

Three vegetation projects were combined with the stream restoration projects in order to increase the benefits and maintainability of the stream restoration.

- ◆ Project 5. Dead tree management in the Jasper area where trees fall in the stream and cause localized flooding
- ◆ Project 6. Dead tree management near Capulin where a 2-mile row of trees are dead and in danger of destabilizing the stream bank.
- ◆ Project 20. Revegetation
- ◆ Projects 27 & 28. Noxious weed management
- ◆ Project 31. Riparian Buffer Zone

A riparian buffer is an area adjacent to a water body that has been set aside for conservation and maintenance to protect stream and riparian habitat quality. Activities such as farming and development are limited in the buffer zone. Buffers can be created through a combination of ordinances and easements, or can be implemented on a voluntary basis. Figure ES-9 shows the implementation of a buffer zone with cattle fencing.

Project 22. Sediment Trap Pilot Project with Water Quality BMPs on Alum Creek

During high flows, Alum Creek carries a tremendous bedload of sediments derived from hydrothermally altered rocks to the Alamosa River. These rocks typically contain sulfide-rich accessory minerals, which when oxidized contribute to metal loading as well as low pH in the Alamosa River. Following spring runoff, a large fan of materials is deposited at the terminus of the creek, and these sediments are then progressively eroded and carried downstream by the Alamosa River.

A sediment trap and water quality project would consist of regrading the fan area, stabilizing the

adjacent river bank with limestone rock, constructing limestone rock check dams within the Alum Creek channel to trap a portion of the annual bedload, and directing the lower portion of Alum Creek to a flow-through pond. There are several options for water quality improvements that could be tested on Alum Creek as pilot projects and potentially implemented elsewhere if funds are available. However, any sediment trap and water quality project would require significant, regular maintenance.

Project 23. Reclamation of Pass-Me-By Mine

Contaminant loads from smaller historical mining sites are less significant on a watershed scale than loads from the Summitville site and loads from natural sources. These smaller mine sites represent less than one percent of the watershed contaminant load for copper, zinc, and magnesium, and less than 3 percent of the contaminant load for iron and aluminum. However, as point sources the mines are more readily treatable than non-point sources. The Pass-Me-By Mine produces the highest contaminant load of all of the smaller sites (see Figure ES-10). The reclamation project could include a combination of an anoxic limestone drain at the collapsed mine portal followed by a sulfate reducing wetland or settling basin as well as capping and diversion of drainage around the mine tailings dump. The Pass-Me-By Mine is located on private property and an agreement would be needed from the landowner to implement the project.

Project 38. Easements

Easements may be negotiated with willing landowners along the Alamosa River for various purposes such as conservation, recreation and access to the Alamosa River. Conservation easements are a tool to protect and enhance existing quality habitat and areas that can be improved through restoration projects such as those in the riparian



Figure ES-8. Ongoing Stream Restoration Project County Road 10 to Gunbarrel Road



Figure ES-9. Riparian Buffer Zone with Cattle Fencing
Source: U.S. Department of Agriculture et al., 1998

corridor. Conservation easements are legal agreements between a landowner and a public agency or conservation group, in which the parties agree to protect certain natural resource values of the land or provide access to the public. Due to the extensive private ownership along the river, access and recreation easements are proposed to allow the public to benefit from the restoration projects.

Project 24. Mainstem Lake for Water Quality

A lake constructed on the mainstem of the Alamosa River below Wightman Fork could significantly improve water quality conditions downstream in the watershed. The primary water quality improvement mechanism of a lake is the capture of sediments. Suspended sediments and metals in particulate form would be removed from the Alamosa River by such a lake. Lime addition or injection within the lake is an additional active process that could potentially reduce all water quality contamination and help meet water quality standards. In order to maintain the lake's capacity, sediments would periodically need to be removed.

Project 41. Increased Access to Terrace Reservoir

Improving public access to Terrace Reservoir should increase recreational utilization of the reservoir area. Improvements can include increased parking on FR 250, the establishment of a maintained trail from the parking area to the reservoir shore, fishing access, small boat and picnicking facilities, and lavatories. Educational signage could be included to teach visitors about water quality, mining impacts, and the Master Plan.

ES.8 Implementation

The idea of opportunistic implementation will be important to making the most of the Master Plan. Opportunistic implementation means that projects should be implemented according to the following conditions:

- ◆ As the specific project proposals are submitted to and approved by the Trustee Council and Alamosa River Foundation,
- ◆ As outside project proponents or “passionate advocates” are identified,
- ◆ As the appropriate mix of sufficient funding becomes available to complete a particular project, and
- ◆ As a specific project's implementation is required by or coincides with another related project that is being implemented.



Figure ES-10. Photo of Pass-Me-By Mine Portal

Figure ES-11 shows one possible implementation schedule. As noted above, many factors will influence the actual order that projects are implemented. The Trustees and stakeholders will choose to implement projects in an order that is appropriate for available funding and based on other factors. The actual order may be different from that shown below.

Other sources of watershed restoration funding are available for those Master Plan projects that do not qualify for NRD funding and as matching funds for those that do. Potential national, state, and local funding sources are summarized below:

- ◆ U.S. Army Corps of Engineers (Restoration of Abandoned Mine Sites (RAMS))
- ◆ American Sportfishing Association (FishAmerica Foundation)
- ◆ U.S. Department of Agriculture and Natural Resources Conservation Service (Integrated Research, Education, and Extension Competitive Grants, Farm and Ranch Land Protection Program, Conservation Reserve Program, Environmental Quality Incentives Program, Resource Conservation and Development, Small Watershed Program, Wetlands Reserve Program, Wildlife Habitat Incentive Program, Grassland Reserve Program)
- ◆ U.S. Fish and Wildlife Service (Partners for Fish and Wildlife)
- ◆ Patagonia (Environmental Grants)
- ◆ U.S. EPA (Regional Geographic Initiative Program, Assessment and Watershed Protection Program Grants)
- ◆ Department of Homeland Security
- ◆ National Research Initiative (Enhancing the Prosperity of Small Farms and Rural Agricultural Communities Competitive Grants)
- ◆ National Fish and Wildlife Foundation (Pulling Together Initiative Grant Program)
- ◆ National Geographic Society (Conservation Trust Grants)
- ◆ River Network (Watershed Assistance Grants)
- ◆ U.S. Department of Interior Bureau of Land Management
- ◆ U.S. Department of Agriculture Forest Service
- ◆ Colorado Water Conservation Board (Construction Loan Program)

- ◆ Colorado Division of Wildlife (Cooperative Habitat Improvement Program, Habitat Partnership Program, Colorado Waterfowl Stamp Program, Colorado Wetland Initiative Legacy Project, Colorado State Trust Lands)
- ◆ Colorado Department of Public Health and Environment (Clean Water Act Section 319 Non-point Source Grants)
- ◆ Great Outdoors Colorado Trust Fund (GOCO)
- ◆ Colorado Water Trust
- ◆ San Luis Valley Wetland Focus Area Committee
- ◆ Rio Grande Headwaters Land Trust

It is critical that the Alamosa River Foundation and other project sponsors leverage the \$5 million NRD funding with matching funds in order to maximize benefits to the Alamosa River Watershed.

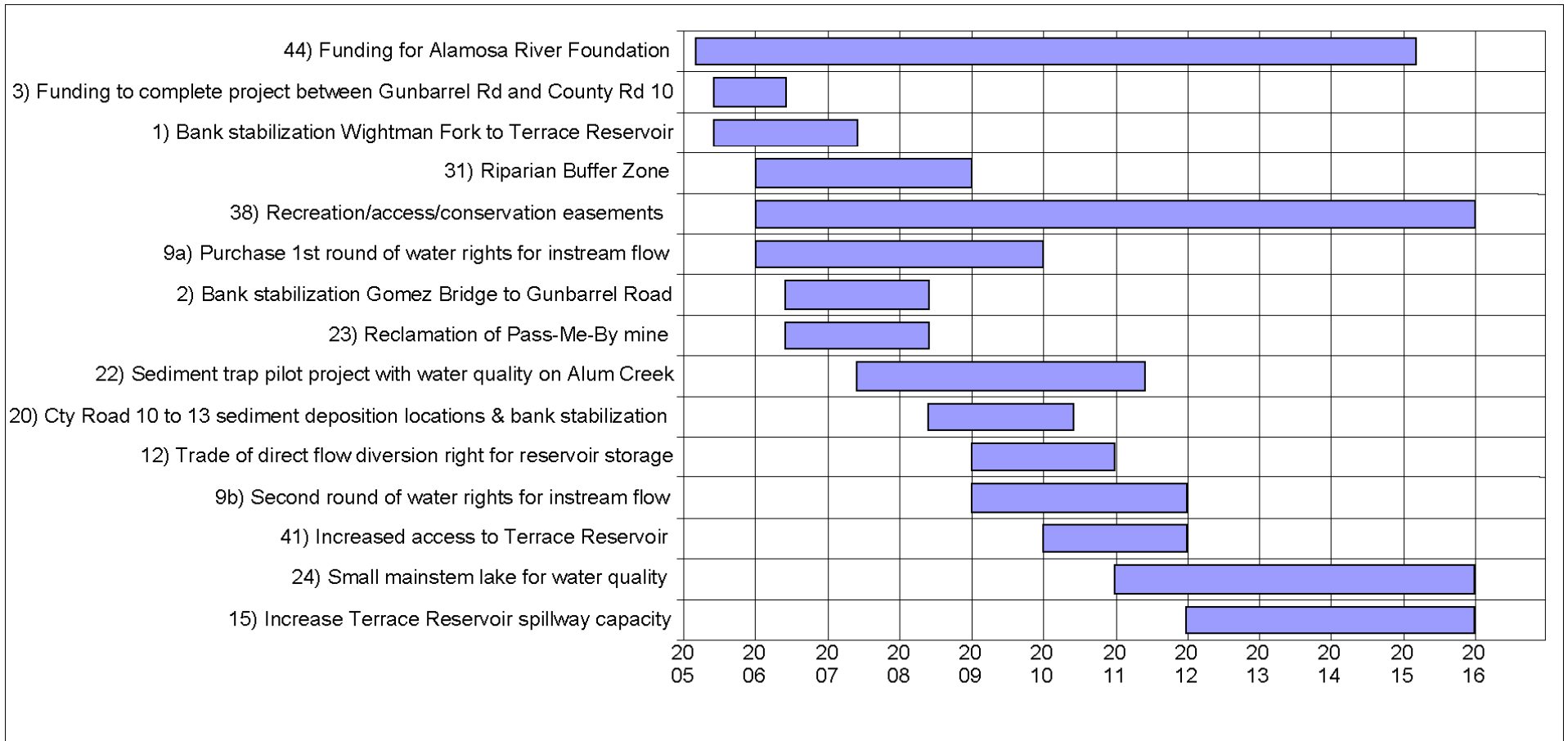
ES.9 Monitoring

Project monitoring to measure performance in meeting the desired objectives and providing the anticipated benefits is required for NRD-funded projects, and is recommended for all Master Plan projects. Monitoring plans should be developed and included in each specific project proposal. Monitoring activities will be different depending on the type of project. The Trustee Council and Foundation will monitor project results and make them available to the public.

ES.10 Environmental Consequences

The environmental consequences of the three preliminary alternatives, the Preferred Alternative, and the No Action Alternative were evaluated based on the assumption that all actions identified under each alternative would be implemented successfully. The environmental consequences of Alternative 1, the No Action Alternative, are what would happen if none of the Master Plan projects were implemented. Consideration of this alternative is a requirement of the National Environmental Policy Act (NEPA). Table ES-5 summarizes the environmental consequences of each alternative.

Figure ES-11. Possible Implementation Sequence of Preferred Alternative



Note: this chart represents one possible sequence of projects. Actual project sequencing may be different

Table ES-5. Summary of Environmental Consequences by Alternative

Attributes	Alternative 1 (No Action)	Alternative 2 (Project Rank)	Alternative 3 (Watershed Objectives)	Alternative 4 (Trustee Preferences)	Alternative 5 (Preferred Alternative / Proposed Action)
Surface water quantity	Continued lack of flow in lower watershed from late fall to early spring.	Longer period of sustained flow in lower watershed.	Longer period of sustained flow in lower watershed.	Longer period of sustained flow in lower watershed.	Longer period of sustained flow in lower watershed.
Surface water quality	Remain degraded due to high sediment and metal load.	Improved water quality associated with mine reclamation and sediment trap on Alum Creek. Additional control of water quality downstream of Terrace Reservoir due to improved outlet works.	Significantly improved water quality associated with mine reclamation, sediment trap on Alum Creek and mainstem lake.	Significantly improved water quality associated with mine reclamation, and mainstem lake.	Significantly improved water quality associated with mine reclamation, sediment trap on Alum Creek and mainstem lake.
Groundwater	Groundwater levels continue to decline.	Groundwater levels rise or decline at a slower rate.	Groundwater levels rise or decline at a slower rate.	Groundwater levels rise or decline at a slower rate.	Groundwater levels rise or decline at a slower rate.
Aquatic habitat	No change	Improved habitat downstream of Terrace Reservoir due to instream flow.	Improved habitat in and downstream of mainstem lake. Improved habitat downstream of Terrace Reservoir due to instream flow.	Improved habitat in and downstream of mainstem lake. Improved habitat downstream of Terrace Reservoir due to instream flow.	Improved habitat in and downstream of mainstem lake. Improved habitat downstream of Terrace Reservoir due to instream flow.
Riparian habitat	Continued loss of habitat due to lack of surface and groundwater and water quality.	Increase of habitat quantity and quality in Alamosa River watershed. Temporary impacts during construction in stream channels.	Increase of habitat quantity and quality in Alamosa River watershed. Displacement of riparian habitat in mainstem lake footprint. Temporary impacts during construction in stream channels.	Increase of habitat quantity and quality in Alamosa River watershed. Preservation of high quality habitat in neighboring Conejos watershed. Displacement of riparian habitat in mainstem lake footprint. Temporary impacts during construction in stream channels.	Increase of habitat quantity and quality in Alamosa River watershed. Displacement of riparian habitat in mainstem lake footprint. Temporary impacts during construction in stream channels.
Biological impacts	Continued harm and decrease in numbers of riparian dependent wildlife. No sustainable fish populations in water quality impacted reaches and water quantity impacted reaches.	Fish populations in Terrace Reservoir have potential to migrate downstream of Terrace Reservoir. Increased populations of riparian dependent wildlife.	Improved habitat downstream of mainstem lake due to improved water quality and downstream of Terrace Reservoir due to instream flow. Increased populations of riparian dependent wildlife. Additional fish in vicinity of Terrace Reservoir due to fish stocking.	Improved habitat downstream of mainstem lake due to improved water quality and downstream of Terrace Reservoir due to instream flow. Increased populations of riparian dependent wildlife. Protection of known southwest willow flycatcher and yellow-billed cuckoo habitat in Conejos River watershed.	May have sustainable fish populations downstream of mainstem lake and potential for fish downstream of Terrace Reservoir. Increased populations of riparian dependent wildlife.

Table ES-5. Summary of Environmental Consequences by Alternative

Attributes	Alternative 1 (No Action)	Alternative 2 (Project Rank)	Alternative 3 (Watershed Objectives)	Alternative 4 (Trustee Preferences)	Alternative 5 (Preferred Alternative / Proposed Action)
Cultural resources	No change	Potential impacts to sites and resources will be avoided or mitigated during construction.	Potential impacts to sites and resources will be avoided or mitigated during construction.	Potential impacts to sites and resources will be avoided or mitigated during construction.	Potential impacts to sites and resources will be avoided or mitigated during construction.
Environmental justice issues	No change	Increase in recreational opportunities.	Increase in recreational opportunities.	Increase in recreational opportunities.	Increase in recreational opportunities.
Socio-economic issues	Image of watershed as “dead watershed” continues. No change in recreational or job opportunities.	Increase in local economy due to improved public image of watershed, recreational opportunities, and additional jobs for Master Plan implementation.	Increase in local economy due to improved public image of watershed, recreational opportunities, and additional jobs for Master Plan implementation.	Increase in local economy due to improved public image of watershed, recreational opportunities, and additional jobs for Master Plan implementation.	Increase in local economy due to improved public image of watershed, recreational opportunities, and additional jobs for Master Plan implementation.
Land use impacts	Water quality and channel instability would continue to degrade the productivity of agricultural areas.	Additional recreation and access in the watershed. Channel stability would benefit irrigators. Decreased land area in production due to transferred water right. Increased reliability and functionality of Terrace outlet works improves water quality.	Additional recreation and access in the watershed and at Terrace Reservoir. Improved water quality and channel stability would benefit irrigators. Decreased land area in production due to transferred water right.	Additional recreation and access in the lower watershed, at Terrace Reservoir, and Crowther property. Improved water quality and channel stability would benefit irrigators. Decreased land area in production due to transferred water right.	Additional recreation and access in the watershed and at Terrace Reservoir. Improved water quality and channel stability would benefit irrigators. Decreased land area in production due to transferred water right.
Traffic impacts	No change	Increased traffic on roads providing access to the river.	Increased traffic on roads providing access to the river.	Increased traffic on roads providing access to the river and Crowther property.	Increased traffic on roads providing access to the river.