Chapter 5
ENVIRONMENTAL CONSEQUENCES

Environmental Consequences—This section forms the scientific and analytic basis for the comparisons under (Comparison of Alternatives). (40CFR1502.16).

This chapter describes the direct, indirect, and cumulative environmental impacts of the ECP alternatives. The chapter analyzes impacts of current and proposed ECP restoration practices and changes, and the ECP alternatives in which they would be employed. It analyzes ECP alternative effects on human communities and the cumulative impacts of the ECP on the natural and human aspects of farmland.

5.1 CHAPTER ORGANIZATION

This chapter has four major analytical sections:

- Section 5.2 describes the impacts of individual ECP practices on the environment.
- Section 5.3 describes the impacts of the Alternatives: No Action, Proposed Changes, and No Program.
- Section 5.4 discusses the socioeconomic impacts of the Alternatives.
- Section 5.5 addresses the cumulative impact of ECP projects when considered with other NRCS actions, actions of other agencies, private entities, and citizens.
- Section 5.6 describes the unavoidable impacts of the Proposed Action.

5.2 IMPACTS OF IMPLEMENTING ECP PRACTICES

This section addresses the adverse and beneficial effects of the ECP practices on soil quality, water quality, air quality, vegetation, wildlife communities, and riparian and wetland ecosystems.

5.2.1 Section Organization and Assumptions

The current ECP practices evaluated in this section include:

- EC1 - Remove debris associated with natural disasters
- EC2 - Grading, shaping, or leveling of farmlands
- EC3 - Restore permanent fencing
- EC4 - Restore or install damaged or destroyed farm structures and installations
- EC5 - Provide emergency wind erosion control measures
- EC6 - Implement drought emergency measures
- EC7 - Implement other emergency conservation measures

ECP changes proposed under the Proposed Action include:

- Change cost-share levels to 75 percent flat rate
- Implement a 90 percent special flat rate cost-share program for limited resource producers
- Add more provisions to deal with confined livestock in natural disasters other than drought.
- Must complete an Environmental Evaluation Checklist (FSA 850) before any cost-share is allocated.

5.2.2 Impacts of Current ECP Practices

This section evaluates the effects of disasters on soil quality, water quality, air quality, vegetation, wildlife communities, and riparian and wetland ecosystems in the context of farmland impairment involved with ECP. It evaluates the impacts of current ECP practices on these ecosystems that address debris removal; grading, shaping and leveling of farmland; permanent fence repair; structure and installation restoration; emergency wind erosion control measures; drought emergency measures; and other emergency conservation measures.

5.2.2.1 Debris Removal from Farmland (EC 1)

This section evaluates the impacts of disaster-related debris removal on farmland. Accumulation of large amounts of debris is a common result of natural disasters. Debris jams of downed trees and branches, and widespread silt or overburden deposits are typical in the aftermath of major flood events. Tornados leave widely dispersed household debris and downed trees. Debris remaining in these situations can have a wide range of effects, blocking farm roads and field access, burying cropland in a thick layer of sediment, or creating public health and environmental hazards in farmland communities. Hazardous materials may also be encountered and would be handled and removed in accordance with all applicable state and local regulations. Specific impacts of current ECP debris removal practices on soil, water, and air quality, vegetation, wildlife communities, riparian and wetland ecosystems, and cultural resources will be discussed.

Effects of Disaster Debris on Soil Quality

Debris damage from natural disasters can be quite extensive depending on the severity of the event. Aside from the obvious problem of debris strewn across farmland and rural communities, serious damage can occur to soil systems and biodiversity. Uprooting of trees and other vegetation from high winds increases soil erosion opportunity. Flooding and heavy rain may saturate the soil decreasing infiltration of water and increasing runoff. Debris jams may cause ponds to form in fields. Floods often leave behind thick layers of nutrient and pollutant rich silt or overburden on fields that could contaminate soil or groundwater systems.

Effects of Disaster Debris on Water Quality

Debris accumulation because of natural disasters can have a severe effect on water quality. Sediment from farm fields eroded by the high winds and/or rain of some severe weather events can runoff into surface water sources. Nutrients from overburden or manure recently applied to fields may degrade water supply systems and cause algal blooms and eutrophication, which will affect aquatic organisms as well as downstream users. Over-saturated soils and high winds increase runoff rates and carry debris into surface water systems and cause flooding events.

Effects of Disaster Debris Air Quality

Air quality can be affected greatly by certain natural disaster events such as wildfires and dust storms caused by high winds and drought conditions. Following fires animals and residents of agriculture areas may experience respiratory problems associated with smoke.

Effects of Disaster Debris on Vegetation

Disasters such as fires, tornadoes and extreme or severe weather events can destroy crops, protective vegetation and trees, increasing soil erosion and the amount of debris in fields and farmland communities. Vegetative habitat may be lost or altered in the wake of disaster events, changing terrestrial ecosystems significantly. Damaged areas may create habitat for native plant species that could not be sustained prior to the disaster. Many invasive species thrive in damaged areas where native species have been damaged. Invasives are opportunistic and may take over damaged area, altering habitat structures and species biodiversity.

Effects of Disaster Debris on Wildlife Communities

Wildlife ecosystems may be significantly altered by debris and disasters. Fallen trees and damaged vegetation transforms habitat structures. Some wildlife species may be forced to migrate to new territory. Destroyed fences may open up areas that were otherwise restricted from wildlife prior to the disaster event. Ground dwelling species populations may be effected from floods and saturated fields. Debris effects may be beneficial or adverse for these types of creatures, depending on the species affected. Effects vary with the positioning of the debris. Downed trees may actually improve existing cover and introduce habitat elements that did not exist previously. Debris has the ability to increase, destroy and improve wildlife habitat.

Effects of Disaster Debris on Riparian and Wetland Ecosystems

The impacts of disaster debris in riparian and wetland ecosystems adjacent to agriculture can be extensive, depending on the type and path of the disaster. Debris in wetlands and riparian areas, such as downed trees, may destroy natural habitat and either open up or destroy opportunities for new vegetative growth. Heavy equipment used to remove woody debris, create possible impacts from erosion and soil compaction down slope of farmland. Debris removal may alter the overland flow of rain and runoff, possibly affecting erosion along the slope and sedimentation in surface waters. Wetland and riparian ecosystems act as bio-filters for nutrients and provide habitat for wildlife species. Wetlands can be very sensitive to pollution, specifically agricultural related runoff, and for that reason are natural indicators of environmental degradation.

Variability of Debris Impacts across Farmlands

Specific characteristics of debris impairments vary regionally. Different farmland communities will exhibit different levels and types of debris based on the type and amount of material present in the farmland community and the type and destructive capacity of the disaster event. For example, agricultural areas that are interspersed with forested areas, such as in the northeast, would have an ample cover of trees. Disaster debris in such a community would be predominantly woody. Sediments, with a relatively smaller contribution of woody debris, affect agricultural lands interspersed with grasslands, such as in the Midwest. High volume, slow flowing rivers, can severely damage levees and fields, eventually overwhelming streamside farmland environments. Debris in these rivers is often floating woody debris from uprooted riparian vegetation, material from damaged levees, and material from man-made structures in the floodplain.

The creation of debris is highly dependent on the type of disaster. Floods are a typical example of a disaster where debris impairments are prominent. Floodwaters carry rocky and woody debris, as described above. Tornados usually leave a narrow swath of damage with multiple types of debris, because they are not generally confined to prescribed paths analogous to floodplains. Damage occurs in any type of environment, from agriculture communities to wooded areas and urban centers.

Effects of Current ECP Practices to Remove Debris

This section describes the environmental impacts of current ECP practices on debris removal procedures. Chapter 3 has a description of this practice and the activities associated with removal. As with all ECP practices, the primary goal is to return productive agricultural land to normal, pre-disaster operational status.

Environmental Impacts

In order to remove debris from farmland, a number of activities may be required, depending on the extent of debris. A common example, if debris is located in a remote field where access has been compromised, it may be necessary to ***create access,*** which will require several actions, including: using heavy machinery to clear vegetation for equipment and workers, could require removing small areas of vegetation or it may be as invasive as creating a new road. Bringing heavy machinery and trucks onto fields to carry away the debris could compact soil, reducing infiltration and increasing runoff and water erosion hazards. Indirectly this could reduce soil temperature, effect soil microbiology and biodiversity, and possibly impair future plant growth. Rate of organic matter decomposition and activity of microorganisms in the soil may be affected.

There are two principle methods to deal with floodplain sediment: deep tilling and sediment removal. Deep tilling involves using heavy equipment to level the sediment to an even thickness, followed by tilling the soils to mix the sediment with the topsoil buried below and restore agricultural function. Sediment removal would involve scraping the land and loading the sediment for shipping and disposal off-site. Sediment removal involves many of the same principles as deep tilling. Virtually no impacts would be felt in the ecological communities. Disposal of the sediment, however, may pose some problems. Many levees are constructed with sediment dredged from river channels, and floodplain sediment would be a likely source of levee materials. This may introduce erodible materials back into the floodplain, increasing turbidity and contributing to sedimentation and the degradation of habitat and channel structure.

Debris removal is the second major issue that may initiate significant environmental impacts. Once the debris is removed, it must be disposed of. Disposal methods vary regionally and within individual watersheds. Debris can be used for a number of purposes on-site or offsite. Woody debris may be hauled away to landfills or incinerators, burned on-site, chipped and left on-site, or used in other practices such as rootwads or tree revetments. Landowners may wish to keep some debris as firewood or chipped as mulch. It has been suggested that cobble and other rocky debris be used to create low berms to mitigate and alleviate future flood effects or for field stabilization practices, but these uses conflict with natural flood regimes and create an on-site supply of cobble for future disasters (Darnell 1976).

Disposal by burning, whether on-site or at a central location, contributes to air pollution and can create problems for sensitive areas downwind, such as homes or airports. Local burning ordinances may prohibit burning or restrict the amount and timing of burning allowed. Leaving woody or vegetative debris to compost on-site allows for slow release of important nutrients into the local ecosystem but can pose problems in future disaster events. Berm creation may have both positive and negative impacts, as these structures may protect the floodplain and adjacent areas during smaller floods. However, they may also provide additional debris for larger floods, as well as altering the natural flood cycle, which may adversely affect wetlands and other flood sensitive areas. Table 5.2-1 summarizes the impacts of the various methods used to dispose of disaster debris. On-site methods may have adverse effects to the local ecosystem, over either short or long term. Off-site methods benefit the ecosystem at the disaster site by transferring adverse effects to the new disposal site, which may or may not be more sensitive to these effects.

Table 5.2-1 Impacts Comparison of Debris Disposal Techniques

Use On-Site	Haul Off-Site	Burn On-Site	Burn Off-Site	Bury On-site	Bury Off-Site
Water Quality[1]					
On-site use could allow material to re-enter nearby surface waters.	Hauling off-site could increase site disturbance by heavy equipment, increasing compaction and erosion. Removes debris from future threats to the site.	Runoff from ashes could increase turbidity.	Burning off-site could increase site disturbance by heavy equipment during removal.	Burying on-site would cause short-term site disturbance.	Burying off-site could increase site disturbance during removal by heavy equipment.
Habitat Structure					
Using the material on-site could cause runoff, which could cover or create habitat.	Hauling off-site would decrease the potential for affects to habitat.	Burning on-site could increase temperature, decreasing habitat quality.	Burning off-site should decrease the risk of on-site chemical and biological effects.	Burying on-site would cause short-term increases in erosion.	Burying the material off-site would decrease effects on habitat.
Vegetation					
Using natural debris on-site may be beneficial for future plant growth, minimizing soil erosion.	Hauling off-site would minimize on-site impacts.	Burning debris material on-site would have minimal impacts on vegetation.	Burning off-site would minimize on-site impacts.	Burying the material on-site could cause short-term increases in erosion, which may affect habitat.	Burying the material off-site should decrease on-site impacts to vegetation.
Air Quality					
Using debris on-site has potential to cause dust problems and could impact visibility.	Hauling debris off-site for disposal would minimize on-site dust impacts but would increase emissions depending on transportation methods.	Burning on-site has potential to impact air quality in the immediate and downwind areas.	Burning off-site would minimize on-site impacts but would only transfer impacts to another area.	Burying debris on-site would have minimal impacts on air quality.	Burying debris off-site would have minimal impacts on air quality.
Riparian and Wetland Ecosystems					
Using debris on-site could cause wetland filling during future disaster events or other damages from remaining debris.	Hauling off-site would minimize on-site impacts.	Burning the material on-site could cause runoff to enter wetlands or riparian areas causing changes in chemical parameters.	Burning off-site would minimize on-site impacts.	Burying on-site would cause a disruption in soils, possibly disturbing floodplain vegetation or leading to sedimentation into nearby wetlands.	Burying off-site would minimize on-site impacts.
Soil Quality					
Composting woody or vegetative material or creating berms on-site would increase available nutrients, but may cause future hazards.	Hauling off-site would minimize on-site impacts.	Burning on-site could cause short-term increases in soil temperature.	Burning off-site would minimize on-site impacts.	Burying on-site would cause a disruption in soils, possibly disturbing vegetation or leading to sedimentation into nearby wetlands.	Burying off-site would minimize on-site impacts.

[1] Includes turbidity, temperature, dissolved oxygen, and pollutants

Summary of Environmental Impacts

Soil Erosion: Debris removal may increase the rate of erosion from fields. Erosion removes topsoil, reducing the level of organic matter and contributing to the breakdown of soil structure, thus creating a less favorable environment for plant growth. Nutrients removed by erosion are no longer available to support plant growth, but can runoff and accumulate in surface waters, creating such problems as algal blooms and eutrophication. Deposition of eroded materials may obstruct roads and fences and fill drainage channels. Eroded sediment that ends up in waterways may alter aquatic habitat and degrade water quality. Blowing dust can create a public safety and health hazard for humans.

Soil Compaction: Heavy equipment used in and around agricultural fields to remove debris or create access roads may result in soil compaction. Soil compaction occurs in response to pressure exerted by machinery and the risk of compaction is greatest when soils are wet. Compaction restricts rooting depth, decreasing water and nutrient uptake by plants. Compaction decreases infiltration thus increasing runoff and erosion hazards.

Sedimentation and runoff: Short term increases in sedimentation and runoff may result from operation of heavy equipment near a stream during debris removal. Removal of debris from fields may include removal of structures that increase sedimentation. Loss of vegetation from high winds or fire may increase runoff and erosion, introducing additional sediment to surface water sources. The rate of sediment deposition on soil may have adverse or beneficial effects on soil quality depending on the quality of the soil prior to deposition, the depth, and the origin of the sediment deposited by floodwaters.

Pollutants: Household debris from tornadoes or wind may contain paint, asbestos, insulation, and other household chemicals. Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. Changes to the soil surface such as the creation of gullies, steep slopes, or exposed slopes, may decrease infiltration capabilities for rainfall and encourage runoff and erosion of fertilizers, pesticides, manure, or other chemicals. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health, beneficial plants, and soil organisms. Water quality may be impaired or contaminated when pollutants enter surface or groundwater sources through leaching or runoff prompting adverse effects to aquatic ecosystems.

Air Quality: Air quality can be affected greatly by certain natural disaster events such as wildfires and dust storms caused by high winds and drought conditions. While ECP does not have any programs that directly deal with improving air quality, they indirectly address the problem through the implementation of numerous emergency conservation practices aimed at rehabilitating lands affected by such disasters. Air pollution originates from many different sources. Adverse air quality impacts from agricultural practices and associated field operations include smoke produced during burning operations, airborne chemicals, pesticide application (especially aerial applications), and methane gas (released from feedlots and dairy farms).

Habitat structure and Wildlife: Debris removal can create new habitat, or alter or remove existing habitat structures for terrestrial and aquatic organisms. Habitats may be formed or altered by debris that did not exist pre-disaster creating habitat for species that may have previously been limited by existing structure. Alternately, habitats may be destroyed by debris forcing wildlife species to migrate to new territories in search of new suitable habitat.

Water quality: Removal of debris may decrease pool formation in fields and subsequent flooding caused by debris jams in nearby surface water sources, which may saturate soil systems and increase potential for sedimentation in water sources. Removal of vegetation may increase erosion from floodplain areas, increasing turbidity and input of nutrients from agricultural lands.

Riparian and Wetland Ecosystems: Wetlands serve as natural sponges that trap and slowly release surface water, precipitation, groundwater, and floodwaters. The trees, shrubs, and other wetland vegetation slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and slowing action effectively lowers the potential for flood heights and reduces erosion. The holding capacity of wetlands helps control floods and prevents water logging of crops. Preserving and restoring wetlands, together with other water retention practices can often provide the level of flood control otherwise provided by expensive dredge operations on levees. Debris removal may not involve revegetation of the damaged area.

Vegetative cover and habitat: Removing vegetation to create site access will decrease cover and may reduce habitat quality. Equipment use may damage riparian vegetation through leaks, soil compaction or direct damage from equipment operation (Darnell 1976). Loss of vegetative cover from crops that are destroyed by debris or natural disaster events may increase erosion and runoff hazards.

5.2.2.2 Grading, Shaping or Leveling Farmland (EC 2)

A common result of disasters is the destabilization of farmland through flood damage, vegetation removal, and changes in soil surface. Excessive erosion, scour and gully formation, damage from debris, uprooted vegetation, and floodwaters that leave behind silt and sedimentation or overburden are typical farmland impairments. The effects include damages to soil quality, water quality, air quality, vegetation, wildlife structure, and riparian and wetland ecosystems.

Disaster caused impairments may require grading, shaping or leveling in order to return farmland to normal agricultural use. Potential impairments include the formation of gullies, humps, ridges or depressions that may cause water to pond on the ground surface, sand and silt deposits, and loss of vegetation. These damages are the results of floods, hurricanes and other significant disasters. Re-vegetation, leveling, and smoothing are techniques used to return farmland to pre-disaster operational use.

Effects on Soil Quality

Natural disasters such as wind, heavy rain, fire and other events may cause formation of depressions, humps, gullies or ridges in fields increasing the potential for standing water, erosion and runoff. Standing water temporarily increases soil moisture by saturating soils, thus decreasing the rate of infiltration. Silt and overburden deposits arise from floods water inundated with nutrients and pollutants. Because of implementing grading, shaping and leveling practices to alleviate post-disaster damages and return farmland to working order, organic matter content of soil may increase. Drainage of soil improves with the leveling and grading of farmlands due to the formation of soil aggregates.

Effects on Water Quality

Implementation of grading, shaping and leveling practices on disaster damaged agricultural land may have a significant effect on the water budget, depending on how volume and rates of runoff, infiltration, evaporation, and transpiration increase or decrease. Water quality degradation may occur due to erosion or runoff of nutrient rich sediments. Water quality will improve with better soil drainage because infiltration rates will increase with formation of soil aggregates.

Effects on Air Quality

Natural disasters have little impact on air quality when dealing with grading, shaping and leveling the land. Practice impacts will be discussed further in this section.

Effects on Vegetation

Vegetation may be damaged in several ways by disasters that require restoration by grading, leveling or shaping of farmland. Tornados and high winds or ice cover may uproot or cause trees to fall, drastically effecting field stability. Fires and extended drought will likely cause crop vegetation to be damaged in fields and adjacent areas, increasing erosion potential. Floods overtop banks and impair vegetation.

Effects on Wildlife

Wildlife habitat structure is severely impacted because of vegetation impairment, increased sedimentation of waterways, and soil erosion caused by natural disasters and subsequent grading, shaping and leveling of farmland.

Effects on Riparian and Wetland Ecosystems

Little impact would be expected in riparian and wetland ecosystems because of grading, shaping, and leveling farmland following natural disasters.

Effects of Current ECP Practices to Grade, Shape or Level Farmland

This section describes environmental impacts of the current ECP practice of grading, shaping or leveling farmland. Chapter 3 describes in more detail field impairments, the practice of grading, shaping or leveling farmland and the specific activities involved. As with all ECP projects, the primary goal of the repairs to restore agriculture lands to normal operations following a natural disaster. Restoration may require replanting vegetation in critical areas, mulching or planting hay or pastureland, mechanically smoothing the land or leveling the land to restore irrigation.

Depending on the extent of the damages, the practice of grading, shaping and leveling farmland is often the second step in restoring farmland following debris removal. Generally, upon completion of such activities as access creation and heavy equipment use, some grading and shaping are likely to be required. Activities unique to grading, shaping and leveling include: re-leveling irrigated land and smoothing out damages from disasters, and Revegetation of critical areas, mulching, and planting hay and pastureland.

Environmental Impacts

Grading, re-leveling or shaping farmland can have many impacts on the land. Heavy machinery required to excavate and move soil increases erosion potential and soil, air and noise pollution from construction. Fill material may be required for shaping or grading and depending on where the fill comes from, may bring new pollutants. Leveling is required occasionally as part of normal field maintenance on farms, and disaster related leveling would likely not cause any additional environmental consequences than normal farm operation. Water flow may be interrupted and aquifers may be affected as a result.

Land smoothing is similar to grading and shaping in that its purpose is to improve surface drainage by removing irregularities from fields, which tend to interfere with soil and water conservation and management practices. Special equipment is required to smooth the land, causing soil compaction. Earth moving may uncover or redistribute toxic materials, such as saline soils. Lack of vegetative cover could increase sediment runoff during construction. Nutrient and pesticide requirements may alter, either negatively or positively, depending on specific site and soil quality characteristics. There are several benefits of implementing this practice. Surface drainage is improved which decreases pond formation that may occur due to debris or gullies.

Revegetation is the final stage of grading, shaping or leveling farmland. Once the structural work has been completed, it is possible that the equipment operation, in combination with the disaster impacts, has destroyed vegetation in its path. To increase the effectiveness of the newly installed practices, grasses and woody species can be planted to reduce erosion, stabilize fields, and provide cover and soil temperature regulation (see Sweeney 1993 and Beeson and Doyle 1995) in critical areas. Critical area planting may help to restore habitat structure and increase organic matter and water holding capacity in soil, which is important especially during periods of drought. Planting hay or pastureland increases cover, reduces wind and water erosion and restores forage and habitat structure for wildlife and livestock. Mulching practices conserve soil moisture during drought conditions, reduce runoff and erosion, control weeds, and help establish plant cover. Concerns include invasion of undesirable plant and insect species and potential disease vectors.

Summary of Impacts

Soil Erosion: Grading, shaping and leveling of farmland may increase the rate of erosion from farm fields. Erosion removes topsoil, reducing the level of organic matter and contributing to the breakdown of soil structure, thus creating a less favorable environment for plant growth. Nutrients removed by erosion are no longer available to support plant growth, but can runoff and accumulate in surface waters, creating such problems as algal blooms and eutrophication. Deposition of eroded materials may obstruct roads and fences and fill drainage channels. Eroded sediment that ends up in water ways may alter aquatic habitat and degrade water quality. Blowing dust creates a public safety and health hazard for humans.

Soil Compaction: Heavy equipment used in and around fields to excavate soil and reshape, level and grade fields may result in soil compaction. Soil compaction occurs in response to pressure exerted by machinery. The risk of compaction is greatest when soils are wet. Compaction restricts rooting depth, decreasing water and nutrient uptake by plants; and decreases infiltration thus increasing runoff and erosion hazards.

Sedimentation and runoff: Short term increases in sedimentation and runoff may result from operation of heavy equipment near a stream during field leveling and smoothing operations. Leveling, shaping and grading fields may include movement of earth, potentially increasing sedimentation. Loss of vegetation from high winds, fire, or drought may increase runoff and erosion, introducing additional sediment to surface water sources. The rate of sediment deposition on soil may have adverse or beneficial effects on soil quality depending on the quality of the soil prior to deposition, sediment layer depth, and the origin of the sediment deposited by floodwaters.

Riparian and Wetland Ecosystems: Some minor effects in wetland and riparian ecosystems may occur because of temporary increases in erosion because of grading, shaping, and leveling farmland practices. Increases in runoff loaded with sediment may impact water quality and buildup in wetland areas.

Pollutants: Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. Changes to the soil surface, such as the creation of gullies, steep slopes, or exposed slopes, may decrease infiltration capabilities for rainfall and encourage runoff and erosion of fertilizers, pesticides, manure, and/or other chemicals. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health, beneficial plants, and soil organisms. Water quality may be contaminated when pollutants enter surface or groundwater sources through leaching or runoff and may cause adverse effects to aquatic ecosystems. Earth moving may uncover or redistribute toxic materials, such as saline soils throughout the field.

Air Pollution: Heavy equipment needed to grade, shape and level farmland following natural disasters may create temporary air quality problems from emissions. Digging and moving earth may aerosolize dust particles creating a respiratory and visibility hazard.

Habitat structure and Wildlife: Altering the shape and grade of the land can remove or modify habitat structure. Revegetation of critical areas, planting hay and pastureland, and mulching may increase and/or restore wildlife diversity following natural disaster events.

Water quality: Grading, shaping and leveling may decrease pool formation and subsequent flooding by increasing infiltration rates and improving surface drainage systems. Removal of vegetation may increase erosion from floodplain areas, increasing turbidity and input of nutrients from agricultural lands. Revegetation will improve water quality by filtering sediment runoff and nutrients.

Vegetative cover and habitat: Damaged vegetation from disasters and leveling, shaping and grading farmland will decrease cover and could reduce habitat quality. Equipment use may damage riparian vegetation through leaks, soil compaction or direct damage from equipment operation (Darnell 1976). Loss of vegetative cover from crops damaged by natural disaster events may increase erosion and runoff hazards. Revegetation of critical areas will promote habitat and wildlife biodiversity and reduce erosion and runoff as well as improve soil and water quality.

5.2.2.3 Permanent Fence Restoration (EC 3)

The primary function of fence restoration includes controlling movement of livestock and wildlife in agricultural areas and limiting human access to fields. Fence restoration is an ECP practice that is applied only to cross fences, boundary fences, and cattle gates that are less than 30 years old. The destruction of fences by natural disasters may provide additional debris that would require removal. Soil erosion and limiting of wildlife movement are potential environmental impacts of fences.

Impacts to Soil Quality

Disaster damages to fences are generally minimal impacts with few soil quality concerns.

Impacts to Water Quality

The only impact of fences on water quality is the potential for fence debris to end up in nearby streams or for built up sediment along fence lines to runoff into surface water sources if the fence is disturbed or destroyed.

Impacts to Air Quality

Disaster caused fence damage has little to no expected impact on air quality.

Impacts to Vegetation

There are minimal impacts to vegetation associated with fence damage from natural disasters.

Impacts to Wildlife

Restoration of fences needed because of natural disasters may have a significant effect on wildlife. Downed fences open up temporary wildlife migration routes that may not have existed prior to the disaster. Fences may restrict or open up watering sources to wildlife and livestock that were not previously accessible.

Impacts to Riparian and Wetland Ecosystems

Destruction of fences from high winds and severe weather has minimal impact on riparian areas and wetland ecosystems. Minimal soil erosion and runoff may occur, causing small amounts of sedimentation to end up in wetland areas, however no major impacts are expected.

Effects of Current ECP Practices to Restore Fences

This section describes environmental impacts of the current ECP practice of fence repair or installation. Chapter 3 describes in more detail field impairments, and the practice of fence restoration and the specific activities involved. As with all ECP projects, the primary goal of the repairs is to restore agriculture lands to normal operation following a natural disaster.

Depending on the extent of the damages, the fence restoration or repair may be required. Only cross fences, boundary fences, or cattle gates may be restored. Regular inspections of fences and post-disaster inspections are needed to facilitate the function of the intended use of fences.

Environmental Impacts

Restoring or replacing fences following disaster events most likely will require debris clean up as fences are a common source of farm debris. Reuse of materials is the preferred use of debris disposal, however it is understood that is not always possible. In those instances heavy equipment may be needed to remove debris, and depending on the type of barrier, may be required to help restore the fence (i.e. if the fence barrier is constructed of rocks). Heavy equipment may have detrimental soil effects, such as compaction and small amounts of vegetation may be damaged. Larger sections of vegetative cover may be damaged if access roads are needed. Soil erosion could be an issue if constructing a new fence line to sink posts however, and the most likely scenario, is that built up sediment along the fence line may be disturbed and could end up in nearby surface water sources via runoff. Wildlife movement needs must be considered when fences are installed and repaired. Avoiding irregular terrain and water crossings mitigates potential environmental impacts associated with wildlife.

Summary of Impacts

Soil Erosion: Soil may erode when fence line is restored or replaced when built up soil along fence lines is disturbed.

Soil Compaction: Heavy equipment used to repair fences or carry away debris may cause soil compaction. Soil compaction occurs in response to pressure exerted by machinery and the risk of compaction is greatest when soils are wet. Compaction restricts rooting depth, decreasing water and nutrient uptake by plants. Compaction decreases infiltration thus increasing runoff and erosion hazards.

Riparian and Wetland Ecosystems: Restoration of fence lines following disasters will have minimal impact on riparian and wetland ecosystems.

Pollutants: Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health and beneficial plants and soil organisms. Water quality may be impaired or contaminated when pollutants enter surface or ground water sources through leaching or runoff and may cause adverse effects to aquatic ecosystems. Wildlife and livestock that graze near fence lines may be impacted by water bound pollutants.

Air Quality: Heavy equipment needed to restore fences following natural disasters may create temporary air quality impacts from emissions. Digging and moving earth may aerosolize dust particles creating a respiratory and visibility hazard.

Habitat structure and Wildlife: Fence lines restrict wildlife movement and in some circumstances may restrict access to grazing and water sources.

Vegetative cover and habitat: Equipment use may damage vegetation through leaks, soil compaction or direct damage from equipment operation (Darnell 1976) or creation of access.

5.2.2.4 Practices that Restore Structures and other Installations (EC 4)

The primary function of farm structure and installation restoration is to replace or repair equipment to pre-disaster condition necessary for post-disaster farm operation. This section discusses practices including: installation of i.) Dams, ponds, and other water impoundments for agriculture uses; ii.) Sod or grass waterways; iii.) Restoration of installed open or closed drainage systems; iv.) Diversions or spreader ditches; v.) Terrace systems; vi.) Structures for the protection of outlets or water channels before the disaster; vii.) wells; viii.) Springs; ix.) Pipelines; x.) Buried mainlines; xi.) Ditches and other permanently installed systems; xii.) Permanent vegetative cover including re-establishment where needed; and xiii.) Animal waste lagoons.

Farm structures and systems are needed to make farmland operational. They provide irrigation water to fields and crops, vegetation for erosion control, water and waste storage, water source protection, and water supply for livestock and wildlife. Destruction of these structures and systems by disasters can halt farm operation if not restored quickly.

Impacts to Soil Quality

Installation of wells and terrace systems may be sources of soil quality concerns during and following natural disasters including drought, high winds, and intense rain, such as tornados and hurricanes. Soil erosion may increase causing sediment to settle in diversions and ditches as blockages, and depositing in surface water and degrading water quality. Grass waterways, pipelines, and other structures are used to decrease erosion potential, however when those systems fail due to blockages from debris, or sediment, or vegetation is lost, erosion may occur.

Impacts to Water Quality

Loss of farm structures and systems due to severe weather and natural disasters may have extensive adverse effects on water quality. Broken dams, sediment filled diversions, broken pipes and water protection structures are examples of the sources from which water quality problems might arise. Blocked ditches, water supply sources, and destroyed irrigation systems are other potential causes. Drought emergencies may require new wells to be installed that could, potentially, affect aquifer and water table levels and have an effect on surrounding users. Irrigation systems may also work overtime during times of drought, increasing water usage. See Section 5.2.2.6 for more information on drought emergency practices.

Impacts to Air Quality

Disaster impacts to air quality with respect to structure repair and restoration should be minimal. Disasters may cause dust problems that may damage equipment; otherwise, effects are not notable.

Impacts to Vegetation

Vegetation is installed to protect structures and decrease erosion in critical areas following structure installation. Destruction or impairment of those structures due to natural disasters such as major storms, winds, tornados, rain and hurricanes, increases the need for Revegetation to protect them and control erosion.

Impacts to Wildlife

Many farm operations have ponds, dams, or other water impoundments for agriculture use that may also serve wildlife needs and provide habitat structure for some wildlife species. Disasters impacts may increase sedimentation in such structures, degrading water quality or impairing the facility entirely for short-term periods. Destruction of those facilities would cause a loss of biodiversity on or near individual farmland and in the farmland community.

Impacts to Riparian and Wetland Areas

The general effects of disasters on riparian, floodplain, and wetland ecosystems would be similar to those seen in aquatic systems. Normally, installation and structural practices are located outside of riparian and wetland areas so interactions with those environments are minimized. Vegetative cover and habitat may be negatively affected if flow volumes are large, as the riparian vegetation may be damaged. Water quality may experience some decreases, especially in cases where animal waste or agricultural chemicals are introduced to the wetland. *Biota* may be adversely affected by increased erosion or reduced water quality. *Wetlands* may see some change in water flows, in water quality, or may experience some negative effects from sedimentation.

Effects of Current ECP Practices to Restore Structures and other Installations

This section describes environmental impacts of the current ECP practice of structure restoration and other installations. Chapter 3 describes in more detail field impairments, the practice structure restoration and other installations and the specific activities involved. As with all ECP projects, the primary goal of the repairs is to restore agriculture lands to normal operations following a natural disaster. Restoration may require installation of i.) Dams, ponds, and other water impoundments for agriculture uses; ii.) Sod or grass waterways; iii.) Restoration of installed open or closed drainage systems; iv.) Diversions or spreader ditches; v.) Terrace systems; vi.) Structures for the protection of outlets or water channels before the disaster; vii.) Wells; viii.) Springs; ix.) Pipelines; x.) Buried mainlines; xi.) Ditches and other permanently installed systems; xii.) Permanent vegetative cover including re-establishment where needed; and xiii.) Animal waste lagoons.

Environmental Impacts

Restoration of most farm structures and other installations requires the use of heavy machinery for installation and restoration. Sediment deposits build up significantly in dams, ponds, and other water impoundments, sod or grass waterways, installed open or closed drainage systems, diversions or spreader ditches, structures for the protection of outlets or water channels before the disaster, pipelines, buried mainlines and ditches and other permanently installed systems as a result of disaster related debris or erosion. Heavy machinery needed to install or restore most practices may compact the soil surrounding the impoundment and harm any vegetation in the immediate vicinity, increasing the potential for runoff and water erosion. However, installation of such structures provides potential water sources for wildlife, irrigation, and livestock watering, reducing impacts on ground water sources and water supply for surrounding communities. These structures also may act as catch basins for runoff water, intercepting and containing or diverting potentially nutrient rich runoff water and keeping it out of surface streams. Ditches and diversions also slow the rate of flow over land, increasing infiltration rates into the soil.

Terrace systems are earth embankments constructed across slopes to decrease water erosion and runoff and increase infiltration rates. Installation of these practices requires heavy earth moving equipment, which may cause soil compaction and temporary or short-term construction related increases in degradation of water quality. Earth moving also has the potential effect to uncover or redistribute toxic materials such as saline soils.

Installation of wells and **spring development** also requires the use of heavy equipment, potentially causing soil compaction and increased sediment erosion, loss or damage of surrounding vegetation and increased soil pollutants. Installation and use of these structures provides water sources for livestock, wildlife, and irrigation, however this may affect local water supplies of the surrounding community by decreasing the water table and the aquifer system. Water quality may be impaired as well by construction methods if not constructed properly.

Permanent vegetative cover, including re-establishment of plants needed in conjunction with eligible structures and/or installations to prevent critical erosion and siltation, provides continued benefits including increases in biodiversity and habitat structure, decreases of runoff in critical and non-critical areas, improved soil structure and soil moisture, and decreases in water and wind caused erosion.

Animal waste lagoons reduce pollution potential by treating manure and wastewater biologically. Installation or restoration must meet NRCS specifications and requires significant construction and earth moving equipment as well as a disposal method for excavated soil. Effects of heavy machinery on farmlands, such as increased erosion and runoff from soil compaction, loss of vegetation, and potential uncovering or redistribution of toxic materials in the soil may be severe. There must be an outlet for treated water, which may have a negative effect on water quality, though in most cases provides a source of irrigation water for non-consumed crops. Proper practices must be followed to avoid contamination of surface waters in the event of a system failure; drainage area must be kept minimal and contained if possible and out of the floodplain. Embankments must be treated for erosion control. Other impacts may arise from transportation of waste to lagoon and systems used to disperse effluent. Failure of lagoons or leaks can have significant detrimental impacts on surrounding water and soil quality.

These practices are typically placed in upland areas, away from riparian and wetland areas, and should have minimal effects on ecologic communities when damaged. A failure in a diversion or waterway would likely result in increased erosion to croplands, as the runoff would no longer be diverted away. These effects may be localized to the damaged structure, as the volumes of water contained or diverted are rather small and may not be sufficient to reach existing waterways. The content of the runoff would be composed of water and sediment, with some contribution from pollutants and chemicals. A failed animal waste storage pond would prove highly problematic, however, as the highly concentrated waste can be devastating on aquatic communities, causing sizeable fish kills and degrading water quality. The failure of an embankment pond could also be more troublesome, depending on the volume of water impounded. The effects could be minimal and localized, or they may more closely resemble the effects seen under dam and dike repairs.

Turbidity may be locally increased during failures, with the possibility of larger effects during greatly elevated flows. Dissolved oxygen would likely decrease causing undue stress on aquatic organisms.

Pollutants may become suspended in the runoff, degrading water quality. Habitat structure may be adversely affected if erosion or poor water quality negatively impacts aquatic vegetation and habitat. Channel structure may be negatively impacted by increased erosion and sedimentation.

Summary of Impacts

Soil Erosion: Restoration of farm structures and other installations may increase the rate of erosion from fields and areas adjacent to structures during installation. Erosion removes topsoil, reducing the level of organic matter and contributing to the breakdown of soil structure, thus creating a less favorable environment for plant growth. Nutrients removed by erosion are no longer available to support plant growth, but can runoff and accumulate in surface waters, creating such problems as algal blooms and eutrophication. Deposition of eroded materials may obstruct roads and fences and fill drainage channels. Eroded sediment that ends up in water ways may alter aquatic habitat and degrade water quality. Blowing dust can also create a public safety and health hazard for humans.

Soil Compaction: Heavy equipment used in and around the field and installation and construction sites to install or restore farm structures and installations may result in soil compaction. Soil compaction occurs in response to pressure exerted by machinery and the risk of compaction is greatest when soils are wet. Compaction restricts rooting depth, decreasing water and nutrient uptake by plants. Compaction decreases infiltration thus increasing runoff and erosion hazards.

Sedimentation and runoff: Short term increases in sedimentation and runoff may result from operation of heavy equipment near a stream during structure installation or restoration practices. Installing and restoring farm related structures and other installations might include movement of earth, which increases sedimentation and potential for uncovering and distributing toxic pollutants such as saline soil. Loss of vegetation from high winds or fire or drought may increase runoff and erosion, introducing additional sediment to surface water sources. The rate of sediment deposition on soil may have adverse or beneficial effects on soil quality depending on the quality of the soil prior to deposition, the depth and the origin of the sediment deposited by floodwaters.

Riparian and Wetland Ecosystems: The primary concern to ecological communities would be prevention of erosion, as the supply of *sediment* and *pollutants and nutrients* would likely be high. Other functions would essentially be unaffected by the restoration efforts, as the work is principally conducted in upland areas. Practices such as diversions, ponds, and waterways are common structures used on farms to prevent soil erosion, contain wastes and runoff, and provide a supply of water for irrigation or animal consumption. Diversions and grassed waterways are often used together and serve to redirect overland runoff and intermittent streams around valuable cropland and into existing stream channels. Animal waste storage ponds collect waste for long-term storage, and it is generally emptied periodically for application to the croplands. Embankment ponds collect rainfall and runoff for protection against erosion, animal drinking water, and for human recreational use.

Pollutants: Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. Changes to the soil surface, such as creating gullies, steep slopes, or exposed slopes, may decrease infiltration capabilities for rainfall and encourage runoff and erosion of fertilizers, pesticides, manure, or other chemicals. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health and beneficial plants and soil organisms. Water quality may be impaired or contaminated when pollutants enter surface or ground water sources through leaching or runoff and may cause adverse effects to aquatic ecosystems. Earth moving may uncover or redistribute toxic materials, such as saline soils throughout the field.

Air Quality: Heavy equipment needed to restore structures and installations following natural disasters may create temporary air quality impacts from emissions. Digging and moving earth may aerosolize dust particles creating a respiratory and visibility hazard.

Habitat structure and Wildlife: Installing or restoring farm structures and other installations can remove or alter habitat structure. Revegetation of critical areas and installation of water impoundments or other water sources may restore wildlife diversity following natural disaster events.

Water quality: Restoring or installing farm structures or other installations may degrade water quality and decrease water supply. Runoff and sediment that buildup in agriculture related water impoundments degrades water quality but may intercept nutrients and pollutants before they end up in surface streams, which improves surface water quality to downstream communities. Removal of vegetation may increase erosion from floodplain areas, increasing turbidity and input of nutrients from agricultural lands. Revegetation will improve water quality by reducing sediment runoff.

Vegetative cover and habitat: Damaged vegetation from disasters and construction will decrease cover and may reduce habitat quality. Equipment use may damage riparian vegetation through leaks, soil compaction or direct damage from equipment operation (Darnell 1976). Loss of vegetative cover from crops that are destroyed by natural disaster events may increase erosion and runoff hazards. Revegetation of critical areas will promote habitat and wildlife biodiversity and reduce erosion and runoff as well as improve soil and water quality and help protect farm structures and other installations from future damage by improving soil stability surrounding the structure.

5.2.2.5 Practices that Provide Emergency Wind Erosion Control (EC 5)

This practice is applied to farmland communities subject to serious wind erosion because of extended periods of insufficient moisture (drought) and farmland that lacks sufficient crop residues or stubble to adequately protect the land. Wind erosion is a result of high winds from severe storms, tornados and drought conditions. Wind erosion may also result from significantly fire-damaged farmlands. Emergency wind control measures are put into place to help reduce the amount of wind erosion.

Impacts on Soil Quality

Wind erosion occurs when wind velocities are sufficient to lift individual soil particles. Exposed soils often occur following severe natural disasters, along long, unsheltered, and smooth soil surfaces, such as farm fields. Wind removes the topsoil layer reducing levels of soil organic matter, thus creating an unfavorable environment for plant growth.

Impacts on Water Quality

Wind eroded soil may be carried and deposited in surface waters via runoff. Water quality may be degraded by sediment build up and nutrients in surface waters.

Impacts on Air Quality

Because of severe wind erosion, dust problems occur negatively impacting air quality and visibility. Dust in the air may cause respiratory ailments for humans and animals in agriculture communities.

Impacts on Vegetation

One of the main causes of wind erosion aside from major natural disasters and high wind velocities is the lack of vegetative cover on the ground to protect the soil. Soil subject to erosion creates a less favorable environment for future plant growth because of the loss of nutrients and soil organic matter.

Impacts on Wildlife

Wind erosion can cause sediment to buildup along fences and in streams, impacting wildlife habitat structure and causing blowing dust, which may be detrimental to not only humans, but birds and other wildlife species as well.

Impacts on Riparian and Wetland Ecosystems

During severe wind erosion events, increased amounts of sediment may move to riparian and wetland ecosystems, causing sediment to build up faster than it normally would. Sediment may also bring with it pesticides and other chemicals that will degrade water and habitat quality, further reducing the function of wetland ecosystems.

Impacts of Current ECP Practices to Implement Emergency Wind Erosion Control Measures

This section describes environmental impacts of the current ECP practice of implementing emergency wind erosion control measures. Chapter 3 describes in more detailed field impairments, the practice of implementing emergency wind erosion control measures, and the specific activities involved. As with all ECP projects, the primary goal of the repairs is to restore agriculture lands to normal operations following a natural disaster. Implemented control measures may include surface roughening.

Environmental Impacts

Wind erosion causes sedimentation in surface waters and along fence lines as well as decreases in plant growth. Wind erosion may also have an adverse effect on air quality; blowing dust can affect human health and public safety. Surface roughening is a tillage method used to curb wind erosion. Surface roughening forms clods or soil aggregates that are too large to be carried by wind. This practice has no apparent negative impacts and doesn't usually require any special equipment.

Summary of Impacts

Soil Erosion: Wind erosion control measures taken on farmland removes topsoil, reducing the level of organic matter and contributing to the breakdown of soil structure, thus creating a less favorable environment for plant growth. Nutrients removed by erosion are no longer available to support plant growth, but can runoff and accumulate in surface waters, creating such problems as algal blooms and eutrophication. Deposition of eroded materials may obstruct roads and fences and fill drainage channels. Eroded sediment that ends up in water ways may alter aquatic habitat and degrade water quality. Blowing dust can also create a public safety and health hazard for humans.

Soil Compaction: Little to no impact is expected because of wind erosion control measures on soil compaction.

Sedimentation and runoff: Short term increases in sedimentation and runoff may result from severe wind erosion events and erosion control measures. Increased runoff and deposition of sediment can be expected in surface water sources. The rate of sediment deposition on soil may have adverse or beneficial effects on soil quality depending on the quality of the soil prior to deposition, the depth, and the origin of the sediment deposited by floodwaters.

Pollutants: Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health and beneficial plants and soil organisms. Water quality may be impaired or contaminated when pollutants enter surface or ground water sources through leaching or runoff and may cause adverse effects to aquatic ecosystems. Earth moving may uncover or redistribute toxic materials, such as saline soils throughout the field.

Habitat structure and Wildlife: Wind erosion and wind erosion control measures may alter habitat structure in and around farmland communities. Habitat structure may be destroyed, forcing wildlife to construct new habitat or migrate to new areas.

Air Quality: Wind erosion may have an adverse effect on air quality; blowing dust can affect human health and public safety causing respiratory ailments in humans and animals as well as severely reducing visibility on the ground and in the air.

Water quality: Wind erosion events and control measures may increase runoff potential, causing a buildup of sediment and agriculture related chemicals to degrade adjacent water quality systems above and below ground.

Riparian and Wetland Ecosystems: Severe wind erosion events and the implementation of wind erosion control measures could increase the amount of sediment in adjacent riparian and wetland ecosystems, impacting the quality and function of the ecosystem.

Vegetative cover and habitat: Following severe wind erosion events, Revegetation of critical areas will promote habitat and wildlife biodiversity and reduce erosion and runoff as well as improve soil and water quality. Wind erosion removes topsoil, which negatively impacts plant growth because most of the nutrients plants need is found in the top layer of soil.

5.2.2.6 Practices for Drought Emergency (EC 6)

During periods of extensive drought, conservation measures must be provided for water conservation and enhancement purposes in order to uphold livestock health, emergency water supply for existing irrigation systems for orchards and vineyards, and to provide water for confined livestock operations. Emergency drought conservation measures include provisions to install infrastructure providing new water sources, including pipeline and wells, installation of water storage facilities if they are needed for immediate needs of livestock, water collection and storage facilities for livestock and irrigation water, develop springs or seeps to provide water for livestock, and measures to provide emergency water supply for livestock in confinement operations on farms where they were confined prior to the emergency.

Extensive periods of drought can have long-term effects on water supply and quality for farmland communities and individual farmers as well as short-term environmental impacts on soil quality, crop loss, and damage to grazing and forage lands. Significant wind erosion may result effects on plant growth, depending on how long the drought persists.

Impacts on Soil Quality

During periods lacking sufficient precipitation, the water holding capacity of soils diminishes, effecting plant growth. The amount of water soil can provide becomes critical to plant growth because plants are removing more water from the soil then is being supplied by precipitation. Soil becomes dry and subject to wind erosion if cover is not available.

Impacts on Water Quality

Long-term droughts can severely degrade water quality and ground and surface water supplies to farmers and farmland communities. Aquifers and water tables levels may decrease and groundwater levels are not recharged sufficiently, which may affect water supply in the future. Surface water supplies diminish from use, evaporation and lack of precipitation to maintain proper flows. When water flow decreases sediment may buildup from erosion and any pumping that may be going on to provide water from surface supplies may affect turbidity.

Impacts on Air Quality

Periods of drought tend to make for dusty conditions, affecting visibility and increasing opportunity for respiratory ailments. Because drought conditions usually occur or are detrimental during the summer season, in some areas high ozone also plays a part in causing respiratory ailments, so agriculture communities in drought prone regions that experience high ozone problems are likely to experience the worst air quality degradation impacts.

Impacts on Vegetation

Droughts cause a loss of protective vegetation and may have a negative effect on plant growth in the fields due to lack of water. If irrigation is possible, then cropland and grazing or forage lands can be maintained for crop production and livestock. Vegetation diversity may also be affected depending on the drought tolerance levels of plant species and whether they are native or introduced. Drought stricken lands may impair the land enough that invasive species could move in or vice versa.

Impacts on Wildlife

Long-term droughts may increase the risk of fires in some communities and degradation of water supplies for wildlife will negatively impact habitat structure. Lack of water may force wildlife species to migrate to areas with sufficient water supply, decreasing biodiversity.

Impacts on Riparian and Wetland Ecosystems

Long-term droughts may decrease the function of riparian and wetland ecosystems, causing wetlands to dry up impacting wildlife habitat and water quality.

Effects of Current ECP Practices on Drought Emergency Measures

This section describes environmental impacts of the current ECP practices of implementing emergency drought measures. Chapter 3 describes in more detail field impairments, the practices involved in implementing drought emergency measures and the specific activities involved. As with all ECP projects, the primary goal of the repairs is to restore agriculture lands to normal operations following a natural disaster. Implemented control measures include: i.) Installing pipeline to a secondary water supply source if the primary source is insufficient; ii.) Installation of above ground water storage facilities for immediate needs of livestock, iii.) Installation, construction or deepening of wells for livestock water or where there is no other source of emergency water available that could be developed at less expense; iv.) Construction of tail water recovery pits for irrigation systems, v.) Development of springs or seeps to supply water supply for livestock, and vi.) Measures to provide emergency water for livestock in confinement operations that were in confinement prior to the onset of the drought.

Environmental Impacts

Installation of pipes, above ground water storage facilities, construction, deepening or installation of new wells, and construction of tail water recovery pits for irrigation systems all require use of heavy equipment and transport vehicles which may compact soil, increasing soil erosion. Installation and construction practices may earth moving which could uncover and/or redistribute toxic materials such as saline soil. Removal or damage to vegetation may occur because of construction. Air pollution from airborne soil particles and exhaust from construction equipment, and soil pollutants are other negative effects of construction practices on farmlands. Deepening of wells or new construction of wells may contaminate groundwater supplies if not constructed properly and new wells may decrease aquifer or water table levels, which has an effect on entire farmland communities. Water storage and collection facilities such as reservoirs and pits may be constructed to intercept surface flow or surface runoff in order to provide emergency water supplies to livestock and for irrigation purposes. Water supplies, such as above ground troughs, may have an increase soil compaction around the source due to livestock.

Summary of Impacts

Soil Erosion: Drought emergency measures installed on farmland may increase the rate of erosion from fields. Erosion removes topsoil, reducing the level of organic matter and contributing to the breakdown of soil structure, thus creating a less favorable environment for plant growth. Nutrients removed by erosion are no longer available to support plant growth, but can runoff and accumulate in surface waters, creating such problems as algal blooms and eutrophication. Deposition of eroded materials may obstruct roads and fences and fill drainage channels. Eroded sediment that ends up in water ways may alter aquatic habitat and degrade water quality. Blowing dust can also create a public safety and health hazard for humans.

Soil Compaction: Heavy equipment used in and around the field to excavate soil to install or construct water supply, storage, or transport infrastructure may result in soil compaction. Soil compaction occurs in response to pressure exerted by machinery and the risk of compaction is greatest when soils are wet. Compaction restricts rooting depth, decreasing water and nutrient uptake by plants. Compaction decreases infiltration thus increasing runoff and erosion hazards.

Sedimentation and runoff: Short term increases in sedimentation and runoff may result from operation of heavy equipment near a stream during construction and installation operations. Drought emergency practices may include movement of earth, which could increase sedimentation. Loss of vegetation drought may increase runoff and erosion, introducing additional sediment to surface water sources. The rate of sediment deposition on soil may have adverse or beneficial effects on soil quality depending on the quality of the soil prior to deposition, the depth and the origin of the sediment deposited by floodwaters.

Pollutants: Heavy equipment used in and around the field may result in leaks of mechanical fluids into the soil. The presence and bioavailability of chemicals in the soil can adversely impact human and animal health and beneficial plants and soil organisms. Water quality may be impaired or contaminated when pollutants enter surface or ground water sources through leaching or runoff and may cause adverse effects to aquatic ecosystems. Earth moving may uncover or redistribute toxic materials, such as saline soils throughout the field.

Habitat structure and Wildlife: Installing new wells and other water supply or storage infrastructure may alter habitat structure. Lack of water supply because of drought may force wildlife to migrate to new areas, decreasing biodiversity in farmland communities.

Air Quality: Heavy equipment needed to mitigate drought may create temporary and air quality impacts from emissions. Digging and moving earth may aerosolize dust particles creating a respiratory and visibility hazard.

Water quality: Deepening of wells or new construction of wells may contaminate groundwater supplies if not constructed properly and new wells may decrease aquifer or water table levels, which has an effect on entire farmland communities.

Riparian and Wetland Ecosystems: Increased wind erosion and sediment from drought conditions and the implementation of drought conservation measures could increase the amount of sediment in adjacent riparian and wetland ecosystems, impacting the quality and function of the ecosystem. Drought may also cause wetland areas to dry up, severely impacting water quality of adjacent surface waters and degrading wetland and riparian habitat diversity.

Vegetative cover and habitat: Destroyed or damaged vegetation from drought will decrease protective cover and reduce habitat quality and structure. Soil water capacity is also diminished, decreasing soil ability to sustain plant growth. Equipment use may damage riparian vegetation through leaks, soil compaction or direct damage from equipment operation (Darnell 1976). Loss of vegetative cover from crops that are destroyed by natural disaster events may increase erosion and runoff hazards. Revegetation of critical areas following droughts will promote habitat and wildlife biodiversity and reduce erosion and runoff as well as improve soil and water quality.

5.2.2.7 Practices for Other Emergency Conservation Measures (EC 7)

Other emergency conservation practices, not mentioned elsewhere, may be authorized by the required authority on a disaster-by-disaster case. Practices must meet ECP standards. Disasters may cause significant damages in ways that have never occurred or been thought of. Practices may be implemented as approved by proper FSA authority to return or restore disaster damaged conservation or pollution abatement practices and to restore farmlands to normal production capacity and returning it to normal agriculture use. Only practices providing solutions to disaster impacts may be implemented through ECP. Impacts cannot be determined at this time.

Effects of Current ECP on Other Emergency Conservation Measures

This section describes environmental impacts of the current ECP practices of implementing other emergency conservation practices that are disaster-specific special projects. Chapter 3 describes in more detail the purpose of this practice and potential activities involved. As with all ECP projects, the primary goal of the repairs is to restore agriculture lands to normal operations following a natural disaster. Implemented conservation measures have included hauling water to livestock in fields during drought and removing silt from previously existing water impoundment reservoirs to improve water supply sources during drought conditions.

Environmental Impacts

Hauling water to livestock out in fields during severe drought was implemented to conserve livestock health and provide a source of water for livestock when normal sources are unavailable. Impacts from hauling water to the livestock may cause soil erosion or compaction concerns.

Removing silt from previously existing water impoundment reservoirs requires equipment to remove the silt. Other potentially negative impacts include disposal of the silt once it has been removed. Clearing built-up silt out of water impoundments will increase water supply, improve water quality of stored water, and make it usable during times of need, such as drought.

Summary of Impacts

Because this practice is specific to disasters and the practice ends once the disaster is over, such as the end of a drought, it is difficult to characterize specific environmental impacts and summarize them. As with any installation or construction practice, equipment and vehicle related impacts may be incurred, soil erosion and compaction may increase, and runoff may degrade water quality due to lack of infiltration. Habitat and vegetation impacts cannot be evaluated for the practice at this time.

5.3 IMPACTS OF THE ALTERNATIVES

5.3.1 Impacts of the No Program Alternative

Under this alternative, farmers and ranchers would be forced to pursue other avenues of assistance in the event that a natural disaster damaged their farmland, and ECP would not have:

- Allocated almost $500 million in cost-share assistance to over 220,000 farms across the country in order to rehabilitate agriculture lands damaged by natural disasters and drought from 1978 to 2000, (See Figure 3.2.3-1).
- In 2001 alone, ECP helped rehabilitate 7.6 million acres of farmland at a total of $64,985,108 in cost-sharing and technical assistance provided to 44 states (CFDA, "No Date").

Predicting the affects of the impacts without ECP is difficult due to the other avenues of emergency assistance already available to farmers, please refer to discussion of these programs in Section 3.3.1. It may however, be assumed that the productivity of those agriculture lands affected by natural disasters would be degraded. This is in part due to the focus of ECP, while other programs focus on mitigating damages to the environment or giving financial assistance directly to the farmer to compensate their losses, ECP focuses solely on returning the land back to its productive state after receiving damage from a natural disaster.

5.3.2 Impacts of Current Program: The No Action Alternative

The No Action Alternative would not involve any changes in the current Program. The impacts to the environment would be essentially the impacts described under each practice, in Section 5.2.2. Refer to these sections for the detailed discussions on environmental impacts of the current Program.

5.3.3 Impacts of Proposed ECP Changes

This section describes the impacts of proposed changes to be implemented under the proposed actions: cost share rate changed to a flat percentage rate; implementation of a special flat rate for limited resource producers; and addition of provisions to provide ECP funding for confined livestock operations for natural disasters other than drought. Impacts caused by the proposed changes (below) are in addition to the effects of the current program in Sections 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, and 5.2.7. Refer to these sections for the detailed discussions on environmental impacts of the current Program.

5.3.3.1 Impacts of Changing the Cost-Share Rate

Changing the ECP cost-share rate to a flat rate of 75 percent has been analyzed in detail earlier in Chapter 4. Traditionally, ECP has used a sliding rate, providing cost-share funds up to 64 percent The Proposed Action would make the program easier to administer, make ECP cost-share rates consistent with other USDA programs, and prevent potential abuse of the program, such as when a large practice is subdivided into smaller practices to avoid lower reimbursement rates applicable at the higher loss levels.

Effects of Changing Cost-Share Rate

Changing the ECP cost-share rate to a flat rate of 75 percent has been discussed is an administrative change. No environmental effects or impacts are apparent because of this proposed change at this time.

5.3.3.2 Impacts of Implementing a Special Flat Rate for Limited Resource Producers

Introducing a special flat rate cost-share of 90 percent for limited resource producers is expected to increase participation among this group of farmers and increase payments to these producers. This proposed change is one way to assure that ECP is operated in a manner that is most beneficial for farmers and the public.

Effects of Implementing a Special Flat Rate for Limited Resource Producers

Implementing a special cost share rate of 90 percent for limited resource farmers has been discussed in Chapter 4. With the increased cost-share rate, additional limited resource providers will be able to afford disaster recovery repairs and return their agriculture land to productive use. The increase in recovery of cropland productivity among this group will involve the same positive and negative impacts as the current program.

5.3.3.3 Impacts of Adding Provisions to Provide ECP Funding for Confined Livestock Operations for Natural Disasters Other than Drought

Currently the program allows assistance to confined livestock operations only in times of severe drought. Additional provisions would provide ECP funding for confined livestock operations for natural disasters other than drought. The extent of additional provisions is dependent on public comment. Cost-share funds would not be authorized for repair or replacement of buildings; however, depending on comments, funds may be authorized for cleanup of livestock confinements. Potential environmental impacts and effects will be included after public comment has determined the extent of additional provisions.

Effects of Adding Provisions to Provide ECP Funding for Confined Livestock Operations for Natural Disasters Other than Drought.

The addition of provisions to provide ECP funding for confined livestock operations for natural disasters other than drought has been discussed in Chapter 4. Environmental effects or impacts cannot be determined at this time because of this change. Environmental impacts will be determined following the public comment period.

5.4 IMPACTS TO HUMAN COMMUNITIES

The assessment of socioeconomic impacts identifies and evaluates those elements of the human social environment that may be affected by the action. Socioeconomic effects are evaluated with a comparative method (Burdge, 1995; ICGPSA, 1995). The potential for impact is based on the comparison of existing social conditions with those that would be reasonably expected to occur following implementation of each alternative. That is, the likely changes that may be caused by the proposed action, or alternatives, are compared with the social setting, as it currently exists. Any resulting impacts identified are then evaluated as to whether they may have a significant adverse or beneficial consequence for the local community.

The economic and social effects of the ECP are the result of a complex interrelationship between the program action and the existing social conditions of the affected communities. Individual communities may differ in terms of their economic conditions, social history, population characteristics, social organization, and prevailing culture and character. Each community's response to changes resulting from the implementation of a particular alternative will be unique and specific to the community affected.

5.4.1 Impacts of the No Program Alternative

In the absence of the ECP program, farm owners and operators would experience a greater exposure to the risk and uncertainty associated with a natural disaster. Similarly, agrarian based communities, especially those that are dependent on agriculture as a primary basis of the local economy, would experience greater adverse effects from the unremediated consequences of a natural disaster.

5.4.1.1 Effects of Natural Disasters on Human Communities

The general social effect of a natural disaster (and also the primary criteria for defining a natural event as a disaster) is that some level of stress is placed on the economic, social, or physical infrastructure of a given community. Either this stress results through the direct damage or destruction of a given resource, or through the creation of a continuing threat to property or other resources. A natural disaster produces a complex and interconnected pattern of effects that includes both the local agricultural economy and the larger social life of the community beyond the immediate environment of the individual agricultural producer. The level of stress in these situations normally grows beyond the capability of existing institutional structures, funding sources, and support networks to cope, to absorb the change, or to adapt to meet future contingencies.

The specific consequences associated with a natural disaster, as well as the prevailing conditions of the individual communities affected, are unique to each event. As a result, no uniform or codifiable set of socioeconomic effects exists for natural disasters (Vogel, 1999). However, some general areas of impact can be defined. They include the potential for change in local or regional agricultural production or in the economic and social structures of the local community.

Natural Disaster Effects on Local Agriculture

Natural disasters represent a major source of unpredictable and, for the most part, uncontrollable risk to farm owners and agricultural producers. The USDA's Risk Management Agency has accumulated data on the sources of loss for claims filed under Federal Crop Insurance (USDA, 2001). For the 10-year period from 1990-99, drought and heat accounted for the largest single source, with 34.8 percent of all losses. Floods were the second most frequent source of damage, accounting for 32.5 percent of all losses. Other naturally occurring sources of damage included fire, hail, wind, and storm events, accounting for 14 percent of all crop losses.

The effects of a natural disaster for farm owners and operators include damage or loss of cropland, rangeland, or forested areas, as well as a potentially increased mortality rate for livestock or wildlife. Such changes can have substantial economic consequences for agricultural production. In addition to the immediate damage or loss of crops, reduced productivity of cropland may extend for several years into the future. Costs for production input requirements, such as seed, livestock feed, or irrigation may be correspondingly increased.

The most important indirect consequence of these changes is the potential for a loss of income to agricultural producers. Income loss may also have a ripple effect throughout the local community as well, affecting both agribusiness and other elements of the local economy, such as employment, the community's tax base, mortgage and lending institutions, and the general service sector of the local economy. However, some agricultural producers, who are not affected directly by the natural disaster, or who may have surplus production capability, may potentially benefit from higher prices as the result of a natural disaster (NDMC, 2002).

Natural Disaster Effects on Human Communities

In addition to the direct physical impacts of a natural disaster, the patterns and structures of social life within the community may be altered. Loss of agricultural production as the result of a natural disaster may potentially disrupt other aspects of the community such as industries or services that directly depend on agricultural production. Local sources of employment and income to residents may be either temporarily or permanently lost because of a disaster event. Disasters can also affect the appearance, quantity or value of land available to the community as either as a source of economic production or as the as current or future investment. Other more indirect effects may include concerns for public safety, increased poverty, higher frequency of farm or other business bankruptcies, or damage to recreational or other important resources on which the community depends.

5.4.2 Impacts of the Current Program – The No Action Alternative

The current ECP provides financial assistance to farmers and ranchers for the restoration of farmlands on which normal farming operations have been impeded by natural disasters. In the absence of Federal assistance, these lands might otherwise be too costly to return to productive agricultural use. The primary beneficial impact of the program is to provide repair funds and inject necessary capital into the local economy at a time when individual producers/operators and their surrounding communities are under stress as the result of the disaster event. Landowners, landlords, tenants, or sharecroppers on a farm or ranch who would incur at least a portion of the cost of an approved conservation practice in a disaster area, are eligible to apply for assistance.

Because the ECP program is directed toward the maintenance and restoration of existing, working farmlands, the consequences of the program for local agriculture are generally beneficial. However, nationwide, ECP reimbursements account for only a small fraction of the total gross income from agriculture. For the period from FY'95 through FY'99, ECP reimbursement payments totaled approximately $87.7 million on eligible repairs of approximately $142 million. ECP reimbursement payments during this period averaged approximately $17.5 million per year (Stephensen, 2002). This represents only a small fraction of the average annual gross farm income of $226.1 billion (USDA, 2002).

The level of ECP reimbursement assistance has increased since FY 1999. For FY 2000, FSA released $97.9 million in ECP assistance to farmers and ranchers in 45 states, Puerto Rico, and the Virgin Islands (FSA, 2001). For FY 2001, $60 million in supplemental funding has been provided for the ECP program. Estimates for FY 2002, indicate that approximately $147 million in cost-share and technical assistance will be available for farmers and ranchers with an additional $82 million becoming available for FY 2003 (CFDAP, 2002)

The local community benefits indirectly from the ECP program through the conservation and maintenance of the productive capability of the land and through the money spent locally. Protection of property in the form of land for economic production or capital investment becomes an important beneficial impact of the program, while any potential loss of productive agricultural, commercial or residential property or diminishment of its attractiveness as the result of a natural disaster may represent a serious negative impact. To the extent that ECP reimbursements are spent in the local community in support of the implementation of specific practices, the local trade and service sector of the economy can be expected to experience some effect in terms of the realization of additional income from sales of products and services. Assistance provided through the ECP could be spent in the local community for rehabilitation purposes and for the continued production of rehabilitated land. Local employment and income may increase from the restoration of the productive capability of impaired facilities and resources. Over time, the demand for products and services may increase, thus stimulating the overall local economy. Conversely, the demand for local products and services by affected producers could diminish without the aid of the ECP, thus contributing to a negative loss in the revenue of the local economy. Local employment and income may or may not be affected over time. Natural disasters may affect not only the impaired land itself, but also any adjacent land. The community derives an additional potential benefit from the restoration of the setting and character of the impaired property as well as any adjacent properties.

Because the ECP program reduces, at least in part, some of the risk associated with natural disasters, the availability of the program may induce some farm operators to engage in higher risk production. There is some evidence that by reducing this risk, crop insurance and disaster assistance payments such as ECP may also result in bringing more marginal land into production (Claasen, Hansen et al, 2001, p.23; Goodwin and Smith, 2001). The ECP has a built-in mechanism to limit this potential. Program regulations require that land damaged three or more times in a 25 year period, or 'in a location subject to frequent damage' (e.g. along stream banks or in flood plains, etc.) is not eligible for ECP. In addition, eligible participants must execute a maintenance agreement with the FSA indicating that installed practices will be maintained in place for ten years (Furukawa, 2002).

Because program reimbursements are provided on a cost-share, sliding scale basis, it may be difficult for certain environmental justice populations, such as minority or limited resource owners or operators to acquire the necessary capital to cover the individual's portion of the cost share arrangement. This would indicate at least some concern that these populations might be excluded from participation in the program. This is especially important in those circumstances where significant repair costs (i.e., those which exceed $62,500 and are only eligible for 40 or 20 percent reimbursement) are incurred on properties operated by limited farmers. Program regulations do establish a $200,000 cap per person (Stephenson, 2002), which at least partially prevents a program bias toward larger farms with greater assets and ability to fund the cost-share portion of the practices implemented. Because the program is available to all farm producers, tenant farmers would not be disproportionately excluded from program benefits.

5.4.3 Impacts of Proposed ECP Changes

In general, the primary effect of ECP program with the changes proposed under this alternative would be similar to those outlined for the no action alternative; that is the beneficial aspect of repairing and restoring the affected area to its pre-disaster condition and use. Land areas protected are regained by the community as part of the economic base or as natural use areas. From a programmatic perspective, the primary consequence of ECP reimbursements is to mitigate the effects of natural disasters on the subject acreage.

The proposed regulatory change to allow a flat rate of 75 percent for all reimbursements instead of the current sliding scale would be expected to have a minimal impact on most farm income. Although generally beneficial in reducing the net cost of repair to producers, this change would not substantially alter the short- or longer-term net income for most producers. In contrast to the sliding scale employed under the current program, the proposed change to a 75 percent flat rate would result in a maximum increase of $2,500 in the cost to producers for the first $62,500 in reimbursable costs. However, a net decrease of $12, 500 in costs would be realized for the next $62,500 in repair costs. The proposed flat rate would also provide a 300 percent increase in reimbursement payments over the current program for all costs over $125,000. The payment limitation of $200,000 per individual would still apply.

Limited resource farms would see a larger benefit from the proposed regulatory change. Limited resource farms would be eligible for an increased maximum reimbursement rate of 90 percent, which could have a more significant impact on their net income (Stephenson, 2002). Net income could be increased by lowering net costs of repair and increasing the level of farmland rehabilitation and consequent productivity restoration (Stephenson, 2002). Higher individual cost-share payments could lead to greater participation by limited resource farmers and a further increase in aggregate net income (Stephenson, 2002).

The majority of repair costs (more than 90 percent) was below the $62,500 threshold under the current program and therefore reimbursed at the 64 percent rate (Stephenson, 2002). Although the majority of producers would incur slightly increased costs under the proposed 75 percent rule, those who incur more substantial damage as the result of a natural disaster could expect additional support under the proposed flat rate rule. Local communities as well as individual producers would be expected to benefit from the increased likelihood that more extensively damaged areas would be funded under the proposed alternative.

The introduction of a special flat rate for limited resource producers could have a substantial effect for those operators who might be unable to provide the necessary capital to meet the cost-sharing requirement under the current program. The increased level of participation anticipated by this proposed rate would be an important contribution to the inclusion of environmental justice populations in program benefits.

5.5 CUMULATIVE IMPACTS OF ECP

In addition to considering direct and indirect effects, the CEQ NEPA regulations require that an EIS consider "cumulative impacts." Cumulative impacts are the combined impacts on the environment from the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. It was not feasible to evaluate Program impacts in every farmland community for every possible disaster scenario in the U.S. where ECP practices might be employed so generalized impacts are discussed.

The analysis below begins by describing what “other” types of actions were considered. Then, cumulative impacts are considered for each of the alternatives. The program-wide implications of the disaster recovery practice-specific analysis are discussed. The cumulative impacts of the alternatives are compared in Chapter 4.

5.5.1 Description of Other Actions

Choosing and evaluating the other Federal and non-Federal actions to be considered in the cumulative impacts, analysis first involved defining spatial and temporal boundaries for the actions to be considered in the analysis. After this "scoping" process, the affected environment for cumulative impacts was described. The cumulative environmental consequences were determined for the appropriate spatially-and-time-bounded actions in the same way the direct and indirect effects were analyzed.

Most ECP practices are disaster specific and related to structure repair, restoration or installation. Therefore, many of the "other" governmental actions that interact with them are also emergency or disaster recovery based. Because of the regulated nature of farmlands, many of these actions are associated with the actions of FSA and other Federal agencies, and with state or local government actions. The major exceptions are private actions that increase runoff or modify the hydraulic regime in the same watershed as the ECP activities. Typically, these are upland land-disturbing activities associated with agriculture and commercial and residential activities. Each of these types of other actions is described briefly below.

Other FSA Actions: Other FSA actions include past and present ECP activities in the same farmland community or watershed as a current ECP action, particularly for similar types of disaster recovery. Because of the nature of natural disasters, it is impossible to plan for future impacts.

Other NRCS Actions: Other NRCS actions include past ECP activities in the same watershed as a current ECP action, particularly those on the same reach as the current ECP activity. Also included are past, present, or planned actions of other NRCS programs in the same watershed as the current ECP action, particularly those on the same reach as the current ECP practice.

Other USDA Actions: Other USDA actions include past, present, or planned actions of other USDA agency programs (i.e., not including NRCS programs) in the same watershed as the current ECP action, particularly those on the same reach as the current ECP practice.

Other Federal Agency Actions: Other Federal agency actions include past, present, of planned actions of other federal agency programs (i.e., not including USDA programs) in the same watershed as the current ECP action, particularly those on the same reach as the current ECP practice. Chapter 2 contains information on these Federal programs.

State and Local Government Actions: State government actions often result from state delegation of some or all aspects of the Federal programs discussed above. However, many other state actions, and most local government actions, are smaller and even more site-specific than the federal governmental program actions discussed above. Again, the actions considered are those occurring in the same watershed as the ECP action, particularly those on the same reach as the current ECP practice.

Private Actions: Private actions can include all nongovernmental actions that increase runoff or modify the hydraulic regime in the same watershed as the ECP activities. Such private actions are the most site-specific of all actions considered in the cumulative impact analysis. However, because they are ubiquitous, all such actions in a watershed tend to interact and to be reflected in the overall characterization of the watershed's water quality. Therefore, all such actions are considered in the cumulative impact analysis.

5.5.2 Cumulative Impacts under the No Program Alternative

Alternative 1 assumes that the program never existed. Cumulative impacts of this action would be widespread. Negative impacts on local economies and ecosystems would occur and agricultural productivity in these areas potentially could decline. Many agriculture producers would be unable to implement disaster recovery methods due to high expense further distressing water and soil and air quality, wildlife and habitat structure, and vegetation.

5.5.3 Cumulative Impacts under the Current Program Alternative

Under the No Action Alternative (Alternative 2), cumulative environmental impacts are the result of impacts from this program compounded by everything else that is occurring in the watershed and immediate community. It is difficult to determine cumulative effects of disaster recovery impacts because they may be widespread and may be felt for a long period. Immediate recovery impacts include those impacts already discussed for the current program in section 5.2.2 along with the impacts to community areas, losses of homes or non-agriculture structures, forestland impacts, and infrastructure impacts.

5.5.4 Cumulative Impacts under the Proposed Changes Alternative

Alternative 3 contains elements designed to improve the ECP and incorporate new practices. These elements would be expected to influence cumulative impacts as follows:

Establishing a cost-share of 75 percent for all ECP projects (90 percent for projects in limited resource areas) would make the Program more readily available in lower income communities. This could result in higher short-term positive ECP cumulative socioeconomic benefits to communities, particularly low-income communities. Long-term benefits could be positive as well including a higher rate of farmland returned to production.

Introducing provisions to provide funding for confined livestock operations for natural disasters other than drought would be likely to result in reduced long-term losses of livestock following disasters due to economical solutions to clean-up confined livestock areas. The actual practices for this proposed change would be determined following the public comment period. Cumulative impacts will further be defined at that time.

While some of the elements are administrative, implementing practices to restore confined livestock operations would further enhance the ECP program and continue to return productive agriculture land to use following disasters.

5.6 UNAVOIDABLE IMPACTS OF THE PROPOSED ACTION

Unavoidable impacts of the proposed action would be similar to those of the current program. Affected surface and ground water, soil quality, and lands adjacent to eligible agriculture lands will be altered by

ECP, and in certain instances, some adverse environmental consequences may result to those adjacent areas may result (Refer to discussion in Sections 5.2 for these impacts). Any substantial adverse impacts would be limited to the immediate site and near downstream environments and limited to the short term. Procedures to ensure the environmental defensibility of ECP practice designs should minimize the likelihood of these effects occurring.