POLICY BRIEF

DeVoe L. Moore Center
College of Social Sciences
Florida State University

ISSUE #21 MAY 2006

THE FAILURE OF WETLAND MITIGATION BANKING TO ACCOUNT FOR ECOSYSTEM SERVICES

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When a land development project involves filling of wetland areas regulated under the Clean Water Act (CWA) or similar state laws, one condition of the permit authorizing the activity often is to require mitigation for the loss of wetland functions. Permittees can accomplish this themselves directly through creation or enhancement of wetlands on the development site (onsite mitigation) or an offsite location (offsite mitigation), or by paying a fee to fund wetland mitigation by a third party conservation entity in lieu of providing direct mitigation (in-lieu fee mitigation). Wetland mitigation banking provides a third party variation on offsite mitigation by allowing the developer to compensate for the resource loss by purchasing "credits" from another landowner—the wetland banker—who has created or enhanced wetland resources elsewhere and been authorized to sell a defined quantity of credits to developers within a geographic "service area" market.

In the decade since the Corps of Engineers (Corps) and Environmental Protection Agency (EPA) officially blessed wetland mitigation banking for purposes of satisfying mitigation requirements under the Clean Water Act (CWA), the practice has fueled an ongoing debate about its pros and cons. For the most part, however, the debate has focused on the relative advantages and disadvantages of banking programs in terms of administrative efficiency and ecological impact, with little attention being paid to the effects of wetland mitigation banking *on people*.

Wetlands provide important ecosystem service values to human populations, such as flood mitigation, groundwater recharge, water filtration, and sediment capture. Some of these ecosystem services are primarily local in terms of who benefits from them. For example, research on the effects of the 2004 Asian tsunami shows that the presence of coastal wetlands significantly mitigated the nearby inland damage caused by the wave forces. Even small wetlands in urban areas, it has been demonstrated, provide important pollutant control services to the local urban population, and clusters of small isolated wetland areas provide important functions as a complex.

As a convenient form of mitigation, wetland mitigation banking facilitates moving wetland resources from one location—the development project—to a potentially distant location—the bank site. It may well be that this provides, on balance, a net ecological advantage over onsite mitigation. Even assuming that is the case, however, it seems unlikely that the same human population benefits from the ecosystem service values associated with the wetlands when wetlands mitigation banking is the mitigation method of choice. Simply put, if the wetlands move, their ecosystem services go with them. This means that some people inevitably will lose (and others will gain) the economic benefit of wetland ecosystem services when wetland mitigation banking takes hold in a region. Yet the debate over the *ecological* impacts of wetlands mitigation banking has thus far left out this potential *economic* impact as a relevant policy concern.

Indeed, there is good reason to believe that wetland mitigation banking, given its market incentive drivers, will systematically move wetland resources from urban areas to rural areas within a given bank's service area. Entrepreneurial bankers are in the business to make a profit, and thus are likely to seek the least cost land that will produce the desired stream of credits for sale. Land developers are also in their business to make a profit, and are likely to seek the least cost land in the desired development market. It is highly unlikely, however, that bankers and developers will compete for land in the same market—bankers need large tracts capable of wetland restoration, which, if they do exist in a development market area, are likely to be too pricy for the banker to compete with the developers. Wetland mitigation banking thus is likely also to asymmetrically redistribute local ecosystem service values associated with wetlands between those two land markets.

To test whether this effect is in fact experienced, we conducted the first comprehensive empirical study of the demographics of wetland mitigation banking, revealing what has long been suspected—that banking facilitates the redistribution of wetland resources from urban to rural areas, taking with them the important ecosystem service values wetlands provide to human communities. We studied Florida's wetland mitigation banking program, which has 30 banks actively selling credits, 3 that have sold all approved credits, and 10 approved for operation but not yet selling credits. The permitted banks cover over 117,000 acres and have the potential, if they meet all permit conditions, to offer over 36,000 credits for sale. The combined service areas of the permitted banks covers over half the state's land mass.

Taking the 24 banks for which adequate data were available, representing over 900 trades and a total of 4000 credits traded, we mapped each bank and its associated development projects and generated demographic data for all locations to allow comparison of the human populations around them. Our findings confirm the hypothesized migration of wetland resources from urban to rural areas, which took place for all but a few banks. As one could expect given the urban-to-rural shift, the population density around the lost urban wetlands was much higher than around the new rural wetlands, making it likely that there were far more people losing ecosystem service values than gaining them. For the banks exhibiting the urban to rural shift, the population density around the projects was on average over 900 people per square mile higher than for their associated banks. But the pattern for median income and minority population was less clear than for population density.

Project area median incomes were higher than bank area incomes for 11 banks, lower for 11, and equal for two. Percentages of minority population were higher in project areas for 15 banks, lower for 7, and within a percentage point for two. Nevertheless, although the directions were mixed, overall there were significant differences in median income and minority populations for project areas and banks. The average difference for median income was $11,750, and the average minority population difference was 13 percentage points.

None of this is surprising given that the average distance from a bank to its associated project areas was considerable for many banks—over 10 miles for all but three of the 24 banks studied. In many cases, moreover, the projects responsible for filling urban wetlands were tightly clustered, raising the concern that any beneficial synergistic effects of a wetland complex have been lost.

Location, location, location is the mantra of any real estate broker, but wetlands mitigation banking has left the location of ecosystem services out of the calculus for evaluating bank credits and development project debits. In that sense, nobody can blame developers and bankers for not taking ecosystem service distribution into account, but neither can anyone reasonably claim that the "market" for credits produces the most efficient allocation of wetland resources. So long as federal and state wetlands regulation programs do not acknowledge the geographic distribution of ecosystem service values as a criterion for regulation and a factor in mitigation policy, the "market" for wetland mitigation credits will not do so either and we can only expect what has happened thus far—development projects in urban areas purchasing credits from banks located in distant rural areas.

Yet these findings raises more questions than they answer, simply because so little information is available about the economic effects of wetlands in general. We cannot say, for example, whether the effect of redistributing wetland ecosystem services is to increase or decrease overall social welfare. Moreover, ecosystem services are just one of the values associated with wetlands and land development, so we also cannot say whether any net loss of wetland ecosystem service values is offset by other considerations such as the economic impact of urban development facilitated by the wetlands banking program. Nor would either of those quantifications, if we could perform them, likely remain static. It is certainly possible, for example, that over time the population around wetland banks could grow, meaning that larger populations would enjoy their associated ecosystem services, and that the economic development in urban areas losing wetlands far outstrips the costs associated with the lost services.

The question, of course, is how our findings and the questions they raise matter for wetlands policy. It is difficult to approach this topic intelligently, however, given the data vacuum that exists about the scope and magnitude of the distributional effects. Wetlands mitigation banking procedures do not perform what would be necessary to test the policy implications of the phenomenon—i.e., track the redistribution of wetlands, estimate the effects thereof on ecosystem service values, notify the affected public, and provide opportunity for public input. Given that ecosystem services are economically valuable, one could reasonably expect the people losing wetland service benefits at least to be interested in knowing about their loses, so that they may make an informed decision to about whether they care. It only seems appropriate, therefore, to identify the scope and magnitude of the phenomenon before deciding its policy outcome.

In that sense, our findings do not justify a rush to abandon wetland mitigation banking or to radically overhaul its structure. Rather, we suggest further research to identify with more precision the magnitude of ecosystem service redistribution and other socioeconomic effects associated with wetland mitigation bank transactions (and of wetland mitigation in general). Banking does have efficiency advantages, so any reforms designed to reflect ecosystem service values may want to retain the market-based approach. For example, one way to change how wetland mitigation banking influences ecosystem service distribution is change the incentive structure. When agency monitoring identifies a region in which migration of wetlands from urban to distant rural areas presents concerns, an incentive premium, such as an enhanced credit allotment, could be awarded to banks that locate closer to the urban areas losing wetland resources. Bankers would have an increased expected revenue stream to offset higher land process, and the urban population would benefit from a bank in closer proximity. Such reforms would change expected outcomes but keep wetland mitigation banking market-based in orientation.

Our study confirms what has long been expected of wetland mitigation banking—that it promotes the migration of wetlands out of urban areas. More study will be necessary to determine the economic implications of that effect and how to respond to them. Given how prevalent wetland banking is becoming and how important wetland ecosystem services can be to local populations, it seems appropriate to make that research agenda a high priority for wetlands policy.

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