Supplementary Information

Appendix

1. Results: additional descriptive statistics

Nearly 95% of the respondents were Caucasian. Roughly 67% of the group had educational levels (EDUCATION) ranging from bachelor's degrees to postdoctoral studies. Most were quite familiar with the Pennypack Preserve (FAMIL-PERT) and the Raytharn Farm (FAMIL-FARM), but respondents were less familiar with the Farm.

Seventy-two percent thought that government should spend more on open space (PCT-INCREASE), but over 50% thought 40% or less additional spending should occur. While almost no one favored preserving generic wilderness "regardless of cost," nearly 30% favored this with respect to the Raytharn Farm. Of those who preferred natural to artificial wildlife habitat, over 50% preferred natural by more than 80%. Fifty percent of the group estimated the Farm's market value to be above $10 million (appraised value: $10.3 million), & 75% estimated it to be above $5 million (sale price + transactions costs: $5.5 million). While 60% thought that the Farm was worth 60% more than its market value, 67% would like potential developers charged above 80% more than market value.

Less than 20% of the respondents had viewed the twenty-five photographs of the Farm on the dedicated Web page.

While over 80% had used (USE) the area within the year preceding the survey, 50% used the farm on at least a monthly basis. Slightly more of the respondents had not paid for similar recreational opportunities elsewhere, but of those who did (PAID-OTHER), 60% reported at $10 or less. Roughly 45% estimated that they get more than 60% of the enjoyment (PCT-OTHER) they paid for elsewhere from Raytharn.

Over three-quarters reported paying under $20 for a Raytharn-like experience in the past. Over 40% were willing to pay up to $4 per Raytharn *use*, and 94% were willing to pay up to $14.

2. Cross-Tabulations

The large majority of people in each USE class were in the $0 to $10 WTP category. Again, the χ^2 test showed non-rejection of the categories being independent. When PAID-OTHER categories and PCT-OTHER were compared to WTP categories, both yielded the greatest numbers in the $0 to $10 category. No χ^2 test was valid for these cross-categories. Most people in each EDUCATION class were in the $0 to $10 category. Again, the χ^2 test showed non-rejection of independence. The independence of PCT-INCREASE categories and WTP classes was (barely) rejected. Besides its effect on WTP and WTA, the effect of DISTANCE on attitude and preference categories was examined. It turned out that the hypotheses that the DISTANCE classes were independent of the PCT-OTHER, FAMIL-FARM and PCT-INCREASE categories could not be rejected. Among the DISTANCE comparisons, the independence of DISTANCE and FAMIL-FARM came the closest to being rejected. The independence of USE and FAMIL-FARM *was* rejected. EDUCATION categories apparently did not systematically influence PCT-INCREASE.

3. Logistic regression

$$[1]\ Y = \ln\left(\frac{p}{1-p}\right) = \mathbf{b_0} + b_1 x_1 + b_2 x_2 + \cdots + b_J x_J = z,$$

The logit transformation, based on probabilities (p = [Pr Y=1|x]; (1-p) = [Pr Y=0|x]) of category inclusion and not, is

where **Y** is the dependent or response variable, the natural log of the odds ratio insures a value between 0 and 1, the $\mathbf{x_j}$ are the independent variables, and the $\mathbf{b_j}$ are the estimated parameters. The probability **p** is estimated by

$$[2]\ \hat{p} = \frac{e^z}{1+e^z} = \frac{1}{1+e^{-z}},$$

following a logistic distribution. The interpretation of **p/(1-p)** is easiest in the case when the response variable is binary or dichotomous, as above. Kline and Wichelns [1] apply a binary logistic transformation to the probability of voters approving a bond issue to preserve farmland (dependent variable) through the purchase of development rights. They apparently ran the logit using Ordinary Least Squares on continuous and dummy independent variables for the states of PA and RI (their Tables 2 and 3) with the caveat that the coefficients do not have direct meaning. Davidson and MacKinnon [2] argue that while OLS may yield *some* information, it is perhaps more advisable to use general maximum likelihood estimation. Hosmer and Lemeshow [3] and Mertler and Vannatta [22] discuss in considerable detail how the resulting estimates and related tests can then be interpreted.

When there are more than two possible categories of the response (polychotomous case), the class with the lowest coded value is usually designated the reference category. The **p** above is the probability of being in class **k** as opposed to being in the reference class, **0.** If there are **k** categories of the response, then the *baseline model* generates **k-1** logit equations in the form of Equation [1] with parameters, $\mathbf{b_{kj}}$.

A constraint is placed on the proportional odds model that the log-odds do not depend on the response category. Hence, only one logit equation results. Equation [1] becomes

$$\mathbf{[3]\ ln}\left[\frac{\mathbf{Pr\ Y \le k\,|\,x}}{\mathbf{Pr\ Y > k\,|\,x}}\right] = \mathbf{b_0} + b_1 x_1 + b_2 x_2 + \cdots + b_J x_J = \mathbf{z.}$$

The interpretation of the $\mathbf{b_j}$ in Equation [3] is the estimated change in the logit of the cumulative probabilities as the **j-th** predictor variable changes by one class, or one number if it is continuous, holding the other predictors constant.

The **k-th** odds ratio is **exp (b_j)**. The odds ratio indicates how much more likely a (weakly, ≤) lower-coded response outcome relative to a (strictly, >) higher-coded response outcome is when a predictor has a certain value.

References

1. Kline J, Wichelns D (1994) Using Referendum Data to Characterize Public Support for Purchasing Development Rights to Farmland. Land Econ 70: 223-233.
2. Davidson R, MacKinnon JG (2004) Econometric Theory and Methods. Oxford University Press, NY.
3. Hosmer DW, Lemeshow S (2000) Applied Logistic Regression. John Wiley & Sons, NY.