

SURFACE MINING AND WETLANDS RECLAMATION STRATEGIES¹

by

Ronnie J. Haynes²

Abstract. Surface mining of wetlands to recover coal or other minerals may result in significant long-term environmental impacts unless adequate mitigation can be achieved through the reclamation process. Mitigation of impacts includes (1) avoidance, (2) minimization, (3) reduction or elimination over time, and (4) compensation. Existing regulatory controls usually promote close scrutiny of potential environmental damages to wetlands. Development of a comprehensive wetlands reclamation plan is essential, and should include an acceptable wetland evaluation system. All known functions and values of specific wetland types should be considered. Initial emphasis should be on avoidance of non-essential or non-water dependent activities in wetlands. Non-wetland alternatives for activities such as road construction and waste disposal are usually considered to be less damaging. Reclamation strategies for replacing affected wetlands typically involve either replacement in-kind or out-of-kind, depending upon reclamation goals, wetland functions and values to be replaced, and an evaluation of the benefits and losses for each approach. Guidance is needed regarding the technical and applied aspects of wetlands determination and reestablishment. Restoration of specific wetland types should be viewed as still in the applied experimental stage.

Additional Key Words: mitigation, restoration, reestablishment.

Introduction and Background

Surface mining in wetlands to recover coal or other minerals may result in significant long-term environmental damage unless adequate mitigation can be achieved through the

reclamation process. Probably the most widely used and accepted definition of mitigation is that provided by the President's Council on Environmental Quality (CEQ) in the National Environmental Policy Act regulations (43 FR 55978-56007). These regulations define mitigation to include: (a) avoiding the impact; (b) minimizing the impact; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time; and (e) compensating for the impact by replacing or providing substitute resources. These elements of the definition represent a logical sequence of steps in the mitigation planning process (U.S. Fish and Wildlife Service 1981).

¹Paper presented at the 1986 National Meeting of the American Society for Surface Mining and Reclamation, Jackson, Mississippi, March 17-20, 1986. The views presented in this paper represent those of the author and do not necessarily reflect those of the U.S. Fish and Wildlife Service.

²Dr. Ronnie J. Haynes, Coal/Minerals Specialist, U.S. Fish and Wildlife Service, Atlanta, Georgia 30303.

Proceedings America Society of Mining and Reclamation, 1986 pp 209-214

DOI: 10.21000/JASMR86010209

Some operators may question why impacts to or losses of wetlands are perceived to be of any special concern. In fact, in the not too distant past, wetlands were often considered to be worthless swamps and breeding grounds for mosquitos that could transmit diseases to humans. To make a long story short, there has been a significant change in attitudes toward the functions and values of wetlands, coupled with the realization that the nation's wetlands have been and are continuing to disappear at an alarming rate. Thus, today it is much more clearly recognized that wetlands in general provide many important functions and values including flood and water quality control and protection; erosion control; recharge of aquifers; nutrient cycling; habitat for fish and wildlife, recreational, scenic; and aesthetic resources; and contribute to the production of agricultural products and timber (Barton 1985, Sather and Smith 1984, U.S. Congress 1984).

On the other hand, less than 46 percent of the nation's original 215 million acres of wetlands remain today. For certain types of wetlands such as the bottomland hardwood forests and marshes of the southeastern United States, losses have been even more severe (80 percent of the original forested wetlands have been lost and 25 percent of the remainder may be lost by 1995). Losses have been continuing at a rate of from 300,000 to 458,000 acres per year (Barton 1985, Hefner and Brown 1985, Harris et al. 1984, Tiner 1984).

Over a period of time a national philosophy has seemingly been developing that says in general: wetlands are of exceptional public value and should be carefully conserved. This message was clearly conveyed by President Carter in his statement for implementing Executive Order 1190 (Protection of Wetlands) (Federal Register 1977), and more recently by conservative states' righter James J. Kilpatrick (1985): "The disappearance of American wetlands is a national problem, involving damage to environmental systems that leap across state lines. The wetlands are vital not only to ducks, but to mankind as well for they play a significant role in controlling floods and diminishing pollution."

Emphasis herein on wetland values and the magnitude of wetland losses was not intended to imply that surface mining should not or could not occur in wetlands, or that surface mining has been responsible for a large share of the nation's wetland losses. In fact, all types of surface mining have probably accounted for less than 1 percent of the nation's wetland loss; the majority of this loss (80 percent) has been attributed to draining and clearing wetlands for agricultural purposes (Tiner 1984).

The important point to be made here is that mining operators should expect a careful evaluation by regulatory authorities of any proposed surface mining in wetlands before mining is approved; and, in some cases where an acceptable mitigation cannot be achieved, approval may be denied or significantly modified.

Close scrutiny of surface mining impacts to wetlands is further promoted by various local, State, and Federal regulations and controls (See Kusler and Hamann 1985) for which a discussion is outside the scope of this paper. However, with regard to the protection of wetlands through direct or indirect Federal influence, the following Acts and their associated regulations are of major significance:

- (1) The Rivers and Harbors Act of 1899 -- e.g., Section 10 requires that a permit be obtained from the U.S. Army Corps of Engineers (Corps) for certain construction, dredging, or disposal of dredged material or other modification of navigable waters (Barton 1985, Goldfarb 1984, U.S. Congress 1984);
- (2) Federal Water Pollution Control Act Amendments of 1972 and the 1977 Amendments, Known as Clean Water Act -- e.g., Section 404 requires anyone discharging dredged or fill materials into waters of the United States to obtain a permit from the Corps, unless the activity has been previously authorized under the special category of a general permit. Section 404(b)(1) provides guidelines and environmental standards promulgated by the U.S. Environmental Protection Agency (EPA). Section 402 authorizes the EPA to issue permits under the procedures established to implement the National Pollutant Discharge Elimination System (NPDES) (Barton 1985, Goldfarb 1984, U.S. Congress 1984);
- (3) Fish and Wildlife Coordination Act -- As amended in 1958, provides the basic authority for the involvement of the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and State fish and wildlife agencies throughout the planning process for federally sponsored water resource projects, including review or proposed permits under Section 404 of the Clean Water Act. Also, mandates that wildlife conservation is to receive equal consideration with other project features (Barton 1985, U.S. Congress 1984, Stutzman 1980); and
- (4) Surface Mining Control and Reclamation Act of 1977 -- This Act regulates both surface and underground mining for coal. Specific regulations are provided for the protection as well as reestablishment of wetlands and riparian areas affected by surface coal mining. Also, the Act established the concept of "lands unsuitable for surface coal mining," based on designated criteria as defined. This includes situations

where application of the "best available technology" cannot achieve adequate or acceptable reclamation of affected environments (Code of Federal Regulations 1985).

Also, depending upon the type of wetland and its importance to species of concern, other Federal Acts such as the Endangered Species Act and Migratory Bird Treaty Acts could result in modifications to proposed mining operations (Margolin 1979, U.S. Fish and Wildlife Service 1976).

Reclamation Strategies and Issues

Since mineral recovery through surface mining totally eliminates existing vegetation, land features, and associated values, at least two important issues relative to approval of mining operations in wetlands should be addressed. The first concern should focus on the merits of avoidance of impacts by prohibiting the surface mining of any "high value" wetland areas as determined by the regulatory authority to be of such importance to the public as to preclude mining. The second issue concerns the short-term and long-term nature of impacts and whether or not damages can be rectified or offset within an acceptable period of time.

In the past, the concept of determining certain lands to be unsuitable for surface mining was given little serious concern. Today, however, operators should be prepared to address this issue by clearly demonstrating that surface mining can be achieved without a permanent loss of wetlands; or, that losses can be adequately compensated. Also, as required by the water dependency test defined in the 404(b)(1) guidelines (Federal Register 1980), operators must demonstrate that there are no practical non-wetland alternatives to discharges in wetlands, especially for activities such as roads, transmission lines, and sediment ponds that are not water dependent; or, that a non-wetland alternative would be more environmentally damaging than a wetland alternative. Regulations issued by the Corps (1984) require them to deny a permit if it does not comply with the 404(b)(1) guidelines.

If an operator can overcome the avoidance hurdle by convincing decisionmakers that no practical alternative exists and that any damages to wetlands will be adequately mitigated, then he must be prepared to implement and carry out a carefully planned mining and reclamation plan that addresses the specific points of mitigation and compliance with regulatory environmental performance standards. Also, because of the national importance of wetlands and their declining status, operators should also expect to be required to restore specific wetland types and their known qualities and attributes using the best technology available, and should not expect to convert wetlands to other vegetation types that would result in a net loss of wetlands. Restoration of wetlands to the same type that existed prior to disturbance (in-kind replacement) may also be recommended, especially with regard to forested and estuarine wetland systems.

The decision that must be made regarding approval of mining and reclamation plans should be greatly dependent upon a wetland evaluation system. In other words, an accounting system is needed that documents the existing pre-mining wetland values and functions and compares these with the proposed and expected post-mining conditions at certain time periods following reclamation. The assessment of pre- and post-mining conditions should serve as the basis for developing and evaluating the mitigation plan.

There are a number of existing wetland evaluation systems applicable to surface mining (e.g., Kusler and Riexinger 1986, Adamus and Stockwell 1983, Dittberner et al. 1983, U.S. Fish and Wildlife Service 1980), the substance of which cannot be addressed in this paper. All such evaluation systems have certain advantages and disadvantages regarding assumptions used, degree of subjectivity, relationship of the evaluation criteria to the actual functions and values of the affected wetland, and the time and cost required to carry out the evaluation.

With the previously described concerns and limitations in mind, a potentially reasonable mining and reclamation strategy could include the designated preservation of specific wetlands determined to be of "high value" for fish and wildlife or other attributes. This situation could include important habitat for protected or other species of concern, buffer zones along streams to protect water quality and provide movement corridors for wildlife (Harris 1985, Moring et al. 1985) or other unique or irreplaceable wetlands. The preservation approach could be combined with an acceptable mining and reclamation plan for other wetlands determined to be of a "lesser value" for wildlife or other uses, and a commitment to reestablish affected wetlands. The proposed wetlands reestablishment plan should address all meaningful wetland functions, including methods to provide for the life needs of selected wildlife species and groups of species, and should carefully explain any proposed "trade-offs" in functions and values. Accordingly, the reestablishment of wetlands may be either in-kind or out-of-kind, but should be based on a rational assessment of the net gains or losses of specific values such as habitat for wildlife species of concern. Also, some of the proposed mitigation could take the form of increased management of selected wetlands; or, possibly a long-term or permanent dedication of specific wetlands for wildlife and other appropriate uses (U.S. Fish and Wildlife Service 1981).

Information Needs

There is no question that wetlands can be reestablished on mined land, or that such wetlands can be productive and useful (Brooks et al. 1985, Haynes 1984). However, perhaps the most important information need relative to wetlands reestablishment on mined land is to obtain a much more comprehensive documentation of the technological ability to reestablish specific wetland types and specific functions and values (e.g., forested wetlands and associated habitat

diversity for wildlife). In addition, such documentation needs to be of sufficient duration to allow an objective evaluation of the degree of permanence and self-regenerating ability of the reestablished wetland. To date, such documentation is lacking to the degree that wetland reestablishment technology should be viewed as still being in an applied experimental stage (Race 1985, Haynes 1984, U.S. Bureau of Land Management et al. 1983).

Other information needs that should be important to mining operators and to certain regulatory authorities include (1) synthesis of available information on specific wetland reestablishment methodologies, ongoing research activities, and wetland evaluation methods; and (2) criteria, definitions, and procedures for identifying and delineating wetlands.

The concept of wetlands reestablishment is attractive to regulators from the viewpoint of allowing mineral recovery while addressing environmental concerns. However, the danger inherent in the lack of supporting documentation concerning the technological ability to reestablish specific wetland ecosystems is that regulatory authorities may approve operations in wetlands based on inconclusive or erroneous information; whereby, these wetlands and their associated values may be lost or damaged permanently or over an extensive time period. For example, a recent paper on wetlands mitigation policies in the United States, based on past restoration projects in San Francisco Bay, California (Race 1985), noted that published information was often misleading regarding the success or potential success of projects, and the regulators were often quick to adopt or support wetlands reestablishment proposals without adequate supporting documentation.

Hopefully, mining operators, regulators, and environmental groups can all work cooperatively to objectively protect our nation's important wetland resources while optimizing mineral recovery.

Literature Cited

- Adamus, P.R. and L.T. Stockwell. 1983. A method for wetland functional assessment (2 vols.). Federal Highway Administration Reports FHWA-IP-82-23 and FHWA-IP-82-24. U.S. Department of Transportation, Federal Highway Administration, Washington, DC.
- Barton, Katherine. 1985. Wetlands preservation. p. 212-264. In Audubon Wildlife Report 1985. R. L. DiSilvestro (ed.). The National Audubon Society, NY.
- Brooks, R.P., D. E. Samuel, and J. B. Hall (eds.). 1985. Wetlands and water management on mined lands. Proceedings of a Conference (The Pennsylvania State University, October 23-24, 1985). The Pennsylvania State University, University Park, PA. 393 pp.
- Code of Federal Regulations. 1985. Mineral resources, 30. Part 700 to end. Office of Federal Register National Archives and Records Administration, Washington, DC. 603 pp.
- Dittberner, P.L., M. Schamberger, and R. J. Haynes. 1983. A reclamation planning and evaluation process based on the habitat evaluation procedures. p. 411-427. In Reclamation and the Phosphate Industry. Proceedings of the Symposium (Clearwater Beach, Florida, January 26-28, 1983). Florida Institute of Phosphate Research, Bartow, FL.
- Federal Register. 1980. Guidelines for specification of disposal sites for dredged or fill material. U.S. Environmental Protection Agency, Federal Register 45:85336 (December 24).
- Federal Register. 1977. Protection of wetlands: Executive Order 11990. Federal Register 42:26961 (May 24).
- Goldfarb, W. 1984. Water law. Butterworth Publishers, Stoneham, MA. 233 pp.
- Harris, L.D. 1985. Conservation corridors: A highway system for wildlife. ENFO (November). Florida Conservation Foundation, Inc., Winter Park, FL. 10 pp.
- Harris, L.D., R. Sullivan, and R. L. Badger. 1984. Bottomland hardwoods: Valuable, vanishing, vulnerable. University of Florida, Cooperative Extension Service, Gainesville, FL. 17 pp.
- Haynes, R.J. 1984. Summary of wetlands reestablishment on surface-mined lands in Florida. p. 357-362 In 1984 Symposium on Surface Mining, Hydrology, Sedimentology, and Reclamation (December 2-7, 1984). University of Kentucky at Lexington.
- Hafner, J.M. and J. D. Brown, 1985. Wetland trends in the southeastern United States. Journal of the Society of Wetland Scientists 4:1-11
<http://dx.doi.org/10.1007/BF03160482>
- Kilpatrick, J.J. 1985. Wetlands victory. The Capital, Wednesday, December 18, 1985. Annapolis, MD.
- Kusler, J. and R. Hamann. (eds.) 1985. Wetlands protection: Strengthening the role of the states. Proceedings of a National Symposium. University of Florida College of Law (September 19-21, 1984), Gainesville, FL 711 pp.
- Kusler, J. and Patricia Rieking (eds.). 1986. Proceedings of the National Wetland Assessment Symposium (Portland, ME, June 17-20, 1985) Assoc. of State Wetland Managers, Chester, VT 331 pp.
- Margolin, S. 1979. Liability under the migratory bird treaty act. Ecology Law Quarterly 7:989-1010.

- Moring, J.R., G. C. Garman, and D. M. Mullen. 1985. The value of riparian zones for protecting aquatic systems: General concerns and recent studies in Maine. p 315-319 In Riparian Ecosystems and Their Management: Reconciling Conflicting Uses, First North American Riparian Conference. (Tucson, AZ, April 16-18, 1985). United States Department of Agriculture, Forest Service, General Technical Report RM-120, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
- Race, Margaret S. 1985. Critique of present wetlands mitigation policies in the United States based on an analysis of past restoration projects in San Francisco Bay. Environ. Manage. 9(1):71-82.
- <http://dx.doi.org/10.1007/BF01871446>
- Sather, H.J. and R. D. Smith. 1984. An overview of major wetland functions and values. U.S. Fish and Wildlife Service (FWS/OBS-84/18), Washington, DC 68 pp.
- Stutzman, K.F. 1980. Issues in fish and wildlife planning: Water resources planning under the Fish and Wildlife Coordination Act. U.S. Fish and Wildlife Service (FWS/OBS-80/44), Washington, DC 44 pp.
- Tiner, R.W., Jr. 1984. Wetlands of the United States: Current status and recent trends. U.S. Fish and Wildlife Service, Washington, DC 59 pp.
- U.S. Army Corps of Engineers. 1984. Final regulations for controlling certain activities in waters of the United States. Federal Register 49(198): 39843-39485 (Friday, October 5, 1984).
- U.S. Bureau of Land Management, U.S. Forest Service, and U.S. Fish and Wildlife Service. 1983. Environmental assessment on state of reclamation techniques on phosphate mined lands in Florida and their application to phosphate mining in the Osceola National Forest. U.S. Department of the Interior, Bureau of Land Management, Eastern States Office, Alexandria, VA.
- U.S. Congress. 1984. Wetlands: Their use and regulation. Office of Technology Assessment, Washington, DC 208 pp.
- U.S. Fish and Wildlife Service. 1981. U.S. Fish and Wildlife Service mitigation policy. Federal Register 46(15):7644-7663 (Friday, January 23).
- U.S. Fish and Wildlife Service. 1980. Habitat evaluation procedures (HEP). U.S. Fish and Wildlife Service (ESM 102), Washington, DC.
- U.S. Fish and Wildlife Service. 1976. Selected list of Federal laws and treaties related to sport fish and wildlife. U.S. Fish and Wildlife Service, Office of Legislative Services, Washington, DC 19 pp.

