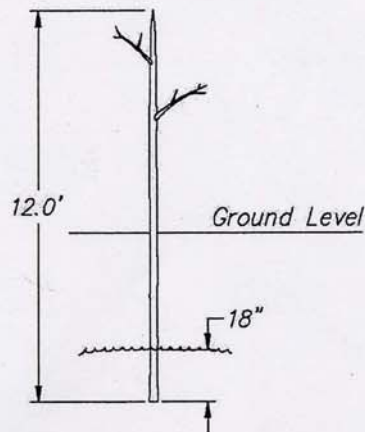
Addendum to Application for the following items on ENG FORM 4345:

20. Project Schedule: Start Date has been moved to December 2005 and the End Date to March 2006.
23. Material Discharged into US Waters:
The Native material sediment will be discharged into the Rio Grande. The sediment concentration is approximately 80% less in the arroyo than before the Soil Conservation Service detention dam was constructed.
26. Impacts to the water quality will occur two months during the scheduled timeframe in item #20. There should not be any irrigation flows occurring during construction. Dewatering may be required depending on the elevation of the water table during excavation of the cutoff collars, placement of the soil cement slurry under cmps, and placement of riprap below the invert of the pipe. See (d) for quantities below original highwater mark below. See Figure B below and revised drawings for elevations.
27. Should dewatering be required during installation of the 18" cmp and the two 60" cmps, the outflow hose from the dewatering pump will be placed within the existing river flow to keep erosion from occurring at the toe of the dike and the bank of the river.

Revegetating Southwest Riparian Areas

Steps for Successful Pole Plantings

1. Cut poles while dormant during February. Remove all side branches except the top two.
2. Soak poles in water for 10 to 14 days before planting.
3. Dig holes to the depth of the lowest anticipated water table. Sites where the water table will be within one foot of ground surface during the growing season are better suited for willows than cottonwoods.
4. Place the poles in the holes the same day they were removed from the soak treatment. Set the butt as close to the lowest annual water table elevation as possible. Four to six feet of the pole should remain above the ground surface after planting.
5. Backfill the holes carefully to prevent air pockets. Use dry surface soil.
5. Put tree guards around the poles to protect from rodents and rabbits.
7. As buds begin to swell (usually in April or May), wipe them off the lower two-thirds of the pole. This will reduce evaporation water loss and stimulate root growth.
8. Exclude the planting area from livestock grazing for two to three growing seasons. Control beaver, or place protective screening around the trees, if necessary.



Reclamation Plant Monitoring Report

Date:

Site:

Temp:

PMC Soak Time:

Planted by:

#:

#:

Type:

Plant Origin:

Planting Technique & Field Soak Time for Poles:

Total pole length (meters):

Depth to water:

Pole diameter at base (after planting):

Total pole height (after planting):

Average pole height:

Soil type (NR/R):

Plant Protection? (V/W/N):

Comments / Condition (E/G/F/P/D):

Seedmix:

**Certification of Compliance
with Department of the Army Nationwide Permit**

Action Number: 2003 00529
Name of Permittee: Bureau of Reclamation Albuquerque Area Office
Project: Espanola Dikes - Borregos Arroyo
Nationwide Permit: No. 12, Utility Line Activities
No. 43, Stormwater Management Facilities

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

District Engineer
Albuquerque District, Corps of Engineers
ATTN: Ms. Lesley McWhirter, Regulatory Branch
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

Please enclose photographs showing the completed project (if available).

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Date Work Started _____

Date Work Completed _____

Date

Signature of Permittee