Appendix: Predicting the Location of New Mitigation Banks

If the forces that drove the demand for and, subsequently, the creation of mitigation banks continue, history can provide a perspective of where future mitigation banks might be located. Data from the USACE (edited by the Environmental Law Institute) identify counties with mitigation banks (both approved and waiting for approval). Currently, banks are dispersed across and within multiple States and in rural and urban areas, suggesting that opportunities have been widespread (see fig. 4.7).

To predict the probability that a county might have a mitigation bank in the near term, a probit model is estimated using data on existing mitigation banks, county population demographics, land use, and other factors. As discussed above, one would expect that new banks will be created in counties with higher urban pressure and greater wetland acreage. Based on these and other factors, the probability model is expressed as:

Bank = f(urban pressure (low, medium, high), wetland acres, wetland acres squared, total agr land)

Where:

1) *Bank* equals 1 if the observation county has a mitigation bank or application and zero otherwise;

2) *low (medium, high)* equals 1 if urban pressures (as defined by county PIZA scores) are low (medium, high) and zero otherwise. Population-interaction zones for agriculture (PIZA) codes are derived from a classification scheme that indexes small geographic areas according to the size and proximity of population concentrations (akin to a gravity model). The codes are discrete values ranging from 1 (rural) to 4 (high population interaction);

3) *wetland acres* is a county's wetland acreage;

4) *wetland acres sq* is wetland acres squared;

5) *total agr land* is the total agricultural land within the county.

Data on wetland acreage are from the National Resources Inventory (USDA, NRCS, 2000). Total agricultural land is from the 2000 Agricultural Census, and the qualitative measures of urban pressure are from ERS.

Results of the analysis are statistically significant and consistent with expectations (app. table 1). Urban pressure variables are significant determinants of the probability of a mitigation bank, and the sizes of their coefficients indicate that, as expected, the probability of a mitigation bank increases with greater urban pressure. The positive coefficient on *wetland acres* and negative coefficient on *wetland acres sq* indicate that greater wetland acreage is likely to increase the need for a mitigation bank (e.g., without wetlands, mitigation is not necessary) but at a decreasing rate as wetland acreage increases. Mitigation may be avoided if alternative lands—lands without wetlands—are available for development. The negative and significant coefficient on t*otal agr land* supports this proposition.

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To provide a perspective of its reliability, we use the probit model to "back forecast"—that is, see how well the model predicts observed values. We found that the model correctly predicted counties with mitigation banks only 12 percent of the time. Counties without mitigation banks were correctly predicted 98 percent of the time. Although we have confidence that the variables in the model are appropriate, additional data related to the economics and landscape characteristics of wetland mitigation are needed to estimate a more robust prediction model.

Number of counties that have:	Number of counties predicted to have		
	Banks	No Banks	Percent correct
Banks	33	267	12%
No Banks	56	2,740	98%
Percent correct	37%	89%	90%

Note: 52 counties have no agricultural land (they are not included in the table).

Appendix table 1
Regression results: Probit model of the probability of a county's having an application for a new mitigation bank

County variables	Parameter standard		
	Estimate	Error	Pr>ChiSq
Intercept	-1.829	0.0735	<0.0001*
Low	0.388	0.092	<0.0001*
Medium	0.801	0.104	<0.0001*
High	0.904	0.107	<0.0001*
Wetland acres	11.586	1.339	<0.0001*
Wetland acres sq	-27.313	5.189	<0.0001*
Total agr lands	0.420	0.138	<0.0023*
Number of observations	3,101	NA	NA

Pseudo r-square = 0.06.
NA = Not applicable.
Data sources:
1) USACE district mitigation banking data as edited by the Environmental Law Institute: Dependent variable (yes/no mitigation bank).
2) USDA, NRCS, National Resources Inventory: wetland acres, and former wetlands.
3) 2000 Census of Agriculture: Net farm income, farms, and government payments, USDA, ERS (2005): Low, Medium, and High urbanization measures based on PIZA scores, www.ers.usda.gov/Data/PopulationInteractionZones/discussion.htm