

Chapter 9: The Minerals Industry Can Enhance Biodiversity

Differing levels of understanding biodiversity issues result in a range of concerns for conserving biodiversity and minimizing negative human impacts. Most people have an inherent concern for the environment and some degree of knowledge of the impacts of living in a heavily degraded or polluted area. Few people have absolutely no concern for the environment or wildlife and would go to any degree of degradation to make a profit. However, many people do not have a good understanding of Oklahoma's biodiversity and how a small negative action that appears to be insignificant may be magnified throughout the natural community and ecosystem. Much of the controversy over maintaining a clean environment and conserving biodiversity stems from a lack of understanding about natural community functions and how easily they are degraded.

During recent decades, the American public has become increasingly concerned with the loss of natural communities and species. A variety of environmental groups has publicized examples of habitat destruction and pollution. Individuals or companies that severely degrade the environment cast shadows on industry as a whole as polluters and destroyers of habitat. Government regulations enacted to reduce the occurrence of such abusive situations are perceived as meddlesome and extreme. Much of this has resulted in a series of groups that have become polarized in their views and tolerate very little movement toward a workable solution.

Increasing public concern about the size of government have been expressed and ways to reduce the number of employees and taxes are being explored. At the same time, the public continues to want a clean environment and healthy ecosystems. Because governmental regulations have been the traditional mechanism for conserving biodiversity and the environment, these goals appear to be mutually exclusive.

While the traditional method of conserving an

important natural community has been for a governmental agency to purchase the land and manage it as a wildlife refuge, the theory that these areas could be managed as islands of biodiversity has, in most cases, proven false. Changes in the land matrix surrounding these islands have significant impacts on the natural communities occurring within the boundaries. Species have disappeared from many of these public areas. Demands for multiple use of public lands (e.g., mining, timber production, grazing, recreation) may increase the stress on these areas.

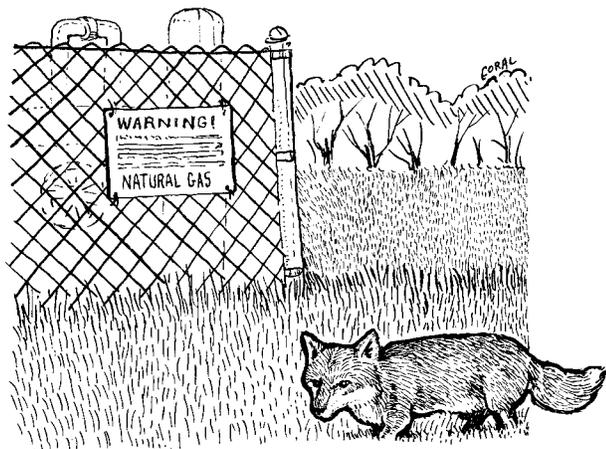
All of these factors point out that if Oklahoma is to conserve the biodiversity that makes it unique, all Oklahomans must recognize their responsibility to conserve biodiversity within their activities. Oklahomans must find ways to incorporate biodiversity concerns with our economic and recreational activities so that they may complement, rather than oppose, one another. Polarized stances must be relaxed so that workable solutions may be found and implemented. Because 95 percent of Oklahoma is in private ownership, conservation efforts must work with private landowners to find ways they can successfully manage biodiversity. If the movement toward less government continues, it will be increasingly important for individuals and companies to implement measures that complement biodiversity on a voluntary basis.

Although the importance of biodiversity to the minerals industry may not be as obvious as it is to some other fields, mineral producers have a number of reasons to maintain high levels of biodiversity. Due to past abuses of the environment by some irresponsible operators, mining and petroleum producers have experienced a lowered public image. Many people view these industries as entirely destructive to the environment. However, by integrating various measures that incorporate biodiversity conservation into these vital industries, this public image may be enhanced. Examples where natural communities are

restored or used in an operation may be publicized to emphasize that economic profitability and biodiversity may act in concert. As companies include biodiversity concerns in their operations during planning, implementation and rehabilitation phases, public perception and support for the industry will increase.

Proper planning of an operation is very important in determining the ultimate impact on biodiversity. Ideally, an initial survey of the biodiversity in the area may be used to highlight the location for the project most suitable to minimize its impact. An understanding of potential impacts on the natural community will enable the planner to identify alternative production activities. The planner may wish to determine which areas would be impacted least and would be the easiest to restore. Production activities could be concentrated in those areas.

Natural communities may directly benefit the producer by performing needed functions. Diverse



Using native shrubs and grasslands can enhance mineral operations and local biodiversity.

areas are generally more stable than monocultures during adverse environmental conditions. After being established, a diverse native vegetative community will provide more reliable erosion control during droughts or floods with fewer costs for pesticides, fertilizer and water. An adjacent buffer zone of vegetation may slow the spread of a spill and lower its impact on aquatic communities, also lowering the cost of cleanup.

Vegetation also may be used to trap dust, reduce noise, collect sediment and other materials in runoff water, and provide windbreaks to reduce wind erosion and drifting snow.

Restoration costs may be lower in areas of high diversity than in monocultures, since populations of plant species surrounding the site may naturally recolonize the disturbed area. Generally, once an area has been disturbed it may be more difficult to return it to its original productivity, especially if it was supporting an agricultural crop. Location of projects on the fringe of such monocultures, rather than in a more interior site, has benefits for biodiversity. Such a location could be more readily restored to a diverse plant community. These sites would promote increased biodiversity and would not interfere or detract significantly from continued management of the remaining agricultural field.

Native species present in surrounding areas will often voluntarily establish themselves on a disturbed area. In these instances, opportunistic native plants require only minimal encouragement to become established on the disturbed site and begin the vegetative restoration of the site.

Environmental regulations on minerals production were enacted to remedy and prevent problems, the difficulty of working within these regulations may decline as biodiversity improves within the state and nation. Improved biodiversity management and restoration will slow or reverse declines in species populations, resulting in fewer species being listed as threatened or endangered and aid the recovery of those currently listed. As natural communities are restored, it should become less complicated to comply with regulations and permit requirements.

As companies and landowners better understand biodiversity concerns, they will be more willing to work to find solutions and comply with regulatory or permit processes. People will become aware of the concept of biodiversity and will begin to grasp how it is important to them as individuals, companies and a society. With this knowledge it will not seem as burdensome to them to plan to accommodate ways to improve biodiversity through their everyday actions. They will be more willing to design workable solutions to meld biodiversity and economic concerns. An

understanding of, and commitment to improving, the biodiversity of Oklahoma will benefit both the economy and the environment.

The Minerals Industry Addresses Biodiversity

Initial Planning

Many adverse impacts of mining or petroleum production may be eliminated or reduced if the project is properly planned. If potential impacts and solutions are identified before the project is implemented, the final condition of the site will be much better than if problems are addressed only as they arise or become serious. Identifying ways to minimize disturbed areas and retain important habitats reduces the impact from the outset. Identifying sensitive natural communities, such as streams and wetlands, helps planners and operators locate impacted sites away from these areas to protect their integrity.

Extracting minerals impacts land and biodiversity, whether it takes the form of constructing an oil or gas well location or a surface-mining operation. However, certain long-range benefits are possible with the inclusion of a few ideas during the planning stage of these varied projects. By coordinating with governmental agencies, such as the Oklahoma Department of Wildlife Conservation, the Oklahoma Natural Heritage Inventory, the Natural Resources Conservation Service, and local communities, both short- and long-range economic and biodiversity conservation objectives can be achieved. All efforts to educate the community, landowners and employees about conservation needs, through open houses and plant or site tours, lead to a more thorough understanding of what the company is trying to accomplish. With this understanding, future plans may be generated using talents and ideas of individuals who might otherwise be indifferent to these projects.

Reclamation Planning

Because of reclamation efforts, mineral extraction today normally does not cause as severe long-lasting effects as it did in the past. However, due to better equipment, minerals now can be extracted from larger

areas. Careful planning of the final nature of the site's condition is very important in minimizing permanent natural resource impacts of the operation. Creating detailed reclamation designs before the project begins will provide a clear direction for mining activities and help ensure appropriate reclamation. Although the potential to provide significant benefits to biodiversity and wildlife conservation through restoration is greater for operations that involve large amounts of land, even small areas may provide resource benefits if properly planned and located.

The manner in which a company plans and performs reclamation has a great impact on the biological community. Thorough planning should seek to identify the level of sensitivity of a particular construction area and establish attainable and cost-effective objectives for restoration of the land after the completion of activities. For restoring biodiversity, the goal of final reclamation should be to restore the area to a diverse, natural community characteristic of the region while still satisfying all regulations. For mineral operations in agricultural fields or other areas where natural communities have already been degraded or replaced, companies may create a net gain in biodiversity by restoring healthier natural communities than were there before the operation began.

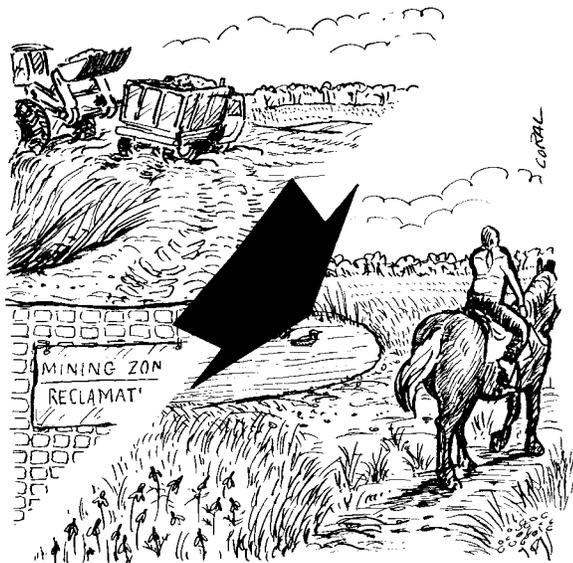
Planting a variety of native plant species, rather than introduced species or a monoculture of native species, provides more diverse biological communities following restoration. While some of these species will naturally re-colonize the restored site from surrounding areas, others may have to be planted to prevent erosion problems while the area recovers. During ditching or excavation operations, a company may opt to segregate the overburden (soil removed to reach the desired mineral), keeping the topsoil separate. This will preserve the natural seed bank present in the topsoil so native vegetation will recolonize the site more quickly and thus lower costs of purchasing seed or plants for the area.

Preplanning may require design modifications for roads, terraces, berms, drainage ditches and drilling or mining sites to avoid sensitive areas and minimize erosion. Creative contouring of land and establishment of habitat to create corridors linking similar communities, both on-site and in surrounding areas, allow plants and animals to travel among areas of

suitable habitat and begin using the reclaimed site sooner. For example, linking restored forests with those on surrounding lands will permit woodland species present in surrounding forests to recolonize the reclamation site. This will allow restored woodlands to become diverse much more rapidly.

In some cases, it is possible to backfill sites concurrent with removal of overburden from new areas. By using the overburden being removed to backfill the previous site, the first site will be reclaimed sooner than it might have been otherwise. This also eliminates the expense of having to handle the overburden twice, once during removal and again during backfill.

Some large projects may require the purchase of conservation land elsewhere for the purpose of replacing a wetland that will be impacted by the construction. On projects that impact large areas, companies are encouraged to consider tapping the resources of the state's extension offices for consultation and advice as to cost-effective alternatives for site reclamation or a state forester for tree-planting assistance.



Using a variety of native plants in reclamation efforts helps restore a mine site's biodiversity.

Minimize Contact with Oil and Related Substances

Because pipelines and oil or saltwater tank batteries contain substances that are harmful to biological resources, precautions are taken to prevent the release of these substances into the environment. In this regard, both the state and the pipeline companies are urged to support the state's One Call system, known as Okie One-Call (1-800-ONE-CALL). Individuals or companies planning to dig in an area should call this number to avoid breaking any pipelines.

Pipeline and oil producers should alert landowners about detecting leaks or spills so the company can stop the leak as soon as possible. Pipeline companies also are encouraged to distribute information to people living in close proximity to underground lines, such as how to detect leaks and what number to dial in an emergency. Some companies even offer rewards for persons alerting them to leaks as long as the individual didn't cause the leak. Policies which facilitate immediate and complete cleanup of spills help contain damage.

Waterfowl, shorebirds, herons, egrets and other birds are attracted to saltwater pits or open tanks, viewing them as wetlands or ponds. Not only is the saltwater extremely toxic to the birds, but any oil slick on the water coats the birds' feathers and causes them to drown or lose their insulatory properties. Erecting a cover of netting over these pits and tanks prevents mortality of birds attempting to land in them.

The Oklahoma Corporation Commission has a number of Best Management Practices (BMP's) that it recommends operators implement. These practices help ensure operations impact local areas as little as possible.

Support of Conservation Programs

The Oklahoma Legislature created an oil industry education and environmental restoration program in 1992. This program is the first of its kind in the nation, where private industry--oil-producing companies and royalty owners--contribute to a voluntary fund administered by a quasi-governmental agency, the Oklahoma Energy Resources Board. Funds for this program are used to clean and restore orphaned well sites (i.e., sites for which responsible parties

cannot be located). These are sites that have been abandoned in a condition where biological resources have been damaged or degraded by some degree of pollution or erosion. Because the responsible parties cannot be found, the sites restored by this oil industry-funded program would otherwise remain in a degraded state unless or until the Corporation Commission or another governmental agency acquired sufficient public funds for remediation.

Several of Oklahoma's mining and oil industries are major contributors to conservation efforts. Whether purchasing land for conservation purposes or producing educational materials, various companies support both private and governmental organizations in a variety of projects that directly benefit Oklahoma's biodiversity. As an example, a major pipeline company in Oklahoma donated surplus lands to The Nature Conservancy for resale to help purchase the Tallgrass Prairie Preserve. Another major energy company has provided funds for acquisition and management of playa lake habitat. Pipeline companies routinely donate used pipe for use as water control structures for wetland restoration projects.

Ways The Minerals Industry Can Improve Biodiversity Management

Incentives

Because much of the publicity given to minerals operations regarding biodiversity conservation and the environment focuses on examples where a company has degraded an area, a certain amount of hostility has developed among producers toward environmental needs. To many companies, the public's attitude appears to focus only on negative examples and overlooks companies that consider biodiversity concerns. Some system of public recognition should be developed to recognize Oklahoma minerals companies that do an outstanding job of integrating biodiversity management into their operations. The companies selected for the award should receive positive publicity throughout the state so the public can appreciate their efforts. Award recipients should present their techniques for integrating biodiversity

concerns to other companies in their field. By acknowledging good management through recognition and publicity, we can present positive attitudes toward environmental stewardship as something that also benefits operations.

Other incentives should be developed to provide economic benefits for good stewardship. Currently, regulations and the potential threat of fines for poor management provide only negative incentives. Some type of monetary reward for companies that surpass regulatory requirements would encourage companies to experiment with new ways to address biodiversity conservation needs. Possible incentives include tax credits, direct monetary payments and cost-share programs for conducting special biodiversity projects.

Regulatory Issues

Mineral operations, especially those dealing with oil production or transportation, must be prepared for the cleanup of polluting spills. One problem these companies face when attempting to contain or clean a spill is gaining access to affected private lands. Such delays postpone actions to stop or clean the flow of the pollutant, resulting in more severe spill impacts. Some landowners deny companies access to cleanup after an event and ask for monetary compensation rather than remediation or restoration of the affected biological resource. Because monetary compensation may never restore the biodiversity impacted by the spill, biodiversity is lowered as a result of the mineral operation. If these areas remain polluted, they lend credence to the image that the oil industry is a major polluter. Producers need the authority to enter private property to cleanup and restore or mitigate damages before monetary compensation is given to the landowner. This not only will improve the image of the operator, but also will improve the biodiversity that would otherwise be lost.

Although specific regulations are needed in some cases (e.g., no discharge of pollutants, safety considerations, complete spill cleanup), some regulations are so inflexible as to discourage companies from practicing measures that would benefit biodiversity, even though many of these regulations were enacted to protect biodiversity. For example, wetlands could be created during a number of operation practices and could even be used to

perform valuable functions for the company. Wetlands could be used to filter runoff water or trap materials in tailing ponds for subsequent recovery. However, once these wetlands are created, regulations control activities within them and might restrict future modification of them. In cases where the wetlands are constructed to recover tailings, regulations prohibiting the recovery of those minerals defeat the original purpose of creating them. This discourages companies from creating wetlands that would provide, at the minimum, temporary benefits to biodiversity. Increased flexibility, however, should not include “natural” or previously existing wetlands.

An example of a regulation where increased latitude would encourage restoration of biodiversity is the rule of 90 percent vegetative cover within five years for bond release to coal-mining operations. Because native communities usually require more than five years to become established and some native communities never achieve 90 percent vegetative cover, this regulation encourages companies to plant monocultures of exotic species, such as Bermuda grass and fescue, because they are easily established and respond well to fertilizer. Companies attempting to restore a site to natural communities may be unable to gain release of their bond. Increased latitude in this federal requirement should be given to companies making legitimate efforts to restore healthy native communities. Special bond-release schedules could be developed for operations establishing native species on reclaimed sites. Cover requirements could be adjusted for various natural communities to reflect healthy structure of the targeted community. Of course, incentives such as tax credits, rebates and cost-share programs for restoring diverse communities, linked with the increased flexibility of regulations, would further encourage use of native species in reclamation.

Great care should be taken to ensure that regulations are enforced equally among companies, both large and small. Enforcement actions or fines should not be targeted only against large companies that have substantial financial resources. Small operations should not be allowed to “get away” with violations simply because they “may not be able to afford to do it properly.” Any amount of unequal enforcement creates resentment among all operations

when they see neighbors or competitors escaping fines for similar violations.

Physical Practices

One of the serious impacts of mineral extraction is soil erosion associated with the operation. Not only does erosion remove topsoil that is necessary for terrestrial communities; it also increases the sediment load in streams and lowers the diversity of aquatic communities. Early implementation of erosion controls is imperative, since erosion is much more difficult to control or reverse once the process has begun.

A large range of erosion-control practices is available to operators. Maintaining vegetated buffer areas slows runoff waters and filters out sediment. In cases where a mix of native plant species is used, these buffer strips can benefit biodiversity as well. Stands of cattails can be used to filter water before it enters a stream, pond or reservoir. Rip-rap may be used where the likelihood of bank erosion is very high. Terracing the area to slow run-off and trap moving topsoil can be very effective. Once terraces are built, the areas between the terraces will eventually fill with soil, ultimately producing a gently sloping landscape.

Hay bales are commonly used to slow water entering drainage areas and retain soil. Bales produced from native grasslands not only provide erosion controls but also distribute seeds of the native species comprising the bales. These bales may provide benefits in revegetating the site as well as controlling erosion until the vegetation is well established.

Berms and rows of trees can be useful for reducing noise, dust and water pollution along roads. Heavy loads of dust are believed to reduce the ability of plants to convert sunlight into useable energy, thereby limiting their ability to grow or survive. Rows of trees or shrubs could collect dust near the gravel roads, preventing it from coating plants farther away. If appropriate native species are used in these strips, they also could provide biodiversity benefits by increasing cover for wildlife species.

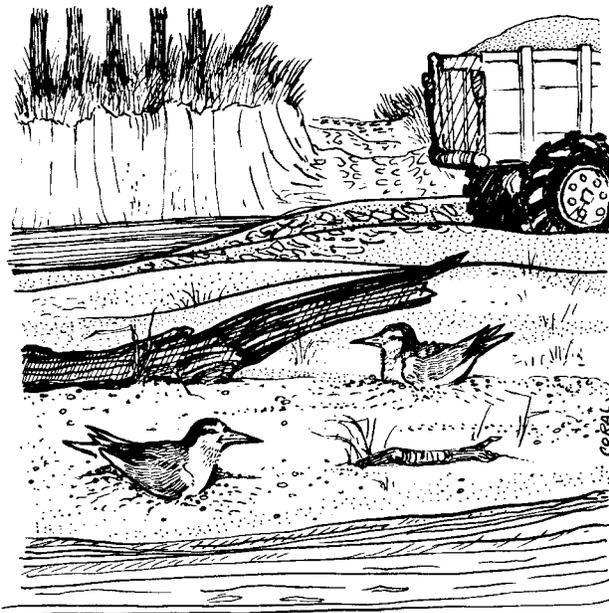
Planning

Currently, many operation plans are geared toward

reclamation or mitigation of the site after the minerals have been extracted. However, reclaimed sites take a great amount of time to recover to the diversity of an undisturbed site. The primary emphasis of these plans should be to avoid and minimize any environmental damage incurred during the project, as well as evaluation and description of reclamation measures to be implemented. Important sensitive areas would then be preserved and subsequent reclamation would be much simpler.

Careful practices while handling fuels and other substances will prevent spilling them. While fueling vehicles, stopping when the pump first cuts off avoids the overflow of fuel that commonly occurs while attempting to “top-off” the fuel tank. Special safeguards can be installed at refueling points for all

features that are hazardous to wildlife species. Using blinking lights (white is preferable to red) reduces the number of night-flying birds attracted to towers and



Proper planning can minimize impacts on sensitive species, such as the endangered least tern.

of the company’s vehicles. This prevents potential spills in unprotected areas around scattered fuel tanks. Spill prevention and response plans should be in place for aboveground fuel tanks.

Various other actions can be taken by the minerals industry to protect and conserve Oklahoma’s biodiversity. In some circumstances, an operation may hold little or no potential to enhance local biodiversity. However, the facility may include some

structures, thereby lowering the number of collision casualties. Placing conical covers over the tops of heater towers or stacks prevents bats and migratory birds from entering, nesting or perching on them and then dying when the heater is turned on. Netting saltwater pits or storage tanks prevents birds from dying in them.

Educating

Mitigation Banking

In some cases, negative impacts to biodiversity are simply unavoidable. Whether in design of the project or in the event of an unplanned occurrence, some degree of degradation of biodiversity will occur in some operations. One method of dealing with this is to create or restore natural communities on a large block of land and use this as a “bank” of biodiversity to mitigate for unavoidable impacts in projects nearby. This is called mitigation banking. Although some “banks” consist of purchasing already existing communities and protecting them, a net loss in overall biodiversity still occurs. Therefore, creation or restoration of a community being impacted is a preferred approach because new areas are present to compensate for those destroyed.

Due to regulations that control activities affecting wetlands, most mitigation banking efforts have been directed toward these habitats. However, this concept could be expanded to other natural communities, whether regulations are involved or not. Companies could voluntarily develop and manage natural areas. An alternative to a company’s managing a natural area is for it to provide funding for an individual or organization to develop and manage the area specifically for their “bank.” Impacts on similar natural communities within the region could then be “subtracted” from the “credit” acreage in the natural area. When the credits are used up, additional areas or acreage could be restored. This would provide significant benefits for biodiversity, since large blocks are more valuable than many scattered parcels. Properly managed and publicized, these banks could provide many benefits for the company by building public support for its efforts.

Information and Education

A very important part of any project is dissemination of information to its target audience.

the public, corporations and others about how they can incorporate biodiversity management into their practices is vital.

Companies can provide summer projects for children or other students interested in the minerals field or biodiversity conservation. Volunteer groups, such as Boy Scouts, or individuals could assist the company in restoring or enhancing biodiversity, providing valuable hands-on experience to these children.

College students, especially graduate students, may be useful for developing plans for specific projects. Many of these students are looking for opportunities to gain practical experience and could design detailed project plans and reclamation schedules. Not only would this give the student valuable experience, but it also would assist the company in planning the project to have minimal impact and creating a detailed reclamation plan.

Various trade associations of minerals companies should actively promote the incorporation of biodiversity conservation into industry practices. Many of these associations have a variety of forums, such as conferences, meetings and newsletters, that could effectively spread the word about projects and methods that successfully account for biodiversity needs. Trade associations could recognize companies by presenting awards for good management, as mentioned earlier. This would improve biodiversity conservation within the industry, and also give a favorable public image of Oklahoma's mineral producers.

Miscellaneous

One indirect way to reduce negative impacts to Oklahoma's biodiversity would be to use reclaimed areas for urban developments when projects occur near towns. This may reduce the pressure to build housing developments in undisturbed areas. By using the already disturbed land of newly completed mineral operations for housing developments, areas that would otherwise be cleared and built-up would be spared.

Roadbuilding can have significant impacts on biodiversity. Not only do roads and their construction contribute to erosion and stream sedimentation, they also contribute to the fragmentation of natural

communities. Mining operations and oil producers should minimize the mileage of roads by using existing infrastructure as much as possible. Where roads are constructed, companies should use BMPs similar to those used in forestry to minimize erosion. Currently, companies face many barriers to using roads or access points constructed by another producer. This may result in several separate roads leading to drill sites or production areas that are close together. Economic avenues to encourage companies to share roads or access points and to encourage landowners to minimize the number of roads built should be explored and implemented.

Some wildlife behaviors can be manipulated to achieve specific project goals. For example, an Oklahoma mining company narrowed a drainage ditch to attract beavers to build a dam in the narrowed channel and flood an area to trap sediment and reduce erosion. This also might attract them away from areas where their activities cause problems.

One problem associated with waste disposal and recycling is that suitable locations for leaving items for recycling or for disposing of hazardous wastes or pollutants are not readily available. Disposal sites for saltwater and drilling mud from oil projects are widely scattered. Because of the difficulty in transporting these substances to approved sites, some operators dump them illegally. Additional disposal or collection locations should be developed. Creating a more extensive network of disposal facilities for oil production wastes would save producers the cost of transporting the substances to more distant facilities. Building such a network might be a good business opportunity for private entrepreneurs. If these facilities were more readily available, illegal dumping might decrease.

Outreach

An important aspect of enhancing biodiversity conservation is getting more individuals and companies involved. To do this, they must be informed about biodiversity and ways they can contribute to its conservation.

All mining operations (e.g., coal, gypsum, clay and

aggregate), sand and gravel yards (including county yards), petroleum producers and transporters, stone quarries and salt producers should be informed about biodiversity and ways they can include its conservation in their operations.

Regulatory and other governmental agencies are important avenues for reaching the minerals industry. Inspectors regularly meet with operators and could talk with them about these recommendations. Information could be printed and distributed in permit packages for new operations or projects. Information targeting a specific segment of the industry could be sent through direct mailings.

Trade and training organizations also provide a valuable conduit for information transfer. The Oklahoma Mining Training Institute could incorporate some of these recommendations into their training and include articles about biodiversity and conservation techniques in their monthly newsletter. Other professional organizations, such as the Associated General Contractors, could distribute information to their members and include this topic in their meetings or conferences.

A regular annual or biennial conference or workshop should be conducted to allow members of the minerals industry to share experiences about how they include biodiversity considerations in their operations. Although similar trade conferences occur nationally, there are no forums held in Oklahoma. Biodiversity information also could be incorporated into the annual safety training conference conducted by the Oklahoma Mining Training Institute, based at Eastern Oklahoma State College.

Summary

The primary ways the minerals industry can enhance Oklahoma's biodiversity is through planning and reclamation. Proper planning should allow the operation to avoid or protect sensitive natural communities and minimize the effects of extracting or transporting the mineral resource. After production is complete, biodiversity needs should be considered during reclamation of the site. To the greatest extent possible, native plants should be used to establish natural communities characteristic to the ecoregion, although landowner wishes may limit this. The recommendations made in this document demonstrate ways individuals and companies can enhance biodiversity in conjunction with their activities. These are simply recommendations for operators to implement on a voluntary basis. Many of them are relatively simple and require little capital expenditure. Not every recommendation will be suitable for every single operation or circumstance, but most operations could incorporate some of them. This project is a non-regulatory attempt to enhance Oklahoma's biodiversity in a proactive manner as a way to preclude future additional regulatory actions.