

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

LAND RECONSTRUCTION, ABANDONED MINED LAND

(Acre)
CODE 543

DEFINITION

Restoring land and water areas that are adversely affected by past mining practices, increasing the productivity of the areas for a beneficial use.

PURPOSES

- Stabilize mined areas so that they can be used to support desirable vegetation.
- Reduce erosion and sedimentation.
- Enhance water quality or quantity.
- Maintain or improve the visual quality of the landscape.
- Protect public health, safety, and general welfare.
- To reduce airborne particulate matter.
- Improve soil quality and sequester carbon.

CONDITIONS WHERE PRACTICE APPLIES

On abandoned mined land that degrades quality of the environment, prevents or interferes with the beneficial use of land or water and air resources, or endangers the health or safety of individuals.

The standard applies to the construction, grading, and reshaping of land that has been disturbed or adversely affected by past mining of all minerals and commodities.

CRITERIA

General Criteria Applicable to All Purposes

Reconstruction plans must comply with all local, state, federal, and tribal laws and regulations relating to mining and reclamation.

In California, the Surface Mining and Reclamation Act of 1975 (SMARA) regulates surface mining operations, in part to assure that: 1) adverse environmental effects are prevented; 2) mined lands are reclaimed to a usable condition which is readily

adaptable for alternative uses; and 3) residual hazards to the public health and safety are eliminated.

This practice is a management system that may combine practices to meet conservation goals. Land reconstruction on abandoned mined lands shall include the components necessary to reclaim and stabilize the area and prevent further degradation of air, water, soil and plant resources. Land reclamation and other conservation practices shall be used as appropriate, to meet the criteria for this management system. Potentially applicable NRCS Conservation Practice Standards include, but are not limited to:

(455) Land Reclamation – Toxic Discharge Control;

(600) Terraces;

(410) Grade Stabilization Structures;

(342) Critical Area Treatment.

Dust Control. The generation of particulate matter and fugitive dust shall be controlled when moving soil and other earth materials by: 1) controlling vehicular and pedestrian traffic; 2) modifying soil moisture content as appropriate; and 3) establishing temporary vegetation on disturbed soils as needed.

Earth moving activities shall be restricted or stopped when wind direction and velocity could allow particulate matter and dust to impair the visibility on roads downwind from the construction area.

Site Preparation. Areas to be graded shall be cleared of trees, logs, brush, rubbish and other undesirable materials that can prevent proper application of the practice. These materials shall be disposed of in a manner that precludes interference with water disposal practices, stabilization operations, or the operations associated with the planned use of the land.

Unsuitable soil material must be removed and buried so that it does not adversely affect water quality or plant growth. These materials must be

disposed of in a manner that minimizes the potential for seepage, which can pollute surface and groundwater. Materials containing heavy metals must be buried to a depth below the root zone, or suitable kinds and amounts of soil amendments must be added.

The generation of dust shall be controlled as needed during earthmoving activities.

Overhanging rocks and walls that are to be covered shall be sloped to ½ horizontal to one vertical slope (½:1) before the soil is placed against the wall, unless a flatter slope is needed for stability. Unless otherwise specified, fill material shall be spread in successive layers not more than two feet (0.6 m) thick.

Removal and Placement of Material for Final Cover. Any soil material on the site that is suitable for the intended final use shall be salvaged, stockpiled and protected for use as final cover material.

The reconstructed soil must meet the requirements for the specified land use on at least 80 percent of the area. The rest of the area must be in such a condition that it can be stabilized.

The salvaged material and other suitable materials must be spread over the graded areas to the depth specified in the reclamation plan. The final slope must permit application of needed conservation and management practices to keep soil losses within planned permissible levels. If settlement is likely to interfere with the planned use of the land, surface drainage or water disposal, allowances must be made for the expected settlement during final grading.

Temporary seeding, mulching, water disposal and similar measures to help control erosion shall be used as necessary.

Water Disposal. The need for a water disposal system shall be carefully analyzed, and if needed, it shall be included in the design. The system must be intensive enough to control erosion during and after stabilization. If any practices are to be removed after vegetation is established, provisions must be made to promptly stabilize all disturbed areas. Water disposal systems suitable for intensively farmed cropland are usually required for mined land reclamation and may be used as a guide in the absence of local experience.

Establishment of Vegetation. Plant materials selected for establishment shall be adapted to the site conditions.

Apply soil amendments and plant nutrients to achieve the physical or chemical soil conditions suitable to support plant growth.

Seedbed preparation, seeding rates, dates, depths, and planting methods shall be consistent with approved local criteria.

Install additional structural measures needed, such as terraces, lined waterways and/or grade stabilization structures.

Restoration of Borrow Area. If cover material is taken from outside the reclamation site, the borrow area must be graded and reshaped to insure proper drainage, and be revegetated to control erosion.

If the cover material is taken from adjacent land, the topsoil from the borrow area must be stockpiled separately and replaced after the borrow area is restored for its intended purpose.

If the borrow area is prime farmland, the A and B horizons (or the B and C horizons if applicable) must be removed and stockpiled separately by horizon and then replaced on the borrow area in natural sequence. The combined thickness of the replaced horizons shall be adequate to restore the original soil productivity. Treatment of the borrow area shall meet the requirements set forth in NRCS Conservation Practice Standard 544, Land Reconstruction, Currently Mined Land.

Additional Criteria to Maintain or Improve the Visual Quality of the Landscape

The appearance of the reclaimed site must be in accordance with standards for maintaining and improving the visual quality of the landscape, and must be compatible with the adjacent landscape. Areas of high public visibility or those offering direct or indirect human benefits shall be evaluated and considered in landscape resource management planning and design. Soil piles and borrow areas shall be shaped to blend with the adjacent landscape as much as possible.

Additional Criteria to Protect Public Health, Safety and General Welfare

Provisions must be made to reduce potential safety hazards, erosion, and water quality degradation in areas that have highwalls and landslides. Treatment shall meet or exceed the requirements of NRCS Conservation Practice Standards for Land

Reclamation - Landslide Treatment (453) and Highwall Treatment (456) as appropriate.

Provisions must be made to identify and reduce safety and contamination hazards posed by any subsurface shafts or tunnels that may be present in the area to be reclaimed. The State Conservation Engineer shall review any projects where subsurface shafts or tunnels are identified that impact or are impacted by the reconstruction project.

Additional Criteria to Improve Soil Quality and Sequester Carbon

Establish plant species that are appropriate for the site, that will produce the greatest quantity of above and below ground biomass.

CONSIDERATIONS

Cultural Resource Considerations

NRCS' objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements Worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with internet sites for additional information.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened, or Endangered species or their habitat. NRCS' objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicated the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments for installation; or at the request of the landowners, the NRCS may initiate consultation with the U.S. Fish and Wildlife Service, NOAA Fisheries (National Marine

Fisheries Service), and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravels, and rearing of young, may preclude activities in the stream that may directly affect the stream habitat during those periods. For example, there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, evaporation, and infiltration;
2. Potential for changes in plant growth and transpiration because of changes in soil water.

Water Quality

1. Effects on erosion and transport of sediment and sediment-attached contaminants by surface runoff;
2. Effects on the mobilization and transport of pathogens and soluble contaminants by surface runoff, and by infiltration to the vadose zone and groundwater;
3. Effects on the chemical quality of the surface and subsurface waters draining from the reclamation site, including pH and temperature;
4. A special concern is the potential for uncovering or redistributing toxic materials from earth moving activities.

Other Considerations

A detailed soil survey should be made of the area to be reclaimed and the proposed borrow area, to identify the types and extent of soil materials.

Consider the need for access roads that would facilitate final reclamation activities and operation and maintenance. Planning, design, and construction shall be in accordance with NRCS Conservation Practice Standard 560, Access Roads.

Reclamation has great potential for increasing or improving wildlife habitat in the reclaimed area. Avoid monocultures when developing vegetative specifications. Additional guidance regarding the revegetation of disturbed lands is available in Van Kekerix and Kay (1986), and Newton and Claassen (2003).

Limit or stop earth-moving activities when wind direction and velocity could allow particulate matter to impair visibility on roads downwind from the construction area.

Planting reclaimed areas to perennial vegetation that will sequester carbon.

The use of organic materials such as manure, compost, mulch or sewage sludge can contribute to the success of vegetative establishment and the long-term success of the planting. It also can increase the organic matter content of the soil.

PLANS AND SPECIFICATIONS

Plans and specifications for reconstructing abandoned mined land shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

A reclamation plan must be developed for each site. The plan shall specify the required procedures for conducting reclamation and reconstruction activities.

Plans shall include provisions for the disposal of toxic materials that may be uncovered as a result of the earth moving and reclamation activities.

OPERATION AND MAINTENANCE

An O&M plan shall be prepared that provides specific details concerning maintenance and operation of conservation practices identified in the reclamation plan. The maintenance and operation plan shall specify procedures for:

- Filling areas where settlement may adversely affect drainage and land use;
- Promptly repairing and revegetating bare spots, eroded areas, areas of excessive settlement, and other areas on which the initial attempt to establish vegetation was not successful;
- Adding soil amendments to soils that cannot support adequate vegetation or replacing them with suitable soil material;
- Maintaining access roads;
- Keeping drainage structures and channels clean and functional;
- Applying fertilizer and lime;
- Controlling weeds;
- Proper grazing practices where applicable; and
- Controlling vehicular and pedestrian traffic.

REFERENCES

- California Dept. of Conservation, Office of Mine Reclamation, May 2004, Surface Mining and Reclamation Act of 1975 and Associated Regulations:
<http://www.consrv.ca.gov/OMR/smara/>; 87 p.
- Chepil, W.S., 1956, Influence of moisture on erodibility of soil by wind: Soil Sci. Soc. Am. Proc., Vol. 20, pp. 288-292.
- Newton, G.A., and Claassen, V.P., 2003, Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making: California Geological Survey Special Publication 123,
http://www.consrv.ca.gov/OMR/qh_publications.htm, 240 p.
- USDA- Soil Conservation Service (Soil Survey Division Staff), Oct. 1993, Soil Survey Manual: Revision of USDA Handbook No. 18, 437 p.
- Van Kekerix, L., and Kay, B.L., 1986, Revegetation of Disturbed Land in California: An Element of Mined-Land Reclamation: California Division of Mines and Geology (renamed California Geological Survey) Open-File Report 86-14 SAC, 105 p.