

Subsidence wetland formation and transition in the high ground water table coal mining areas¹

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Abstract: The total amount of coal production and consumption in China is keeping on the top of the world. The coal mine resources has played and still plays an important role in the economic development, however, the mining activities impacts the eco-environment severely. In the coal mining area with high water level, the problem is even more seriously, the mining activities due to the land subsidence and caused water logging, large areas of farmland and construction land merged into water, the farmers lost their farmland and houses. The land reclamation and ecological restoration has been started in China since 1980s, as food production is always essential in these areas, farmland is the first choice for the restoration. However, only 50%~70% of the subsidence arears could be reclaimed into farmland because of topsoil shortage and technical restrictions; therefore, the water area will continue to expand with the mining activities. The subsidence wetland caused by mining activities which is different with the natural wetland, which has not been defined clearly in the former research, this paper has studied its connotation and its location in the wetland classification system. According to the mining subsidence theory, the forming reasons of the topography and hydrography of the subsidence wetland and the feature of soil and vegetation have been analyzed. In addition, the mining disturb to the landscape does not happen once, but happens gradually in accordance with the mining schedule and geological situation and the subsidence wetland forms dynamically. Other anthropogenic factors of the subsidence wetland are including the reclamation, wetland restoration, and spontaneous farming activities, and the wetland transition in the coal mining areas with high ground water level is drastic. Take a coal mine site in Shandong Province as an example, this paper has examined and analyzed the dynamic patterns of wetland transition based on the high-resolution Landsat TM (Thematic Mapper) data from 1985, 1995, 2005, 2010, and 2015. The result shows that the wetland increased 210% in the study areas, mostly transited from farmland and construction land. The wetland transition can dramatically affect the eco-environment in these areas. Wetland is one of the three most important ecosystems, and considered as the lung of the earth. The new formed subsidence wetland could be a harm or benefit of the eco-environment. The mining caused subsidence wetland has changed the terrestrial ecosystem into terrestrial-aquatic ecosystem, with rational planning and proper restoration, it could alleviate mining impact to the ecosystem, enhance the ecological service function, landscape diversity and resistance ability, furthermore, optimize the social, economy and ecological benefit during the ecosystem succession in coal mining areas, and meanwhile supplement the wetland quantity in China which declined 11.46% in the recent 20 years.

Additional Key Words: reclamation; restoration; eco-environment.

¹ Oral paper presented at the 2017 National Meeting of the American Society of Mining and Reclamation, Morgantown, WV: *What's Next for Reclamation?* April 9 - 13, 2017. Published by ASMR, 1305 Weathervane Dr. Champaign, IL 61821.

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