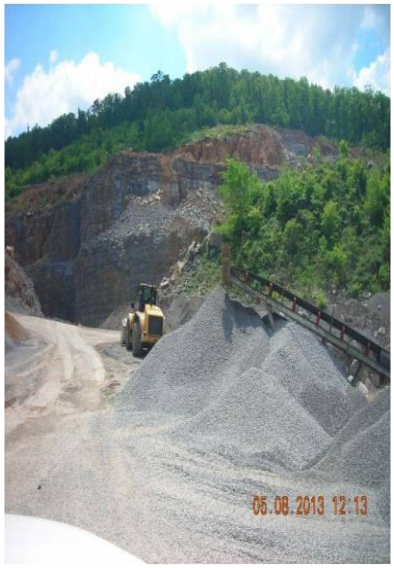
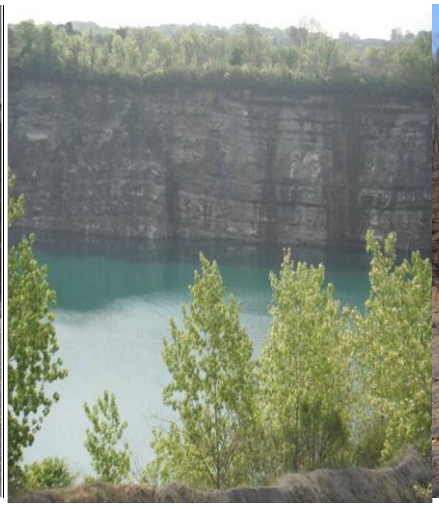
APPENDIX D

ALABAMA NONPOINT SOURCE MANAGEMENT PROGRAM

RESOURCE EXTRACTION





APPENDIX D
RESOURCE EXTRACTION

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RESOURCE EXTRACTION

Section D.1 Introduction

a. Overview

Resource extraction in Alabama includes the exploration and recovery of fossil fuels (e.g. crude oil, natural gas, and bituminous coal) and ores and minerals (e.g. iron oxides, shale, limestone, quartz, dolomite, sands, gravel, and clays, marble, sandstone, mica, granite, quartzite, mica, bauxite, salt, sulfur, and other ores and minerals such as gold and a variety of gemstones) from natural resource deposits. Most non-fuel ores and minerals are extracted from surface mines and quarries. Underground mining is largely confined to the recovery of coal from seams that cannot be economically excavated using traditional surface mining technologies. Advancements in oil and gas exploration and extraction technologies continues to promote targeting of new areas, improving older sites, or enhancing production of low permeability formations both statewide and off shore. There is increasing interest by state officials and the industry to enhance exploration, production, and processing of oil or tar sands. In addition, a relatively unique extraction endeavor involves the dredging of sand from the state's jurisdictional Gulf waters to restore storm-damaged beaches along the coast.

Nonfuel minerals in Alabama include but are not limited to bentonite, common clay, fireclay, kaolin, shale and mica. Alabama ranks third in the nation in producing limestone for agricultural, crushed stone and other uses. Sand and gravel surface mines are common is southern Alabama. Economically significant elements include deposits of iron ore (hematite is the official state mineral), chalcopyrite (copper), salt, gold a variety of collectable gemstones and minerals. Alabama is also a national top energy producer. Fossil fuel (e.g. coal, crude oil, and natural gas) exploration and production are important economic and development drivers. Alabama ranks relatively high in the nation in coal production with the Warrior (which contains 90 percent of the state's coal reserves), Cahaba, and Coosa coal fields (see Figure D.1.a) being the three main coal fields in the state. The recovery of fossil fuels continues to have a notable impact on the state's overall economic conditions. Severance taxes (i.e. taxes levied by the State for the removal of natural resources from soils and waters of the state) help to insure that resource extractive costs to Alabama taxpayers are recouped from the producers. The Alabama Heritage Trust Fund was established by the state as a repository for oil and gas production royalties and lease sale monies to help pay for education and infrastructure needs. Most Trust Fund monies are deposited into the State's General Fund for public infrastructure needs, environmental protection, and other state programs including the acquisition of trust lands managed by the state in perpetuity for specific public benefits and purposes. The Trust Fund program was the first of its kind in U.S. history.

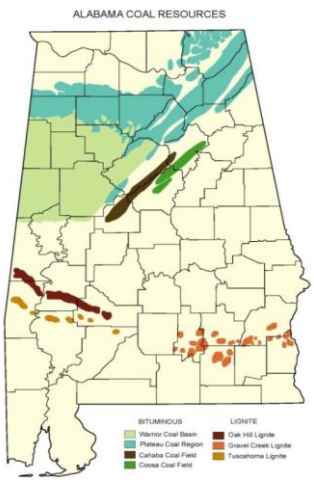

Figure D.1.a: Primary Coal Producing Areas in Alabama

The Alabama Surface Mining Commission (ASMC) located in Jasper, Alabama is the state's lead Title V *regulatory* authority (Administrative Code of Alabama 1975. Chapter 880-X-x) for administering active coal mining operations in Alabama. The Alabama Mining and Reclamation Division (AMRD of the Alabama Department of Labor (ADL) in Montgomery, Alabama, is the state lead agency for administering the Title IV *abandoned* mine lands (AML) program (i.e. mitigating hazards associated with "pre-law" coal mines abandoned before 1977). The AMRD also administers "non-fuel" ores and minerals (e.g. sands, gravel, stones, clays, etc.) state surface mining site permits and requires the development and implementation of comprehensive reclamation plans to ensure that disturbed sites are properly reclaimed in accordance with the Alabama Surface Mining Act of 1969 (Act 99-579, as amended) and Open Pit and Quarry Safety Rules of Alabama (ADL Administrative Code Chapter 480-3-4) regulations.

The ASMC and AMRD both work very closely with the Mid- Continent Region - Birmingham Field Office (BFO - Homewood, AL) of the U.S. Department of Interior: Office of Surface Mining, Reclamation and Enforcement (OSM) to protect citizen, health and safety and the environment from pollution impacts as surface coal mining operations progress and as coal mining lands are reclaimed (30 CFR Chapter VII; Title 30 Part 901). The OSM also

has authority and responsibility for overseeing the reclamation of abandoned coal mining lands and impacts of coal mining such as acid mine drainage. Federal OSM abandoned mine land reclamation activities do not extend to addressing sand, gravel, or clay pits or to ore and mineral mining and quarries.

The OSM enforces federal laws and regulations, provides oversight (e.g., Directives REG-8, AML-22, REG-23, INE-35), and offers guidance to the State relevant to the Surface Mining and Control and Reclamation Act of 1997 (SMCRA or Public Law 95-87). The OSM establishes oversight criteria for the ADL and ASMC to administer and implement the federal aspects of the AML reclamation enforcement program in Alabama and for selecting and ranking abandoned mine lands to be reclaimed. The SMCRA was established by Congress to protect public health and safety and to minimize adverse environmental, social, economic and other impacts from surface coal mining and reclamation activities. The Act was unique in that it regulated a specific industry program (i.e., abandoned mine land reclamation) as opposed to a particular type of pollution. The SMCRA (Section 405) requires states to prepare a State Reclamation Plan and have an approved regulatory program (Section 503) in order to gain state-level approval authority from the federal OSM to implement the Plan and to receive annual trust funds awarded from the U.S. Treasury - Abandoned Mine Reclamation Fund. Amendments to the SMCRA in 2006 (Public Law 109-432) have continued to allow for the collection (through year 2021) of trust funds to reclaim and restore land and water resources adversely affected by past coal mining activities. Trust funds are generated from reclamation fees paid by surface and underground coal mining operators per ton of coal produced. The Alabama Department of Revenue administers natural resource severance taxes for the coal, iron ore, minerals, oil and gas, and forestry industries.

Alabama is a major oil and gas producing state. The State Oil and Gas Board (OGB) located in Tuscaloosa (a regional office is located in Mobile) has regulatory primacy (see "Gold Book" rules and statues and Administrative Code Chapter 400-X-x) for onshore oil, gas, and "tar" or oil sands production as well as offshore (e.g. the state's territorial jurisdiction in Mobile Bay and parts of Baldwin and Mobile counties overlain by water) oil and gas exploration, conservation, and extraction operations in Alabama. Rules and statues that the OGB enforces and operates under do not apply to coal bed methane operations. The OGB, in partnership with the EPA, also oversees Class II Underground Injection Control (UIC) wells to protect surface waters, groundwaters and the land surface from pollutants associated with oil and gas production. Congress in 2005, exempted hydraulic fracturing operations from having to obtain a UIC permit; however, entities that use diesel fuels to extract oil and gas during hydraulic fracturing (fracking) are subject to EPAs UIC program permitting guidance (EPA 816-R-14-001. February 2014).

The State Lands Division (SLD) of the Alabama Department of Conservation and Natural Resources provides oversight of natural resource extractive activities conducted on state-owned lands (e.g., oil and gas, coal, sand and gravel, minerals, etc.). The SLD (Administrative Code Chapter 220-4-x) also manages state-owned submerged lands including navigable water bottoms, coastal bays and offshore state waters. Royalty payments collected relative to natural gas production from offshore reserves lying within the state's three mile territorial jurisdiction generates a substantial portion of funding for the Alabama Heritage Trust Fund program. This program is a major funding source for the Forever Wild Land Trust program that receives 10 percent of the distributed interest, capped at $15 million for any given year. Additional funding for the Forever Wild Land Trust program is derived from the purchase of Forever Wild Land Trust state license plates by Alabama drivers. State land acquisitions, water quality and other environmental protection benefits relative to SLD activities are primarily attributable to funding as provided by resource extractive activities (e.g. oil and gas production) in Alabama.

Stormwater runoff associated with resource extraction activities are regarded as a discernable and potential "point source" of pollution (CWA Section 502(14). Point source discharges are regulated by EPA and ADEM under the National Pollutant Discharge Elimination System (NPDES) permitting program. Federal and state regulations regarding effluent and stormwater discharges require surface mining and quarry operators/owners to apply for and obtain NPDES permit coverage prior to conducting operations of small noncoal, nonmetallic mining sites, and associated land disturbance activities (such as sand and gravel pits). As of February 1, 2013, small mining operations less than 5 acres in total land disturbance are permitted by ADEM under a General Permit (i.e., no longer registered under ADEM Administrative Code r. 335-6-12 or "Chapter 12"). Registration does not authorize land disturbance activities in the coastal areas of Baldwin and Mobile counties until coastal consistency certification or permit coverage is obtained per ADEM Administrative Code Chapter 335-8-1 and Chapter 335-8-2. Resource extraction facilities are required by EPA and ADEM to obtain and implement an Individual or General NPDES construction stormwater permit. The permit requires the site owner/operator to implement effective best

management practices designed to ensure that stormwater runoff discharged from the permitted site does not degrade surface waters and groundwaters. Non-complying permitted facilities (extraction, processing, etc.) and associated activities (e.g. clearing, grubbing, etc.) are subject to EPA and ADEM regulatory actions and processes. In some instances, alleged water quality standard's violators may choose to reach an agreement to resolve a regulatory enforcement action by voluntarily agreeing to implement an environmentally beneficial Supplemental Environmental Project (SEP) in exchange for direct monetary payment of the violation penalty.

The U.S. Army Corps of Engineers (COE) requires all land disturbance / mining operations that discharges or deposits overburden, dredged, or fill material into a "navigable" body of water, including streams and wetlands, to obtain a CWA Section 404 permit. This regulatory requirement is designed to ensure that the mining operator evaluates the effects of overburden disposal on different streams within the permit boundary and that the discharge of fill does not degrade threaten or endangered species and habitat; does not violate state or federal water quality standards, nor contributes to the significant degradation of waters of the United States. A permit under SMCRA does not negate the need by the mining operator to obtain a CWA Section 404 permit. As funding becomes available, the Restoration of Abandoned Mine Sites (RAMS) Program should be expanded into Alabama to enhance technical, planning, and design assistance in carrying out projects to mitigate water quality problems associated with abandoned and inactive coal mines.

It should be noted that ADEM lacks state regulatory authority to approve or disapprove of the actual siting or location of a surface mining site or quarrying facility. Local approval decisions relative to resource extraction activities and facility-siting authorizations are under the purview of local government officials and jurisdiction (e.g. ordinances and zoning). Water quantity issues relative to surface water and groundwater withdrawals, redirected flows, and sinkholes are under the authority of the Alabama Office of Water Resources; vehicle noise control issues are under the purview of the Federal Highway Administration; road and bridge conditions and vehicle conveyance is directed by county commissions, county engineers and the Alabama Department of Transportation; and primacy and statutory authority for blasting (e.g. handling, safety, transport, timing/use) are addressed by the State Fire Marshall and the Alabama Department of Industrial Relations. Pollutant discharge permits issued by ADEM are designed to prevent, reduce and abate air pollution and stormwater runoff discharges that may impact water quality. The ADEM also responds to oil releases and hazardous material spills and emergency mitigation resources in partnership with EPA and the U.S. Coast Guard. Concerns related to resource extraction operations and mine land reclamation activities that may impact endangered or threatened species or impair critical habitat (e.g. the Indiana Bat-*Myotis sodalis*) should be directed to the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, and the Alabama Department of Conservation and Natural Resources. Oversight of hazards and safety issues associated with the design, construction and maintenance of surface mining dams and impoundments is provided by the Office of Surface Mining Dam Safety Program and Department of Labor - Mine Safety and Health Administration. The Office of Surface Mining also oversees abandoned main land (AML) initiatives and projects including but not limited to acid mine drainage, environmental justice, restoration of aquatic habitat, and reforestation.

Commercial exploration of coal bed methane in Alabama began in 1980 and about 10,000 wells have been drilled to capture methane for use as an energy source. In 2013, the industry had about 6,100 active wells which are confined to 7 counties in the Black Warrior and Cahaba River Basins. State rules to regulate the production of natural gas were developed by the State Oil and Gas Board in 1984. These rules still serve as a national and international model for production of natural gas from coal. In addition, the industry and ADEM worked together to develop a comprehensive stormwater NPDES permit to address NPS stormwater runoff and erosion concerns.

Resource extraction is regarded by EPA as a major "category" of nonpoint source pollution. Nonpoint source pollution (NPS) does not originate from a distinctly-identifiable "point" source (i.e., an "end-of-pipe" discharge). When stormwater runoff flows over the land surface it may pick-up and transport NPS contaminates. These pollutants are not always visible to the naked eye. Although the rainfall runoff may appear to be clean and safe, it may contain dissolved, suspended or attached particles, substances, and chemicals that can cause significant environmental, economic and public health and safety impacts. Polluted runoff can alter the physical, chemical, and biological characteristics of receiving waters, degrade aquatic habitat; make coastal and inland beaches and rivers and reservoirs unsightly or unsafe to human health, impair beneficial uses (e.g. water recreation, swimming, fishing, tourism, economic vitality), and foster the loss of personal and community-level social and economic benefits, connections and values. Nonpoint source pollutants present significant water quality protection and restoration

challenges to Alabama's rivers and streams, wetlands, lakes and reservoirs, coastal areas and estuaries, and watersheds. Polluted runoff can also increase drinking water resource protection and treatment costs, contaminate drinking water sources and irrigation wells and aquifers and degrade aquatic habitat.
When certain resource extraction activities have ceased, contaminated waters may continue to be discharged from tunnels and adits (horizontal entrances into hillsides to reach mineral-rich ore deposits) or other geologic fractures and fissures. Water discharged from abandoned mines may contain significant concentrations of heavy metals and total dissolved solids and cause significant human health and environmental concerns. When exposed to oxygen and pyrites (or other sulfide minerals) mine waters can become highly acidic. The acidity (low pH) can continue to react with the sulfides and dissolve heavy metals in the mine and mined materials for long periods of time; and thus, complicate efforts to protect and restore down-gradient NPS pollution of surface water and groundwater. It should also be noted that neutral and basic/alkaline (high pH) waters discharges may also contain metals in excess of state water quality standards. In addition, quarrying operations (hard rock), open pit (sand and gravel) and underground (coal) mines may extend below the normal pre land disturbance water table range. When pumping of quarry / mine water ceases, normal groundwater levels generally returns and forms a reservoir, fills the shaft, or comes into contact with reclamation/backfill material. The return of groundwater hydrology to near pre-pumping levels and recovering from the ecological effects of groundwater drawdown can take many years or decades after the mining operation has ceased. Limited availability of adequate financial capital and resources needed to identify and properly and holistically mitigate known NPS stressors, protect and restore water quality, meet state water quality standards continues to be problematic. The AL NPS Management Program and CWA Section 319 grant program will continue to enhance programmatic initiatives that present stakeholders with a voice in water quality protection and restoration, natural resource management, and NPS pollution reductions decision-making relative to ensuring resource extractive activities are environmentally healthy and safe while enhancing state economic opportunities.

When precipitation falls, it either infiltrates into the ground, is captured where it eventually transpires or evaporates, or flows down hill as stormwater runoff to a receiving waterbody. A cooperative and coordinated NPS pollution prevention approach is highly recommended to proactively reduce stormwater runoff from threatening and degrading surface waters and groundwaters. Nonpoint source pollution management decisions require the participation and input of a multitude of federal and state agencies, officials, planners, landowners, developers, organizations, and private citizens. The AL NPS Management Program highly recommends that management decisions and processes take into account the cumulative water quality and human and ecological health impacts from all causes of nonpoint sources of pollution as opposed to singularly mitigating individual or narrowly defined NPS causes and sources. Adverse water quality impacts should be quantifiable and mitigated holistically (preferably on a watershed-level) and especially relative to the implementation of measures and practices to protect and restore drinking water sources, surface and groundwater hydrology, and sensitive and unique areas, species and habitat. Temporal and long-term programmatic success measures and indicators should be based on credible science and quality-assured trend data such as the State of Alabama Water Quality Monitoring Strategy (as amended). Coordinating and leveraging technology transfer, technical assistance and financial resources, and facilitating public and private sector education and outreach are integral components. Iterative, voluntary, watershed-based planning and implementation processes will continue to be facilitated whenever and wherever and as expeditiously as practicable throughout Alabama to achieve NPS pollutant load reductions associated with resource extractive activities and protect and restore surface water and groundwater quality.

The exploration, site development, extraction and processing of fuel and non-fuel natural resources can present challenging NPS water quality protection and public health and safety issues. For example, oil, gas, and coal production can provide significant benefits to local and state economies, but can also contribute to tensions and conflicts between proponents and opponents relative to environmental and human health protection, reclamation solutions, political interests; regulations and authorities; policy decisions; cultural and historical aspects; personal security and welfare, and communal societal and quality-of-life identity, values, concerns, and preferences. As the areal extent of drilling and mining increases, conflicts relative to economic benefits verses environmental protection verses human health impacts tends to intensify. Successful NPS management conflict resolution requires a commitment to continued and amiable discourse from the earliest planning stage until all resource extraction activities have ceased,

the land is satisfactorily reclaimed, human and environmental health concerns are attenuated, and water quality is adequately protected and restored (physically, chemically, and biologically). Mitigation of adverse water quality impacts associated with abandoned mine reclamation will likely depend on increased implementation of innovative activities, technologies, partnerships and performance-based economic incentives.

Potential factors to preclude resource extraction conflicts include but are not limited to:

- Proactively identifying, addressing and overcoming oftentimes protractive, resource-wasteful, and expensive barriers that impedes open communication and working together as a mutually-respected, cooperative and sustainable partnership
- Using only science-based data to characterize impacts to water quality, base management decisions upon, and to focus mitigation funding and other resources (preferably on a HUC-12 watershed protection basis)
- State or federal regulatory agencies and local authorities work closely with the industry, consultants, academia, landowners, operators and the private sector to mutually identify and prioritize sites to target NPS mitigation funds and resources
- Establishing and maintaining a statewide partnership composed of agencies, industry, consultants, academia, landowners, operators and the private sector to set NPS priorities and implement NPS management processes and solutions to resolve legacy mine land issues
- Demonstrating new, emerging, innovative and environmentally-protective and cost-effective methods, practices and technologies to protect and restore surface and groundwater quality from nonpoint sources of pollution
- Implementing conventional BMPs to treat, process, store, remove, or stabilize mining products, overburden and wastes and address associated NPS water quality and water quantity issues
- Identifying, selecting, and implementing the most effective and efficient management measures and practices (e.g. applicable to a specific site or targeted pollutant; the design, types and numbers of measures/controls needed; performance characteristics and expectations; regulatory / compliance considerations, funding availability and access; community acceptance and other socio-economic and quality-of-life considerations)
- Facilitating open lines of communication between the regulated and non-regulated sectors of society
- Modifying standard operational practices to prevent or reduce NPS stormwater runoff, minimize overall waste production, and to protect / restore natural hydrology and ecological integrity and benefits
- Facilitate opportunities to ensure adequate NPS education and outreach targets both specific and multiple representative audiences in order to enhance public and private sector knowledge and awareness
- Publicly report science-based data and information in easily understandable and accessible formats

The AL NPS Management Program continues to support new initiatives and endorses the continued implementation of effective programs and projects to prevent, reduce or abate NPS impairments to water quality; especially efforts that concurrently address public health and safety hazards associated with legacy (abandoned mine land) resource extractive activities conducted on public lands. Section 319 grant funding resources, as administered by ADEM, contuse to target NPS water quality problems associated with legacy mine land reclamation if those activities are targeted as a component of an EPA Section 319 watershed-based management plan. The AL NPS Management Program also endorses public and private sector partnership approaches to mitigate a range of water quality protection issues, including but not limited to watershed-based planning, resource leveraging, research, monitoring and assessments, BMP demonstration and implementation, education and outreach, technical assistance, and technology transfer. Partnering opportunities continue to evolve relative to addressing real and potential NPS pollution threats associated with hauling roads, noise, revenue enhancement, water and air quality, fish and wildlife habitat and biodiversity, and recreation. These partnerships are critical to efforts to reclaim and restore the ecological functions of abandoned mine lands (e.g. soils / soil amendments, hydrology / water quality, vegetation, habitat, etc.) to near pre-mining conditions. It is critical that everyone have a voice in NPS pollution management decision-making processes. Varied and multiple sector input helps to ensure environmental and economic accountability and provides an avenue to identify and express different values, creativity, talents, and skills; build trust; negotiate and contribute to mutually beneficial solutions and outcomes; and provide a focus on funding, resources, authorities and schedules. Not working together in a cooperative partnership manner generally contributes to a re-direction or waste of limited human and financial capital resources that could be better used for on-the-ground management practices. The implementation and demonstration of new, emerging, and innovative remediation, reclamation, restoration techniques and technologies (including pollution prevention) also continues to

be recognized by the AL NPS Management Program as key to achieving long-term environmental protection success and expeditiously meeting state water quality standards.

Leveraging resources to implement the AL Nonpoint Source Management Program to target resource extraction problems is an environmental, economic, social, and public health and quality-of-life necessity. Continued public and private sector cooperation, coordination and collaboration are essential. Although the AL NPS Management Program endorses a voluntary approach as the primary NPS stormwater runoff pollution control strategy; enforceable regulatory "back-up" authorities are also essential programmatic elements. Addressing certain local, site-specific, or placed-based NPS issues in Alabama often requires statewide designated authorities. Each of the 67 counties in Alabama has their own elected legislative branch with executive authority (e.g., county commissions); however, all but seven counties (Jefferson, Lee, Mobile, Madison, Montgomery, Shelby, and Tuscaloosa) have little to no local home rule statutory (autonomous adoption, alteration, or repeal flexibility) authority. The Alabama Constitution (1901) requires most counties to seek state legislator sponsorship and statewide voter approval to address relatively ordinary locally-based matters. As of 2012, about 90 percent of the Alabama Constitution's length comes from its 856 amendments. About 75 percent of those amendments cover a single county or city; oftentimes resulting in the convoluted application of NPS pollution resolutions, inefficient opportunities to build and sustain public and private sector cooperative partnerships, and hampering cooperative efforts to equitably apply NPS water quality, economic, and human health protection and restoration resources efficiently and effectively. In addition, since water *quantity* is administered as a distinct lead state-agency (ADECA) programmatic issue, it is not generally presented herein as a primary NPS pollution management topic of discussion. This is in accordance with Section 319 grant guidelines to mitigate NPS pollution relative to the protection and restoration of water *quality*. The AL NPS Management Program recognizes that there are often a multiplicity of site-specific and project-level constraints and funding issues, as well as state and national agency and program requirements and variability relative to the design, selection, inspection and maintenance of NPS best management practices (e.g. technically sound, environmentally-protective, and economically-sensible). Local nonpoint source management measure and practice implementation decisions should be locally-led with input from both the public and private sectors, and applied using a watershed-based planning and implementation approach. In order to best protect and restore water quality and resources and expeditiously meet state water quality standards; input regarding issues and concerns relative to resource agency and local citizen thoughts, beliefs, values, and ideas should be encouraged. Sustained public and private sector communication and collaboration is highly recommended during all phases of NPS mitigation planning and implementation.

The AL NPS Management Program and the Section 319 grant guidelines recommends that stormwater runoff to surface and groundwaters associated with surface mining be addressed as practicable, on a watershed-basis and as a component of a holistic EPA-defined 9-key element watershed-based management plan. The AL NPS Management Program also supports efforts to proactively protect the environment using a combination of regulatory permitting authorities and voluntary private sector pollution prevention strategies. In general, the Section 319 grant as administered by ADEM will not fund the implementation of structural BMPs to mitigate problems associated with active resource extractive activities because those sites and activities are NPDES permitted "point sources" of pollution. A fundable Section 319 grant funded nonstructural NPS management practice for "active" resource extraction activities in a targeted watershed may involve education and outreach if it is an implementation component of a nonpoint source or mixed-source TMDL or holistic watershed-based management plan.

b. Abandoned Mine Lands

Alabama has about 15,000 acres of abandoned mine lands (AML). Abandoned mine lands are areas where development, extraction, processing, storage, and maintenance activities associated with surface mining of coal, ore and minerals has ceased and no further mining activities will occur (i.e. "legacy" mine sites). A cost-effective but exceptional environmentally-destructive method for mining coal is generally referred to as "strip" mining whereby soil and rock above the coal seam (overburden) is removed to expose the seam. The coal seam is then blasted and the coal scooped up and transported to a processing facility to separate the raw coal from waste rock and minerals (tailings). Overburden and waste materials may be piled up (gob piles) or stored as thick slurry in a man-made impoundment.

After coal mining operations have ceased, the mining lands should be regraded to approximate the original contours of the land and replanted using native grasses and trees. Legacy or "pre-law" AML site reclamation, remediation and restoration can be challenging in terms of economic costs; entail innovative techniques and technologies or suites of treatment solutions, and involve a mix of public and private sector expertise. Geological, physical, chemical, and biological land disturbance and water quality impacts can cross and impact both private and public land boundaries and add to mitigation cost and solution complexities. The EPA is the primary federal agency with authority for overseeing the reclamation of abandoned sand, gravel, clay pits, and other ore and mineral mining and quarries activities. The OSM is the designated federal agency in Alabama with responsibility for addressing environmental impacts associated with surface coal mining activities and acid mine drainage (AMD). The ADEM issues NPDES permits for small noncoal, nonmetallic mining sites, and associated land disturbance activities to protect water quality from stormwater discharges. Each agency enforces national water quality standards and recommends environmentally-protective guidelines to both prevent and mitigate pollutant load reductions.

Implementation of AML best management practices should use the best NPS pollution control technology, be science-based, effective long-term, and result in measurable environmental protection or human health and safety improvements. Implementation of structural measures should incorporate a schedule for inspections, monitoring to measure effectiveness and maintenance. Leveraging human and financial resources greatly enhances AML restoration capabilities, technology transfer, sharing and exchange of information, and increased potential for project success. Continued coordination, cooperation, collaboration and communication are key AL NPS Management Program mechanisms to achieve statewide programmatic goals and objectives and are highly recommended to minimize AML prioritization and reclamation conflicts, prevent duplication of efforts, and help to ensure that NPS measures are protective of water quality.

Uncontrolled and untreated stormwater runoff, hazardous waste or toxic spills and leaks, and improper sludge and waste disposal from "pre-law" or non-complying and abandoned surface mines can appreciably degrade water quality. Nonpoint source pollution impacts associated with "pre-law" mines are particularly difficult to mitigate because of inadequate financial capital and other resources that are required to expeditiously and holistically mitigate the large number and areal extent of impaired sites. The AL NPS Management Program and the Section 319 grant program endorses a cooperative and mutually beneficial public and private sector partnering and resource leveraging approach to mitigate AML sites. Section 319 grant funds in Alabama target "pre-law" abandoned mine lands since:

- This major category of NPS pollution did not historically require issuance nor was subject to compliance with an NPDES permit
- No current claimant of record or responsible operator is known
- There is no intention by the current landowner to resume an active resource extraction operation
- Reclamation, remediation and restoration of a legacy (pre-law) AML site does not implement the requirements and conditions of a current NPDES permit or an environmental compliance enforcement action
- Section 319 grant guidelines allow for the funding of nonpoint source BMPs to restore water quality associated with NPS contaminated stormwater runoff

The Alabama Department of Labor - Mining Division works closely with the U.S. Department of Interior: Office of Surface Mining - Birmingham Field Office to inventory, characterize and prioritize AML sites and to conduct remedial actions as reclamation funding and resources become available. Estimating the financial needs to reclaim and restore all AML sites and addressing all NPS problems in Alabama is challenging. This is due in large part to the convoluted intricacies of AML mitigation including but not limited to:

- The type of mining process (e.g. open-pit, dredging, underground mining, injection well and leaching, etc.)
- The composition, areal extent, location, and volume of site-specific pollutants, wastes, and hazards
- Site inventory and assessment complexity
- Chemical, physical and biological characteristics relative to the targeted polluted runoff and local hydrogeology (e.g. infiltration to groundwater, surface water hydrology, precipitation events, groundwater/aquifer levels)
- Management measure design, implementation, maintenance, and technical challenges
- Public and private sector land use and boundary conflicts and priorities

- Insufficient spatial and temporal collection and analyses of chemical, physical, biological and hazard monitoring and assessment data
- A mix of public and private sector interests, expectations, and perceptions relative to indices used to measure long-term watershed and water quality restoration protection and human health and safety issue successes.

The AL NPS Management Program and Section 319 grant program endorses AML prioritization approaches composed of relevant partners dedicated to mitigating nonpoint sources of pollution using the best available technical data and information and project success measures and indicators. Section 319 resource extraction prioritization decisions relative to NPS pollutant load reductions and water quality restoration should first consider application of a watershed-based management approach whenever practicable. The watershed-based approach addresses a specific geographic watershed boundary dataset (preferably HUC-12) and uses public and private sector partnership and resource leveraging to resolve problems and threats that affect watershed and water quality health. In general, AML prioritization and NPS mitigation resource-targeting decisions should reflect, but are not limited to the following areas of interest:

➢ Watershed Health and Water Quality Protection and Restoration:

- Treatment or removal of toxic chemicals, materials and other waste using a focused remediation plan to address highest contaminated or toxic areas first
- Targets goals and objectives of a watershed-based management plan or acceptable alternative natural resource protection or remediation plan
- Threats to nearby surface and groundwater source water / drinking water supplies
- Protection or restoration of riparian areas and streambank integrity
- Sites impacting wetlands, aquatic and wildlife habitat and travel corridors, threatened and endangered species, and other sensitive areas
- Sites that drain to a priority impaired waterbody (CWA Section 303(d) lists)
- Sites that may impair Special Designated and Outstanding Alabama waters
- Sites that may impair recreational uses of public waters on public lands
- Cross-media transfer of pollutants (e.g. mercury and/or other particulate emissions to air, land and water)
- Landowner interest, participation and acquiescence of public access to a targeted impaired site

➢ Other Considerations Applicable to Achieving NPS Programmatic Goals and Objectives:

- Effectiveness and expectations of implemented NPS best management practices
- Identifying measures and indicators and tracking both incremental progress and final mitigation project success
- Education and outreach processes and products to enhance public and private sector knowledge and awareness
- Technology transfer and technical assistance
- Availability of and opportunities to leverage financial and human capital
- Sustains existing cooperators, increases volunteerism, and promotes new partnerships and efforts
- Landowner / land user interest, input, commitment, and expectations
- Implements Federal and state agency environmental protection laws, authorities, statues, orders, and guidance's
- Fosters new and innovative NPS characterization, monitoring, analyses, and remedial processes
- Project accountability (financial tracking) and transparency (uncomplicated public access, review, and input)
- Implementation of a holistic and focused multi-year or phased-project process to avoid a resource wasteful or piece-meal approach
- Potential to recover some project costs or validity as real or in-kind grant or other project funding match
- Local historical and cultural heritage
- Environmental justice (disenfranchised minority and low income population areas and concerns)
- Individual and community-based social, prosperity, livelihood and quality-of-life
- Aesthetics, tourism and outdoor recreation (reclaimed mine land re-use opportunities)

In addition to protecting and restoring water quality, human health and safety factors are important decision-making elements of the AL NPS Management Program. It is recommended that relevant health and safety issues, if applicable, are included as a component of an EPA-defined 9-key element watershed management plan. Nonpoint source mitigation strategies should correspond with non-EPA and EPA regulatory laws and executive orders, including but limited to the, Occupational Safety and Health Act, Noise Control Act, Comprehensive Environmental

Response, Compensation, and Liability Act, Resource Conservation and Recovery Act, and the Emergency Planning and Community Right-to-Know Act. The following human health and safety factors may parallel prioritization and implementation of NPS water quality protection and restoration decisions:

- Public Health and Safety Protection from Physical Hazards:
- Incorporation of a risk-based priority ranking process supported by sound science
- Remediate expansive land disturbance areas by mitigating areas of highest human health and safety risks first
- Sites located near population centers, sites with high visitation rates, or impacts to recreational / public use areas
- Areas of increased human exposure to contaminated toxic pollutant discharges to land, air and water
- Risk of death or injury from incidents associated with unrestricted public access to mine land high walls; spoil, refuse, or gob pile areas, open pits, water hazards and impoundments, discarded equipment, machinery and debris, etc.,
- Proactively preventing or reducing the potential for accidents and to assuage liabilities and litigation conditions

c. Hydraulic Fracturing

Hydraulic fracturing or "fracking" is a natural resource recovery process and technology in which high pressure fluids are injected underground to stimulate the release of highly dispersed or trapped natural gas and oil reserves in petroleum-bearing rock formations. Wells may be drilled hundreds or thousands of feet below the land surface to target selected coal beds, tight sands and shale formations; and may involve horizontal or directional borings extending more thousands of feet. There is increasing interest by federal and state government leaders and companies to expand this unconventional type of resource extraction in Alabama. There are three primary natural oil and gas "basins" in Alabama where fracking exploration has the greatest potential for expansion: the far southwest Texas-Louisiana-Mississippi Salt Basin; the Black Warrior Basin in west Alabama, and the northeast corner Valley and Ridge Province Basin. Hydraulic fracturing fluids commonly consist of water, sand, and chemical additives and are injected down a drilled well to create and hold open underground rock fractures. Once the injection process has been completed, the internal pressure of the rock formation causes the fracking fluid to return to the surface of the wellbore. This "produced water" may contain the injected chemicals plus naturally occurring materials such as total dissolved solids (brines), metals, and hydrocarbons. The produced water is typically stored on site in lined pits to be re-used, treated, and discharged. In some cases, produced waters may be injected underground for disposal.

In addition to helping to release coalbed methane gas from deeper coal formations, vertical and horizontal hydraulic fracturing drilling can open up shale and tight sands areas for gas development. Shale gas extraction may be present in locations where oil or gas production has never occurred before. Tight sands are gas-bearing, fine-grained sandstones or carbonates with a low permeability and often require hydraulic fracturing to release the gas. Drilling and underground injection well (e.g. Type II) activities associated with hydraulic fracturing in Alabama is under the statutory authority of the State Oil and Gas Board (OGB). Stormwater runoff pollutant discharges are regulated by both EPA and ADEM. The EPA and the OGB oversee Class II Underground Injection Control (UIC) wells in Alabama to protect surface waters, groundwaters and the land surface from pollutants associated with oil and gas production. The Safe Water Drinking Act (Section 1421(d) (1) exempts hydraulic fracturing operations from UIC regulations; however, entities that use diesel fuels to extract oil and gas during hydraulic fracturing (fracking) are subject to EPAs UIC program permitting guidance (EPA 816-R-14-001. February 2014). Actual and potential risks associated with hydraulic fracturing and drinking water / groundwater interactions could benefit from additional scientific research and understanding. Fracking operations are primarily regulatory in nature and as such, are not directly applicable to the AL NPS Management Program or Section 319 grant nonpoint source program.

The AL NPS Management Program supports efforts to proactively protect the environment in much the same way as expressed above for AML sites and activities. In general, the Section 319 grant as administered by ADEM will not fund the implementation of structural BMPs to mitigate problems associated with hydraulic fracking because those activities are considered NPDES permitted "point sources" of pollution. A nonstructural NPS management practice may involve education and outreach if it is an implementation component of a nonpoint source or mixed source TMDL or EPA-defined 9-key element watershed-based management plan and permissible under Section 319 grant guidelines.

d. Quarries and Open Mining Pits

Quarries yield essential noncoal, nonfuel, industrial mineral products to improve our standard of living. Quarried stone (specific sized and shaped rock or crushed aggregate such as granite, marble, and limestone) is produced to construct roadways, buildings and houses; treat impaired water quality, and other uses. Raw and produced products obtained from open or "borrow" mining pits include but are not limited to cement, concrete, construction sand and gravel, tiles, brick, wallboard, paint, abrasives, binders, lime, topsoil, and some precious ores and minerals. Quarries and borrow pits generally produce less toxic NPS pollutants than mining methods used to extract fuels (e.g. oil, gas and coal) and heavy metals. Uncontrolled and improper treatment of erosion and sedimentation from all resource extraction sites can result in significant impacts to water quality. Quarrying may cause sinkholes (particularly limestone quarries), contribute to air pollution (dust and particulates), and prompt human safety concerns associated with blasting hazards, lack of fencing and high walls, inadequate berms and barriers, spills and hazardous materials, and processing /transport noise. Active quarrying operations can also alter "natural" groundwater levels and disrupt stream hydrology (e.g. lower aquifer and drinking well-water levels; interrupt natural baseflow to streams and lakes, etc.). Recovery of aquifers and stream hydrology to near pre-quarrying conditions and associated ecological effects after operations have ceased can be long-term (years or decades). Depending on the quality of the water and economic benefits, inactive quarry pits may serve as a drinking water supply, as a water source for rural fire trucks and dry hydrants, or for recreational purposes. The proper restoration of mined sites can help to restore wildlife or create habitat that was impacted by excess dust, pollutant runoff, erosion and sedimentation, and noise.

The locations of quarrying operations are authorized by locally-elected officials. The potential discharges of pollutants that may impact water and air quality are regulated by EPA and ADEM NPDES permits. Solid and hazardous waste threats to air, water, and land resources in Alabama may be subject to the Resource Conservation and Recovery Act of 1976 (RCRA), including the "Bevill Amendment" that focuses on low toxicity /high volume wastes. Stormwater runoff from industrial facilities including activities associated with crushed stones and sand and gravel are also regulated by NPDES permits. Because quarrying and open/borrow pits are primarily regulated activities , the Section 319 grant program in Alabama only indirectly focuses on this NPS activities; primarily the delivery of generic watershed and water quality protection and restoration, NPS pollution, and stormwater runoff information education and outreach, and facilitating field days, tours, workshops, meetings, etc., relative to the implementation of a NPS or mixed (point/nonpoint) source TMDL or component of an EPA-defined 9-key element watershed-based management plan as allowable under Section 319 grant guidelines.

e. Water Quality Impacts

Surface water runoff from resource extraction activities can impair receiving water quality and alter stream flow rate, concentration, direction, and velocity. The degradation of surface water and groundwater quality and hydrology can occur any time anthropogenic (human-caused) activities disturb watershed topography, soils, and natural land covers (e.g. rainfall runoff from haul roads, access roads, inactive and active mine lands). Rainfall runoff picks up NPS pollutants and transports them directly to receiving waters. Pollutants picked up by rainfall runoff can be transported untreated and unrestricted into waterbodies the public uses for swimming, fishing, and drinking water sources, thus contributing to potential public health and safety concerns. Implementation of effective management measures to prevent or control the volume, velocity, and pollutant composition of stormwater runoff is critically important. Nonpoint source water quality impairments are directed or indirectly influenced by a number of factors, including but not limited to:

- Location of the site (e.g. topography, hydrogeology)
- Land covers (vegetation, soils, overburden type and composition)
- Type of activity (exploration, extraction, storage, processing, maintenance, transporting)
- Spatial and Temporal (duration, extent, intensity, past/historical events, future land uses)

Water quality data relevant to resource extraction in Alabama is presented below and is derived from the 2010 Water Quality Inventory Report:

Probable Source	Probable Source Group	Acres Threatened or Impaired
• Surface Mining	Resource Extraction	554.3
• Impacts from Abandoned Mine lands (Inactive) (Total Assessed Acres: 433,760.6)	Resource Extraction	412.5

Site-specific Targeting Monitoring Results: (Rivers and Streams - 2010)

Probable Source	Probable Source Group	Acres Threatened or Impaired
• Surface Mining	Resource Extraction	128.1
• Mine Tailings	Resource Extraction	17.5
• Impacts from Abandoned Mine lands (Inactive) (Total Assessed Miles: 10,913.4)	Resource Extraction	412.5

Nonpoint source pollution problems associated with resource extraction activities, particularly active surface mining and quarries, are preventable or relatively easy to minimize. Water quality problems associated with NPS pollutant runoff is generally contributable to:

- Non-existent, insufficient, ineffective, or inadequately installed or maintained management measures
- Limited citizen knowledge and awareness relative to the characterization and mitigation of NPS pollution and associated impacts on watershed health and water quality protection
- Inadequate pre-project environmental protection planning
- Deficient project activity staging to meet changing site, weather, social, and economic conditions
- Limited BMP inspections and compliance monitoring

f. Water Quality Protection and Restoration

The variable, convoluted and diffuse causes; a diverse complex of corporate and individual interests and actions, and the often inadequate and inconsistent investments of financial and human capital to address NPS pollution continue to negatively influence water quality protection and restoration efforts in Alabama. It will require several years of sustained public and private sector partnership support, funding, and other resources to adequately address and achieve resource extraction /mine land reclamation goals and objectives applicable to the AL NPS Management Program and to meet and sustain state water quality standards. The AL NPS Management Program will continue to promote iterative planning and implementation approaches and supports a NPS management framework that uses voluntary resource extraction incentives, practices and processes supported by Federal and State regulatory back-up authorities. Sustained and enhanced public and private sector partnerships, expertise, programs, and resource leveraging continue to achieve NPS programmatic expectations.

Included throughout this Appendix are suggested strategies to identify, prioritize, and implement NPS best management measures and practices to protect surface waters and ground waters; and in particular, the restoration of inactive mining sites (e.g. abandoned mine lands / waste and tailings disposal areas) that contribute excessive levels of NPS pollution to waters of the state. It is highly recommended that NPS pollution management planning decisions relevant to resource extraction targets:

- Early and sustained input from a diverse mix of public and private sector entities
- Prioritized watershed-based and site-specific measures and practices
- Clearly defined and understood environmental and public health protection goals, objectives, and milestones
- Strong science-based monitoring and assessment data (pre- and post-qualitative and quantitative)
- Close public and private sector coordination and open communication
- Fiscal accountability and transparency when using public funds
- Indicators and measures that reflect stakeholder participation and other interests (e.g. input of human and financial capital)

Resource extraction stormwater runoff mitigation activities presented herein (particularly associated with abandoned mine lands and sand and gravel operations), are designed to effectively, efficiently, and expeditiously achieve AL

NPS Management Program goals and objectives. Section 319 grant partners continue to work together to coordinate and leverage resources to restore designated uses of waters where elevated levels of NPS pollutants have been documented (e.g. Section 303(d) listed waters) using science-based water quality monitoring and assessment data and indicators to measure success. It is highly recommended that partners continue to dedicate available NPS management funds and resources to proactively protect threatened and unimpaired waterbodies (i.e., Outstanding Alabama Waters, Outstanding National Resource Waters, and Treasured Alabama Lakes) to prevent them from becoming impaired. In addition, the environmental and economic benefits of point source and NPS water quality pollutant credit "trading" should continue to be considered as a component of a holistic watershed restoration and NPS pollution management approach. The AL NPS Management Program and Section 319 grant program will continue to particularly support community-based NPS pollution management activities, NPS pollutant load reductions, and water quality protection and restoration efforts where equitable resources have not been historically targeted (i.e., environmental justice), such as underserved, low income or under represented racial / ethnic minorities who may benefit from resource extraction and NPS pollutant load reductions.

Political boundaries do not correspond with specific hydrologic, ecologic, and geographic aspects of water quality and natural resource protection and restoration endeavors. And, while the regulatory approach must be relied on to make strategic environmental response decisions, it is not always the most efficient or productive forum through which NPS pollution management and resource extraction decisions should be addressed. Voluntary collaborative partnerships can be a very effective and useful mechanism to identify, prioritize, implement, and maintain water quality protection and restoration efforts. As practicable, NPS resource extraction pollution problems should be mitigated using a holistic watershed-based approach. Watersheds provide a useful areal extent and focused starting point (preferably HUC-12 in Alabama) to target NPS water quality protection and restoration resources. Science-based watershed-based data collection and analyses can provide clear evidence of the severity and magnitude of NPS pollution problems and enhances opportunities to effectively, efficiently and economically address NPS concerns on a "manageable" scale. The AL NPS Management Program and Section 319 grant program highly recommend the development and implementation of an EPA-defined 9-key element watershed-based management plan to mitigate NPS water quality problems. Having clear NPS water quality goals and local buy-in is especially significant because of a strong and inherent stance by many landowners in Alabama relative to private property rights and private land use.

The AL NPS Management Program and Section 319 grant program continues to address resource extraction issues by facilitating partnerships, leveraging public and private sector resources, and applying both voluntary and regulatory water quality protection and restoration approaches. These complementary mechanisms continue to be instituted to align national, regional, and state NPS programs and priorities with local and specific actions. The AL NPS Management Program and Section 319 grant program strive to meet state water quality standards and achieve beneficial uses of state waters by:

- Strategically focusing a mix of leveraged funds on specific, priority, water quality based programmatic goals and objectives so that NPS impaired waters are restored and unimpaired or threatened state waters continue to be protected
- Clearly articulating NPS goals and objectives developing management plans and approaches to meet them
- Reflecting a balance between statewide and local priorities to ensure limited funds and resources achieve measurable water quality protection and restoration results
- Aligning and setting priorities that make the best use of available human and financial resources to reduce NPS loadings and meet state water quality standards
- Tracking and reporting results to demonstrate incremental progress and document final successes and outcomes

Resource extraction activities such as exploration, extraction, overburden and raw material storage, preparation and processing, hauling road and equipment maintenance or other endeavors contribute to nonpoint sources of pollution. Nonpoint source pollutants impair water quality as they are dissolved, suspended, transported and dispersed by stormwater runoff to waters of the state. The EPA has developed stormwater discharge permit regulations under the National Pollutant Discharge Elimination System (NPDES) program to protect water quality from uncontrolled and untreated discharges associated with land disturbance activities. Stormwater discharge permits associated with coal mining, metal mining - metallic mineral/ores, oil and gas extraction, and non-metallic minerals except fuel facilities (also see North American Industry Classification System) are issued by ADEM if discharges of stormwater pollutants may come into contact with overburden, raw material, products and byproducts, or waste located onsite.

An NPDES stormwater permit issued by ADEM requires a Notice of Intent and the development of a best management practices plan for small noncoal/nonmetallic mining activities. The plan provides an assessment of potential sources of stormwater runoff pollutants and the control measures that will be implemented to minimize the discharge of those pollutants from the proposed mining site. Nonpoint source pollution control measures may include implementation and maintenance of structural erosion and sediment control measures as well as non-structural practices such as education, outreach and training, inspections, and the collection and reporting of water quality monitoring data to help resource agencies determine permit noncompliance.

The AL NPS Management Program continues to support a targeted, flexible, and iterative voluntary approach to address nonpoint sources of pollution in Alabama; however, it is recognized that regulatory back-up authorities (e.g. NPDES permit compliance) are also essential. This Appendix recommends several environmentally-protective and economically-sensible measures and practices to mitigate nonpoint sources of pollution using both approaches. The ***Strategies*** and ***Action Items*** presented in Attachment 1, herein, recognize that intertwined and sometimes contentious relationships exist among various sectors of society. Resource extraction and water quality protection and restoration conflicts do emerge and dialogue can sometimes be dynamic and contentious; however, continued communication is critical and should begin at the initial planning stage and continue through implementation, resource extraction cessation, and long-term restoration and post-BMP maintenance. The AL NPS Management Program acknowledges that reasonable and mutually-beneficial NPS management programmatic solutions are best achievable through sustained public and private sector partner communication, collaboration, coordination, and cooperation. Water quality monitoring should be conducted prior and during operations and continue until all mining activities have ceased or NPS threats to water quality are attenuated. In addition, effective integration and leveraging of a wide array of programs and resources to support resource extraction education and outreach, research, training, and technology transfer and technical assistance is also essential.

g. Water Quality Monitoring

Water quality monitoring and assessments are critical to demonstrating and documenting NPS impacts and the effectiveness of BMP implementation. The Alabama Department of Environmental Management (ADEM) continues to use its established 5-year rotational river basin monitoring and assessment approach to ascertain various NPS pollution impacts to surface waters and groundwaters of the state. The ADEM integrated monitoring strategy is designed to provide science-based water quality data needed to identify and prioritize NPS issues and problems and to target programmatic solutions to protect and restore water quality. This statewide strategy provides definitive quality assured/quality controlled and fact-based data and information to both the public and private sectors using tangible watershed health and water quality measures and indicators. The data is useful in substantiating or repudiating public perceptions relative to water quality and human health impairments, conditions, or threats. In addition, the NPDES permit program also requires industrial facilities to submit discharge monitoring reports (DMR) and other forms to ADEM. The NPDES water quality monitoring data informs the public where, when and how much pollutants are discharged from a facility. The data is also used to apply enforcement actions to ensure compliance with Federal and state surface water and groundwater protection standards.

Each major river basin monitoring iteration uses standardized EPA-approved field collection and laboratory analyses methods to gather unbiased estimates of the condition of the state's rivers and streams, lakes, wetlands, and coastal waters. This approach provides ADEM with valid science-based water quality data to help the public and private sectors evaluate the:

- NPS pollutant load reduction components of a watershed-based management plan.
- Extent of waters of the state that support healthy biological, physical, and chemical conditions
- Impacts on recreational, industrial and municipal water uses, community environmental and economic health, and aquatic and wildlife resources and habitat
- Success of investments of funds and other resources to protect and restore water quality and natural resources
- Status of whether state waters are healthy or are incrementally achieving state water quality standards
- Trends or changes in water quality over time including "water quality limited segments" under Section 303(d)

- Scope and scale of NPS impacts on watersheds and surface water and groundwater quality

As additional water quality data and information is collected and evaluated, the intertwined relationships relative to human activities and resource extraction impacts on the environment continue to be better documented and understood. The collection of reliable water quality data and heightened citizen environmental knowledge and awareness are critical to NPS management decision-making processes (e.g. enhancing problem identification; prioritization and targeting of human and financial capital to address pollution problems, etc.). Water quality data and information may be collected by ADEM concurrently or independently of Section 319 grant-funded projects to help the state holistically identify priorities, evaluate statewide NPS programmatic effectiveness, and assess BMP targeting and implementation success. Water quality data is reported by ADEM biennially in the CWA Section 305(b) Integrated Report to Congress, and is also used to update the ADEM-compiled CWA Section (303) d List of Impaired Waters, as applicable. The data may also be used to document EPA Section 319 success stories and to document NPS pollutant load reductions and update and closeout NPS projects in the EPA Grants Reporting and Tracking System database. Monitoring data is also critical to the development and implementation of Total Maximum Daily Loads (TMDL) which is a primary water quality restoration mechanism used by EPA and ADEM to achieve CWA objectives and meet state water quality standards.

The Section 319 grant program continues to sustain ADEM efforts to collect and analyze water quality data from relevant resource extraction activities. The information is evaluated and used to document the causes of NPS pollution, leverage and target resources to mitigate problems, estimate pollutant load reductions, and support AL NPS Management Program accountability and transparency, including but not limited to the following implementation processes and efficiencies:

- Protect and restore surface waters and groundwaters impaired by a nonpoint source pollutant or mixed pollutant sources for which TMDLs have been developed
- Bring together technical experts, program managers, policy makers, community leaders, and citizens at the federal, state, and local levels to leverage and integrate resources and prevent duplication of efforts
- Enhance NPS knowledge and awareness relative to water quality protection and restoration, human and aquatic organism health, BMP implementation and maintenance, and watershed management to public and private sector audiences at workshops, conferences, field days and tours
- Fill in resource extraction water quality data gaps, support research and technology, and advance relevant air, land and water media data collection quality assurance and control protocols
- Provide resource extraction information to public and private entities to enhance the planning and implementation of NPS water quality protection and restoration management measures and practices
- Identify personal and community-based social and economic needs, character, and context to help enhance and sustain individual and community resiliency and sustainability

Given that Alabama does not have a dedicated source of sustainable funding to adequately manage all causes of NPS pollution, all waters of the state impaired by legacy resource extraction activities cannot realistically be expected to be restored expeditiously. The AL NPS Management Program continues to utilize inclusive partnerships to deliver mutually beneficial management measure planning, prioritization, and implementation decisions and strategies. To get the best bang for the NPS mitigation buck, mitigation scenarios should continue to strategically focus relevant resource extraction mitigation resources on improving water quality, setting priorities, clearly articulating goals and objectives, integrating and leveraging financial capital, and tracking and reporting reclamation progress and water quality protection success. Water quality monitoring and assessment data collected by ADEM will continue to be made available to the public and private sectors to assess resource extraction impacts and to target implementation efforts and NPS mitigation activities for:

- Surface waters and groundwaters that serve as a drinking water supply or that require continued assessments
- Waters near geographic areas where rapid land use development is occurring
- Sites contributing high NPS pollution loads to downstream waters
- Waters where trend data indicates increasing water quality degradation
- High quality waters of the state
- Waters with unique, valuable, or threatened species or critical aquatic habitats and species
- Implementation effectiveness and maintenance of BMPs

h. Air Quality Impacts

Although the AL NPS Management Program primarily addresses water pollution issues, resource extraction activities such as exploration, site development, processing, preparation, storage, transportation, and utilization can release airborne hazards to the atmosphere, thereby impacting air quality as well. For example, the oil and gas industry (operations and equipment) is a leading source of volatile organic compounds (contributes to ground level ozone or smog), and a significant source of air pollution, including methane (a greenhouse gas) and benzene, ethylbenzene, and n-hexane (known or suspected cancer causing compounds). Mobile sources (gases, vapors, dust) can be dispersed by the wind, by vehicular traffic or by earth-moving machinery and contribute to toxins and particulate matter released to the atmosphere. Surface mining and quarrying operations can also discharge heavy metal (e.g. lead, mercury, arsenic) contaminates. Silica/silicon dioxide (formed when silica-bearing rock such as granite is drilled or pulverized) exposure can result in increased risks to human health. Coal mine dust, a product of blasting, processing, and transporting of coal, is an airborne human health hazard consisting mostly of coal, but can also include silica, clay, limestone and other minerals. Chronic human respiratory diseases and human health hazards have been associated with increased exposures to methane, hydrogen sulphide, and radon. Resource extraction emissions are regulated by applicable ADEM air and water programs as NPDES permitted "point sources."

Spatial and distal atmospheric transport of particulate matter from multiple sites and processing operations can contribute to long-term NPS water quality and human health nonpoint source pollution problems. Actual and potential risks associated with air transport of NPS pollutants could benefit from a better scientific understanding. Real and perceived air quality issues are, in general not directly applicable to the AL NPS Management Program or Section 319 programs whose primary focus is on improving water quality. Section 319 funded best management practices may include watershed health and water quality restoration education and outreach if the NPS cause of air transport and disposition is a component of a watershed-based management plan. Leveraging point source / NPS human and financial capital to cooperatively address air pollution concerns (e.g. fugitive dust associated with crushers and processing, spoil piles and tailings, hauling road use, etc.) greatly enhances mitigation capabilities, technology transfer, sharing of expertise and exchange of information, and increases the likelihood that impaired waters of the state meet state water quality standards. Continued coordination, cooperation, collaboration and communication are key AL NPS Management Program and Section 319 grant mechanisms being used to achieve programmatic goals and objectives, overcome barriers, minimize conflicts, prevent duplication of efforts, and help to ensure that NPS pollutant load reduction resources are focused and protective of water quality.

Mine overburden (topsoil and rock material that covers and is removed to extract a targeted ore or mineral) and tailings (waste material that was separated from the targeted mineral) are potential sources of NPS pollution. Dry and fine grained tailings are especially prone to producing dust (air pollution). Wet and thickened tailings containing heavy metals or sulfides may contribute to acid mine runoff. The type of tailings (wet, thickened, and dry) are important from a pollution remediation standpoint because it characterizes the material and helps to establish the best measures and practices that will be needed to successfully stabilize, remove or remediate a NPS problem.

Section D.2 Resource Extraction and Nonpoint Source Pollution

a. Overview

Pre-law abandoned surface mines and non-complying active mining activities can disturb extensive areas of top soils, eradicate natural vegetative cover, and contribute to substantial opportunities for NPS pollution runoff to impair waters of the state. Hauling roads, hard-scaped/staging areas and inadequately designed rainfall runoff drainage conveyances can alter natural hydrologic patterns and processes, diminish ground infiltrative capacity, degrade streambanks, and threaten aquatic organisms and their habitat. Potential NPS discharges can also originate from the land area upon or under which minerals or metal ores are extracted and where incidental mining activities disturb the adjacent natural land surface (e.g. impoundments and depressions; refuse tailings and overburden areas, structures, etc.). In addition, oil, grease, gasoline and other fluids

from leaking and maintenance of equipment and vehicles may also contribute to water quality degradation. Stormwater discharges from surface mining activities (e.g. preparation, storage, disposal, haul and access roads, etc.) may contribute elevated levels of acid runoff, suspended solids, dissolved solids, iron, manganese, lead, chromium, mercury, aluminum, and traces of other heavy metals to surface and groundwaters. Active operations can increase dust and turbidity, and impair aquatic life and wildlife survival and habitat. Large quantities of water are frequently needed to extract (e.g. hydrologic fracturing) and process (i.e., wash / clean raw materials to remove impurities) mined resources for beneficial uses. In addition, improperly stored overburden stockpiles (i.e., the typically uncontaminated soil, rock, and vegetation that lie above a coal seam or mineral deposit before mining begins), tailings (i.e., the "spoil" or "waste" material that remains after the targeted economically-beneficial components have been extracted from the mined material), buildings and structures, and haul and access roads can continue to impair air and soil quality and contribute to state water quality standards violations long after mining activities have ceased. The state's biennial CWA Section 303(d) Lists of Impaired Waters continues to identify metals, pH, sediment, and habitat alteration as the primary causes of nonpoint source pollution problems associated with abandoned surface mines.

Pollution prevention is a critical component of the AL NPS Management Program and Section 319 grant program. These statewide NPS programs support the development and implementation of proactive, economically sustainable and environmentally-protective measures and practices that will ensure resource extractive sites are safe and healthy for everyone who lives nearby or benefits from resource extractive activities or its products. Preventive management measures must be designed to not allow a site to become a source of NPS pollutant runoff nor a future public health and safety liability or clean-up responsibility (e.g. proactive development of NPS pollution prevention and clean up plans to address runoff from startup to closure). Concurrent with the mitigation of environmental problems, pollution prevention can address human health physical hazards such as excessive noise and exposure to natural background ionizing radiation (e.g. radon releases from permeable soils, fractured rocks, or water supply). The need to treat stormwater runoff can be reduced by preventing, as practicable, exposure of potential NPS pollutants to surface waters, groundwaters, and rainfall runoff. Monitoring of NPS discharges from all discharge outfalls must be adequate and timely in order to properly assess pollution prevention needs and success. Successful pollution prevention strategies requires continued communication, collaboration, cooperation, and coordination between relevant public and private sectors and is highly recommended by the AL NPS Management Program and for CWA Section 319 grant funded projects. This is especially applicable relative to the development and implementation of NPS watershed-based management plans in which structural or nonstructural resource extraction measures to achieve pollutant load reductions of Section 303(d) listed impaired waters are targeted. Structural NPS pollution prevention BMPs include but are not limited to:

- Covering construction and other materials using temporary (tarps) or permanent structures (buildings, sheds)
- Proper disposal of waste in approved landfills and keeping dumpster lids closed to prevent runoff
- Proper land grading and haul road/access road construction (and drainage systems)
- Physical impacts relative to slope failures, tailings / slurry impoundments, subsidence, structures, and mine openings
- Impermeable caps or isolation barriers, drainage layers, hardened/armoring and vegetative covers
- Streambank and riparian area protection
- Selecting and replanting native plants or establishing/maintaining evapotranspiration vegetative covers
- Posting signage to ensure worker and public safety and to prevent water quality impacts that could result from an accidental release of NPS pollutants
- Water flow diversions, contours, backfilling, and retention areas and detention basins
- Approved injection wells

Non-structural pollution prevention practices may include but are not limited to easements, covenants, zoning, education and outreach, inspections, and reporting to prevent environmental and human health and safety hazards; and/or, to reestablish, maintain or protect hydrological and ecological systems at both abandoned and active sites. Resource extraction reclamation management decisions should consider water quality protection and economic benefits, site access (to conduct monitoring, maintenance and other activities), safety hazards and liabilities, pollutant runoff threats and characteristics, and performance indicators and success measures. Water quality monitoring and ecological assessments should be continued to ensure that the implementation of structural measures and nonstructural practices continue to be effective and are helping to meet state water quality standards.

The AL NPS Management Program highly recommends efforts to identify, establish and maintain cooperative public and private sector partnerships (e.g. resource agencies, academia, nonprofits, trusts, developers, planners, contractors, engineers, industry/corporations, advocacy groups/organizations, citizen volunteers, etc.). Collecting and disseminating timely and science-based data and information relative to resource extraction, abandoned mine land reclamation, nonpoint source pollution, and water quality protection decision-making is essential. Close public and private sector alliances improve collaboration, coordination, and communication and can significantly accelerate progress in protecting and restoring water quality and help to ensure efficient targeting and leveraging of NPS mitigation resources. Long-term improvements in water quality, NPS pollutant load reductions, reclamation / environmental protection success, and economic-based aspects are often contingent on building and sustaining relationships with a mix of local entities that represent the many and varied environmental, economic, social and cultural character of the targeted mine land restoration site (e.g. Alabama Clean Water Partnership).

Continuing to facilitate opportunities to deliver technology transfer, technical assistance, and education, outreach and training enhances NPS programmatic efforts to enhance knowledge and awareness, minimize duplicative efforts, and reduce wasteful expenditures of limited human and financial capital. Implementation and demonstration of new and emerging innovations, measures, and practices under different conditions and site characteristics helps to ensure effective, efficient, and expeditious improvements in water quality. For example, technologies such as X-Ray Fluorescence metals analysis and sulfate reducing bioreactors have become fairly common. As the AL NPS Management Program is updated over the next 5-year cycles, it is expected that more advanced tools will continue to emerge and be incorporated as a component of an iterative toolbox building process.

Unlike "point source" (i.e. end-of-pipe) pollution, nonpoint source pollution or "pointless pollution" originates from many and varied dispersed sources and is a significant contributor to impairment of waters of the state. Nonpoint source pollutants are picked up by precipitation (rainfall, snow) runoff and drainage and seepage waters and transported to receiving waters casing several adverse environmental, economic and human health problems. Atmospheric transport and deposition of some NPS pollutants (e.g. mercury, particulate matter) can also contribute to impaired water quality. As runoff flows over or through the ground, it can pick up contaminates such as trash and debris, soil particles, chemicals, oil and grease, and other pollutants and transport them to surface streams, rivers, lakes and to groundwaters. Increased volume and velocity of rainfall runoff can accelerate the rate of soil erosion, sedimentation, and turbidity and also transports litter and trash. Adverse NPS problems can also include intensified streambank, stream channel and riparian area degradation. In addition, aquifer /drinking water source levels, supplies and quality can be threatened and diminished. The reduction and loss of trees and other natural vegetative covers and shading associated with land clearing can result in changes in waterbody temperature (many aquatic plant and animals and habitats are very sensitive to changes in water temperature).

Inadequate or improper selection, implementation and maintenance of resource extraction measures may negate NPS treatment success expectations or accelerate impairments to surface waters and groundwaters. Mitigating a particular environmental or human health threat can be a relatively intensive, expensive and time consuming endeavor; particularly when attempting to mimic or restore natural hydrologic patterns to near pre-land disturbance conditions. In some instances, it is more efficient and effective to install a drainage system "train" of BMPs to holistically target multiple NPS causes and types of pollutant discharges. A series or "train" of management measures can efficiently, effectively and expeditiously treat pollutant loadings while reducing discharge flow volumes and velocity. Control strategies recommended by the AL NPS Management Program and Section 319 grant program to protect environmental and human health and safety associated with AML sites include but are not limited to the following measures and practices:

- Coordination of a cooperative and inclusive public and private sector partnership approach
- Leveraging programs, authorities, and resources whenever allowable and prudent
- Implement regulatory compliance actions whenever the voluntary NPS management approach doesn't appear to be working in order to prevent, minimize and abate the causes of water quality degradation

- Ensure that mining overburden and tailings piles are properly capped, or remove and transport the materials to an appropriate waste storage area for holding and treatment
- Protect topsoil to be used to reclaim mined areas from eroding or becoming mixed with subsoil's and rock in order to protect the topsoil's organic matter, prevent the eradication of beneficial soil microorganisms, and to avert contact and mixing with mining waste contaminants
- Install and protect native vegetative buffers and riparian areas along streams and other waterbodies to act as natural NPS pollution and stormwater runoff filters
- Remove and properly dispose of anthropogenic sources of pollution (e.g. discarded mining equipment, oil and chemical drums, trash and debris, etc.) that may impact surface and groundwaters
- Redirect surface hydrology to avoid untreated discharge of mine wastes and tailings (restore and stabilize stream banks and riparian areas, preferably using natural vegetation)
- Once mining activities have ceased, native vegetation should be re-established similar or equal to the composition and quality of natural vegetation of the pre-mined area to help create or sustain a diverse and permanent cover capable of self-regeneration and plant succession
- Properly and timely inspect and maintain stormwater runoff conveyances and mine tailing retention areas and detention ponds to prevent untreated and unrestricted discharge of sediment, slurry, drilling fluids, chemicals, acids, or heavy metals-laden waters
- Restrict needless and unauthorized public access to NPS pollution prevention and treatment sites and measures
- Close vertical shafts either by backfilling them or by covering openings with substantial inert and non-polluting materials
- Stabilize highwalls and overburden to prevent leachate infiltration and erosion contributing to NPS sedimentation, turbidity, and heavy metals runoff or from altering the "natural" pH of waters of the state
- If bats are present in tunnels / adits (horizontal entrances dug into hillsides to extract ore and mineral deposits), restrict unauthorized human access or interference, but still allow for use as bat and other species habitat
- Continue to research and implement management measures to minimize pre- and post-mining water quality impacts that may directly and indirectly effect threatened and endangered species, introduce invasive species, or enhance publically and privately owned land uses

The following topics are brief summations of common causes of NPS pollution associated with resource extractive activities (e.g. where it comes from; how it can harm environmental and human health; and steps that can be taken to mitigate NPS pollutant loadings and protect and restore water quality while concurrently attaining economic competitiveness and sustainability).

b. Erosion and Siltation

Erosion and sedimentation (siltation) is a primary cause of NPS water quality impairments associated with most resource extractive activities. It is generally a direct consequence of inadequate or ineffective design, installation, operation, or maintenance of NPS control measures. Erosion and sediment may originate from land clearing and grading, improper haul road and access road design and construction, and inadequately planned, constructed and maintained mine land overburden, product, and tailing storage areas and settling ponds. As runoff from precipitation events flows over the landscape, it can pick up, dissolve, and suspend pollutants attached to soil particles and transport them to streams, rivers, or lakes. The spatial and temporal extent of mining activities, topography, geology, hydrology, vegetative cover, ore/mineral chemical and physical composition, and other factors will influence the design, type and number of management measures to be implemented to prevent, reduce or abate erosion and sedimentation problems from nonpoint sources.

Sediment deposited in surface waters can result in severe acute and chronic water quality and human health problems. Too much sediment can smother benthic organisms, destroy or degrade aquatic habitat, clog fish gills, or alter dissolved oxygen levels and temperatures, resulting in fish kills or fish and shellfish consumption advisories. Increased sediment deposition from mine site clearing and grading may disrupt, fill in, and clog stormwater runoff conveyances; degrade drinking water sources and reduce storage volume; lead to expensive dredging, increase flooding, impair wetlands and sensitive areas, degrade or restrict recreational opportunities and resources, and create

public nuisance and property owner and user liabilities. Total suspended solids such as silt and clays can cause receiving waters to become muddy or cloudy (turbid). Turbidity is a measure of water clarity and is a useful indicator of the effectiveness of BMPs in preventing, reducing, and treating NPS stormwater runoff from mining sites. Excessive turbidity levels generally suggest a need to install preventive erosion control measures or revising management measure inspection and maintenance procedures.

Measures to trap sediment after it has eroded may include but are not limited to silt fences / staked hay bales or retention areas and detention areas. Active coal mining operations must implement erosion and sediment control measures as a requirement under the Surface Mining Control and Reclamation Act. Uncontaminated overburden should be properly capped and contained until mining operations have ceased. The overburden should then be reused to help restore the disturbed land surface and as practicable, to near pre-mining landscape contours and conditions. Vegetative controls to prevent NPS runoff problems may include but are not limited to appropriate mulching, seeding, tree planting and sodding. Erosion and sedimentation problems are best prevented or minimized by proper BMP planning, implementation and maintenance (e.g. planting buffers of native plants along streambanks; restricting or not disturbing soils or vegetative cover along ditches or streams during exploration, site preparation and clearing, production and processing; allowing rainwater to gradually infiltrate into the ground rather than flow untreated and unimpeded to a non-impaired receiving water; properly designing, inspecting, operating and maintaining overburden and tailing waste retention areas and detention ponds, etc.).

Mine tailings (waste material that was separated from the targeted mineral) and overburden (topsoil and rock material that covers and is removed to extract a targeted ore or mineral) may ultimately become potential sources of NPS pollution. The types of mining waste and tailings (e.g. wet, thickened, and dry) are an important consideration from a NPS pollution prevention and remediation perspective because it characterizes the material, thereby establishing the best remediation measures and practices. Dry and fine grained tailings are especially prone to producing dust (air pollution). Wet and thickened tailing slurries generally contain heavy metals or sulfides that may contribute to acid mine runoff.

The AL NPS Management Program recommendations to prevent or reduce siltation, sedimentation and turbidity problems include sustained education and outreach to increase citizen awareness, and the implementation of on-the-ground management measures (e.g. keeping soils on-site and in-place as much as practicable; installing adequate rainfall runoff detention ponds and retention areas, establishing and maintaining vegetative buffers along waterbodies to act as natural filters, etc.) to moderate the volume and velocity of stormwater runoff and prevent excess sediment runoff. Holistic pre-mining watershed-based and ecological risk assessments should be conducted to identify erosion and sedimentation impacts and BMP implementation needs, develop post-mining remediation plans, and to evaluate management measure implementation and water quality protection success. Nonpoint source management measures are usually best installed at, or very near to, the source and cause of the pollution problem. Regular and competent inspections and maintenance of control measures should be a continuing priority during all phases of resource extraction processes. Education and outreach and training to introduce effective and efficient measures and technologies to minimize environmental impacts should continue.

c. Acid Mine Drainage

Acid mine drainage (AMD) is a major water quality concern. Acidic water conditions and discharges occur when surface and groundwaters react with coal and overburden containing iron pyrite (a sulfur-bearing mineral). Acid mine runoff can threaten and overwhelm aquatic organisms, wildlife, and vegetative growth, survival and habitat; contaminate drinking water supplies, and degrade recreational waters. Discharges from active coal mines are regulated thorough the NPDES permitting program; however, “pre-law” AMD and reclamation of abandoned mine lands (AML) generally requires a voluntary clean-up approach. Mitigating the impacts of AMD can be relatively expensive; however, if AMD problems are not properly treated, it may require centuries for water quality, hydrology, and watershed ecology to return to pre-mining conditions. The AL NPS Management Program continues to recommend implementation of the best science-based applications of AMD technologies, including but not limited to: properly installing and maintaining constructed wetlands, anoxic limestone drains, excavation and

disposal, reuse and reprocess, microbial mats, and phytoremediation. Additional Mining Waste Treatment and Technology Selection recommendations by the Interstate Technology Regulatory Council and the Office of Surface Mining - Acid Mine Technology Initiative and associated Remediation Handbook applicable to Alabama may also include but are not limited to: in-situ biological treatment, passivation, aeration, chemical precipitation, biochemical, permeable reactive barriers, and pressure-driven membrane separation. The environmentally-protective and economically-sensible advantages of all AMD treatment technologies should be carefully considered before NPS management funds are expended to address nonpoint sources of pollution. Education and outreach and training to introduce effective and efficient technologies to minimize AMD impacts to water quality should continue. Regular and competent inspections and maintenance of NPS control measures to mitigate AMD should also be a continuing priority.

d. pH

The pH of a waterbody is a measure of its acidity or alkalinity. Increasingly basic (alkaline of high pH) and caustic (acidic or low pH) water quality conditions can leach out highly toxic metals from the mine, mined materials and stream sediments; increase the toxicity of certain metals (e.g. copper and aluminum) in excess of state water quality standards; contribute to significant and prolonged declines in floral and faunal growth and survival; and impair recreational or other beneficial uses and opportunities. The pH of a waterbody can be significantly influenced by local geology (e.g., minerals, rocks and soils) and hydrology (surface and groundwater sources and flows) and may also fluctuate naturally (daily, hourly, and seasonably). When mine waters are exposed to oxygen and pyrites (or other sulfide minerals if present) during the mining process, the water can become highly acidic (i.e. produces sulfuric acid). The discharge of highly acid mine drainage (see "c" above) can have devastating ecological and economic impacts and can complicate mitigation of downstream water quality. Remediation of pH / AMD problems is best accomplished using a cooperative partnership approach and leveraging AML reclamation funds. As place-based, sensible and practicable, pH mitigation activities should utilize a watershed-based management approach.

The AL NPS Management Program supports a continuation of NPS education and outreach activities to increase owner/worker and public awareness and knowledge relative to pH issues and watershed health and water quality protection. These efforts should particularly stress the point that most NPS pollutant runoff problems are preventable. Implementation of structural BMPs to mitigate pH problems are similar to those to control AMD, but may also include proper disposal of mining industry chemicals and fluids, never dumping NPS pollutants into off-site drainage conveyances, and protecting, installing and maintaining natural vegetative buffers and set-backs (e.g. using native species to act as a natural NPS polluted runoff filter along waters of the state). Regular and competent inspections and maintenance of NPS control measures to mitigate pH problems should be a continuing priority. Nonpoint source education and outreach to increase industry, mine owner, worker, and general public awareness and knowledge of and to introduce effective and efficient technologies to minimize environmental impacts should also continue.

e. Dissolved Oxygen

Dissolved oxygen (DO) is a measure of how much gaseous oxygen (O_2) is dissolved in the water and is a good indicator of the "health" of a waterbody. Oxygen is dissolved in water by diffusion from the surrounding air, aeration (movement, mixing or agitation of stream flow), and aquatic plant photosynthesis. All aquatic life needs adequate levels of dissolved oxygen to survive. Adequate dissolved oxygen is also necessary for good water quality. The level of oxygen in a waterbody can also affect the odor, clarity and taste of a drinking water source. Rapidly moving water tends to contain higher levels of dissolved oxygen. Lower DO levels are generally associated with stagnant waters, sluggish flows or pools exposed to hot summer temperatures and little or no shading, and bacteria and microorganisms consuming dissolved oxygen as organic matter decays (e.g. biochemical oxygen demand). Excess organic material in streams, rivers, and lakes/reservoirs can also result in eutrophic conditions, especially during calm weather conditions and hot summer months. Primary AL NPS Management Program management practice recommendations to address low DO problems associated with resource extractive activities include sustained education and outreach to increase public awareness and knowledge relative to NPS pollution, water quality protection and restoration, and DO concentrations that can fluctuate seasonally as well as diurnally (daily). Nonpoint source education and outreach to introduce or increase the use of effective and efficient technologies to minimize negative physical, chemical and biological impacts should continue. Regular and competent inspections

and maintenance of NPDES required control measures to mitigate construction stormwater runoff should also be a continuing priority and coordinated with NPS programmatic goals and objectives.

f. Metals

Metals occur naturally in soils and rocks. Metallic form, type, and concentrations will vary according to the geology of the mine site and its watershed. Although some metals are essential for normal aquatic life and human health and survival; at high biologically available levels, all metals can be toxic. Common heavy metals in Alabama that may degrade water quality and beneficial uses include but are not limited to iron, manganese, aluminum, zinc, arsenic, and mercury. Metals can be eroded naturally and transported by air and water or concentrations may be strengthened and dispersed in receiving waters by improper anthropogenic (caused by man) resource extraction, storage, processing, use and disposal activities. Impacts to water quality and aquatic organism and human health may be chronic (occur slowly over time) or acute (shorter time frames). In addition, there may be no human sensory evidence (e.g. taste, sight, smell) that a waterbody is contaminated by metals; however, high pH / acid mine drainage usually imparts a distinctively identifiable reddish/orange/yellow color to the streambed. The AL NPS Management Program best management practices recommendations to control heavy metal pollutants include sustained education and outreach to increase public and owner/worker awareness and knowledge and reduction and reuse as practicable. Metal-containing tailings and waste and overburden should be properly disposed in approved landfills if the material will not be used to refill abandoned mine shafts or open pits, renovate steep slopes and high wall hazards, or restore subsidence areas or depressions (e.g. sink holes) to pre- or near pre-mining conditions. Native vegetative buffers and riparian areas along waterbodies should be protected or installed to act as filters for NPS stormwater runoff. Regular and competent inspections and maintenance of NPS control measures to mitigate heavy metal pollution problems should be a continuing priority.

The EPA tracks and regulates mercury releases to the environment separately from other heavy metals. Mercury occurs naturally in rocks; however, the improper storage, treatment, use, and disposal of mined materials may exacerbate the release of harmful levels of mercury into the environment. Coal-fired power generating facilities can also contribute to atmospheric emissions and transport of mercury. Some forms of mercury can build up in fish tissue (methyl mercury) and pose health risks (e.g., nervous system, brain, heart, kidneys, lungs, and immune system) to people and animals that eat fish or shellfish. Fish consumption warnings are compiled annually by the state. The mitigation of mercury contamination on air, land and water resources is a highly complex NPS dilemma in Alabama (see Section 303(d) lists) as well as an interstate, national and international quandary. Holistic management solutions are beyond the scope of this AL NPS Management Program and the Section 319 grant program and will require a broad-based public and private partnership approach. Nonpoint source education and outreach to increase industry, mine owner, worker, and general public awareness and knowledge of mercury impacts on the environment and introduce cleaner and efficient technologies to minimize environmental impacts should continue.

g. Total Solids

Dissolved solids (e.g. chlorides, magnesium, sulfates, carbonates, etc.) and Total Suspended Solids (e.g. silt and clay particles and other particulate matter) in a water body can harm aquatic life and make water resources unusable or expensive to treat for human consumption, irrigation, livestock watering, manufacturing and other beneficial uses. Minerals and salts occur naturally in the environment, are essential to life, and are generally tolerated by plants and animals in specific ionic strengths. In many instances, measures of concentration (conductivity) indicate an overall water quality impact rather than a specific NPS pollutant cause. Mining, oil or gas production brines, weathering, and salt-water intrusion into drinking water supplies can contribute to increases in dissolved solids concentrations. Primary AL NPS Management Program best management practices to address the impacts of high concentrations of Total Solids from resource extraction activities include sustained education and outreach to increase owner/worker and public awareness and knowledge, never disposing of anthropogenic wastes into or close to a waterbody or drainage conveyance (regardless of its location or use), regular and competent inspections and maintenance of retention areas and detention ponds, and protecting, installing and maintaining native vegetative buffers and riparian areas to act as filters for NPS runoff. Nonpoint source education and outreach to increase

introduce or increase the use of effective and efficient technologies to minimize environmental impacts should continue. Regular and competent inspections and maintenance of control measures should also be a continuing priority.

h. Temperature

Many fish and other aquatic animals are sensitive to rapid or prolonged increases in water temperature. Higher temperatures (warm waters hold less DO than colder waters) and turbidity (generally associated with erosion and sedimentation and the improper design and operation of mining wastes, overburden and tailings retention and detention sites and structures) can also impair water quality. Waters can become too warm as a result of rainfall running off of barren mine land surfaces. In addition, the absence of streambank and riparian vegetation and low flows can cause stream waters to heat up more rapidly on warm sunny days. Temperature ranges that are outside of the normal ecological and physiological range or requirements of an aquatic organism for too long can increase risks of disease and mortality. Warmer waters may also increase the toxicity of some NPS pollutants. The AL NPS Management Program recommends continued education and outreach to increase mine operation owner / worker and public awareness and knowledge. Best management practices such as least-disturbance or removal of overstory along streambanks, maintaining native groundcovers and re-vegetating disturbed areas as soon as practicable should be continued. Nonpoint source education and outreach to introduce or increase the use of effective and efficient technologies to minimize water quality impacts should also continue. Regular and competent inspections and maintenance of NPS control measures to mitigate pollution problems relative to temperature should be a continuing priority.

i. Trash, Litter, Debris, and Discarded Solid Waste

Garbage or refuse thrown or dumped along mine land hauling and access roads is a common and unsightly NPS pollution problem in Alabama. Discarded household solid waste (e.g. paper and cardboard, furniture; glass, metal and plastic containers; construction/building waste, grass yard trimmings, etc.) can cause the appearance and quality of nearby waterways that provide drinking water, recreation and other benefits to be quickly degraded. Litter and trash may be transported by both wind and stormwater runoff. Trash in a waterbody can degrade aquatic biota habitat and health long-term depending on duration and strength of toxic exposure, pollutant size, ability to sink or float, and the rate of decomposition. Discarded waste and scrap tires can hold water, thereby increasing mosquito and vermin problems. Nonpoint source best management practices include prohibiting active and abandoned mine land streambanks and roadsides from becoming illegal dump sites (e.g. discarded appliances, batteries, vehicle parts, construction debris, leaves and yard litter, etc) or hazardous (e.g. toxic, flammable, corrosive) wastes. The AL NPS Management Program continues to recommend sustained education and outreach activities to increase mine land owner/worker and public awareness and knowledge. Native vegetative buffers and riparian areas along waterbodies should be protected, installed and maintained to filter NPS stormwater runoff. Regular and competent inspections and maintenance of control measures should be a continuing priority. Fencing and other barriers may be installed to restrict unauthorized human access to installed reclamation measures and projects designed to actively protect and restore water quality and ecosystem functions.

j. Toxic Substances, Leachate and Spills

As stormwater runoff flows over the landscape it can pick-up NPS pollutants along with soil particles and transport them to receiving waters. While toxic substances and chemicals are regulated, accidental toxic releases and spills can occur during mining and drilling operations and contribute to water quality degradation. Many factors (e.g. sporadic rainfall amount and duration, diffuse sources, pollutant potency/strength and composition, areal extent, volume of the receiving water, etc.) can influence the impact that toxic substances from NPS runoff have on water quality protection and restoration efforts. Water quality impairment and treatment options can also be significantly influenced by the synergistic effects of pollutants (the toxicity of two or more blended chemicals being greater than the sum of their individual effects). Nonpoint source causes may include oil spills, hazardous waste, and illegal dumping. Exposures to releases and spills of hazardous NPS pollutants to aquatic life and terrestrial life and human

health may be chronic (impairment occurs slowly over time) or acute (shorter time frames such as soon after a rainfall runoff event). Known and unspecified toxic substances and chemicals from NPS runoff may produce odors and sheens and/or create corrosive, reactive, or ignitable conditions. Adverse human and aquatic life health effects can be influenced by the type of pollutant transport media (e.g. air, water, soil erosion); strength (potency), magnitude and length of contact, and the health condition of the exposed organism. Abrupt changes in commonly measured water quality parameters (e.g. pH, conductivity, alkalinity, hardness, and dissolved oxygen) or significant changes noted in aquatic species richness, abundance, behavior, and mortalities (e.g. deformities, tumors, disease and parasites) should trigger immediate actions to evaluate potential for toxic releases and spills. The AL NPS Management Program recommends sustained education and outreach to increase mine land owner/worker and public awareness and knowledge; to introduce or increase the use of effective and efficient technologies to minimize water quality impacts, implementation of management measures and pollution prevention practices (reduction, reuse and recycling) as practicable, and never disposing of anthropogenic wastes into or close to a waterbody or NPS runoff drainage conveyance (regardless of its location or use). As practicable, vegetative buffers and riparian areas acting as filters for NPS runoff should be protected, installed and maintained along each waterbody impacted by a resource extraction activity. Structural measures may also include installing retention areas and detention ponds to hold, treat and infiltrate contaminated NPS runoff. Regular and competent inspections and maintenance of structural practices should remain a priority.

k. Oil and Grease

Oil and grease pollutants may originate from spills, leaks, and improper storage and disposal of equipment and vehicle lubricants, hydraulic and other fluids, and fuels. Excessive discharges can contaminate fish, shellfish, and drinking waters used for human consumption, degrade recreational opportunities and impair aesthetic benefits. Even small amounts can smother aquatic life and degrade aquatic habitats as it sinks, floats, or forms slicks. Water pollution problems generally occur when rainfall runoff washes over the landscape and picks up oils and grease from road ways, maintenance lots, and storage tank areas and carry's the untreated nonpoint sources of pollution, untreated, to waters of the state. Large petroleum-based spills are usually widely publicized; however, the cumulative effects of many and diverse smaller spills, leaks and improper disposal practices can significantly degrade water quality and jeopardize beneficial environmental and economic water quality uses. The AL NPS Management Program promotes continued education and outreach to increase mine owner/ worker and public awareness and knowledge; never disposing of waste oils into or close to a waterbody (regardless of its location or use), regular and competent inspections and maintenance of retention areas and detention ponds; reduce, reuse and recycle products; installing and maintaining catch basins at fuel and other storage facilities to contain spills and to mitigate potential overflow events; preventing leaks from storage tanks, and installing and maintaining native vegetative buffers along waterbodies to act as filters for stormwater runoff. Nonpoint causes such as fluid leaks (e.g. transmission, power steering, brake fluids, antifreeze, etc.) and equipment (e.g. pumps, generators, compressors, etc.) should be promptly cleaned up and contaminated soils properly treated on-site or disposed of in an approved landfill.

l. Stream, Riparian Area, and Aquatic Habitat Modification

- Habitat alteration is identified by ADEM on Section 303(d) lists as a water quality impairment concern. Most watersheds (hydrologic unit codes) in Alabama with economically recoverable ores, minerals or petroleum-based deposits have endured or may be disposed to human-caused activities that can threaten or impair the water quality and hydrologic or ecological significance of a stream, river, lake or reservoir, or estuarine waterbody located therein. Land disturbance activities (e.g. large scope and scale land clearing and surface mining) can significantly alter stream order, stream channels, flows and other processes and conditions that constitute or support a watershed or stream system. In addition, stream flow can vary widely since it is a function of the landscape, variable rainfall runoff amounts and patterns, surface and groundwater hydrology, vegetative cover, geology, and other watershed characteristics. Human activities in a watershed can change the amount, timing, and velocity of water reaching a stream, divert flow / hydrology through manmade channels and drainage conveyances, and alter the shape or relocate the location of streambeds. Degraded

physical and chemical (e.g., flows, sediment, temperature, clarity, ambient light, dissolved oxygen, evapotranspiration, infiltration, etc.) and biological processes and conditions (e.g. abundance, richness, diversity of fish and benthic macroinvertebrates; algal biomass) are typical indicators of an impaired stream.

Most natural streams provide adequate and necessary cover, substrate, and hydraulic conditions to meet the reproduction and survival needs of a diverse population of fish and macroinvertebrates. Changes in water quality (and quantity) from resource extraction activities can threaten or exterminate aquatic biota and degrade habitats. The National Fish Habitat Partnership is a national program supported by the Office of Surface Mining and EPA where both federal and state partners identify, prioritize, and reclaim AMLs impacting fish and other aquatic life habitats. The Southeast Aquatic Resources Partnership is a southeastern U.S. regional initiative designed to protect, improve, and restore habitat for fish and other aquatic species. The AL NPS Management Program recommends expansion of these endeavors to protect Alabama's freshwater and coastal marine aquatic resources from nonpoint sources of pollution.

The presence of man-made dams, levees, walls, armored streambanks; stream banks lacking vegetation; excessive streambank erosion and sedimentation; scouring and incision; extreme stream width to depth ratios; and the exclusion of normal stream-floodplain interactions are symptomatic of stream channel and aquatic habitat degradation. Stream alterations related to channelization, bridge construction, dredging, culvert and discharge pipe placement, and ditching discharges can also degrade benthic habitat. The AL NPS Management Program promotes continued education and outreach to increase mine land owner/worker and public awareness and knowledge, and the implementation of relevant resource extraction NPS pollution controls associated with hydromodification (EPA 841-B-07-002, July 2007).

- Riparian areas play an important role in stream flow, form, and structure. Anthropogenic (human caused) alterations (e.g., levees, rip-rap, channels, dams, bridges, culverts, etc.) often times disrupt or impair natural stream functions. Riparian areas can attenuate streambank overflows, capture and store excess sediment, chemicals, metals, and other NPS pollutants; help stabilize stream channels by preventing stream bank failures, and provide food and habitat to support diverse species and populations of aquatic organisms. Riparian area protection, causes and symptoms of degradation, and nonpoint source protection and restoration are best addressed proactively as a component of a holistic watershed management plan. Riparian area protection is an important NPS pollution control mechanism in Alabama and restoration activities will continue as practicable and as resources allow.

- Dams affect water quality by disrupting hydraulic residence times (i.e. the length of time water is stored and NPS pollutants may settle out) and the quantity and timing of downstream flows. Increased turbulence and velocity of water released downstream of a dam can significantly erode stream banks and scour stream beds and channels. Aquatic species composition, populations, migration and habitat can be drastically altered both upstream and downstream of the obstruction and pooled waters can accumulate excess sediment behind the dam and reduce water volume holding capacity. In addition, improperly designed, inspected, and maintained coal wastes/tailings impoundment dams can present significant public safety and property risks and environmental hazards. Alabama currently has no privately-owned, small impoundment dam safety program, nor a dedicated funding program to assist land owners with dam repairs, abandonment, or removal. The AL NPS Management Program endorses relevant nationally-recommended dam siting, construction, operation, maintenance, and removal measures associated with hydromodification (EPA 841-B-07-002, July 2007) to help ensure state water quality standards are met. The AL NPS Management Program also endorses continued education and outreach and increasing state funding and staffing for a dam inspection program; and proactive dam design, construction, maintenance, inspections, ranking, and operation in accordance with the Office of Surface Mining's Dam Safety Program and other relevant interagency programs, processes, guidelines, directives, and authorities such as FEMA, the Department of Homeland Security (e.g. dam safety and emergency planning), and the U.S. Department of Agriculture (dam hazard classification - Technical Release No. 60) .

- Channelization (mechanically straightening or deepening of natural stream channels) often results in direct alterations of a stream's physical characteristics. As a result, many wetland and stream ecosystem functions and values have been lost (e.g. sediment transport, food sources and habitat for aquatic life, recreational benefits, aesthetics, etc.). Stream drainage systems and wetland areas in or near a mining area may be devoid of any semblance of pre-development conditions. In addition, some stream channels may be hardened/lined or covered (e.g. engineered armoring structures and materials such as rip-rap, culverts, pipes, etc.), or may be completely re-located. As a result, water quality, flows, and stream channel degradation can be so severe that the stream is no longer ecologically or functionally integrated (physically, chemically or biologically) with its pre-land disturbance setting. The AL NPS Management Program promotes continued education and outreach to increase owner/worker and general public awareness and the implementation and maintenance of best management practices to restore, enhance or mitigate upland and coastal aquatic resources, streambanks, wetlands, drainage channels and riparian areas to approximate pre-development hydrology and watershed conditions. The AL NPS Management Program endorses national relevant hydromodification (EPA 841-B-07-002, July 2007) measures to help ensure state water quality standards are met.

m. Reforestation of Abandoned Mine Sites

Typical resource extraction activities require that land be cleared of natural vegetative cover and graded to create a suitable surface for operational activities. Land clearing can expose soils that are particularly susceptible to erosion. The removal of trees on mining sites and stabilizing root systems along streambanks can alter natural drainage patterns, significantly impact geomorphology and stream bank integrity (increasing susceptibility to erosion and streambank failure) and contribute to the degradation of wetlands and other sensitive areas. The loss of natural shade (tree canopy) can adversely affect aquatic biota and wildlife abundance and diversity. The natural input of organic material (vegetative matter and woody debris) into a waterbody is important because it helps to provide food and habitat for aquatic organisms. In addition to providing shade and moderating local micro-climates, trees can help mitigate the quantity and quality of NPS stormwater runoff. Establishing and maintaining forested areas may help filter airborne pollutants (thus improving air quality); reduce noise pollution, and enhance wildlife habitat and travel corridors. Reforestation efforts can also bolster citizen quality-of life benefits including but not limited to aesthetics (e.g. soften disparate and divergent land uses); recreational opportunities, and cooperative mitigation connections between resource agencies, the resource extraction industry, and the general public. Allowing as many trees as feasible to remain in-place and replanting trees (preferably with native species) after mining operations has ceased, can provide many positive environmental benefits including mitigation of the quantity and quality of NPS stormwater runoff, enhanced wildlife habitat, improved recreational opportunities, and promotion of a forestry product based economy. Entities involved in resource extraction are strongly encouraged to protect trees to the maximum extent practicable and to reforest mined areas once mining activities have ceased.

The AL NPS Management Program and Section 319 grant program will continue to support the art, science, and technology of managing trees and forest systems on and around resource extraction sites to protect waters of the state from nonpoint sources of pollution. It is highly recommended that the industry, agencies, contractors, organizations, citizen groups, etc. integrate native tree protection and restoration in watershed-based management plans and other applicable resource extraction plans and projects. All reclamation/reforestation decisions should be closely coordinated with an appropriate federal and state agency, group, or academic institution (e.g. technical, financial, research, education and outreach assistance, etc). The benefits of phytoremediation should be a NPS management consideration. The AL NPS Management Program and Section 319 grant program endorses management measures (as applicable to resource extraction and silviculture) presented in the Alabama's Best Management Practices for Forestry and as recommend by Office of Surface Mining - Reforestation programs to address re-establishment of forest systems on formerly mined lands. The U.S. Forest Service, National Best

Management Practices for Water Quality Management on National Forest System Lands (FS-990a; April 2012) is also recommended for mitigating NPS pollution and managing water quality on Federal forest lands in Alabama.

n. Water Supply Color, Taste, and Odor

Not all resource extraction activities causes actual harm to water quality or human health; however, general public perceptions can play a significant role in planning and implementation decision-making processes, approval, and acceptance; especially if the activity will threaten or impact a drinking water source. Resource extraction activities can influence public opinions relative to human health by increasing public sensitivities relative to water color, taste and odor, especially if mining areas and operations are located near a drinking water supply. The level of "acceptable" Organoleptic (perceived by the senses) measures and indicators can often vary among individuals and communities; however, there is general agreement that negative sensory connotations relative to water quality does contribute to negative economic and recreational benefits (e.g. swimming, fishing, tourism, etc). A body of water may appear to be, "clear and clean" but in fact may not be safe for human body contact or consumption. A variety of undesirable and even toxic NPS pollutants (e.g. heavy metals) can be dissolved in stormwater runoff from an active, inactive, or abandoned mining operation and diminish beneficial use expectations. If contaminated, a waterbody may be rejected and expensive and time-consuming clean-up treatments necessitated. Color may be indicative of air, soil and water chemistry interactions, dissolved metals (iron and manganese), or siltation from erosion and sedimentation processes (turbid/muddy waters). Objectionable odor and taste problems can result from the presence of hydrogen sulfides (high iron and low pH), spills (chemicals, gasoline,) and poorly maintained or corroded discharge pipes. Primary AL NPS Management Program best management practices include sustained education and outreach and training to increase mine land owner/worker and public awareness and knowledge and to introduce and implement new and innovative technologies; never disposing of anthropogenic wastes into or close to a waterbody or NPS runoff discharge conveyance (regardless of its location or use), regular and competent inspections and maintenance of mine wastes retention areas and detention ponds, and installing and maintaining vegetative buffers and riparian areas to act as filters for NPS runoff.

Section D.3 Management of Nonpoint Source Stormwater Runoff

a. Overview

Significant sources of human and financial capital, new and enhanced resource extraction technologies and innovations, mine land owner/worker and general public education and outreach, and other resources are required to holistically restore NPS impaired waters and protect unimpaired and threatened waters of the state. Fortunately, numerous programs, processes and approaches are available to the public and private sectors in Alabama to mitigate nonpoint source pollution associated with resource extraction. This section focuses on water quality protection and restoration relative to achieving AL NPS Management Program goals and objectives. It promotes flexible, targeted, iterative, and broad-based strategies to address the causes and conditions of NPS runoff and the mitigation of water quality impairments so that waters meet state water quality standards and attain beneficial uses. Action items focus on BMP implementation, integration of cooperative partnerships, and leveraging of public and private funds and resources as authorized, permissible and practicable. Voluntary implementation of NPS best management practices presented herein do not supplant mandatory regulatory requirements specified by Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), but rather complements the state's coastal NPS program approval processes whenever practicable. The AL NPS Management Program seeks to present effective measures, practices, principals and activities by promoting the concept that water quality protection extends from the natural resource product planning, extraction, production /processing, storage, transport, and use phases to the mining cessation and mine land reclamation phases. The fundamental NPS management strategy presented herein promotes continued resource leveraging, technology transfer, technical assistance, and research; education and outreach, and encourages an increased emphasis on NPS pollution prevention and source controls (reduce, reuse and recycle) as practicable. Sustaining voluntary, regular and competent inspections and maintenance of structural management measures is a NPS programmatic priority.

The AL NPS Management Program continues to support efforts to implement an integrated and inclusive partnering approach to systematically identify, prioritize, and mitigate NPS pollution sources and causes. Identifying and

strengthening partnerships (coordination, collaboration, cooperation and communication) continues as funding and other resources allow. Implementation of environmentally-protective and economically-sensible on-the-ground measures continue to be at the forefront of NPS management efforts to protect and restore surface water and groundwater quality, reduce NPS pollutant load reductions, and meet state water quality standards (e.g. mitigate heavy metals, chemicals, fluids, and other NPS contaminates that threatens or impairs waters of the state or severely or irreparably threatens watershed and human health or aquatic organism survival and habitat).

Section 319 grant resources continue to focus on implementing Section 319 grant guidelines, targeting TMDL and Coastal NPS pollutant load reductions, and restoring NPS impaired waters (e.g. Section 303(d) Lists). Water quality monitoring, partnerships, and continued development and implementation of holistic watershed-based management plans are integral programmatic elements. Statewide water quality data and information collected by ADEM continues to be collected and evaluated and then shared with the public and private sectors. In order for impaired waters to expeditiously meet state water quality standards, the ADEM uses NPS monitoring and assessment data and information to help raise awareness relative to resource extraction management measure design, planning, implementation and maintenance. Section 319 grant resource extraction education and outreach practices may include but are not limited to delivery of NPS information and data relative to watershed health and water quality protection and restoration, pollutant load reductions, and pollution prevention; and tours and training events to demonstrate treatments and controls that address NPS water quality impacts and threats.

b. Management Plans and NPS Measure Implementation

The importance of developing a water quality protection and restoration plan cannot be overly stated; however, even "good" NPS planning efforts will most likely fail if the plan is not properly implemented. It is highly recommended that NPS management measures that address resource extraction phases and processes are:

- Clearly thought out to help eliminate the need for revisions during the plan approval process or once a required permit has been issued
- Based on sound scientific principles and water quality monitoring and assessment data
- Designed for site-specific conditions (place-based, appropriate and "workable")
- Realistic and provides detailed information to ensure that the plan can be properly and timely implemented by the facility owner/operator and workers
- Somewhat flexible to allow for "mid-stream" changes caused by unpredictable or unknown circumstances

A site-specific management plan should, at a minimum, incorporate detailed site assessment data and information sufficient to:

- Select an efficient and effective BMP, group of BMPs, or "trains" of BMPs to mitigate NPS pollution loadings
- Address various ores, minerals, products and other materials and product types, amounts, and handling issues
- Surface and ground water protection and hydrology changes and impacts
- Establish effective erosion and sediment controls
- Protect pre-development biological, physical, hydrological and other ecological characteristics as practicable
- Evaluate and select effective AMD and contaminated runoff treatment options
- Protect environmental and human health
- Assess economic feasibility and sensibility relative to land ownership, privacy issues, and future land reuse options
- Coordinate and implement relevant handling, stockpiling/storage, and processing procedures to protect waters of the state

Site assessment data and information needed to develop a water quality management plan can typically require extensive site visits, surface and groundwater samples, and surface water flow measurements. Clearly designed plans should include appropriate maps and a detailed descriptive narrative about the site, pollution prevention options, and protection and restoration / reclamation expectations. All elements of the plan must be verifiable and information made readily available to relevant plan approval and inspection/compliance agencies and authorities.

The NPS stormwater management measures presented herein are intended to protect and maintain natural ecological conditions and surface and groundwater hydrology (water quality and quantity) to near pre-development conditions; and successfully achieve AL NPS Management Program (e.g. meet and sustain state water quality standards) and Section 319 grant-funded project (e.g. mitigate the causes of N, P, and sediment) water quality protection and restoration goals as sensible and practicable. Modifications of the pre-mine topography can significantly alter the velocity and volume of rainfall runoff as it flows over the land surface. It is highly recommended that NPS control measures address unavoidable pollutant loadings to receiving waters as near to the source as possible. Management

measures should ensure that pre-mining runoff volumes and velocities are not significantly altered by extraction and reclamation activities (to the maximum extent practicable). Proactive management measures should be taken pre- and post-mining to ensure long-term human health and safety, streambanks and stream channels, riparian areas, wetlands, and aquatic habitat protection.

Resource extraction NPS category best management measures and practices, particularly those funded by CWA Section 319 grant funds, should be designed, implemented and maintained to:

- Protect and restore surface waters and groundwaters using a mix of environmentally-protective and economically-sensible practices and education and outreach options that ensure stakeholder buy-in, long term sustainability, and meet that NPS programmatic and Section 319 grant program and project-specific goals and objectives
- Target high priority (e.g. Section 303(d) and TMDL pollutants of concern), special designated or outstanding waters of the state
- Enhance environmental, economic, social, and cultural benefits, and communal health and quality-of-life
- Protect, enhance and restore sensitive areas (e.g. drinking water sources, wetlands, aquatic and other biota, wetlands, habitat, etc.)
- Abate or minimize NPS pollutant runoff by restoring mined areas to closely mimic pre-mining hydrologic and aesthetic conditions
- Abate or minimize NPS pollutant loading impacts through pollution prevention
- Treat NPS stormwater runoff pollutants as near to their cause as practicable during all phases of exploration, extraction, storage, and processing
- Implement the NPS components of a watershed-based management plan whenever practicable and economically sensible

The AL NPS Management Program acknowledges that the design, type, and selection of appropriate stormwater control measures can be site-specific and that NPS pollutant load reduction effectiveness and project implementation success may be variable in duration, scope and scale. A management measure or a "train" of measures and practices presented throughout this document are not all-inclusive. The design, types and benefits are expected to expand as resource extraction pollution management technology continues to evolve and mature to address adverse water quality impacts. Implementation of new and innovative measures should continue to be diligently focused on achieving NPS pollutant load reductions, addressing programmatic water quality protection and restoration goals, and meeting state water quality standards. It is reasonable to expect that the public and private sectors will continue to apply enhanced technologies as they are developed and become available for demonstration and installation.

c. Non-Structural NPS Mitigation Measures

Non-structural stormwater controls can effectively manage NPS runoff associated with resource extraction activities and may sometimes be preferred (environmentally, economically, socially, and culturally) over more costly structural measures. The primary non-structural NPS management practice used in Alabama is education and outreach aimed at enhancing mine land owner/worker and general public awareness and knowledge about NPS pollution, watershed health and water quality protection. The keys to successful programmatic implementation efforts are public and private sector cooperation, collaboration, coordination, and communication. Training, BMP demonstrations, technical assistance, and technology transfer activities continue to focus on:

- Strengthening partnerships and leveraging resources
- Delivery of science-based water quality protection and restoration data and information
- Developing and implementing Total Maximum Daily Loads
- Watershed-based management planning and implementation
- NPS pollution prevention
- Balancing the mining site footprint while preserving natural "green" areas
- Protecting and conserving coastal resources; wetlands; stream corridor function, form and hydrology; riparian areas; public lakes and reservoirs, wellhead protection and groundwater recharge areas, etc.
- Balancing resource extraction with environmental and economic sustainability, resilience and quality-of-life issues

The AL NPS Management Program and Section 319 grant program will continue to seek ways to strengthen AML reclamation partnerships and linkages between the public and private sectors. A variety of formal and informal mechanisms may be used to form and sustain partnerships, including memoranda of agreement / understanding, letters of support, cooperative projects, leveraging of funds and other resources, and meetings to exchange NPS data, information, perspectives, and opinions. The ADEM continues to work with the resource extraction industry to facilitate implementation of NPS stormwater runoff control measures. Interagency collaborative teams, NPS task forces, representative advisory groups, and program coordination and outreach efforts are effective mechanisms for accomplishing regulatory / non-regulatory linkages. Involvement from federal, state, interstate, regional, and local agencies, industry, academic institutions, owners, concerned citizens, and others helps to ensure that national and

statewide water quality protection goals are well integrated with local environmental, economic stability, and social and cultural goals. Although primarily a voluntary program, the AL NPS Management Program continues to integrate compliance authorities when best suited and to ensure state water quality standards are met.

AL NPS Management Program and Section 319 grant resources continue to implement non-structural management practices to protect and restore water quality, including but not limited to the following:

- Strategic planning to protect watersheds and water quality and human health and safety (e.g. watershed-based management, erosion and sedimentation, and pollution prevention; protecting and establishing vegetative areas and stream buffers, etc.)
- Public and private sector partnerships (broad-based and targeted audiences)
- Signage, brochures, web-based media, floor and table top displays and models
- Research, conferences, meetings, and training workshops
- Incentives, recognition programs and awards
- Monitoring data and information collection and distribution to the public
- Permitting, compliance inspections and enforcement; licensing and certification
- Easements, set-backs, and buffer requirements
- Programmatic, project, and site-specific efficiency and effectiveness; accountability and auditing

Non-structural NPS stormwater control practices should:

- Be closely corresponding with a relevant resource extraction permit and be addressed as a component of a holistic watershed-based management plan
- Enhance water quality protection and restoration awareness and knowledge that will hopefully lead to positive, quantifiable improvements in stakeholder NPS pollution attitudes and personal behaviors
- Address pollution prevention
- Be a component of inspection/compliance activities and maintenance
- Consider pollutant composition, management goals, site conditions, project scope and scale, sustainable pollutant removal efficiency and effectiveness, relevant social acceptance, values and interests, economic practicality, and pollutant mitigation success potentials
- Target and sustain management efforts designed to protect and restore watershed characteristics and systems (e.g. riparian areas, hydrology, sensitive areas, aesthetics, green spaces, surface waters, wellhead protection and groundwater recharge, etc.)
- Support efforts to mitigate NPS pollutant causes at or as close to the impaired site or pollutant source as possible
- Integrate management approaches to mitigate NPS water quality and quantity issues (e.g. pollutant discharge volume and velocity)
- Be coordinated with academic / institutional research, resources, and expertise
- Leverage human and financial resources of relevant federal, state and local governments, industry, organizations, and others

d. Structural NPS Stormwater Mitigation Measures

The AL NPS Management Program and Section 319 grant program continues to support the implementation of effective structural measures designed to achieve pollutant load reductions, mitigate NPS pollutant composition, volume and velocity/peak flows; infiltrate near the source, protect and restore watershed health and water quality, and for impaired waters to meet state water quality standards. Anthropogenic land disturbance measures often disrupt or contradict natural pre-mine land / watershed hydrology. The implementation of structural NPS runoff management measures should try to mimic pre-mined land form/contour and stream shape and functions as much as practicable. Treatment systems should be designed to achieve the best environmentally-protective and economically-sensible NPS pollutant load reduction effectiveness and efficiencies practicable. Structural stormwater control measures typically endorsed by the AL NPS Management Program and Section 319 grant program in Alabama (and most commonly implemented in the southeastern U.S.) to stabilize land surfaces, convey and treat NPS runoff, and protect and restore watershed and water quality health from resource extraction activities include, but are not limited to:

- Retention areas and detention ponds
- Constructed wetlands
- Vegetated filter strips, swales, or riparian buffers
- Sealing tunnels, adits and vertical shafts
- Organic and inorganic screens and filters
- Limestone anoxic trenches
- Addition of biosolids or nutrient rich sewage sludge
- Land Contouring, and Grading
- Surface Roughening
- Composting and Mulching
- Tillage with lime and organic or inorganic fertilizers
- Topsoiling and soil stabilizers
- Rock Filters, Dikes, Flumes, Check Dams, Riprap outlets
- Erosion and sediment control blankets, mats, and fibers
- Silt Fences; Hay/Straw bale barriers
- Ditches, diversion ridges, berms, culvers and cross drains
- Phytoremediation
- Planting native grasses, shrubs, and trees
- Sodding and seeding (temporary and permanent)
- Armoring (rip-rap, retaining walls, gabions)

- Permanent and temporary stream crossings
- Aggregate stabilized entrance/exits and tire washing

The importance of proper planning, design, implementation and maintenance of structural NPS pollution management measures cannot be overly stated. It is imperative that all structural measures be appropriately monitored pre-, during, and post-implementation in order to assess site-specific management measure implementation effectiveness (e.g. NPS pollutant load reduction efficacy and project success). Installed measures must be replaced or retrofitted if water quality does not appear to be improving, protected, or restored. Often, minimizing the extent of land disturbance activities offers the best NPS pollutant runoff mitigation solution (e.g. pollution prevention). In general, it is highly recommended that "treatment train" management systems and processes be implemented to synergistically and economically treat NPS pollutants. As practicable, strategies should address NPS pollution holistically (e.g., relative to the many and varied causes, sources and types of pollutants, areal extent, synergistic effects of multiple stressors or control practices, and the costs associated with treatment). It is acknowledged that multiple and unknown causes, historical loadings, changing land uses, and other anthropogenic alterations to pollutant composition and stream flows rates, velocity, and volumes may exacerbate efforts to definitively quantify NPS pollutant load reductions and program/project implementation effectiveness over time.

The AL NPS Management Program and Section 319 grant program highly recommends that structural measure decision-making processes methodically and deliberately embrace the following concepts:

- Feasibility (is it the right measure/practice or system of measures and practices at the right time and in the right place)
- Effectiveness (will the measure/practice achieve the intended project goal and NPS pollutant load reduction target)
- Costs (will the environmental benefits justify the financial aspects; is there an effective retrofit or less costly alternative or system of practices; are there any long-term maintenance concerns)
- Partnerships (is there adequate local "buy-in" and is all sources of human and financial capital identified and leveraged).

Land disturbance / erosion and sedimentation are primary NPS concerns in Alabama. The AL NPS Management Program and CWA Section 319 grant program endorses applicable structural mitigation measures presented in the, "Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas" (March 2009, or as updated). The NRCS National Handbook of Conservation Practices and Alabama-specific Field Office Technical Guide are also recommended. In addition, the Controlling Nonpoint Source Runoff Pollution from Roads, Highways and Bridges (EPA-841-F-95-008a) document may provide useful water quality protection and NPS management information for access and hauling road construction and maintenance. Resource extraction permits (see **Introduction. D.1**, above) also incorporate particular and general structural BMP requirements.

e. Project Success Measures and Indicators

The Alabama Department of Labor - Abandoned Mine Land Reclamation Program and Office of Surface Mining websites may provide non-fuel mine land reclamation processes and success information. Section 319 grant funded projects may be presented as EPA Section 319 success stories and input to the EPA Grants Reporting and Tracking System (GRTS) database. Water quality data is collected and compiled by ADEM and is useful for NPS project prioritization and targeting, management measure effectiveness monitoring, and permit compliance actions. The water quality data collected by ADEM is publicly accessible in the CWA Section 305(b) Integrated Water Quality Report to Congress, ADEM Water Quality Reports, and Section 319 Grant Annual Reports. Resource extraction project successes in Alabama are directly related to an inclusive mix of public and private sector partners. The AL NPS Management Program continues to identify, build, and sustain cooperative partnerships; and as a result, substantial improvements in NPS pollutant load reductions and water quality protection and restoration are expected to continue.

Section D.3.1 Voluntary Approach

a. Overview

The Alabama NPS Management Program continues to promote the implementation of voluntary NPS control measures and practices (e.g., incentives, technology transfer, technical assistance, education and outreach, etc.) to

protect and restore water quality whenever practicable. Nonpoint source water quality impairments associated with resource extractive activities can seriously impact state and community-based environmental, economic, and societal perceptions, conditions and aspirations. The Clean Water Act (CWA) Section 319 nonpoint source grant is a major provider of NPS programmatic implementation resources in Alabama and helps to target impaired waters in meeting state water quality standards as effectively and expeditiously as possible. The voluntary NPS management approach continues to advocate sustained cooperative partnerships and leveraging of human and financial capital to optimally plan, implement, and maintain NPS management measures and practices. Voluntary NPS efforts continue to achieve priority NPS pollutant load reductions (e.g. nitrogen, phosphorus, and sediment) as reported in the EPA Grants Reporting and Tracking System database. The NPS components of legacy resource extraction/abandoned mine land activities addressed by a Total Daily Load (e.g. metals, pH, siltation, habitat alteration, etc.) may be targeted using Section 319 grant fund in accordance with grant guidelines and EPA 9-key element watershed-based management plans, and voluntarily implemented relevant to achieving AL NPS Management Program goals and objectives.

Voluntary implementation of NPS measures and practices to protect water quality from NPS impacts associated with resource extraction activities requires proactive planning. The implementation of control strategies should be designed to conserve and restore the natural hydrology and ecological benefits of the disturbed site while concurrently mitigating water quality causes and threats associated with nonpoint sources of runoff. Controlling the impacts of NPS pollution from abandoned mines sites is often convoluted and is best achieved by implementing control measures and practices that provide multiple environmental, economic, social, and health and safety benefits. The AL NPS Management Program highly recommends that reclamation efforts and other NPS controls promote and sustain effective and efficient cooperation, coordination, coordination and communication processes among many and varied partners (e.g. agencies, governments, industry, owners, organizations, landowners, and citizens). Section 319 grant funded control measures should target priority NPS pollutant load reductions and water quality restoration.

Volunteer management practices to protect environmental and human health include, but are not limited to: identifying NPS pollution causes; prioritizing sites for restoration, developing watershed-based management plans, water quality monitoring, education and outreach to enhance citizen awareness and knowledge, posting environmental protection/restoration awareness and public safety and hazards signage, and pollution prevention. Structural measures must be coordinated with federal and state regulatory agencies and local officials and authorities; but can involve volunteer input and resources to install a single NPS control measure or a "train" of infiltration, filtration, retention and detention elements to control NPS pollutant runoff. Additional NPS pollution management strategies are presented in **Table D.3.1.a**, below.

The human and financial resources required to holistically and successfully implement a statewide voluntary NPS management program and address all adverse resource extraction threats and impacts far exceeds the support that can be provided by any one state resource agency or institution. An AL NPS Management Program priority is to leverage the available resources of all relevant agency, industry, community, and site-specific NPS mitigation programs and processes to achieve state water quality standards for all waters of the state. The primary limiting factor continues to relate to inadequate NPS resources (dollars) to monitor and assess water quality and implement water quality protection and restoration projects. A primary source of volunteer incentive funding in is the federal dollars appropriated by Congress to EPA and to the state under CWA Section 319. The Alabama Department of Environmental Management (ADEM) obligates Section 319 funds to implement the AL NPS Management Program. Section 319 funds can be used to treat NPS runoff from "pre-law" abandoned mine lands; but generally only as a component of a watershed-based management plan designed to restore Impaired Waters (primary funding use) or to protect designated Special, Outstanding, and Public Water Supply waters of the state (secondary funding priority).

Table D.3.1.a Voluntary NPS Action Items to Protect and Restore Waters Quality

The AL NPS Management Program continues to promote a cooperative voluntary partnership approach to protect and restore waters of the state from resource extraction impairments and threats as follows:

a) Help citizens in areas impacted by resource extraction activities to connect or re-connect environmentally, economically, and socially with their rivers, streams, reservoirs, and other waterbodies, and to work to protect and restore them. Efforts should particularly focus on

revitalizing communities that historically have been particularly and disproportionately, underserved or economically distressed (e.g. the Alabama Black Belt region. Efforts will continue to be made to develop and enhance NPS pollution and water quality-based education and outreach in order to progressively improve the personal and communal health, safety and "livability" intangibles (e.g. personal and corporate prosperity, comfort and satisfaction) from the impacts of NPS pollution.

b) Identify, establish, enhance and maintain strong and effective community-based partnerships. Several public and private sector resources are available in Alabama to help communities prevent or reverse neglect, energize partnerships, and programs to restore and protect surface waters and groundwaters.

c) Enhance opportunities to communicate NPS programs; coordinate technology transfer, innovations, and technical assistance; and provide incentives and resources to implement protective and beneficial actions. Collaboration, cooperation, communication, leveraging of resources and identifying local commitments, interests, and assets are important to volunteer sustainability and success and will promote early and sustained citizen interest and actions.

d) Protect and restore the environmental health and economic importance of NPS impaired waters and their watersheds. The primary aspiration of the AL NPS Management Program is to address NPS pollutant loadings to protect and restore water quality; however, it is recognized that local historical, social aesthetical, economic and recreational significances must also be acknowledged in order to ensure watershed, ecosystem, and community-based health and sustainability.

e) Address the physical, chemical and biological challenges of NPS degraded waters using a holistic watershed-based management approach, whenever and wherever doable and practicable. Incentives and education and outreach efforts should continue to be provided, leveraged, and coordinated to help the public and private sectors protect and restore water quality (and quantity).

f) Promote NPS programmatic efforts including incentives, education and outreach, BMP retrofits, emerging technologies, and innovations, technology transfer, and technical assistance.

g) Sustain NPS partnerships and leverage water quality and water quantity funding to promote NPS programmatic sustainability and success.

h) Protect and restore water quality and healthy ecosystems relative to economic competitiveness and job creation. Section 319 funded resources will continue to stress the importance of clean and safe waters to multiple and varied public and private sectors.

i) Sustaining strong and active partnerships is essential. Reclamation priorities and plans should be systematically aligned and deliberation given to issues that may emerge as a result of shifts in population and urban sprawl (e.g. drinking water quantity and quality).

j) A strategic focus of the AL NPS Management Program is to increase, document, and evaluate statewide AML reclamation performance and accountability. Progress indicators and success measures are designed to provide meaningful outcomes and include but are not limited to:

- Interim progress toward restoring water quality and hydrology
- Protection of high quality surface and groundwater/drinking water sources
- NPS pollutant load reductions
- Strategies and success of implementing new, emerging or innovative NPS structural controls
- Enhanced education to increase mine land owner/ worker and general public knowledge and awareness
- Programmatic support such as the development and implementation of watershed-based management plans
- Project and BMP-specific implementation tracking

k) Water quality monitoring, analyses, reporting, and data distribution and availability

l) Inspections and compliance actions (regulatory backup authorities to the volunteer NPS management approach)

It is essential that water quality protection and restoration strategies to engage the public and private sectors (and implement the AL NPS Management Program) be clear, on target, and achieves local "buy-in." Watershed and water quality protection and restoration does not usually lend itself to a one-size-fits-all approach. In addition, principals, standards, and ideals of various entities may differ between one another or from one area to another. In order to sustain active and significant volunteer participation and input, regular communication is essential and must continue through all phases of NPS water quality protection and resource extraction activities.

Section D.3.2 Regulatory Approach

a. Overview

If voluntary NPS pollution management strategies do not appear to be effectual (as indicated by science-based water quality monitoring and assessment data), statuary mechanisms provide ADEM with enforceable back-up authorities to ensure clean and safe waters. The State of Alabama is authorized by EPA to administer federal environmental laws and compliance mechanisms at the state level. State oversight is consistent with legislative intent of the state's Administrative Code (Division 335-1) that created ADEM. Section 301(a) of the Clean Water Act (33 U.S.C. Section 1311) prohibits the discharge of pollutants by any person (excepting compliance with Sections 302, 306, 307, 318, 402, and 404). Section 402 (33 U.S.C. Section 1342) established the National Pollutant Discharge Elimination System (NPDES) permit program. A facility that will discharge or have the potential to discharge stormwater is required to obtain an NPDES permit issued by ADEM or EPA. The ADEM enforces applicable provisions of the NPDES permit program to control both point source and nonpoint sources of pollution to surface waters and to groundwaters. Storm drains, pipes, and ditches that collect or convey stormwater runoff to waters of the state (or the U.S.) from industrial facilities and construction activities must obtain an NPDES Individual or General Permit. All stormwater permits require structural and nonstructural control measures to reduce pollutant

loads to the maximum extent practicable to protect water quality. A General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) to be developed and implemented that prohibits or reduces unavoidable polluted runoff. The ADEM construction stormwater General Permit requires the development and implementation of a Construction Best Management Practices Plan (CBMPP) in accordance with the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas. The AL NPS Management Program highly recommends the coordination and integration of applicable components of a SWMPP with the development and implementation of a 9-key element watershed-based management plan as required by Section 319 grant guidelines; and as applicable, CZARA (CWA Section 6217) NPS management measures prescribed in Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002 January 1993). An overview of environmental requirements, self-audit checklists, and resources that may be helpful for land disturbance activities associated with the resource extraction industry is presented in Managing Your Environmental Responsibilities: A Planning Guide for Construction and Development (EPA/305-B-04-003, EPA Office of Compliance. April 2005).

In addition to enforcing Alabama Environmental Regulations and Laws, the ADEM administers other federal programs aimed at preventing, diminishing, or abating stormwater runoff from nonpoint sources. Integration of the CWA Section 303(d), Section 319, TMDL, Drinking Water, and Groundwater programs is essential to protecting and enhancing water quality and environmental and public health. Coordination of compliance inspections, enforcement and corrective actions programs (e.g. RCRA, CERCLA, UIC processes) also continues to strengthen the effectiveness of the AL NPS Management Program.

The Alabama NPS Management Program and Section 319 grant program supports a holistic, coordinated NPS runoff and water quality protection approach. The intent is to address all phases of resource extraction including:

- Identifying pre- and post-hydrology and ecological benefits environmental and economic impacts
- Local site-specific and broad-based watershed reclamation
- Planning, design, implementation, operation and maintenance of structural controls
- Planning and implementation of nonstructural practices
- Retrofitting existing or failing and inadequate control measures
- Evaluating the performance of structural measures and nonstructural practices and implementation success
- Measuring and assessing NPS pollutant loading reductions and meeting state water quality standards
- Meeting quantifiable environmental and economic indicators and measures of success
- Ensuring NPS programmatic accountability in terms of on-the-ground actions and water quality protection

A complementary Section 319 funded regulatory/voluntary NPS management approach is particularly appropriate for resource extraction activities from which contaminated runoff may discharge to waters of the state that are listed as impaired on CWA Section 303(d) lists, impact the implementation of a nonpoint source TMDL, threaten Outstanding Alabama Waters (ADEM Administrative Code 335-6-10-.09) and/or waters assigned a special designation in accordance with ADEM Administrative Code 335-6-10-.10. In addition, the AL NPS Management Program and the Section 319 grant program will continue to coordinate the planning and implementation of coastal and marine resource extractive activities (e.g. dredge and fill; sand and gravel mining, wetland protection, etc.) as applicable to CZARA (CWA Section 6217) management measures prescribed in Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002, January 1993).

b. Local Regulatory Requirements and Permitting

In addition to federal and state agency statuary authorities, some counties or municipalities in Alabama may develop local regulatory/compliance conditions relative to resource extraction. Local ordinances, set-backs, monitoring and other resource extraction activity requirements may target:

- Exploration, extraction, processing, storage, and transport of materials and products
- Hydrology (surface waters , groundwater /drinking water sources)
- Air, land, and surface water threats and contaminates

- Land disturbance areal extent
- BMP design, inspections, and maintenance/retrofits
- Sensitive ecological areas (wetlands, beaches/coastal areas, estuaries, etc.)
- Flora and fauna (populations and habitat)
- Quality-of-life issues (human health and safety, noise abatement, economics, etc.)
- Effective and timely NPS inspection, management measure maintenance, and reclamation assurances

The AL NPS Management Program supports a voluntary approach to protect and restore water quality; however, local authorities may opt to develop and enforce locally-applicable resource extraction conditions; especially if the resource extraction project may adversely impact or threaten a drinking water source. It is highly likely that local authorities will need to obtain local approval through the state wide legislative approval process. It is recommended that EPA model ordinances language and templates be considered by local authorities to help make locally-specific environmental and human health protection and safety decisions relevant to, but not limited to: stormwater operation and maintenance, ground and surface water protection, aquatic buffers, erosion and sediment control, and illicit discharges. County and other local governing units in Alabama may develop their own language and compliance mechanisms and processes, but doing so does not relieve them from being subject to federal and state statues, enforcement actions and oversight.

c. Supplemental Environmental Projects

The Supplemental Environmental Project (SEP) program administered by ADEM is designed to enhance environmental quality and increase environmental protection awareness. It provides an opportunity for a respondent in an enforcement action to negotiate an SEP in return for a reduction in an administrative penalty. Selected projects must minimize risks and improve public health and the environment beyond that which is required by being compliance with applicable statutes. In addition, there must be a relationship between the underlying enforcement action and the human health or environmental benefits that will result. Key project categories that may qualify as a SEP include pollution prevention and reduction, planning, and preparedness (see **Table C.3.2.a**). Approved SEP projects may be narrowly focused or include a mix of activities and practices.

Table D.3.2.a SEP Activities that Support AL NPS Management Program Goals and Objectives

- Purchase monitoring kits or replenish supplies for volunteer water quality monitoring programs and funding opportunities for citizens to receive certification training
- Restore natural stream function and hydrology, water quality, and aquatic habitats
- Install or retrofit measures to reduce NPS runoff velocity and volume to protect streambanks
- Install vegetation/ forested areas to help restore an impaired streambank or riparian area and to treat/filter contaminated stormwater runoff
- Reduce erosion and stream bank sloughing/failures to enhance aquatic species population, diversity and habitat
- Purchase, donate, develop or restore mined lands for public parks and natural green space areas
- Remove litter, garbage and solid waste from streams, roadsides, and environmentally-sensitive areas
- Develop, restore or enhance constructed wetlands and biofiltration retention/detention areas to collect and treat contaminated runoff
- Provide water quality protection and restoration classroom materials and training to teachers and students
- Develop or enhance school outdoor environmental study areas and learning centers
- Fund teacher/student field trips to reclamation sites and to observe active and passive water quality treatment measures
- Provide funds, protective clothing, or equipment for hazardous material safety, use, and spill training
- Provide funding to increase public awareness and knowledge of environmental laws, regulations, rules, and programs
- Sponsor an award program to publically recognize outstanding restoration efforts
- Conduct community-based hazardous waste collection and proper disposal events
- Help restore a “brownfields” site for use as a publically safe and healthy recreational-use area

Section D.3.2.1 Nonpoint Source Management in the Coastal Area

The Coastal Nonpoint Pollution Control Program describes *enforceable* polices and mechanisms to implement NPS pollution controls. The program was established by Congress in 1990 under the Coastal Nonpoint Pollution Control Program (Section 6217). It is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA). The Alabama Coastal Area Management Program is jointly administered by ADEM and the Alabama Department of Conservation and Natural Resources (State Lands Division - Coastal Section) to mitigate NPS pollution impacts to estuaries, beaches, the Gulf of Mexico, and marine resources along coastal Alabama (Baldwin and Mobile counties). Section 6217 requires states and territories with approved Coastal Area Management Programs to develop state Coastal Nonpoint Pollution Control Programs. Coastal NPS pollution management measures must conform to those illustrated in EPA Guidance (EPA 840-B-92-002, January 1993) and must address agriculture, forestry, urban areas, marinas, hydromodification (shoreline and stream channel modification), and loss of wetlands and riparian areas. Implementation of NPS management measures include permitting programs, zoning, enforceable water quality standards, and other general environmental laws and regulations. Voluntary measures must be backed up by appropriate enforceable compliance regulations.

The Alabama Coastal Area Management Program (ACAMP) was approved and has been in effect since 1979. It is designed to comprehensively promote, improve and safeguard coastal zone lands and waters while preserving, enhancing, and developing coastal natural resources. The enforceable policies of the program are used to regulate various activities on coastal lands and waters seaward of the contiguous 10-foot contour in Baldwin and Mobile Counties. The ACAMP is a joint effort of the Alabama Department of Conservation and Natural Resources - State Lands Division (ADCNR-SLD) and the ADEM Coastal Programs. The ADCNR-SLD is responsible for planning and policy development and ADEM is responsible for permitting, monitoring and enforcement activities (ADEM Division 8 Coastal Programs Rules: ADEM Admin. Code R 335-8). A primary function of ADEMs coastal program includes issuing state water quantity certifications and ascertaining federal coastal consistency for projects and activities requiring federal permits to conduct dredge and fill/disposal activities (e.g. sand dredging to restore eroded beaches and maintain channels, etc.) and infrastructure (e.g., highways, dams, levees; sand and gravel mining, resource extraction exploration and production, etc.). The U.S. Army Corps of Engineers (Mobile District) and EPA (Region 4) may prohibit coastal projects or place restrictive conditions on a permit (e.g. CWA Section 404). In addition, ADEMs Coastal Program rules require review, permitting or certification for coastal zone activities including:

- Siting of energy facilities
- Dredging and filling of state water bottoms and wetlands
- Beach and dune construction projects
- Drilling and operation of groundwater wells with a capacity of 50 gpm or greater
- Developments and subdivision of properties greater than five (5) acres in size
- Other activities which may have an impact on coastal resources

The Coastal NPS Program is inextricably linked to the statewide Alabama NPS Management Program and the state's CWA Section 319 nonpoint source grant program. As applicable to local conditions and needs, coastal NPS management measures and programmatic activities are at least equivalent to those endorsed by the statewide AL NPS Management Program. Efforts are mutually coordinated and leveraged by ADEM staff to ensure programmatic coordination, sustain partnerships, and to implement NPS control measures. Enforceable authorities to implement the CZARA 6217 coastal program are provided by ADEM Coastal Area Management Program (Division 8) rules. In addition, a variety of voluntary management program strategies are used to indicate progress and success, including but not limited to: watershed-based management plan development and implementation, agency, industry, and private sector partnerships, volunteer groups and programs, education and outreach, pollution prevention, financial incentives, environmental monitoring and tracking, and local regulations and ordinances.

Local, state, and federal coastal zone entities continue to partner together to enhance the ecological and economic health and benefits of the Gulf of Mexico. Multi-state and multi-agency coastal NPS management partners include EPA's Healthy Watersheds Initiative (within the framework as coordinated by the Mobile Bay National Estuary Program),the Gulf of Mexico Alliance, and the Gulf of Mexico Initiative. Section 319 funded statewide and coastal NPS management efforts benefit from these programs by leveraging resources needed to effectively plan, implement

and assess coastal water quality protection and restoration goals, objectives and practices. Adaptable, integrated, and system-based approaches help to ensure that NPS control measures are appropriately installed and maintained. Integral to long-term NPS programmatic implementation success is continued and effective communication, coordination, collaboration, and cooperation. Establishing and maintaining inclusive public and private sector partnerships, achieving priority pollutant load reductions, and meeting state water quality standards will continue to serve as measurable indicators of long-term statewide and coastal NPS programmatic implementation success.

Section D.4 Nonpoint Source Best Management Practices and Measures

a. Overview

Many citizen's in Alabama think about water quality pollution when problems are identified by "the media" such as large scope and scale oil spills and coal slurry-pond failures. People may be unaware or forget that the vast majority of water pollution problems originate from "pointless" or nonpoint sources; i.e., discrete and smaller scope and scale sources of pollution. The AL NPS Management Program and Section 319 grant program continues to endorse a sustained, iterative approach to implement appropriate management measures and practices to enhance public and private sector education and outreach. For optimum water quality protection and restoration effectiveness, resource extraction exploration, production, processing, and reclamation activities should continue to be proactively communicated with relevant resource agencies and the public and private sectors at relevant state, community, and place-based levels. Section 319 grant funds may be available on a limited basis to demonstrate structural NPS pollution controls as well as nonstructural practices such as education and outreach.

Resource extraction operations can discharge NPS pollutants of varying composition and toxicity. Activities can impact surface water and groundwater quality and quantity, stream recharge/ flows and velocity, and patterns, duration, and timing of contaminated runoff. Specific measures to address NPS pollution should be selected on a case-by-case basis depending on particular site conditions, economics, and expected treatment effectiveness.

The topics presented below are environmentally-protective recommendations designed to control contaminated NPS runoff before it enters surface water or groundwater resources. In general, the most practicable NPS management approach for the majority of the pollutant causes listed below is pollution prevention. Prevention practices are generally much more cost effective to implement when compared to mechanical, biological, chemical or physical treatment of NPS impaired waters. Timely and competent structural measure inspections and maintenance are essential.

b. Stormwater Runoff from Land Disturbance and Construction

Entities involved in resource extraction activities must be knowledgeable of the applicability and effectiveness of construction stormwater runoff control measures (i.e. the conditions under which BMPS must /will be implemented). Continued training of workers in all aspects of pre- and post-BMP implementation and maintenance is highly recommended. The EPA Coal Remining Best Practices Guidance Manual (EPA 821-R-00-007; March 2000) provides information relative to developing and implementing a best management practices plan. The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas is highly recommended by the AL NPS Management Program for NPDES permit purposes and activities, as applicable. The AL NPS Management Program and Section 319 grant program also endorses the, Recommended Practices Manual: A Guideline for Maintenance and Service of Unpaved Roads" for "dirt road" nonpoint sources of pollution. The EPA document, Controlling Nonpoint Source Runoff Pollution from Roads, Highways and Bridges (EPA-841-F-95-008a, August 1995), and Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Chapter 4 (EPA-840-B-92-002, January 1993) are also endorsed as effective NPS pollution control reference resources.

c. Industrial

Nonpoint source discharges from industrial sources often contain elevated levels of pollutants associated with natural resource material handling, storage and exposure to the weather. Nonpoint source pollutants may include the discharge of heavy metals, trash, debris, and hydrocarbons. As rainfall runoff flows over or through the facility or site, it can pick up NPS pollutants and transport them directly to stormwater runoff conveyance systems (e.g. drainage ditches, pipes, turn-outs, etc.) and ultimately to streams, rivers, lakes, and estuarine and marine waters. Increased velocity and volume, especially from cleared and barren lands, can degrade aquatic habitats, increase downstream erosion and sedimentation, cause flooding, and alter watershed hydrologic systems and processes. Industrial NPS pollution runoff can also impair drinking and commercial use water sources. Prevention practices are generally very cost effective to implement compared to treatment of NPS polluted waters.

Examples of management practices appropriate for controlling stormwater discharges from industrial sources include but are not limited to the following:

- Provide training and education to all mining industry workers
- Establish emergency spill response clean up plans and prevention controls and train workers to implement them when needed
- Ensure that materials are stored in a contained area with overhead cover, berms, or other secondary containment and do not have the potential to contribute to stormwater runoff contamination
- Use secondary containment structures, berms or dikes, to prevent stormwater contamination from an accidental release.
- Cover temporary waste piles with impervious materials to prevent rainfall runoff contamination
- If waste material has the potential to contaminate stormwater, store it in a contained or controlled area. Evaluate the facility "bone-yard" and scrap all equipment that is not intended to be used
- Segregate and securely store incompatible or reactive materials and chemical should spills or inadvertent mixing occur
- Continue to look for evidence of stormwater discharges by inspecting stormwater outfalls
- Repair or replace worn or ineffective NPS control measures as soon as possible and before the next forecasted precipitation event.
- Use native vegetative covers, mulch, and compost to stabilize exposed soils
- Leave native trees or shrubs in place during and after site clearing as much as is practicable.
- Install NPS pollution barriers such as a silt fences, hay bales, berms, settling basins, or other containment and filter structures as needed.
- Minimize off-site tracking of waste materials by stabilizing and protecting construction roads and entrances with small stones and fines (crusher run). Install a wash site or pad to clean vehicles / tires prior to their leaving the site to reduce a conveyance for materials and sediment from leaving the site.
- Protect areas where vegetation cannot be established using spray-on chemical soil treatments such as anionic asphalt emulsion, latex emulsion, and resin/water emulsions. Conduct soil test to determine appropriateness for using dust control palliatives. Before application, determine whether the chemical is biodegradable or water-soluble and what effect its application may have on water quality, aquatic organisms and wildlife.
- Ensure proper inspection and maintenance of all facilities and areas that may contribute to contaminated runoff.

The NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activities that require discharge authorization under an NPDES industrial stormwater permit. Federal regulations [40 CFR 122.26(b)(14)(i)-(xi)], identify 11 categories of stormwater discharges associated with industrial activities that are required to be covered under an NPDES permit (unless otherwise excluded). These activities can also minimize the impact of NPS pollution discharges from industrial facilities. Specific industrial pollution sources include:

- Category One (i): Facilities subject to federal stormwater effluent discharge standards in 40 CFR Parts 405-471
- Category Two (ii): Heavy manufacturing (for example, paper mills, chemical plants, petroleum refineries, and steel mills and foundries)
- Category Three (iii): Coal and mineral mining and oil and gas exploration and processing
- Category Four (iv): Hazardous waste treatment, storage, or disposal facilities
- Category Five (v): Landfills, land application sites, and open dumps with industrial wastes
- Category Six (vi): Metal scrap yards, salvage yards, automobile junkyards, and battery reclaimers
- Category Seven (vii): Steam electric power generating plants
- Category Eight (viii): Transportation facilities that have vehicle maintenance, equipment cleaning, or airport deicing operations
- Category Nine (ix): Treatment works treating domestic sewage with a design flow of 1 million gallons a day or more
- Category 10 (x) pertains to construction sites that disturb five acres or more is permitted separately
- Category Eleven (xi): Light manufacturing (food processing, printing and publishing, electronic and other electrical equipment manufacturing, and public warehousing and storage).

The EPA Multi-Sector General Permit (MSGP) addresses stormwater discharges from 29 sectors of industrial activity. The North American Industry Classification System (NAICS) provides a general description of each of the 29 industrial sectors and activities. The U.S. Census Bureau has a conversion table to bridge the older Standard Industrial Classification (SIC) codes with the newer NAICS codes (see Industrial Fact Sheet Series for Activities

Covered by EPAs MSGP). In addition, the U.S. Coast Guard requirements (33 Code of Federal Rules (CFR) Titles 153, 154, and 155) should be followed for marine vessel spill prevention and responses at marine facilities.

Industrial nonpoint source pollutants can affect both air quality and water quality. For example, although smokestacks are permitted point sources; some pollutant releases can be transported in the atmosphere over long distances. A pollutant from a single source may combine and interact in the atmosphere with pollutants released from other sources (considered now as nonpoint sources) to be ultimately deposited in receiving waters. Pollutant deposition from atmospheric transport and deposition can degrade waters (change waterbody pH, cause human health issues, result in fish and shellfish consumption advisories). The ADEM Air Division regulates air pollution and emissions in Alabama; however, some air emission solutions will take the concerted efforts of interstate, national and international partnerships to protect water quality and is beyond the scope of this document (e.g. mercury). Specific air pollutants, causes and potential solutions to protect environmental and human health relative to the Clean Air Act are administered as national EPA programs and targeted in Alabama by the ADEM ambient air monitoring plan (as annually updated).

d. Mechanical Equipment and Vehicle Maintenance

Vehicle, equipment, and facility (e.g. repair, oil, compressor and pumping fluids, fueling processes/storage tanks, etc,) spills and leaks can degrade water quality. The NPS measures presented below are examples of housekeeping measures that can prevent or reduce contaminated runoff. Prevention is generally more cost effective to implement compared to the costs to contain, collect, treat, and dispose of contaminated waste /spills. Frequent equipment inspections, process reviews, signage, a good spill prevention and response plan, and employee education and training can effectively prevent or reduce NPS pollution runoff and impacts to water quality.

Examples of equipment and vehicle management measures to address NPS pollutant runoff include but are not limited to the following:

- Equipment (e.g. draglines, excavators, loaders, dozers, etc.) waiting to be repaired can leak fuel, oil, hydraulic fluids, and other pollutants that can be picked up by stormwater runoff. Immediately clean up spills and properly dispose of cleanup materials and waste products. Some spills may be considered hazardous waste.
- Label, store and dispose of hazardous materials and fluids according to federal and state regulations.
- Design barriers or retrofit fueling stations with berms to contain accidental spills.
- Properly maintain haul vehicles, check often for leaks, and repair promptly.
- Do not pour waste fluids directly on the ground. Keep storage containers covered.
- Store hazardous materials in secondary containment areas. Protect from rain, and have an emergency spill prevention and response plan in place to keep pollutants from reaching a stream.
- Keep wastes types separated in order to increase recycling options and to reduce treatment and disposal costs
- Train employees about NPS pollution, storm water runoff, and water quality protection.

e. Erosion and Sedimentation

Mining sites will expose excavated soils, ores and minerals to rainfall. Erosive actions of water (and wind) on the landscape can loosen or displace soil and other particles on the ground (sedimentation), and transport them to a receiving waterbody (siltation). Increases in siltation can make waterbodies cloudy or "muddy" (turbid), interfere with photosynthesis (dissolved oxygen levels), smother aquatic habitat, impair fish and macroinvertebrate survival and reproduction, and increase the cost to treat drinking water used for human consumption. Individual or a "train" of erosion and sediment control measures may be required to be implemented to prevent or reduce water quality problems. The implementation of erosion control measures are generally:

- More effective than sediment control, treatment or removal
- Less subject to failure relative to streambank stabilization and impaired stream restoration measures
- Less predisposed to maintenance
- Less costly and technically unproblematic relative to mitigating multiple and varied stream conditions, characteristics, velocities and volumes

The selection of protective erosion and sediment control measures for a particular site should consider the resource extraction process, timing, and duration; degree of slope (steepness), soil type, protection of sensitive areas and impacts, material and products to be stockpiled, and traffic issues. Regular BMP effectiveness inspections and prompt maintenance and retrofits, if needed, are critical. Reclamation projects and practices, as funded by a Section 319 grant administered by ADEM, should integrate the design, selection, application, and maintenance of resource extraction erosion and sediment control measures as presented in the resources listed below:

- The "Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas" (March 2009, and as updated). This Handbook provides guidance for preventing and minimizing erosion, sedimentation and related stormwater quality problems. It can help users meet environmental and regulatory objectives and can be tailored for site-specific conditions and objectives. It is designed to address problems associated with non-agricultural land disturbance activities. A companion "Field Guide" is available as a quick reference resource and presents 26 of the most commonly used erosion and sediment control practices contained in the "*Alabama Handbook*."

- The AL NPS Management Program and Section 319 grant program as administered by ADEM also recommends Alabama-specific erosion and sediment control best management practices presented in Recommended Practices Manual - A Guideline for Maintenance and Service of Unpaved Roads (Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority, Feb. 2000) to protect water quality from "dirt road" nonpoint source of pollution.

Section D.4.1 Brownfields and Redevelopment

Brownfield sites include real property of which the expansion, redevelopment, or reuse may be complicated by the presence or potential existence of a hazardous substance or contaminant. The ADEM administers the Alabama Brownfields Program utilizing a grant awarded from EPA under Section 128(a) of the Small Business Liability Relief and Brownfields Revitalization Act. The Brownfields Program provides grant funding and resources to assist local governments and non-profit organizations with assessment, cleanup and redevelopment of brownfield sites. ADEM may perform no-cost site assessments and offer assistance to the entity applying for funding. A Directory of Brownfields Sites is available from ADEM that provides details of sites that are ready for redevelopment. The AL NPS Management Program recommends, as applicable to Alabama sites, the EPA Mine Site Cleanup for Brownsfield Redevelopment: A Three-Part Primer (EPA 542-R-05-030) and the, Implementing Stormwater Infiltration Practices at Vacant Parcels and Brownfield Sites (EPA 905F13001, July 2013) as a reference guide to help brownfield land owners/operators determine appropriate stormwater runoff management strategies. General background explanations and examples are also provided by Design Principles for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas (EPA-560-F-07-231, April 2008) and Case Studies for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas (EPA-560-F-07-232, April 2008).

Section D.4.2 Drinking Water, Groundwater and Well Head Protection

Many people in urban areas assume that adequate supplies of high quality drinking and commercial use waters are always available. Drinking water supplies (e.g. surface waters, groundwater aquifers, and private wells) may be susceptible to NPS pollution associated with resource extraction (e.g. sediment, heavy metals, pH, fracking chemicals, etc.); and therefore, source waters and groundwater recharge areas must be diligently protected for public health and to promote and sustain economic growth and development. The AL NPS Management Program and the Section 319 grant program share common water quality protection and restoration goals with the ADEM Drinking Water and Groundwater programs. The Clean Water State Revolving Fund and the Drinking Water State Revolving Fund as administered by ADEM may provide loans at below market interest rates to address source water protection. Examples of fundable CWSRF water quality projects include mitigation of nonpoint sources of pollution (e.g. brownfield contamination cleanup; protection and restoration of sensitive ecological areas such as wetlands and estuaries). In addition, the EPA encourages states to consider the effects of climate change on drinking water quality and availability. The EPA Office of Ground Water and Drinking Water and associated websites and links are

recommended sources of information regarding drinking water source protection. Although drinking water protection are primarily "point source" regulated programs, the CWA Section 319 grant program may provide resources and promote opportunities to facilitate cooperative point source/nonpoint source program partnerships between federal and state agencies, the resource extraction industry, public water supplier entities, and other public and private sectors. Sustained communication, coordination, and collaboration are essential nonpoint source programmatic watershed health and water quality protection and restoration elements.

Section D.5 Resources for Section 319 Project-Specific Best Management Practices

Section 319(b) (2) of the CWA requires states to include a list of BMPs in their NPS management programs that will:

a) Be implemented to reduce NPS pollutant loads from each NPS category and sub-category; and,
b) Contribute to significant NPS pollutant load reductions to navigable waters or prevents waters from meeting water quality standards and goals of the Clean Water Act.

The ADEM obligates Section 319 grant funds to implement NPS pollution management measures and practices to restore impaired waters of the state to state water quality standards, use classifications, and beneficial uses. Projects may apply one or more structural measures or non-structural control practices relative to NPS pollutant cause, site location, site condition, pollutant characteristics, and NPS priority pollutant load reduction target. Typical implementation of mitigation activities relative to resource extraction (primarily AML sites) include education and outreach, attenuation of runoff velocity and volumes, pH and heavy metal treatment, covering/capping exposed soils and overburden with vegetative materials, and demonstration of new and improved water quality technologies. These efforts help to ensure that:

- Chemical, physical and biological integrity of waters of the state are adequately protected, restored and maintained
- Programmatic goals and objectives of the *voluntary* statewide AL NPS Management and *regulatory* Coastal NPS Management programs are effectively, efficiently, and economically achieved and sustained
- State water quality standards and beneficial uses continue to be met
- Economic growth, human health, and social/environmental quality-of-life aspects that are impaired or threatened by nonpoint source pollution are improved and sustained

The resource extraction resources listed below are recommended to help the industry plan, install, and maintain scientifically-sound NPS runoff strategies and techniques to protect waters of the state. Any mention of trade names, products, or services in these resources does not convey EPA or ADEM approval, endorsement, or recommendation. Federal and state regulatory agency guidelines, recommendations and permit requirements may be applicable and will supersede the following voluntary NPS programmatic references.

Abandoned mine land reclamation projects and practices funded by Section 319 grant funds should be implemented, as applicable and practicable, in accordance with the following recommended guidelines, principles and techniques:

- USDA-NRCS Field Office Technical Guides (FOTG) Sections 1-5: General References, Soil and Site Information, Conservation Management Systems, Practice Standards and Specifications, and Conservation Effects (Alabama-specific)
- Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas (Soil and Water Conservation Committee)
- Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002; January 1993)
- Alabama's Best Management Practices for Forestry (Alabama Forestry Commission)

The following general technology, education and outreach and training resources may be useful to Section 319 partners to identify, plan, install, and maintain abandoned mine land reclamation measures and practices:

- Technical Report: Acid Mine Drainage Prediction - examines acid mine processes sampling, testing and modeling. (EPA 530-R-94-039)
- Coal Remining Best Management Practices Guidance Manual (EPA 821-R-00-007; March 2000) presents information relative to the development and implementation of best management practices plans
- Office of Surface Mining Technology Transfer - technology development, technical assistance, and transfer
- Abandoned Mine Land Inventory System - used to store, manage and report AML problems
- National Mine Map Repository - a collection of mine map information
- EPA Abandoned Mine Lands - provides resources related to the environmental risks and challenges
- Abandoned Mine Land Portal - an information repository for AML environmental health and safety issues

- Mine Waste Treatment Technology Selection - provides options for severe waste issues that must be addressed during and after the actual mining operation
- Brownsfield Technology Primer: Mine Site Cleanup for Brownsfield Redevelopment - describes approaches to redevelop mining sites and new and innovative techniques to efficiently characterize and clean up those sites
- AML Mine land Revitalization and Reuse - focuses attention on potential future uses of mined lands and the economic, environmental, and social impact that reuse can provide
- Soil Amendments - discusses issues relative to revitalizing mined soils to make them suitable for sustaining plant life or for redevelopment
- Surface Mining Control and Reclamation Act and Title 30 Code of Federal Regulations - Mineral Resources (Chapter VII - Office of Surface Mining Reclamation and Enforcement- Dept of Interior, Parts 700 to 955: surface mining laws regulations and guidance
- National Stormwater Calculator - a desktop tool that estimates the annual amount of rainfall from a specific site based on local site conditions, slope, land cover and historical rainfall record
- CWA Section 6217 - Coastal Zone Act Reauthorization Amendments (CZARA), Alabama Coastal Programs (ADEM), Coastal Area Management Program (Alabama Dept. of Conservation and Natural Resources)
- Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters - describes BMP measure performance expectations for the coastal zone management program as prescribed by Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (EPA 840-B-92-002, January 1993)
- National Stormwater BMP Database - an American Society of Civil Engineers website dedicated to BMP effectiveness information
- Center for Watershed Protection, American Society of Civil Engineers, and the American Water Resources Association provide objective and scientifically-sound BMP information relative to water resources management, and research and education
- Water Quality Research - this EPA website presents water quality BMP research and development technologies and systems

Section D.6 Nonpoint Source Partners and Resources

Several public and private sector resource extraction programs and practices continue to provide technical assistance, technology transfer, education/extension, and financial resources to mitigate the causes of NPS pollution, reduce pollutant load reductions, and protect and restore water quality in Alabama (see **Section D.1,** above). Relevant statewide and coastal resource extraction NPS programmatic goals, objectives and annual milestones of the Alabama NPS Management Program continue to be targeted and achieve programmatic water quality protection and restoration goals by:

a) Leveraging program and project resources to achieve mutually beneficial water quality improvement objectives
b) Supporting the development and implementation watershed-based management plans
c) Improving partnership collaboration, coordination, cooperation, and communication between a mix of programs, agencies, industry, landowners, organizations and others
d) Improving the connection between resource extraction planning, implementation of management measures, water quality protection, and reclamation /restoration after operations have ceased
e) Demonstrating adaptive management measures and new and innovative technologies and techniques
f) Concentrating mitigation resources to priority "focus areas" based on multiple criteria
g) Enhancing public and private knowledge and awareness, accessibility, comments, and participation

To help ensure that NPS water quality problems relative to resource extraction are addressed in a cost-effective and timely manner, ADEM continues to leverage Section 319 grant-funded human and financial capital to:

a) Develop, demonstrate, and integrate processes to identify and prioritize NPS water quality impairment causes, problems and solutions
b) Deploy available resources in a timely fashion to address those priorities, including but not limited to the protection of human health, drinking water supplies, and aquatic biota and habitat
c) Employ appropriate programmatic and financial systems to ensure that NPS mitigation dollars are used efficiently and consistently with legal intent and obligations and maximizes water quality improvement benefits
d) Target funding to complement the technical and financial assistance available from other federal, state, and local sources

Section D.6.1 State Agency NPS Partners and Programs

D.6.1.a Overview

Developing and sustaining public and private sector partnerships and leveraging resources is standard practice and essential to successfully achieving relative resource extraction category goals and objectives of the AL NPS

Management Program. Cooperative NPS partnerships facilitate efforts and leverage resources to expeditiously achieve water quality restoration and NPS pollutant load reduction strategies including, but not limited to:

- Building relationships of trust and fostering collaboration and cooperation to address resource extraction (particularly abandoned mine land) issues of mutual interest
- Formalizing working relationships and leveraging resources to accelerate identifying, prioritizing, and cleaning-up impaired sites and improving water quality
- Providing forums to express knowledge and receive input relative to environmental, economic, health, safety and social issues
- Expressing and implementing applicable resource extraction laws, regulations, guidelines, and compliance authorities
- Enhancing planning and implementation of on-the-ground environmentally-protective management measures to cooperatively mitigate nonpoint source human health and safety issues
- Encourage input for NPS management planning decisions and early and consistent involvement of stakeholders

State agencies continue to partner together to leverage NPS mitigation resources and coordinate efforts to plan, design, implement and maintain management measures and practices to prevent, reduce, or abate the causes of NPS pollutant runoff, protect and enhance drinking water sources, human health, and aquatic habitats and sustain environmental, economic, social and other communal quality-of-life benefits. The Alabama NPS Management Program and Section 319 grant program promotes a flexible, targeted, and iterative voluntary management approach whenever and wherever practicable to best ensure that state water quality standards and water quality benefits are effectively and expeditiously met as resources allow. Nonpoint source state agency partners and resources targeting resource extraction operations, environmental threats, and reclamation activities may include, but is not limited to:

D.6.1.1 Alabama Department of Environmental Management (ADEM)

- Protect and improve the quality of Alabama's environment and the health of all its citizens
- Protect and restore natural resources which provide significant social, economic, and environmental benefits and opportunities for the citizens of Alabama.
- Develop air, water, and land environmental policy, permits, administrative orders and variances and enforces environmental rules and regulations
- Administer the CWA Section 319 grant and facilitates implementation of the statewide AL NPS Management Program
- Administer CZARA Section 6217 and State Coastal NPS Management Programs

D.6.1.2 State Revolving Fund (SRF) (ADEM)

Clean Water State Revolving Fund (CWSRF) program provisions authorizes low-interest loans to fund a variety of drinking water quality protection and restoration projects addressing nonpoint source runoff, and protection and restoration of wetlands and estuaries (as well as NPDES permitted point source" treatment systems). Federal and state contributions provide project or program set-up capital and then those assets are used to make low-interest loans to qualified entities to protect water quality. Loan repayments are recycled to fund other projects. Community groups, individuals, nonprofits and other entities are eligible to apply to ADEM for CWSRF loan consideration.

D.6.2 Agricultural and Conservation Development Commission (ACDC)

- Established in 1985 by Alabama Act 85-123 for the purpose of making available General Fund cost-share grant money through the State Soil and Water Conservation Committee to each Soil and Water Conservation District
- The only agricultural assistance appropriation provided by the State of Alabama
- Funding is provided to encourage soil conservation, water quality protection, and forest improvement

D.6.2.a State of Alabama Soil and Water Conservation Committee (SWCD)

- Created in 1939 by the State Soil and Water Conservation District Act to carry out the administrative functions of the state's 67 District (county) programs
- Assists and advises District supervisors, disseminates information between SWCDs and partners with state and federal resource agencies and other public and private sector partners
- Provides statewide BMP implementation expertise

D.6.2.b Soil and Water Conservation Districts (SWCD)

- Focuses soil and water protection and conservation decision-making at the local level
- Coordinates NPS technology, education, and funding to address soil erosion, water quality, flood control, drainage, recreation, fish and wildlife, and open land preservation
- Provides county-level BMP implementation expertise and coordination
- Administrative resources are provided by the SWCC and local units of governments

D.6.3 Alabama Department of Agriculture and Industries (ADAI)

- Administers federal and state laws and regulations for products, businesses, goods and services
- Partners with state and federal resource agencies to protect human, economic and environmental health
- Manages statewide animal and plant health and pesticide programs
- Conducts food inspection and safety programs to protect public health

D.6.4 Alabama Department of Conservation and Natural Resources (ADCNR)

- Acquires and manages state lands, parks, lakes, stream beds, and other state-owned properties
- Administers natural resource grants and conducts research
- Partners with federal agencies such as NOAA, EPA,USDI, USFWS, Commerce, and Homeland Security to promote wise stewardship of the state's natural resources
- Partners with the USFWS to implement the Endangered Species Act (Traditional Section 6) conservation projects for listed and at-risk species
- Partners with ADEM to implement the CWA CZARA 6217 coastal nonpoint source program
- Provides partial oversight of project's to restore coastal resources from injuries sustained by the *Deepwater Horizon* oil spill.

D.6.5 Alabama Department of Public Health (ADPH)

- Fosters, promotes and provides information on seafood and shellfish health by partnering with state and federal agencies, industries, and academic institutions
- Provides technical assistance, permits, investigations and enforcement of solid waste, unauthorized dump, and vector control programs
- Develops and enforces human safety rules and regulations

D.6.6 Geological Survey of Alabama (GSA)

- Gathers geological, hydrological, and biological science-based data and information to best manage, develop, and conserve state water resources
- Provides surface and groundwater quantity and water quality assessment information, metrics and data to provide resource managers and community planners with information to balance natural resource benefits with resource protection
- Conducts water quality, biological, coastal, and aquatic resource research

D.6.7 Alabama Department of Economic and Community Affairs (ADECA) / Alabama Office of Water Resources (OWR)

- Administers the Alabama Water Use Reporting Program that details surface and ground water use and trends
- Administers programs to assess and manage water quantity and develop and conserve water resource supplies
- Provides data and information regarding instream flows and prepares flood maps
- Conducts research and education and outreach
- Partners with agencies and the private sector on water quantity resource and economic and quality of life issues

D.6.8 Alabama Department of Transportation (ALDOT)

- Establishes and manages state intermodal environmental programs and strategies to protect air, land and water resources
- Implements NPS management measures and provides highway and bridge construction, maintenance planning and response mechanisms

- Provides support, assistance, and expertise to preserve natural resources and enhance environmentally-protective and economically-supportive intermodal systems

D.6.9 Alabama Rural Water Association (ARWA)

- Provides community and town water and wastewater systems with technical, financial, administrative, management, education and outreach, and training assistance
- Helps protect drinking water sources
- Provides assistance to develop local wellhead and groundwater (aquifer) protection plans
- Partners with ADEM, ADECA, Emergency Management Agency, Department of Homeland Secretary, and the USDA-Farm Service Agency regarding water quality issues

D.6.10 Alabama Forestry Commission (AFC)

- Provides resources and technical assistance to establish, re-establish, conserve, and sustain forestland resources and benefits
- Partners with ADEM to implement Alabama's Best Management Practice for Forestry to help improve air quality, protect and restore surface water and groundwater quality, and mitigate the causes of soil erosion and stream siltation
- Partners with the public and private sector to address forest management, phytoremediation, recreation, invasive species, greenhouse gases, carbon storage, easements and land trusts, and general quality-of-life issues
- Facilitates research, training, and education and outreach designed to increase public awareness and involvement in finding the right balance between forestland benefits, protection and sustainability

Section D.7 Academia Institutions, Partners, Programs and Resources

Several higher education programs and resources provide interdisciplinary instruction, research, processes and innovations, technologies, technical assistance and technology transfer expertise to protect communities, worker health and safety, and the environment. Enhancing land owner, facility operator, worker, and general public knowledge and awareness relative to resource extraction impacts on watershed, water quality, and human health is essential. Academic institutions are key scientific, technological, business, and economic data and information compilation, analyses and delivery entities. Academic community partnerships are fundamental to statewide efforts to manage nonpoint sources of pollution and minimize negative environmental, economic, and social impacts of the resource extractive industry in Alabama. Partners and resources to protect and restore water quality from nonpoint sources of pollution include but are not limited to:

D.7.1 Alabama Cooperative Extension System (ACES)

- Delivers Alabama land grant institution (Alabama A&M and Auburn University) research-based technical assistance, technology transfer, and education and outreach
- Partners with industry, federal and state resource agencies, and other public and private sector entities to help them make informed research/science-based environmentally-protective and economically-sensible decisions
- Provides social, cultural and communal quality-of-life outreach

D.7.2 Auburn University Water Resources Center (Alabama Agricultural Experiment Station)

- Brings together faculty and resources from several academic departments and programs to address a myriad of complex water resource problems and issues
- Facilitates opportunities to enhance public and private sector communication, cooperation, and collaboration
- Enhances water-related instruction, research and outreach efforts to protect and restore waters of the state

D.7.3 Alabama Water Resources Research Institute (Auburn University)

- An interdisciplinary research, education and outreach, and training program based at Auburn University
- Seeks solutions to on-going water quality and quantity problems and emerging issues and threats

- Coordinates, provides funding, and implements a broad spectrum of natural resource protection programs

D.7.4 Auburn University Environmental Institute (Auburn University)

- Facilitates an integrated and cohesive environmental instruction, research, and extension strategy to promote coordination, collaboration and communication between the university's inter-disciplinary programs
- Provides resources and implements programs and activities to address local, state and national environmental education and outreach, leadership, and research issues and needs

D.7.5 Center(s) of Excellence for Watershed Management (Auburn University and Alabama A&M)

- An interagency and interdisciplinary academic project planning and implementation program
- Provides university research-based outreach and assistance to resolve strategic water quality, quantity, and availability issues
- Assists ADEM in developing and implementing watershed-based management plans that meet Clean Water Act Section 319 grant guidelines

D.7.6 Center for Environmental Research and Services (CERS) (Troy University)

- Facilitates and conducts natural resource research, education and stewardship services
- Partners with academic institutions, resource agencies, and the private sector including the Choctawhatchee, Pea and Yellow Rivers Watershed Management Authority, Wiregrass RC&D Council, and Alabama Water Watch.
- Influenced the establishment of the Environmental Education Association of Alabama, the Alabama Water Watch Program and the Alabama Water Watch Association.

Section D.8 Federal NPS Partners and Programs

Federal partners help state agencies, non-governmental groups, non-profit organizations, and other NPS entities identify and resolve NPS pollution problems and protect and restore water quality. Resource extractive industry (e.g. mining, quarrying, dredging, oil and gas extraction) programmatic resources and financial incentives provide for research, education and outreach, and enforcement of rules and regulations. Federal partners help to mitigate nonpoint sources of pollution associated with exploration, extraction, processing, storage, use and transporting activities. In addition, federal partnerships, compliance programs, and reporting help to ensure transparency and accountable management of natural resources and benefits between the industry and the public.

D.8.1. Office of Surface Mining Reclamation and Enforcement (OSM)

- An Office of the DOI, the OSM implements the Surface Mining Control and Reclamation Act of 1977 (SMCRA). Title IV of SMCRA provides for the restoration of lands mined and abandoned or left inadequately restored before August 3, 1977 with priority given to projects that alleviate dangers to public health and safety
- Designated by Congress as the Federal authority responsible for addressing environmental impacts of acid mine drainage/acid rock drainage caused by coal mining.

D.8.2 U.S. Department of Labor - Mine Safety and Health Administration (MSHA)

- Administers the provisions of the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended by the Mine Improvement and New Emergency Response Act of 2006 (MINER Act)
- Partners with ADIR to enforce compliance with safety and health standards to eliminate or reduce the frequency and severity of accidents; minimize health hazards; and promote improved mine safety and health conditions.

D.8.3 U.S. Environmental Protection Agency (EPA)

- Protects human and environmental health by developing and enforcing rules and regulations based on laws passed by Congress
- Provides funds and partners with the public and private sectors to implement the EPA AML Program through the National Mining Team (NMT) and Abandoned Mine Lands Team

(AMLT). These teams provide expertise abandoned mine sites issues to EPA headquarters and Regional offices.

- The Office of Enforcement and Compliance Assurance oversees mineral processing wastes. The EPA Region-4 office regulates coal, hard rock and non-metals mining activities through the National Pollutant Discharge Elimination System permitting program.
- The Superfund Abandoned Mine Lands Program uses regulatory and non-regulatory approaches to identify ways to protect human health and the environment from abandoned mine site contaminates.
- Provides annual appropriations of CWA Section 319 grant funds to ADEM to implement statewide and coastal zone NPS management measures to protect and restore water quality
- Partner with the Corps of Engineers to enforce CWA Section 404 permits and with ADEM relative to CWA 401 state water quality certifications.
- Partners with NOAA to implement NPS management components of the Coastal Zone Act Reauthorization Amendments of 1990 (i.e., CZARA Section 6217)

D.8.4 National Oceanic and Atmospheric Administration (NOAA)

- Co-federal lead (with EPA) to assure that NPS resource extraction activities are in conformance with Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) and Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA. 840-B-92-002, January 1993)
- Requires the state to develop coastal nonpoint pollution control programs that ensures the implementation of resource extraction management measures in the coastal management area reflects circumstances relevant to differing land uses and conditions and provides current technical information to the public and private sectors to make informed decisions
- Provides agencies, private sector groups, and individuals with NPS pollution control measure guidance and information relative to resource extraction and in accordance with the Coastal Management Act (1972, as amended)

D.8.5 National Estuary Program - Mobile Bay (NEP)

- Administered through and funded by the EPA to respond to environmental challenges to the Mobile Estuary through implementation of a Comprehensive Conservation Management Plan
- Conducts assessments, identifies stressors and promotes protection and restoration of coastal water quality
- Uses a non-regulatory programmatic approach to partner with federal, state, interstate, and local agencies; municipalities, businesses, environmental organizations; and academic institutions to address air and water quality, wetlands, stormwater runoff, population growth and land uses, floral and faunal habitat, and other coastal zone issues
- Provides science-based education and outreach to enhance environmental, communal, social, cultural, and economic well-being and to provide citizens with local sense-of-ownership

D.8.6 United States Department of Agriculture (USDA)

Conservation provisions of the 2008 Food, Conservation, and Energy Act (a.k.a. "Farm Bill" as amended or revised in future years) may provide opportunities to address mutual environmental protection goals. Several USDA conservation initiatives and special emphases programs are designed to target water quality and water supplies. The USDA facilitates several natural resource assessment strategies and policies applicable to rural areas and communities. These efforts provide the public and private sectors with technical resources and financial incentives to make informed environmental stewardship decisions.

D.8.6.a Natural Resources Conservation Service (NRCS - Alabama)

- The technical agency of the U.S. Department of Agriculture (USDA) responsible for conserving and protecting natural resources in Alabama
- Administers land-use programs and provides technical assistance to the public to protect and conserve soil, water, and air resources, protect and restore wetlands, and enhance reforestation and phytoremediation

- Partners with USACOE through joint guidance to conduct wetland determinations applicable to the Food Security Act of 1985 and Section 404 of the Clean Water Act
- Works in close partnership with the State Soil and Water Conservation Districts and the USDA - Farm Service Agency in Alabama to control erosion and sedimentation, protect and restore drinking water quality and resources, and protect the environment

D.8.6.b NRCS Technical, Planning, and Financial Assistance Programs in Alabama:

- **Emergency Watershed Protection (EWP):** Provides funding to address emergencies as a result of natural disasters and to mitigate hazards to life and property from floods and erosion created by sudden impairments. Funding may be used to protect roads and bridge abutments, remove debris from streams, and control gullies that threaten infrastructures such as homes, gas and power lines, and road ways.

D.8.6.c Gulf of Mexico Initiative (GoMI)

- Provides financial and easement assistance along the Gulf Coast (e.g., Alabama, Florida, Louisiana, Mississippi, and Texas) to improve water quality
- Promotes sustainable management systems to mitigate NPS runoff and transport to coastal waters and to prevent saltwater intrusion into drinking water supplies and sensitive natural resource areas
- Focuses multi-agency partnership efforts on improving water quality in the Weeks Bay (Fish River) and Escambia River watersheds in Alabama (and Florida)

D.8.6.d "StrikeForce" Initiative (USDA)

- A partnership of USDA agencies (NRCS, FSA, and Rural Development), local and state governments, and organizations to rebuild and revitalize communities in targeted areas
- Leverages resources in persistent-poverty communities to promote economic development and job creation

D.8.7 U.S. Forest Service (USFS)

- Implements the Forest Service Minerals and Geology Management program. This program addresses development, production, and reclamation of energy, mineral and geologic resources (e.g. oil, coal, and gas) as well as the restoration of National Forest lands disturbed by historic mining activities.
- Directs compliance with required CWA permits and State regulations and requires the use of BMPs to control NPS pollution to meet applicable water quality standards and other CWA requirements on USFS leased lands in Alabama.

D.8.8 National Park Service (NPS)

- The Abandoned Mineral Lands Program and Southeast Regional AML Summary enhances federal, state, and non-government partnerships efforts to target: 1) site inventory, characterization, prioritization; 2) public safety hazards; 3) restoration of natural resources, 4) preservation of culturally significant sites; 5) maintenance of critical wildlife habitat.
- Targets AML underground and surface mines; dredge sites; oil and gas wells, and associated facilities.

D.8.9 Resource Conservation & Development Program and Councils (RC&D)

- Administered by the USDA-NRCS and governed by a multi-county, membership-based nonprofit RC&D Council
- Promotes environmental protection and economic sustainability in designated areas through collaborative strategic planning processes and partnerships
- Identifies, plans, develops, and implements conservation and economic projects through wise and efficient use of human and financial capital and natural resources
- Promotes voluntary community-based environmental protection approaches

D.8.10 U.S. Fish and Wildlife Service (USFWS) / Ecological Service Field Office, Daphne, Alabama

- Conserves, restores, and protects fish, wildlife, and plant habitat and populations by enforcing federal natural resource laws
- Conducts environmental investigations and provides technical support to protect and restore natural resources
- Promotes healthy habitats for fish and wildlife

D.8.11 U.S. Army Corps of Engineers (COE) / USACOE -Mobile District

- Constructs, maintains and operates water resource infrastructure to enhance economic and environmental health and human safety and quality of life
- Partners with EPA and ADEM to issue nationwide (CWA Section 404) dredge and fill and state water quality certification (CWA Section 401) permits
- Provides planning and other environmental services to analyze, formulate, justify and document hydrologic and natural resource protection and restoration projects
- Promotes environmentally sustainable designs, engineering, and construction protocols to restore and protect streams, rivers, wetlands, other water bodies, and riparian areas degraded by drainage from abandoned and inactive non-coal mines
- Demonstrates management measures and innovative and alternative treatment technologies to minimize or eliminate adverse environmental effects associated with jurisdictional waters
- Assesses, plans, and implements water supply, storage, withdrawal and release, and flood control and drought contingency operations and projects
- Develops and reviews environmental assessments, environmental impact statements, and project plans to protect and balance the many purposes and demands placed on natural resources by resource extraction activities

D.8.12 U.S. Geological Survey (USGS) / Alabama Water Science Center

- Provides a wide range of scientific expertise to help minimize and, where possible, eliminate the adverse environmental effects of AMLs
- Partners with ADEM, ADOT, GSA, USACE, Homeland Security, communities, industry and others to collect and disseminate scientific knowledge (stream flow, water quality, water quantity, and groundwater monitoring and assessment data and information) needed for an effective cleanup of AMLs.
- Develops natural resource and watershed management plans to enhance environmental and economic benefits
- Provides high resolution imagery for mapping and develops maps
- Develops standardized methods to evaluate environmental health and natural resources

D.8.13 Tennessee Valley Authority (TVA)

- Promotes environmental and economic development and sustainability to improve quality of life and economic prosperity
- Partners with other federal and state and local entities to strengthen relationships; expand collaboration; improve communication; and provide education to many and varied audiences
- Assesses, protects, improves, restores and manages natural resources in order to meet state and federal regulations and standards; uses an integrated river system management process to assesses reservoir and land-uses; provides for public land recreational opportunities, assesses environmental conditions and problems, and facilitates the implementation of relevant management strategies
- Uses an integrated environmental management system approach to strengthen policies and programs to manage and enhance air, land and water quality and other natural resources, protect public health, discourage wasteful consumption, and proactively prevent pollution problems from occurring

D.8.14 U.S. Department of Transportation (USDOT)

- Develops and coordinates mechanisms to support the national transportation system with due regard for need, the environment and national defense
- Administers policies and programs to protect and enhance the nation's transportation systems, security, and services

- Provide funding to enhance quality of life, environmental protection and economic sustainability

D.8.15 EPA Office of Homeland Security (OHS)

The Alabama Nonpoint Source Management Program and CWA Section 319 grant program recommends and endorses reasonable and practicable science-based technical measures to protect surface waters and groundwaters from nonpoint sources of pollution. Dedicated and stable sources of funding are needed to proactively address real and potential environmental and human health, economic, and social threats and challenges. Examples of NPS management threats and impacts applicable to OHS interest and involvement include drinking water safety and security, human health issues, and chemical releases and spills.

Section D.9 Non-Governmental Organization Partnerships

The AL NPS Management Program and Section 319 grant program encourages non-governmental organizations (NGO) to continue to partner with relevant federal, state and industry resource extraction entities to help protect and restore water quality in Alabama. Private sector citizen-based volunteer partnering is a key element of NPS programmatic efforts to deliver resource extraction information, technology and technical assistance, and financial incentives. Volunteer activities are also critical to effective planning and implementation of environmentally-protective and economically-sensible management measures and practices to achieve NPS pollutant load reductions in Alabama; especially efforts aimed at restoring abandoned mine lands. It is strongly advised that the private sector citizen volunteers collaborate, cooperate, coordinate and communicate all resource extraction land reclamation activities with relevant regulatory and resource agencies and authorities. This will help to proactively alleviate potential human health and safety risks and threats and may enhance protection from potential legal vulnerabilities relative to EPA "Good Samaritan" guidelines and principals.

In general, NGO activities to address nonpoint sources of pollution and protect and restore water quality in Alabama may include, but are not limited to:

- Identifying and reporting AML sites and concerns to appropriate regulatory and resource agencies
- Facilitating management plan development and BMP implementation including assisting with environmental studies and on-the-ground construction/implementation and maintenance
- Monitoring sites to ensure appropriate signs are posted and barriers and gates are intact and functional
- Cleaning up debris, trash, and litter along hauling roads, abandoned mine sites, and waters of the state
- Conducting water quality monitoring using EPA-approved protocols (e.g. Alabama Water Watch)
- Providing administrative support to resource agencies

Consultants, researchers, industry, the academic community and others that design or develop new or innovative technologies and techniques to address mine land remediation are encouraged to share information and to demonstrate their products and processes with relevant AL NPS Management Program partners (e.g. using field days, tours, workshops, meetings, etc.). The Section 319 grant program may fund BMPs, provide education and outreach, and demonstrate AML reclamation technologies if relative to the implementation of an EPA-defined 9-key element watershed-based management plan and applicable to grant guidelines.

D.9.1 Alabama Clean Water Partnership (CWP)

- Partners with ADEM to protect and restore water quality and develop and implement watershed-based management plans
- Links federal and state, and local agencies, communities, and watershed stakeholders to put best management practices "on-the-ground"
- Provides a neutral, targeted, and iterative forum to identify environmental problems and tries to find cooperative solutions to mitigate those challenges
- Promotes improved communication, coordination and collaborative decision-making processes to protect and restore water quality using a voluntary (non-regulatory) management approach

D.9.2 Alabama Water Watch (AWW)

- A statewide water quality monitoring program composed of trained and certified citizen-volunteers who tests

certain physical, chemical, and biological conditions of waterbodies using standardized EPA-approved monitoring protocols
- Combines the resources and expertise of citizen groups, a university-based program, and a non-profit association to collect credible water quality data and information
- Provides training and certification to help volunteers collect, analyze, and understand their water quality data
- Identifies pollutant sources and tracks long-term trends to improve water quality and water policy

D.92.a Alabama Water Watch Association (AWWA)
- A 501(c)(3) tax-exempt organization that supports AWW efforts to help identify, monitor, and seek solutions to impaired water quality problems and protect unimpaired waters
- Provides training, education and outreach, and motivation to improve water quality through citizen-based monitoring and water policy actions

D.9.3 Alabama Natural Heritage Program (ALNHP)
- A conservation action and stewardship program of the Environmental Institute (Auburn University)
- Provides science-based biological diversity information to resource agencies and the private sector to protect sensitive flora and fauna and to ensure sound stewardship of land and water resources
- Identifies plants, animals, and natural communities of concern for protection and consolidates that information into a comprehensive database
- Promotes sound natural resource protection and conservation actions within the state and also throughout the Southeast.

D.9.4 The Nature Conservancy (TNC) / TNC - Alabama
- Works to preserve, protect and restore natural resources and areas in Alabama
- Administers projects to conserve and improve species biodiversity; create, protect and restore upland and aquatic habitats; mitigate invasive species, and protect rare and declining species
- Promotes and provides environmental research, education and outreach, and hands-on field experiences to increase citizen awareness and knowledge relative to environmental sustainability and economic growth

D.9.6 Cooperative Ecosystem Study Units (CESU) Network (Auburn University - Office of Vice President for Research)
- A collaborative and interdisciplinary national consortium composed of federal agencies, academic institutions, state and local governments, nongovernmental conservation organizations, and other partners
- Works to support informed public trust and stewardship of natural resources for varied bio-geographical regional levels (i.e., Piedmont, South Atlantic Coast and Gulf Coast)
- Provides contemporary biological, physical, social, and cultural sciences and resource management research
- Provides technical assistance, education and outreach, and capacity building for long-standing priorities.

Section D.10 Section 319 Grant Regulatory NPS Partnerships and Programs

The Alabama NPS Management Program supports a flexible, targeted, iterative, and voluntary incentive-based approach to reduce NPS pollution loadings and protect and restore water quality. If the voluntary NPS management approach does not appear to be environmentally-protective (as determined by science-based water quality monitoring and assessment data), the state implements enforceable "back-up" provisions of the Clean Water Act (CWA) and the Alabama Water Pollution Control Act (AWPCA)(Code of Alabama 1975; Chapter 22A-22.x; as amended), and ADEM regulatory measures as embodied in Alabama Environmental Regulations and Laws to ensure state water quality standards and water quality benefits are met and sustained. Federal agencies also help the state implement the Superfund (e.g. RCRA; CERCLA) program for hazardous waste removal or remedial actions. Superfund resources may be provided by EPA Region 4 and ADEM when a significant environmental or public health threat is imminent, or where a site poses an environmental threat and no potentially responsible party can be found.

Implementation of NPS measures to mitigate resource extraction treats and problems can be technologically complex and may require the expertise of a mix of partners and resources including but not limited to the following:

D.10.1 Coastal Nonpoint Source Management (EPA and NOAA)

The U.S. Congress passed the Coastal Zone Management Act (CZMA) in 1972. The Act provides for managing the nation's coastal resources while balancing economic development with environmental conservation. A national policy objective of the CZMA is, "*to preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone*." [(U.S.C Section 1452. Congressional declaration of policy (Section 303)] Congress later established a Coastal Nonpoint Pollution Control Program to address NPS pollution in 1990 under Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA). The federal CZARA program is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA).

The Alabama Coastal Area Management Program (Baldwin and Mobile Counties) is jointly administered by ADEM and the Alabama Department of Conservation and Natural Resources (State Lands Division - Coastal Section. Section 6217 of the CWA requires states and territories with approved Coastal Area Management Programs such as Alabama to develop Coastal Nonpoint Pollution Control Programs to address NPS pollution impacts on estuaries, beaches, marine resources and ocean waters. The CZARA program also requires the state to describe enforceable policies and mechanisms it will use to implement NPS pollution control measures. Coastal zone measures address agriculture, forestry, urban areas, marinas, hydromodification (shoreline and stream channel modification), and loss of wetlands and riparian areas. Measures must also conform to those illustrated by EPA in the, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002, January 1993).

The ADEM Coastal Zone Management Programs, which falls under Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), are inextricably linked to the statewide AL Nonpoint Source Management Program and the state's CWA Section 319 grant funding program. Available resources are coordinated and leveraged by ADEM to improve coordination, sustain partnerships, and to proactively implement NPS pollution management measures and practices. A variety of mutual programmatic accountability measures are used to indicate implementation progress and success; including but not limited to: laws, rules, regulations, ordinances, watershed-based management approach, sustained partnerships, voluntary approaches, public and private sector education and outreach, pollution prevention, financial incentives, and environmental health monitoring and tracking. As applicable to local conditions and needs, coastal NPS management measures and practices are planned and implemented in partnership with statewide NPS Management Program measures and practices. In addition, ADEM Coastal Area Management Program (Division 8) rules provide regulatory back-up authorities in conjunction with implementation of the CZARA 6217 coastal program.

D.10.2 ADEM Water Quality Protection Relative to Resource Extraction and Mined Land Reclamation

The following laws, regulations, guidelines, and recommendations are relative to ADEM efforts and initiatives to address nonpointsource pollution associated with the resource extractive industry.

- Alabama Administrative Code
  - Alabama Environmental Regulations and Laws
  - ADEM Enforcement and Compliance Information
  - Enforcement and Compliance
- Water Programs (Industrial, NPDES Permits, Construction Stormwater NPDES, Mining NPDES, State Revolving Fund, RCRA, Forestry, TMDLs)
- Water Quality Standards, Drinking Water, Groundwater Rule and Wellhead Protection
- Air Programs / Permitting / Forms
- Guidance Documents and Forms (Land Application; Surface Impoundments Closures, Secondary Containment)
- Pollution Prevention, Brownfields, Waste Remediation
- Surface Water Quality Monitoring Strategy
- Gulf of Mexico Oil Spill Information

- Coastal Programs / Permitting / Forms
- CWA Section 404 - Dredge and Fill; CWA Section 401 - State Water Quality Certification

APPENDIX D

RESOURCE EXTRACTION
NONPOINT SOURCE POLLUTION MANAGEMENT

ATTACHMENT D-1: SECTION 319 GRANT PROJECT-SPECIFIC STRATEGIES AND ACTION ITEMS

Overview:

Project-specific Strategies and Action Items are essential and fundamental NPS pollution management tools to demonstrate reasonable CWA Section 319 grant progress toward achieving Programmatic Goals and Objectives of the Alabama NPS Management Program. The following adaptive NPS management mechanisms provide *project-level guidance* to plan and implement focused water quality protection and restoration activities using a collaborative, cooperative and coherent public and private sector partnership approach.

Structural management measures (on-the-ground) and nonstructural practices (education and outreach) presented herein:

- Are outcome-based, as applicable and practicable
- Do not compromise landowner land use and citizen privacy issues
- Places an emphasis on achieving Section 319 grant priority and EPA Grants Reporting and Tracking System (GRTS) reportable NPS pollutant load reductions (e.g. sediment) and priority Total Maximum Daily Load (TMDL) pollutants of concern (e.g. pH, metals, low dissolved oxygen, degraded aquatic habitat, etc.)
- Supports statewide efforts to expeditiously meet state water quality standards and sustain water quality benefits
- Integrates and leverages human and financial capital of national, regional, state and local programs, projects and authorities
- Aligns multiple project planning and implementing processes using a holistic NPS watershed-based management approach as practicable
- Enhances local "ownership," project implementation transparency and funding accountability
- Supports a flexible, targeted, iterative, and holistic NPS management programmatic implementation approach
- Enhances motivation, causes and opportunities for entities to mutually reach a consensus and achieve a desired NPS management program goal, objective and outcome

The AL NPS Management Program recognizes that Federal and state resource and regulatory agencies, local governments, industry, landowners, environmental groups and others all play a role in mitigating nonpoint sources of pollution associated with active and abandoned mine lands and resource extraction activities. Effective NPS management requires frequent, extensive and clear communication and sustained efforts to identify, improve and sustain cooperative partnerships. The NPS management program is designed to work within the context of existing voluntary principles and regulatory back-up authorities, programs, and practices. It also seeks to focus environmentally-protective and fiscally-responsible resources, tools, and expertise to cooperatively and expeditiously achieve NPS pollutant load reductions and meet state water quality standards. The following Strategies present a coherent and accessible means to help resource extraction entities effectively, efficiently, and expeditiously achieve state water quality standards and maximize water quality benefits. Action Items are elemental strategic-support components that address single, multiple, or mixed NPS pollution causes, conditions and pollution mitigation needs regardless as to whether the outcome is statewide, community-based, or site-specific.

Strategy D.1 Achieve State Water Quality Standards, Use Classifications and Other Beneficial Uses.

Action Item D.1.1 Continue to enhance water quality and watershed health as agency and community authorities, guidelines, criteria, and resources allow:

- Implement the NPS components of a TMDL to accelerate restoration of Section 303(d) listed impaired waters
- Continue to facilitate collaborative studies to develop and demonstrate science-based predictive tools and develop metrics and values to quantify adverse resource extraction impacts and/or water quality benefits and prioritization of NPS program/project mitigation targets
- Develop, update and revise monitoring protocols to best determine how stormwater control projects and programs relative to resource extraction improves or degrades water quality and meets targeted priority Section 319 pollutant and TMDL pollutant of concern load reductions
- Bring together technical experts, program managers, policy makers, community leaders, and citizens at the federal, state, and local levels to advance the science of an integrated water quality assessment approach aimed at protecting surface waters and groundwaters, particularly to ensure safe drinking water sources
- Continue to collect data to characterize both watershed scale and site-specific water quality impacts and trends over time to identify emerging problems, prioritize and direct BMP efforts; assess, target and measure BMP effectiveness; and respond to urgent situations such as spills or threats to human health and safety
- Target workshops/conferences composed of both public and private sector audiences to enhance NPS knowledge and awareness relative to water quality, aquatic health and habitat protection; BMP implementation; holistic NPS pollution control management; and community and land re-use, resilience and sustainability
- Document NPS water quality conditions by measuring sediment, pH, metals and other NPS threats to water quality and aquatic habitat
- Continue to document NPS control management efforts to help protect and restore water quality, aquatic species, stream habitat, riparian areas, wetlands and other sensitive areas using strong science-based water chemistry, hydrology, and land use assessment and monitoring data and information
- Partner with communities and individuals to protect groundwaters and drinking water sources (e.g. public water systems; water supply, wellhead capture zones, private drinking water wells)
- Focus available resources to protect high quality and unimpaired waters (e.g., Outstanding Alabama Waters, Outstanding National Resource Waters, Treasured Alabama Lake, or future designations)
- Support and leverage resources and efforts of the Gulf of Mexico Alliance, CWA S. 6217, and other multi-state and multi-agency NPS pollution management programs to help protect and restore coastal water quality
- Facilitate the compensation of "unavoidable" resource extraction impacts through wetland and stream restoration "mitigation banks" (e.g. federal/state agency and private sector partnerships)
- Promote voluntary NPS pollution programmatic approaches but apply statutory, regulatory and administrative "back-up" authorities and interventions to achieve state water quality standards when voluntary management measures and practice efforts, strategies, and incentives do not appear to be working (as determined by science-based water quality monitoring, assessment, and analyses/evaluations)
- Implement and assess the success of setback requirements to protect and restore priority waters, sensitive areas, wetlands and public health
- Engage federal, state and local partners to continuously deliberate frameworks and metrics to best measure water quality restoration and protection and beneficial use success
- Coordinate with relevant resource extraction agencies, governmental officials/authorities, planners, developers, industry, local organizations, and others to cooperatively develop and implement EPAs nine (9) element Section 319 watershed-based management plans to expeditiously protect and restore surface water and groundwater quality

Strategy D.2 Implement Management Measures to Protect and Restore Surface Waters, Groundwaters, and Natural Resources

Action Item D.2.1 Continue to holistically integrate programs, financial incentives, technology transfer, and technical assistance with a focus on consensus to meet the desired environmental outcome:

- Facilitate public and private sector partnerships to support the development of stakeholder design and planning manuals and to reduce uncertainties associated with preparing and implementing AML clean-up / reclamation plans

- Identify and address resource extraction water quality concerns and management measures in EPA-defined 9 key element watershed-based management plans
- Identify and implement a large-scale watershed-based management (e.g. HUC 12) AML project to demonstrate AML reclamation prioritization, planning, and implementation success, especially technology transfer
- Facilitate partnerships (i.e., increase interaction) between federal and state agencies; land-grant universities, and others to align, leverage, and deliver cutting-edge, innovative, environmentally-protective, and economically-sensible measures to mitigate anthropogenic impacts and establish clean-up / reclamation performance expectations
- Expand hydrological modeling capabilities for very small and/or intermittent stream flows influenced by AMLs. Continue to develop tools and techniques to extrapolate surface water and groundwater flows and interactions, including predictive modeling
- Identify existing techniques and develop new remote or non-intrusive instrumentation and methodologies to monitor, characterize, and provide guidance on specific water quality constituents, meet project objectives, or evaluate remediation and restoration methods.
- Target NPS projects to best leverage Section 319 grant funds to relevant resource agency priorities
- Research and promulgate new or improved BMP technologies, guidelines, standards, and practices
- Enhance greater collaboration with a full spectrum of partners to accelerate research, innovation and new technologies to address NPS pollution challenges and meet state water quality standards
- Target Section 319 grant funds to address adverse resource extraction and AML impacts on a HUC-12 subwatershed level as feasible and practicable
- Coordinate federal and state programs that provide AML landowners with incentives to voluntarily install NPS pollution management measures
- Target NPS pollution management measures based on site-specific conditions and location, land reuse, pollution extent, economics, health and safety protection effectiveness, and maintenance considerations
- Consider both environmental and economic sustainability aspects when designing, retrofitting, or implementing structural solutions, singularly and in combination, in order to get the "best bang for the NPS buck"
- Leverage NPS mitigation resources to best address site-specific pollutant causes and extent (e.g. Section 319 pollutant load reductions, TMDL pollutants of greatest concern; concentration/toxicity, proximity to a water of the state, aquatic species and habitat, sensitive areas, etc.,)
- Target Section 319 grant guideline and NPS programmatic priority pollutant load reductions (e.g. sediment / siltation) and nonpoint source TMDL pollutants of concern (e.g. pH, metals, aquatic habitat alteration, etc.)
- Devise alternative control strategies and criteria that emphasizes the restoration of natural drainage patterns to near pre-land disturbance conditions
- Facilitate incentives and opportunities to improve and strengthen cultural, social and economic conditions, especially near disenfranchised and disadvantaged communities
- Coordinate efforts to minimize or abate NPS pollutants from leaching to groundwaters (e.g., drinking water sources, recreational use waters, outstanding resource water, etc.)
- Continue to facilitate opportunities to leverage public and private sector resources to protect worker health and safety
- Coordinate efforts to prevent or diminish atmospheric transport of NPS pollutants (e.g., mercury; particulates)
- Coordinate stormwater runoff control efforts to prevent or restrain the spread of invasive species

Strategy D.3 Achieve Nonpoint Source Pollutant Load Reductions

Action Item D.3.1 Continue to monitor and assess on-the-ground best management practices designed to address NPS pollution management challenges:

- Form partnerships with relevant Federal and state agencies in support of their AML programs with the objective of combining resources to collectively address NPS pollution created by AMLs and acid mine drainage
- Facilitate collaborative research, information exchanges, training opportunities, and technology development to establish environmental performance standards and to better predict impacts of acid mine runoff , metals mobility, and risks to human and ecological health
- Facilitate NPS management tools to monitor, characterize, and evaluate AML pollutant transport, fate, and treatment and remediation technologies

- Continue to identify, streamline, and evaluate on-going protection and restoration measures and practices in order to identify the "best attainable" improvements in water quality, evaluate the success rate of existing treatments, and to provide updated guidance to avoid future impacts and threats
- Coordinate restoration of priority waterbodies, watersheds, and specific project sites with CWA Section 319, 303(d), CZARA Section 6217/coastal NPS programs; NPDES permits, and TMDL programs
- Identify existing techniques and develop new or innovative remote or non-intrusive instrumentation methodologies for AML site characterization and monitoring
- Continue to provide training, guidance and manuals to measure specific NPS water quality parameters, meet mitigation project objectives, evaluate reclamation / restoration methods, and to document project success
- Continue to collect valid, science-based water quality and pollutant loading data and information using federal and state agency-approved quality assurance project plans and monitoring protocols
- Evaluate current data and historical water quality trends to target NPS management measures and practices needed to protect and restore waters of the state
- Estimate NPS pollutant load reductions using science-based water quality monitoring protocols and computer-modeled (STEPL) data, as practicable and applicable.
- Partner with the Alabama Water Watch Program, Alabama Clean Water Partnership, government agencies and academic institutions to monitor water quality to help identify and prioritize NPS impaired sites; implement NPS measures and practices, and to evaluate pollutant load reduction
- Track and report Section 319 watershed projects to document improvements in land, water, and air quality
- Report both pre- and post-project Section 319 project results to the public using federal and state websites, databases, and other programmatic and project-specific media outreach options
- Coordinate interagency reporting and input of NPS data and information relative to pilot projects, research, costs, and qualitative and quantitative pollutant load reduction indicators and measures
- Promote the development of local ordinances that incorporate NPS pollution best management practice planning, design, implementation, maintenance and effectiveness monitoring requirements (pre-, during, and post-resource extraction phases)
- Continue to promote pollution prevention practices whenever and wherever practicable

Strategy D.4 Provide and Enhance NPS Pollution and Water Quality Education and Outreach (E&O)

Action Item D.4.1 Continue to facilitate the production and distribution of environmentally-protective and economically-sensible information to the public and private sectors:

- Leverage Federal and state agency resources to effectively and efficiently deliver land, water, and air E&O to local agencies, authorities, organizations, groups, citizens, industry, project coordinators, volunteers, etc governmental authorities and entities, landowners, owners/operators, workers, volunteers, etc.
- Develop, update or revise and disseminate relevant guidelines, plans, reports, and manuals to reflect new or changing regulatory requirements, strategies, and technologies relative to NPS stormwater runoff controls, land use / land-reuse and aesthetics, and ecological and global climate changes and concepts
- Continue to develop and populate a central web-based database / clearinghouse relative to technology, management measures, demonstrations project sites, and other AML mitigation activities
- Track AMD mitigation successes, and failures and lessons learned in order to increase the knowledge base and confidence of the private sector in to enhance agency environmental, economic, and public health and safety decision-making processes
- Facilitate NPS training and increase AML technology awareness and knowledge (shorten the learning curve) by enhancing the private sector's access to agency data and academia / researcher expertise
- Expand the use of GIS and mapping software development to characterize threats and impacts of AML and AMD at the watershed and site-specific levels
- Develop audience-specific visual information delivery systems to help convey complex AML data and information
- Ensure that programs, services, and incentives are accessible to a diverse mix of citizens and targeted audiences
- Continue to develop or revise NPS manuals, practices, standards, guidelines, etc., to enhance E&O delivery and AML reclamation leadership
- Partner with various entities to increase the number of Qualified Credentialed Professionals to enhance delivery of programs and services

- Continue to facilitate the delivery of NPS pollution control training, technology transfer, and technical assistance using various venues; including but not limited to the Annual Alabama NPS Conference, Alabama Clean Water Partnership, CZARA, and BMP demonstrations, tours, roundtables, websites, desktop tools, etc. relative to resource extraction and pollutant load reductions.
- Use available EPA resources to increase the public and private sectors' resource extraction/ecological impact knowledge and awareness
- Develop and implement protocols to scientifically quantify private sector interests, perceptions, and responses
- Implement E&O activities designed to best prevent, compensate, ameliorate or adapt to climate change impacts
- Integrate the E&O resources of a variety of federal, state, and local agencies and programs to enhance NPS programmatic goals and objectives (e.g. communication, collaboration, coordination, and cooperation)
- Incorporate various presentation formats to achieve broad based outreach (e.g. newspaper articles, magazines, television, radio, websites, signage, videos, posters/displays, fact sheets, newsletters, brochures, conferences, meetings, seminars, training, tours, advisory committees, work groups, etc)
- Develop and distribute NPS pollutant load reduction / water quality protection and restoration project success stories relative to partial or full mitigation of resource extraction threats and problems
- Characterize the ecological and economic benefits, capabilities, and performance of traditional, innovative or unique NPS water quality protection and restoration approaches (structural or non-structural) at the watershed or project-specific scope and scale. Compile successful results as adaptable Alabama-specific case studies, guides, and decision-making tools.
- Recognize exemplary public and private sector water quality protection and restoration / resource extraction / reclamation activities (e.g., recognition awards and incentives)
- Enhance minority, low income, and/or non-English speaking stakeholder resources and outreach efforts

Strategy D.5: Develop and Sustain Public and Private Sector NPS Pollution Management Partnerships

Action Item D.5.1 Continue to improve coordination with resource agencies, private sector interests, and citizen groups at the statewide, watershed-based and community levels:

- Integrate and align resource programs and project implementation plans to make the best use of limited NPS resources (i.e., prevent, compensate, mitigate, and adapt to both potential threats and real problems)
- Clearly articulate NPS programmatic goals and continue to develop mechanisms and implement projects to achieve them
- Engage the public and private sector through regular outreach meetings and incentives
- Ensure that all NPS mitigation resources targets a prioritized and measurable water quality protection and restoration outcome
- Engage NPS partners early-on in the AML restoration planning phase to help build long-term trust
- Align AML reclamation benefits to address under-served communities and individuals
- Facilitate the development and use of institutional decision-making tools to address personal and corporate NPS pollution producing behaviors and to prevent future water quality degradation impacts and problems
- Partner with academic institutions to educate and train knowledgeable AML reclamation practitioners
- Partner with voluntary citizen water quality monitoring groups, who have developed EPA-approved quality assurance and control monitoring protocols, to identify NPS pollution threats, prioritize sites, and to focus BMP implementation
- Partner with multiple stakeholders to develop and implement a 9-key element watershed management plan (e.g. EPA Section 319 grant guidelines) to holistically address AML challenges on a 12-HUC watershed level whenever feasible and practicable
- Balance NPS program staffing, partnership resources, and BMP planning and implementation approaches to deliver measurable AML water quality protection and restoration results and more protective, resilient, and sustainable private and community-based environmental, economic and quality-of-life benefits
- Collaborate with Federal and state agencies acting or preparing to act on potential environmental, economic, and public health/humanitarian risks posed by climate change
- Develop and update applicable Memorandums of Agreement and Memorandums of Understanding
- Conduct surveys and interviews to assess citizen NPS knowledge, awareness and attitudes relative to resource extraction issues and water quality protection and restoration

- Advance AML restoration efforts to protect and restore waters of the state from NPS pollution through community engagement based upon sound scientific processes, principles, research and technologies
- Develop and enhance voluntary NPS management strategies and techniques depending on the unique character, perspectives, needs, and requests of landowners and the mining community

Strategy D.6 Target Specific Programmatic Goals and Objectives of the Alabama NPS Management Program

Action Item D.6.1 As resources allows and to the maximum extent feasible and practicable, leverage Section 319 resources to protect and restore water quality and maintain beneficial uses of state waters:

- Continue to coordinate, cooperate, communicate, and collaborate with Federal and state resource agency and local community partners and their associated projects and programs to protect and restore surface waters and groundwaters (e.g. Alabama Clean Water Partnership, advisory groups, citizen groups, landowners, etc.)
- Continue to leverage NPS resources of federal programs on a national, regional, interstate, state, river basin or other geographically defined hydrologic unit to holistically address resource extraction threats and impacts
- Continue to cooperatively identify and prioritize waters threatened by resource extraction activities and in need of restoration (e.g. TMDLs, drinking water supplies /source water protection, wetlands, etc.) as well as priority unimpaired waters for protection (e.g., Outstanding Natural Resource Waters, Outstanding Alabama Waters, Treasured Alabama Lake, etc.)
- Continue to refine processes used to assign and progressively address BMP planning, design, implementation, and maintenance priorities
- Continue to examine new and innovative ways to increase public awareness by demonstrating effective planning, design, and implementation approaches that promote partnerships, cooperation and resource leveraging
- Continue to develop Alabama-specific environmental monitoring and data reporting protocols to characterize the performance of resource extraction measures and practices to control NPS pollution
- Develop and maintain a comprehensive clearinghouse and website/database for Alabama-specific BMP information; particularly field scale design, performance, and cost-comparison data
- Develop and implement resource extraction components of an EPA-defined 9-key element watershed-based management plans (as practicable and as resources allow) to address AML runoff
- Continue to periodically (minimum every 5 years) revise resource extraction category Strategies and Action Items as necessary to reflect progress or problems encountered in achieving AL NPS Management Program goals and objectives
- Continue to adopt iterative, adaptive NPS management approaches to meet and maintain state water quality standards and water quality benefits as expeditiously as practicable
- Continue to incorporate a variety of formal and informal mechanisms to sustain partnerships (e.g. memorandum of agreement, letters of support, cooperative projects, leveraged funds, meetings to share information and ideas)
- Continue to ensure that the goals and objectives AL NPS Management Program are well integrated with the economic stability and social and cultural goals at the state, county, and local community levels
- Continue to make strong sustained efforts to coordinate, integrate and leverage the resources of ADEM programs for eligible NPS management program activities
- Continue to review, update and achieve applicable resource extraction category annual milestones of the AL NPS Management Program and communicate those efforts in annual reports and the EPA-GRTS database as applicable