Online Appendix to Accompany:

Climate policy, land cover, and bird populations: Differential impacts on the future welfare of birders in the Pacific Northwest

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A Complete Summary Statistics for All Variables

In the main paper, we present only the selected summary statistics for the variables upon which we focus in the body of the paper. Table A1 documents the complete set of summary statistics for any variable that is employed in any specification in the choice models discussed in this paper. Additional information about the data with regards to sample selection, considerations sets and choice of empirical strategy are discussed in the online Appendix of Kolstoe and Cameron (2017).

B Complete Results for Models in the Main Paper

Likewise, only selected coefficient estimates are presented in Table 2 featured in the body of the paper. Table A2 provides complete versions of Models 1-4 in Table 3 of the body of the paper.

C Additional Discussion, by Section of the Main Paper

C.1 Recreational Site Choice

Consideration sets. As in Kolstoe and Cameron (2017), we assume that the consideration set for each respondent includes the selected birding hotspot on each choice occasion plus the typically huge number of other possible hotspots within 60 minutes of travel time from the individual's home address.[46]

Preliminary models indicated that σ_{μ}^{2}, the estimated variance of β_0 (the random coefficient on the expected species richness variable), is statistically significantly different from zero. Thus

[46]Again, sensitivity analyses with respect to this number of minutes are reported in the Appendix in Table A4.

mixed logit specifications are preferred over the analogous fixed-coefficient conditional logit specifications. The key parameters are show in Table 2 to show the key significant site attributes and controls and for completeness the full results are shown in Table A2.

Systematic sample selection corrections. We maintain the assumption that our estimated coefficients in Table A2 all pertain to an eBird member with the average propensity to appear in our estimating sample (i.e. to have provided home address information). We allow both the coefficient on the travel cost variable and the baseline coefficient on the expected species variable to vary systematically with the fitted propensity from our probit model to explain home address provision among all eBird members in Washington and Oregon states.[47]

Estimation method. Estimation of the coefficients in Table A2 are accomplished using the *mixlogit.ado* utility for Stata. Note that the standard errors in these specifications are not clustered by individual. Cameron and Miller (2011) argue that in the presence of group-specific fixed effects, one cannot compute cluster-robust standard errors. For the mixed logit random-parameter models featured in the body of the paper, we instead bootstrap the standard errors using 500 Halton draws (Train, 2009).

C.1.1 Marginal utilities of travel costs (C_j^i) and expected species richness ($E[S]_{jt}$)

The four columns of results in Table A2 give the parameter estimates for the preferred specification from Kolstoe and Cameron (2017) and a sequence of three increasingly general mixed-logit specifications incorporating the land cover variables into the specification. Model 1 is the preferred specification from Kolstoe and Cameron (2017). Model 3, our preferred specification, the land cover class is included simply as a site attribute of the site and is not interacted with ex-

[47] Let DAP^i be the individual's deviation from the mean propensity to supply address information. Our models thus specify our two key coefficients as: $\alpha' = \alpha + \delta_1 DAP^i$ and $\beta_0' = \beta_0 + \delta_2 DAP^i$. The "selection correction" coefficients δ_1 and δ_2 can be found at the bottom of Tables in Table A2. We attempt no correction to the variance-covariance matrix for the estimated parameters as a consequence of the estimated nature of the DAP^i variable.

pected species.[48] The results of this model is available in Table A2. Model 2 is otherwise identical to Model 3, but excludes the ecoregion controls. Notably, controlling for ecosystem differences make no appreciable difference to the key marginal utilities of travel cost or expected species. Nevertheless, we retain the ecosystem controls in subsequent models because some of them bear individually statistically significant coefficients and a likelihood ratio test of Models 2 and 3 rejects the null hypothesis the parameter estimates of the ecoregions to not be statistically different from zero. Model 4 shows that the interaction term between the developed land cover class (the baseline category) and urban area is statistically insignificant. We included this interaction term out of concern of the broadness of the developed category, and that not all developed areas are within urban area boundaries (see Figure A1).

Travel costs C_j^i. For our willingness-to-pay calculations, the marginal utility of other consumption (i.e. the negative of the α coefficient on the travel cost variable in a linear specification) serves as the denominator, so this travel-cost coefficient is very important. The results in Table A2 demonstrate that the coefficient on the travel cost variable is strongly significantly different from zero, with the expected sign. It is also very robust across all of our specifications.

Expected species richness $E[S]_{jt}$. We are particularly interested in the marginal utility of our species richness (biodiversity) measure, represented by the expected number of different bird species at each destination based on the previous year's data for the same site in the same month. The sample mean of the random coefficient for the marginal utility of the expected number of species is interacted with deviations from the sample mean of census-tract median household income. The mean coefficient represents the preferences of an eBirder who has an average propensity to go birding watching in January of 2010 to a site in a developed area in the rural part of the Puget Lowlands.[49] The baseline coefficient on the ES term is not significantly different from zero in

[48]We did explore interacting the different land cover classes with expected species. However, these interactions were not statistically significant. This may be due to the lack of power the model has given the current number of observations.

[49]Note that the land cover Developed category includes high intensity, medium intensity, low intensity and de-

any of the models. Given the statistical significance of a variety of the interaction terms involving ES, the marginal utility of expected bird species is statistically nonzero among several categories of eBirders and for several different time periods. Also, the estimated variance of the random parameter on expected species is statistically significant, suggesting there also exists unobserved heterogeneity that is unexplained by the systematic shifters.

We find evidence of systematic heterogeneity on the basis of deviations from the sample mean of census-tract median household income. The results across all specifications confirm that eBird members from census tracts with median incomes higher than the sample average have a higher marginal utility per species, as one would expect and as was seen in Kolstoe and Cameron (2017).

All of the models account for time-wise heterogeneity in preferences for species richness, captured by a set of seasonal (monthly) indicator variables and a time-trend variable. Thus a *vector* of β coefficients must be considered. The marginal utility of the expected number of species is a linear function of a set of eleven seasonal (monthly) indicators and a time trend. The coefficients in this set are relegated to the complete results provided in the Appendix in Table A2.

Site Attributes: Others In the model, we control for site attributes and include indicators for the prior presence of endangered or threatened bird species, different ecological management regimes, a congestion/popularity measure, land cover type, and hotspots in different ecoregions. The coefficients on the site attributes that are included in the models in Kolstoe and Cameron (2017) statistically significant and of a similar magnitude and sign as in the previous work. For this reason these other attributes are included in Table A2. The coefficient on the site-level indicator for the likely presence of an endangered bird species is positive and statistically significant, suggesting that a significant marginal utility premium exists for sites where one might expect to see an endangered bird species. Also, the parameter for the more heavily managed sites for biodiversity (National Parks, Wilderness Areas, etc.) is statistically larger in magnitude than the coefficient

veloped open spaces. Figure A1 illustrates this point and shows why we tested whether this interaction term was statistically significant in the model. Using the land cover data provides further refinement of the data and the majority of the sites visited were in developed areas.

on the indicator for sites less-managed for biodiversity (National Forests, etc.) where extractive activities such as logging or mining are allowed. This difference also may be the result of the fact National Parks, Wilderness Areas, etc. tend to be iconic in some way, and also explains the premium in TWTP for trips to such places, regardless of their bird populations. There is an additional premium if a site managed for biodiversity is specifically managed for bird biodiversity (National Wildlife Refuges). This coincides with the land cover classes that bear the largest positive and statistically significant land cover class relative baseline, the developed land cover class. Again, these differences seems a reasonable result given that they imply a trip to a more-pristine area yields higher utility than a trip to a less-pristine area, independent of the number of bird species expected to be seen.

We continue to find that the congestion/popularity measure confers diminishing marginal utility. The linear coefficient on the congestion variable is positive and the coefficient on the squared term is negative. This suggests there is a threshold at which the site's popularity begins to reduce people's utility, possibly as a result of congestion. If birding is a social activity, and a destination is not too crowded, additional visitors do not seem to diminish the quality of the experience. It is possible that at low levels, a little congestion is a "good" thing.

Other Controls: Ecoregions We continue to include ecoregions to avoid omitted variable bias due to the utility an individual may derive from the type of destination (ecological factors) that is separate from the incremental utility associated with the expected number of bird species at that destination. Given the diverse array of land cover classes within an ecoregion, we are not worried about collinearity of these variables. There is some risk that land cover class and ecoregion indicators will be correlated with expected numbers (and types) of species present. The correlation is not perfect, but it may be that (some) birders choose their site destinations because the hotspots have other attractive features (scenery) besides just the number of expected bird species. In our models, the omitted land class is "developed" and the omitted ecosystem is the Puget Lowlands in Washington State. A positive and statistically significant difference is found for the Willamette

Valley, the Cascades and the Coast Range, as was the case for the models.

D Additional Results for Simulations

Table A6 contains the WTP estimates for the site attributes in Table A2 of our preferred specification that are not featured in the body of the paper. These results are similar to the results for site attributes featured in Kolstoe and Cameron (2017).

E Welfare Analysis

In the near future, the 2020s, as can be seen in Figure 1, many areas in the Pacific Northwest expect a decline in bird species richness, with only some areas experiencing an increase. However, the forecasts for the 2050s indicate that more areas in the Pacific Northwest can expect an increase in bird species richness and far fewer areas will experience a decrease relative to the base year.

The maps in Figures A2- A5 show how *spatially* heterogeneous the EV calculations are for the sample, which is not readily apparent in Tables 6. The figures feature close-up maps of the two major urban areas our sample: Seattle, WA and Portland, OR.[50]

Table 6 in the body of the paper summarize the distributions, across the sample, of our estimates of per-trip equivalent variations due to the changes by the 2020s and 2050s, for both the May-June BBS birding season and the December-January CBC season. In this Table, we also presents the distributions for the two largest metropolitan areas in our sample, by the 2012 Presidential election results by county. Here we present the histograms of the EV distributions of the results featured in Table 6.

The histograms in Figure A6 show that the estimated EVs for the effects of climate change on land cover and species richness range from -$109.85 in May-June of the 2050s to +$106 in Dec-Jan

[50]The maps in A2- A5 show the aggregated EV for each user based on the trips they took during our sample period.

of the 2050s. Each birder's consideration set is different, according to where they live, and changes in the attributes of birding destinations drive the estimated EV amounts in the business-as-usual scenarios. These differences stem from the fact that some eBirders will experience a deterioration in birding opportunities among the specific sites in their consideration sets, while other eBirders will experience improvements at the specific sites in their consideration sets.

The histograms in Figures A7 and A8 show, respectively, the spatial heterogeneity for the Seattle and Portland metropolitan statistical areas. It is apparent that the distributional effects of climate change impacts on the welfare associated with birding excursions may become more of a concern, particularly as time passes. Keep in mind that the heterogeneity in these EV measures is determined primarily by changes in birding opportunities, not by heterogeneity in birder characteristics. Only the birder's census-tract-level median income figures in these choice models (not even the birder's individual household income), and no other individual-level characteristics are used in estimating our otherwise "representative birder" preferences.

F Sensitivity Analysis of Welfare Analysis

Our main results, for which the histograms are shown in Figure A6 use the forecasts and applying the predicted percentage change to Expected Species and the predicted new land cover type based on the trip being taken during a time period that corresponds to when the data used to generate the forecast was collected.[51]

We also looked at the EV members need if we were to only look at trips taken during the period of the year when the forecast data was collected. These results are featured in Figure A11. These results are similar to the results of applying the percentage change from the forecasts to all months.

[51] For the BBS, this corresponds to May and June. For the CBC, this corresponds to December and January.

G Additional Tables

Table A1: Complete Descriptive Statistics for Pooled Oregon and Washington State Sample, 60-Minute Maximum Drive Time to Site, 2010-2012 Trips

Variable	Description	Mean	Std. dev.
Number of eBird members	eBird members reporting home address data, and thus allowing travel cost estimation	221	-
Trips per eBird member	This eBird member's count of total trips to any birding site in the previous calendar year	10.28	9.79
Alternatives per eBird member	Number of birding hotspots within a 60 minute drive of eBird member's home address	201.03	80.79
Time traveled to site, one way	Site distance as measure by time from eBird member's home address if in the choice set	33.15	12.91
Distance traveled to site, one way	Site distance obtained using mqtime.ado written by Voorheis (2015)) from eBird member's home address if in the choice set	21.87	10.93
Roundtrip travel cost	For each trip and each alternative hotspot destination, distance multiplied by AAA's mileage rate for the average sedan is used to calculate the deductible costs for use of a car per mile for business miles driven	16.57	14.91
Roundtrip travel cost including the opportunity cost of time at 1/3 the wage rate	For each trip and each alternative hotspot destination, distance (using mqtime.ado) multiplied by AAA's mileage rate for the average sedan is used to calculate the deductible costs for use of a car per mile for business miles driven	41.10	17.38
Expected Bird Biodiversity	Expected bird species richness measure		
Expected # bird species based on last year's reports	Expected number of species for a site in a given month from all eBird reports in the same month of the previous year for seasonal birds and Birdlife for a count of resident birds.	75.74	10.14
1(National Parks, etc.)	GAP status 1 or 2: Permanent protection from conversion of natural land cover. Examples: National Parks, Wilderness Areas, National Wildlife Refuges	.036	-

Descriptive Statistics for pooled Oregon and Washington State sample, 60-minute maximum travel time to site, 2010-2012 trips (continued)

Variable	Description	Mean	Std. dev.
1(National Forests, etc.)	GAP status 3: Permanent protection from conversion of natural land cover for majority of area, but subject to extractive uses (logging, mining, OHV recreation). Examples: National Forests, State Parks, Recreation Management Areas, Areas of Critical Environmental Concern	0.27	-
1(Urban area)	Urban Area as defined by the 2010 Census of having a population of more than 50,000 people.	0.61	-
Share of all eBird trips, same month, last year, to this destination	Across all eBird reports in the same month of the previous year, the fraction of trips to this same destination (proxy for relative congestion)	6.45×10^{-04}	3.57×10^{-03}
Deviation from mean inclusion propensity	Fitted propensity for eBird member to provide address information so distances can be calculated (normalized on zero)	0.44	0.54
Month of trip	Indicator variables for month when observed trip is taken		
1(January)		0.140	-
1(February)		0.086	-
1(March)		0.099	-
1(April)		0.080	-
1(May)		0.088	-
1(June)		0.059	-
1(July)		0.065	-
1(August)		0.040	-
1(September)		0.068	-
1(October)		0.072	-
1(November)		0.097	-
1(December)		0.110	-
Year trend (2012=0)		-0.727	0.797
Ecosystem at destination	Indicator variables for ecoregion at destination.		
1(Blue Mountains)		0.0029	-
1(Cascades)		0.036	-

Descriptive Statistics for pooled Oregon and Washington State sample, 60-minute maximum travel time to site, 2010-2012 trips (continued)

Variable	Description	Mean	Std. dev.
1(Coast Range)		0.015	-
1(Columbia Plateau)		0.026	-
1(E. Cascades/Foothills)		0.006	-
1(Klamath Mts, N. CA)		0.017	-
1(North Cascades)		0.0055	-
1(North Basin Range)		$5.8\text{x}10^{-5}$	-
l(North Rockies)		0.0018	-
1(Puget Lowland)		0.56	-
1(Snake River Plain)		0	-
1(Willamette Valley)		0.29	-
Land cover at destination	Indicator variables for land cover at destination. See maps in Figure A1.		
1(Developed)	Includes open space and low, medium and high intensity developed areas as defined in the 2011 NLCD	0.412	-
1(Water)	Includes areas of open water with less than 25% cover of vegetation and soil. This category also includes areas characterized by perennial cover of ice and/or snow.	0.109	-
1(Barren)	Vegetation accounts for less than 15% of total land cover (e.g. bedrock, desert pavement, volcanic material, sand dunes, strip mines, gravel pits, etc.) as defined in the 2011 NLCD	0.053	-
1(Forest)	Includes areas of deciduous forests, evergreen forests and mixed forests as defined in the 2011 NLCD	0.143	-
1(Shrubland)	Includes areas dominated by shrubs which are less 5 meters tall (e.g. tree shrubs, young trees, etc.) and where the canopy is greater than 20% of total vegetation	0.041	-
1(Herbaceous)	Includes ares dominated by herbaceous vegetation for more than 80% of total vegetation (e.g. tilling, grazing, etc.)	0.042	-
1(Planted/Cultivated)	Includes areas of pasture, hay and cultivated crops as defined in the 2011 NLCD	0.097	-

Descriptive Statistics for pooled Oregon and Washington State sample, 60-minute maximum travel time to site, 2010-2012 trips (continued)

Variable	Description	Mean	Std. dev.
1(Wetlands)	Includes areas of woody and emergent herbaceous wetlands as defined in the 2011 NLCD	0.103	-

Total Observed Trips = 1,094; Total Alternatives = 155,495

Table A2: Progression of Models, Pooled Oregon and Washington Sample; Full Results – 60-Minute Choice Set

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) +Ecoregions, Preferred Specification	(4) $+ 1(LC\ Developed) \times 1(Urban\ Area)$
Travel cost variable: C_j^i				
Roundtrip, 1/3 wage: α	-0.0362*** (0.00306)	-0.0365*** (0.00301)	-0.0363*** (0.00306)	-0.0362*** (0.00306)
Expected species richness: $E[S]_{jt}$**; interactions:** $T_t \times E[S]_{jt}$				
$E[S]_{jt}$ random coef. mean: β_0	0.0105 (0.0127)	0.0109 (0.0123)	0.00949 (0.0123)	0.00954 (0.0123)
$E[S]_{jt}$ random coef. variance: σ_μ^2	0.0219** (0.00869)	0.0194** (0.00887)	0.0195** (0.00873)	0.0195** (0.00876)
$E[S] \times$ dev. med H. Inc. ($10,000): β_1	0.00512* (0.00274)	0.00472* (0.00267)	0.00470* (0.00266)	0.00471* (0.00266)
$E[S]_{jt} \times 1(February)_t$: $\beta_{2,1}$	-0.0380*** (0.0147)	-0.0375*** (0.0145)	-0.0375*** (0.0144)	-0.0374*** (0.0144)
$E[S]_{jt} \times 1(March)_t$: $\beta_{2,2}$	0.00728 (0.0178)	0.00563 (0.0173)	0.00647 (0.0174)	0.00661 (0.0174)
$E[S]_{jt} \times 1(April)_t$: $\beta_{2,3}$	0.00925 (0.0182)	0.00862 (0.0178)	0.00822 (0.0178)	0.00829 (0.0178)
$E[S]_{jt} \times 1(May)_t$: $\beta_{2,4}$	0.00519 (0.0163)	0.00441 (0.0160)	0.00509 (0.0160)	0.00521 (0.0160)
$E[S]_{jt} \times 1(June)_t$: $\beta_{2,5}$	0.112*** (0.0316)	0.106*** (0.0308)	0.111*** (0.0316)	0.111*** (0.0315)
$E[S]_{jt} \times 1(July)_t$: $\beta_{2,6}$	-0.00728 (0.0163)	-0.00759 (0.0160)	-0.00704 (0.0159)	-0.00688 (0.0159)
$E[S]_{jt} \times 1(August)_t$: $\beta_{2,7}$	0.0244 (0.0197)	0.0218 (0.0194)	0.0226 (0.0194)	0.0228 (0.0194)
$E[S]_{jt} \times 1(September)_t$: $\beta_{2,8}$	0.0292 (0.0247)	0.0261 (0.0237)	0.0271 (0.0240)	0.0272 (0.0240)

Table A2 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
$E[S]_{jt} \times 1(October)_t$: $\beta_{2,9}$	0.0138 (0.0188)	0.0125 (0.0183)	0.0132 (0.0183)	0.0133 (0.0183)
$E[S]_{jt} \times 1(November)_t$: $\beta_{2,10}$	0.0428* (0.0233)	0.0391* (0.0229)	0.0396* (0.0228)	0.0396* (0.0228)
$E[S]_{jt} \times 1(December)_t$: $\beta_{2,11}$	0.0472** (0.0232)	0.0452* (0.0233)	0.0442* (0.0230)	0.0443* (0.0230)
$E[S]_{jt} \times$ time trend (t12=0 in 2012): $\beta_{2,12}$	0.00726 (0.00589)	0.00665 (0.00575)	0.00647 (0.00576)	0.00649 (0.00576)
Land Cover: LC_{jt}				
$1(LC\ developed) \times 1(UrbanArea)$: $\gamma_{1,1}$				0.133 (0.162)
$1(LC\ Water/Perennial\ Snow\ \&\ Ice)$: $\gamma_{1,2}$		0.394*** (0.107)	0.377*** (0.107)	0.458*** (0.147)
$1(LC\ Barren\ Land)$: $\gamma_{1,3}$		0.214 (0.153)	0.201 (0.153)	0.283 (0.184)
$1(LC\ Forest)$: $\gamma_{1,4}$		-0.0636 (0.112)	-0.0529 (0.114)	0.0336 (0.157)
$1(LC\ Shrub/Scrub)$: $\gamma_{1,5}$		0.216 (0.136)	0.183 (0.137)	0.257 (0.166)
$1(LC\ Herbaceous)$: $\gamma_{1,6}$		-0.309* (0.185)	-0.305 (0.187)	-0.224 (0.212)
$1(LC\ Planted)$: $\gamma_{1,7}$		0.221** (0.113)	0.208* (0.114)	0.283* (0.148)
$1(LC\ Wetlands)$: $\gamma_{1,8}$		0.390*** (0.106)	0.372*** (0.106)	0.457*** (0.149)
Other site attributes: A_j, A_{jt}				
1(National Wildlife Refuge): $\gamma_{2,1}$	0.899*** (0.185)	0.788*** (0.189)	0.793*** (0.192)	0.789*** (0.192)
1(National Parks, etc.): $\gamma_{2,2}$	0.737*** (0.125)	0.769*** (0.125)	0.736*** (0.128)	0.727*** (0.128)
1(National Forests, etc.): $\gamma_{2,3}$	0.379*** (0.0746)	0.420*** (0.0761)	0.409*** (0.0765)	0.407*** (0.0765)
1(Expect Endangered Bird Species): $\gamma_{2,4}$	1.674* (0.854)	1.900** (0.845)	1.842** (0.864)	1.853** (0.867)
1(Urban Area): $\gamma_{2,5}$	-0.651*** (0.0789)	-0.551*** (0.0826)	-0.567*** (0.0843)	-0.603*** (0.0954)
$1(Blue\ Mountains)_j$: $\gamma_{2,6}$	-0.673 (0.813)		-0.790 (0.835)	-0.748 (0.837)
$1(Cascades)_j$: $\gamma_{2,7}$	0.503		0.634**	0.634**

Table A2 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
	(0.317)		(0.318)	(0.318)
$1(Coast\ Range)_j$: $\gamma_{2,8}$	0.439		0.593	0.589
	(0.367)		(0.364)	(0.364)
$1(Columbia\ Plateau)_j$: $\gamma_{2,9}$	-0.344		-0.442	-0.431
	(0.724)		(0.748)	(0.749)
$1(East\ Cascades/Foothills)_j$: $\gamma_{2,10}$	-0.979		-0.982	-0.954
	(0.664)		(0.687)	(0.688)
$1(Klamath\ Mtns,\ Coast\ Range)_j$: $\gamma_{2,11}$	-0.0936		0.0603	0.0761
	(0.421)		(0.425)	(0.425)
$1(North\ Cascades)_j$: $\gamma_{2,12}$	-0.936		-0.880	-0.870
	(0.699)		(0.724)	(0.725)
$1(North\ Rockies)_j$: $\gamma_{2,13}$	0.280		0.202	0.203
	(0.858)		(0.876)	(0.877)
$1(Willamette\ Valley)_j$: $\gamma_{2,14}$	1.254***		1.268***	1.261***
	(0.360)		(0.357)	(0.357)
†$Congestion/Popularity_{jt}$: $\gamma_{2,15}$	190.1***	190.8***	187.2***	187.3***
	(13.47)	(13.43)	(13.44)	(13.45)
$(Congestion/Popularity_{jt})^2$: $\gamma_{2,16}$	-3702.1***	-3830.7***	-3581.3***	-3591.1***
	(437.7)	(429.6)	(436.7)	(437.3)
Sample selection correction terms				
C_j^i $\times$ dev. mean incl. prop	0.0152***	0.0148***	0.0151***	0.0151***
	(0.00413)	(0.00406)	(0.00412)	(0.00412)
$E[S]_{jt}$ $\times$ dev. mean incl. prop.	-0.00150	-0.00296	-0.00254	-0.00245
	(0.0119)	(0.0114)	(0.0116)	(0.0116)
Sample Selection?	Yes	Yes	Yes	Yes
Time fixed effects?	Yes	Yes	Yes	Yes
Ecoregion indicators?	Yes	No	Yes	Yes
Total Alternatives	155,495	155,495	155,495	155,495
Log Likelihood	-4605.94	-4603.77	-4590.51	-4590.16
AIC	9279.89	9271.54	9263.01	9264.32
BIC	9618.34	9590.08	9671.14	9682.41

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
† Share of all eBird trips, same month, last year, to site j

NOTES: Estimates estimated via STATA *mixlogit.ado*. These results use 500 Halton draws for the mixed logit model simulations. Baseline coefficient represents the marginal utility for an eBirder who has the average propensity of eBird members to have given is home address information at the time of registration and is visiting a rural site that is not managed for biodiversity in the Puget Lowland in January of 2012. Models are the results for choice sets within a 60-minute drive from a member's home.

Table A3: Progression of Models, Pooled Oregon and Washington Sample; Full Results – 120-Minute Choice Set

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed)$ $\times$ $1(Urban\ Area)$
Travel cost variable: C_j^i				
Roundtrip, 1/3 wage: α	-0.0304*** (0.00129)	-0.0304*** (0.00126)	-0.0304*** (0.00129)	-0.0304*** (0.00129)
Expected species richness: $E[S]_{jt}$**; interactions:** $T_t \times E[S]_{jt}$				
$E[S]_{jt}$ random coef. mean: β_0	0.00329 (0.00852)	0.00382 (0.00828)	0.00289 (0.00835)	0.00288 (0.00835)
$E[S]_{jt}$ random coef. variance: σ_μ^2	0.0112*** (0.00386)	0.00990*** (0.00360)	0.0106*** (0.00373)	0.0106*** (0.00373)
$E[S]$ $\times$ dev. med H. Inc. ($10,000): β_1	-0.00226* (0.00125)	-0.00219* (0.00119)	-0.00222* (0.00123)	-0.00222* (0.00123)
$E[S]_{jt}$ $\times$ $1(February)_t$: $\beta_{2,1}$	-0.0236** (0.00956)	-0.0230** (0.00935)	-0.0231** (0.00944)	-0.0231** (0.00943)
$E[S]_{jt}$ $\times$ $1(March)_t$: $\beta_{2,2}$	0.00739 (0.0123)	0.00655 (0.0120)	0.00721 (0.0122)	0.00723 (0.0122)
$E[S]_{jt}$ $\times$ $1(April)_t$: $\beta_{2,3}$	-0.00412 (0.0109)	-0.00438 (0.0107)	-0.00455 (0.0107)	-0.00453 (0.0107)
$E[S]_{jt}$ $\times$ $1(May)_t$: $\beta_{2,4}$	0.00198 (0.0111)	0.00194 (0.0109)	0.00210 (0.0110)	0.00213 (0.0110)
$E[S]_{jt}$ $\times$ $1(June)_t$: $\beta_{2,5}$	0.0149 (0.0140)	0.0146 (0.0138)	0.0152 (0.0139)	0.0153 (0.0139)
$E[S]_{jt}$ $\times$ $1(July)_t$: $\beta_{2,6}$	-0.00267 (0.0117)	-0.00194 (0.0115)	-0.00199 (0.0116)	-0.00196 (0.0116)
$E[S]_{jt}$ $\times$ $1(August)_t$: $\beta_{2,7}$	0.00652 (0.0127)	0.00540 (0.0125)	0.00643 (0.0125)	0.00642 (0.0125)
$E[S]_{jt}$ $\times$ $1(September)_t$: $\beta_{2,8}$	0.00233 (0.0124)	0.00194 (0.0122)	0.00217 (0.0122)	0.00219 (0.0122)
$E[S]_{jt}$ $\times$ $1(October)_t$: $\beta_{2,9}$	-0.00467 (0.0105)	-0.00522 (0.0103)	-0.00437 (0.0104)	-0.00438 (0.0104)
$E[S]_{jt}$ $\times$ $1(November)_t$: $\beta_{2,10}$	0.00421 (0.0114)	0.00308 (0.0112)	0.00409 (0.0112)	0.00408 (0.0112)
$E[S]_{jt}$ $\times$ $1(December)_t$: $\beta_{2,11}$	0.0130 (0.0136)	0.0117 (0.0132)	0.0120 (0.0132)	0.0121 (0.0132)
$E[S]_{jt}$ $\times$ time trend (t12=0 in 2012): $\beta_{2,12}$	0.00190 (0.00315)	0.00182 (0.00307)	0.00176 (0.00310)	0.00176 (0.00310)
Land Cover: LC_{jt}				
$1(LC\ developed) \times 1(UrbanArea)$: $\gamma_{1,1}$				0.130 (0.136)
$1(LC\ Water/Perennial\ Snow\ \&\ Ice)$: $\gamma_{1,2}$		0.323*** (0.0916)	0.326*** (0.0918)	0.393*** (0.116)
$1(LC\ Barren\ Land)$: $\gamma_{1,3}$		0.112 (0.122)	0.144 (0.122)	0.212 (0.142)
$1(LC\ Forest)$: $\gamma_{1,4}$		-0.0383	-0.0428	0.0295

Table A3 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
		(0.0933)	(0.0943)	(0.122)
$1(LC\ Shrub/Scrub)$: $\gamma_{1,5}$		0.170	0.140	0.201
		(0.111)	(0.112)	(0.130)
$1(LC\ Herbaceous)$: $\gamma_{1,6}$		-0.283*	-0.280*	-0.211
		(0.146)	(0.146)	(0.163)
$1(LC\ Planted)$: $\gamma_{1,7}$		0.262***	0.254***	0.318***
		(0.0967)	(0.0975)	(0.119)
$1(LC\ Wetlands)$: $\gamma_{1,8}$		0.338***	0.340***	0.411***
		(0.0915)	(0.0921)	(0.119)
Other site attributes: A_j, A_{jt}				
1(National Wildlife Refuge): $\gamma_{2,1}$	0.869***	0.794***	0.794***	0.792***
	(0.146)	(0.148)	(0.150)	(0.150)
1(National Parks, etc.): $\gamma_{2,2}$	0.759***	0.805***	0.766***	0.758***
	(0.0966)	(0.0969)	(0.0979)	(0.0982)
1(National Forests, etc.): $\gamma_{2,3}$	0.446***	0.499***	0.490***	0.489***
	(0.0637)	(0.0646)	(0.0652)	(0.0652)
1(Expect Endangered Bird Species): $\gamma_{2,4}$	2.098***	2.189***	2.135***	2.134***
	(0.312)	(0.310)	(0.316)	(0.317)
1(Urban Area): $\gamma_{2,5}$	-0.599***	-0.546***	-0.529***	-0.569***
	(0.0674)	(0.0703)	(0.0722)	(0.0841)
$1(Blue\ Mountains)_j$: $\gamma_{2,6}$	0.778*		0.758*	0.774*
	(0.429)		(0.430)	(0.430)
$1(Cascades)_j$: $\gamma_{2,7}$	0.440**		0.511**	0.513**
	(0.215)		(0.216)	(0.216)
$1(Coast\ Range)_j$: $\gamma_{2,8}$	0.756***		0.805***	0.805***
	(0.204)		(0.203)	(0.203)
$1(Columbia\ Plateau)_j$: $\gamma_{2,9}$	0.937***		0.921***	0.931***
	(0.306)		(0.308)	(0.309)
$1(East\ Cascades/Foothills)_j$: $\gamma_{2,10}$	0.872***		0.947***	0.959***
	(0.276)		(0.277)	(0.277)
$1(Klamath\ Mtns,\ Coast\ Range)_j$: $\gamma_{2,11}$	0.142		0.230	0.245
	(0.286)		(0.286)	(0.287)
$1(North\ Cascades)_j$: $\gamma_{2,12}$	0.456**		0.529**	0.539**
	(0.211)		(0.212)	(0.212)
$1(North\ Rockies)_j$: $\gamma_{2,13}$	1.764***		1.774***	1.774***
	(0.433)		(0.434)	(0.434)
$1(Willamette\ Valley)_j$: $\gamma_{2,14}$	0.933***		0.909***	0.907***
	(0.206)		(0.206)	(0.205)
$\dagger Congestion/Popularity_{jt}$: $\gamma_{2,15}$	205.8***	201.1***	202.3***	202.4***
	(11.30)	(11.27)	(11.35)	(11.35)
$(Congestion/Popularity_{jt})^2$: $\gamma_{2,16}$	-4220.6***	-4063.8***	-4071.8***	-4082.7***
	(385.6)	(381.3)	(386.7)	(387.4)
Sample selection correction terms				
$C_j^i \times$ dev. mean incl. prop	0.00687***	0.00709***	0.00677***	0.00676***
	(0.00160)	(0.00160)	(0.00160)	(0.00160)

Table A3 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
$E[S]_{jt}$ × dev. mean incl. prop.	0.00836	0.00794	0.00789	0.00788
	(0.00636)	(0.00599)	(0.00619)	(0.00619)
Sample Selection?	Yes	Yes	Yes	Yes
Time fixed effects?	Yes	Yes	Yes	Yes
Ecoregion indicators?	Yes	No	Yes	Yes
Total Alternatives	553,623	553,623	553,623	553,623
Log Likelihood	-7362.41	-7364.55	-7343.54	-7343.07
AIC	14792.82	14793.10	14769.07	14770.15
BIC	15174.45	15152.28	15229.27	15241.56

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
† Share of all eBird trips, same month, last year, to site j

NOTES: Estimates estimated via STATA *mixlogit.ado*. These results use 500 Halton draws for the mixed logit model simulations. Baseline coefficient represents the marginal utility for an eBirder who has the average propensity of eBird members to have given is home address information at the time of registration and is visiting a rural site that is not managed for biodiversity in the Puget Lowland in January of 2012. Models are the results for choice sets within a 120-minute drive from a member's home.

Table A4: Progression of Models, Pooled Oregon and Washington Sample; Full Results 90-Minute Choice Set

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
Travel cost variable: C_j^i				
Roundtrip, 1/3 wage: α	-0.0337***	-0.0340***	-0.0338***	-0.0337***
	(0.00181)	(0.00178)	(0.00180)	(0.00180)
Expected species richness: $E[S]_{jt}$**; interactions:** $T_t \times E[S]_{jt}$				
$E[S]_{jt}$ random coef. mean: β_0	0.00583	0.00539	0.00433	0.00437
	(0.0107)	(0.0103)	(0.0103)	(0.0103)
$E[S]_{jt}$ random coef. variance: σ_μ^2	0.0217***	0.0194***	0.0198***	0.0197***
	(0.00627)	(0.00581)	(0.00604)	(0.00605)
$E[S]$ × dev. med H. Inc. ($10,000): β_1	-0.000821	-0.000906	-0.000850	-0.000842
	(0.00191)	(0.00181)	(0.00184)	(0.00184)
$E[S]_{jt} \times 1(February)_t$: $\beta_{2,1}$	-0.0289**	-0.0284**	-0.0281**	-0.0281**
	(0.0115)	(0.0113)	(0.0112)	(0.0112)
$E[S]_{jt} \times 1(March)_t$: $\beta_{2,2}$	0.0105	0.00907	0.00999	0.0100
	(0.0144)	(0.0140)	(0.0141)	(0.0141)
$E[S]_{jt} \times 1(April)_t$: $\beta_{2,3}$	0.00186	0.00144	0.00132	0.00136
	(0.0137)	(0.0135)	(0.0135)	(0.0135)
$E[S]_{jt} \times 1(May)_t$: $\beta_{2,4}$	0.00763	0.00707	0.00761	0.00766
	(0.0136)	(0.0134)	(0.0134)	(0.0134)
$E[S]_{jt} \times 1(June)_t$: $\beta_{2,5}$	0.0527**	0.0503**	0.0529**	0.0528**

Table A2 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
	(0.0241)	(0.0232)	(0.0241)	(0.0240)
$E[S]_{jt} \times 1(July)_t$: $\beta_{2,6}$	-0.00547 (0.0138)	-0.00511 (0.0136)	-0.00487 (0.0135)	-0.00483 (0.0135)
$E[S]_{jt} \times 1(August)_t$: $\beta_{2,7}$	0.0262 (0.0183)	0.0240 (0.0179)	0.0251 (0.0180)	0.0251 (0.0180)
$E[S]_{jt} \times 1(September)_t$: $\beta_{2,8}$	0.0230 (0.0194)	0.0215 (0.0188)	0.0220 (0.0189)	0.0220 (0.0189)
$E[S]_{jt} \times 1(October)_t$: $\beta_{2,9}$	-0.00078 (0.0130)	-0.00155 (0.0127)	-0.000583 (0.0127)	-0.000604 (0.0127)
$E[S]_{jt} \times 1(November)_t$: $\beta_{2,10}$	0.0222 (0.0154)	0.0206 (0.0152)	0.0213 (0.0151)	0.0213 (0.0150)
$E[S]_{jt} \times 1(December)_t$: $\beta_{2,11}$	0.0225 (0.0166)	0.0211 (0.0164)	0.0211 (0.0163)	0.0212 (0.0163)
$E[S]_{jt} \times$ time trend (t12=0 in 2012): $\beta_{2,12}$	0.00428 (0.00432)	0.00392 (0.00422)	0.00385 (0.00424)	0.00385 (0.00423)
Land Cover: LC_{jt}				
$1(LC\ developed) \times 1(UrbanArea)$: $\gamma_{1,1}$				0.192 (0.146)
$1(LC\ Water/Perennial\ Snow\ \&\ Ice)$: $\gamma_{1,2}$		0.391*** (0.0970)	0.388*** (0.0973)	0.496*** (0.129)
$1(LC\ Barren\ Land)$: $\gamma_{1,3}$		0.156 (0.133)	0.159 (0.133)	0.269* (0.158)
$1(LC\ Forest)$: $\gamma_{1,4}$		0.00138 (0.0987)	0.00515 (0.0999)	0.120 (0.134)
$1(LC\ Shrub/Scrub)$: $\gamma_{1,5}$		0.218* (0.120)	0.185 (0.121)	0.282** (0.144)
$1(LC\ Herbaceous)$: $\gamma_{1,6}$		-0.254 (0.159)	-0.244 (0.159)	-0.135 (0.181)
$1(LC\ Planted)$: $\gamma_{1,7}$		0.315*** (0.101)	0.302*** (0.102)	0.405*** (0.130)
$1(LC\ Wetlands)$: $\gamma_{1,8}$		0.400*** (0.0965)	0.387*** (0.0972)	0.500*** (0.131)
Other site attributes: A_j, A_{jt}				
1(National Wildlife Refuge): $\gamma_{2,1}$	0.974*** (0.159)	0.896*** (0.162)	0.896*** (0.164)	0.893*** (0.164)
1(National Parks, etc.): $\gamma_{2,2}$	0.7271*** (0.107)	0.751*** (0.107)	0.718*** (0.109)	0.707*** (0.109)
1(National Forests, etc.): $\gamma_{2,3}$	0.407*** (0.0671)	0.454*** (0.0683)	0.446*** (0.0687)	0.444*** (0.0687)
1(Expect Endangered Bird Species): $\gamma_{2,4}$	1.097* (0.595)	1.249** (0.581)	1.203** (0.592)	1.203** (0.592)
[.5em] 1(Urban Area): $\gamma_{2,5}$	-0.618*** (0.0705)	-0.515*** (0.0740)	-0.529*** (0.0754)	-0.583*** (0.0866)
Other site attributes, Ecoregions: A_j				
$1(Blue\ Mountains)_j$: $\gamma_{2,6}$	0.600		0.574	0.607

Table A2 Continued

Variable: coefficient	(1) Ecological Economics Specification	(2) Site Attributes + Land Cover	(3) + Ecoregions, Preferred Specification	(4) + $1(LC\ Developed) \times 1(Urban\ Area)$
	(0.505)		(0.509)	(0.511)
$1(Cascades)_j$: $\gamma_{2,7}$	0.370		0.443*	0.444*
	(0.260)		(0.261)	(0.260)
$1(Coast\ Range)_j$: $\gamma_{2,8}$	0.610**		0.672**	0.670**
	(0.267)		(0.263)	(0.263)
$1(Columbia\ Plateau)_j$: $\gamma_{2,9}$	0.757*		0.719*	0.731*
	(0.403)		(0.405)	(0.406)
$1(East\ Cascades/Foothills)_j$: $\gamma_{2,10}$	0.778*		0.873**	0.892**
	(0.356)		(0.357)	(0.358)
$1(Klamath\ Mtns,\ Coast\ Range)_j$: $\gamma_{2,11}$	0.032		0.132	0.156
	(0.340)		(0.340)	(0.340)
$1(North\ Cascades)_j$: $\gamma_{2,12}$	0.081		0.161	0.171
	(0.311)		(0.313)	(0.313)
$1(North\ Rockies)_j$: $\gamma_{2,13}$	1.722***		1.686***	1.686***
	(0.541)		(0.543)	(0.543)
$1(Willamette\ Valley)_j$: $\gamma_{2,14}$	1.024***		0.992***	0.985***
	(0.268)		(0.266)	(0.266)
†$Congestion/Popularity_{jt}$: $\gamma_{2,15}$	194.1***	191.6***	191.2***	191.3***
	(12.10)	(12.05)	(12.09)	(12.10)
$(Congestion/Popularity_{jt})^2$: $\gamma_{2,16}$	-3826.9***	-3780.4***	-3697.1***	-3712.2***
	(403.3)	(395.6)	(402.5)	(403.4)
Sample selection correction terms				
$C_j^i \times$ dev. mean incl. prop	0.00977***	0.00982***	0.00954***	0.00951***
	(0.00237)	(0.00234)	(0.00236)	(0.00236)
$E[S]_{jt} \times$ dev. mean incl. prop.	0.0136	0.0131	0.0125	0.0125
	(0.00968)	(0.00912)	(0.00931)	(0.00930)
Sample Selection?	Yes	Yes	Yes	Yes
Time fixed effects?	Yes	Yes	Yes	Yes
Ecoregion indicators?	Yes	No	Yes	Yes
Total Alternatives	338,944	338,944	338,944	338,944
Log Likelihood	-6233.8227	-6229.40	-6214.85	-6213.98
AIC	12535.6	12522.79	12511.71	12511.97
BIC	12900.6	12866.27	12951.79	12962.78

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
† Share of all eBird trips, same month, last year, to site j

NOTES: Estimates estimated via STATA *mixlogit.ado*. These results use 500 Halton draws for the mixed logit model simulations. Baseline coefficient represents the marginal utility for an eBirder who has the average propensity of eBird members to have given is home address information at the time of registration and is visiting a rural site that is not managed for biodiversity in the Puget Lowland in January of 2012. Models are the results for choice sets within a 90-minute drive from a member's home.

Table A5: Variations in the value of a birding trip by type of land cover at the destination (calculated at mean species richness and mean congestion level, for June 2012, unmanaged site, no endangered species reported, non-urban destination in the Puget Lowlands).

Simulation	$ Total WTP for trip	$ Marg WTP (per species)
Developed (baseline)	275.77*** (165.96, 391.83)	3.43*** (1.99, 4.95)
Water	286.17*** (176.58, 402.75)	"
Barren Land	275.77*** (165.96, 391.83)	"
Forest	274.29*** (164.29, 389.86)	"
Shrubland	280.82*** (171.30, 397.51)	"
Herbaceous	267.28*** (156.83, 383.10)	"
Planted/Cultivated	281.52*** (172.03, 397.30)	"
Wetlands	286.11*** (175.87, 402.73)	"

NOTE: Across 10,000 draws from the joint distribution of the parameter estimates: mean and 5th and 95th percentiles of the simulated sampling distribution for WTP. Interval reflects precision of the parameter estimates. Relative to the omitted category of Developed, only the indicators for Water, Planted/Cultivated, and Wetlands bear statistically significant coefficients in Model 3.

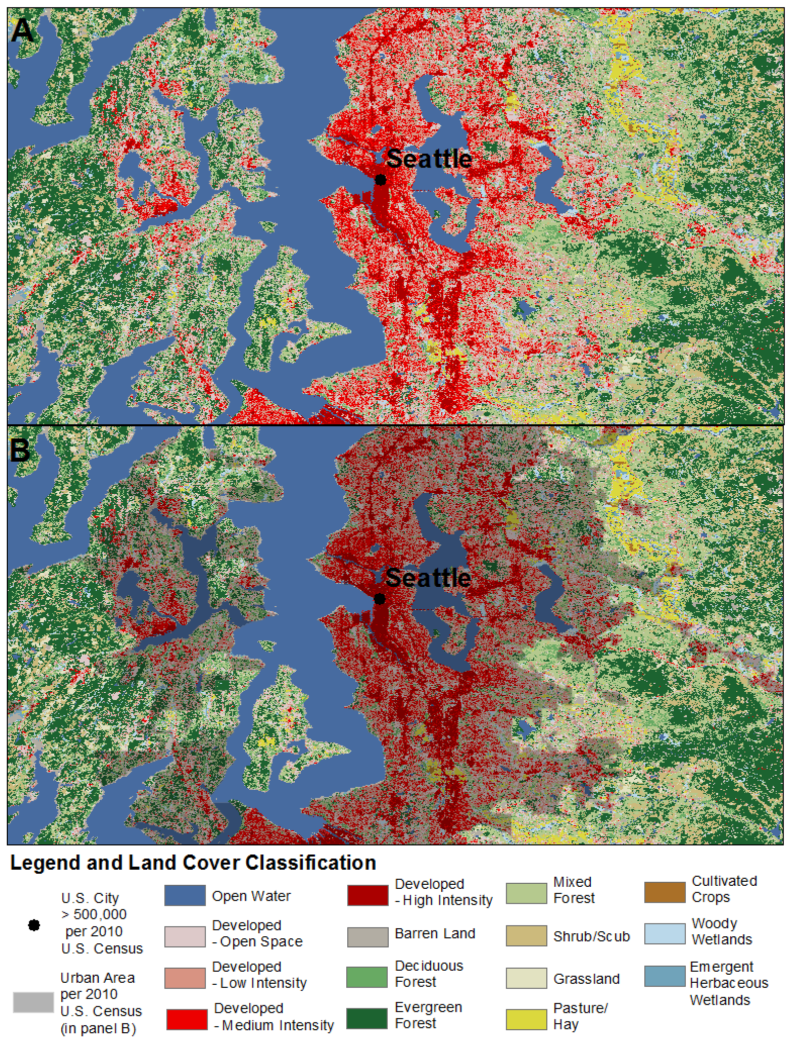
Table A6: Selected simulations based on the parameter estimates in Model (with total number of species)

Simulation	\$ Total WTP for trip	\$ Marg WTP (per species)
D. By presence of endangered species in previous calendar year		
(At means of cont. variables, June, 2012, not managed, rural, developed, Puget Lowlands)		
No endangered species present	275.77***	3.43***
	(165.96, 391.83)	(1.99, 4.95)
Endangered species present	327.24***	"
	(211.12, 453.10)	
E. By management regime (A_{jt} variables)		
(At mean $E[S]$, mean congestion, June, 2012, rural, developed, Puget Lowlands)		
National Wildlife Refuges	318.24***	3.43***
	(207.07, 436.28)	(1.99, 4.95)
National Parks, etc.	296.22***	"
	(185.51, 413.15)	
National Forests, etc.	287.13***	"
	(176.78, 403.90)	
Not managed (repeat)	275.77***	"
	(165.96, 391.83)	
F. By urban/rural (a A_{jt} variable)		
(At mean $E[S]$, mean congestion, June, 2012, not managed, developed, Puget Lowlands)		
Urban	260.00***	3.43***
	(150.90, 375.41)	(1.99, 4.95)
Rural	275.77***	"
	(165.96, 391.83)	
G. By congestion/popularity measure (A_{jt} variables)		
(At mean $E[S]$, June, 2012, not managed, no endangered, rural, developed, Puget Lowlands)		
Mean eBird congestion=0	260.87***	3.43***
	(151.59, 376.07)	(1.99, 4.95)
Mean eBird congestion=.000645	264.18***	"
	(154.97, 379.58)	
Mean eBird congestion=.010481	304.47***	"
	(193.72, 421.86)	
H. By Ecoregion (A_{jt} variables)		
(At mean $E[S]$, mean congestion, June, 2012, not managed, no endangered, rural, developed)		
Blue Mountains	253.75***	3.43***
	(136.76, 376.92)	(1.99, 4.95)
Cascades	293.46***	"
	(181.85, 409.96)	
Coast Range	292.38***	"
	(181.02, 409.97)	
Columbia Plateau	263.39***	"
	(147.73, 385.41)	
Eastern Cascades Slopes and Foothills	248.28***	"
	(136.45, 366.19)	
Klamath Mtns and CA High N. Coast Range	277.60***	"
	(166.32, 394.24)	
North Cascades	251.30***	"
	(141.01, 368.94)	
Northern Basin and Range	275.77***	"
	(165.96, 391.83)	
Northern Rockies	281.19***	"
	(164.42, 406.34)	
Puget Lowlands	275.77***	"
	(165.96, 391.83)	
Willamette Valley	311.27***	"
	(199.24, 429.73)	

H Additional Figures

Figure A1

(a) Comparison for the Seattle MSA



(b) Comparison for the Portland MSA

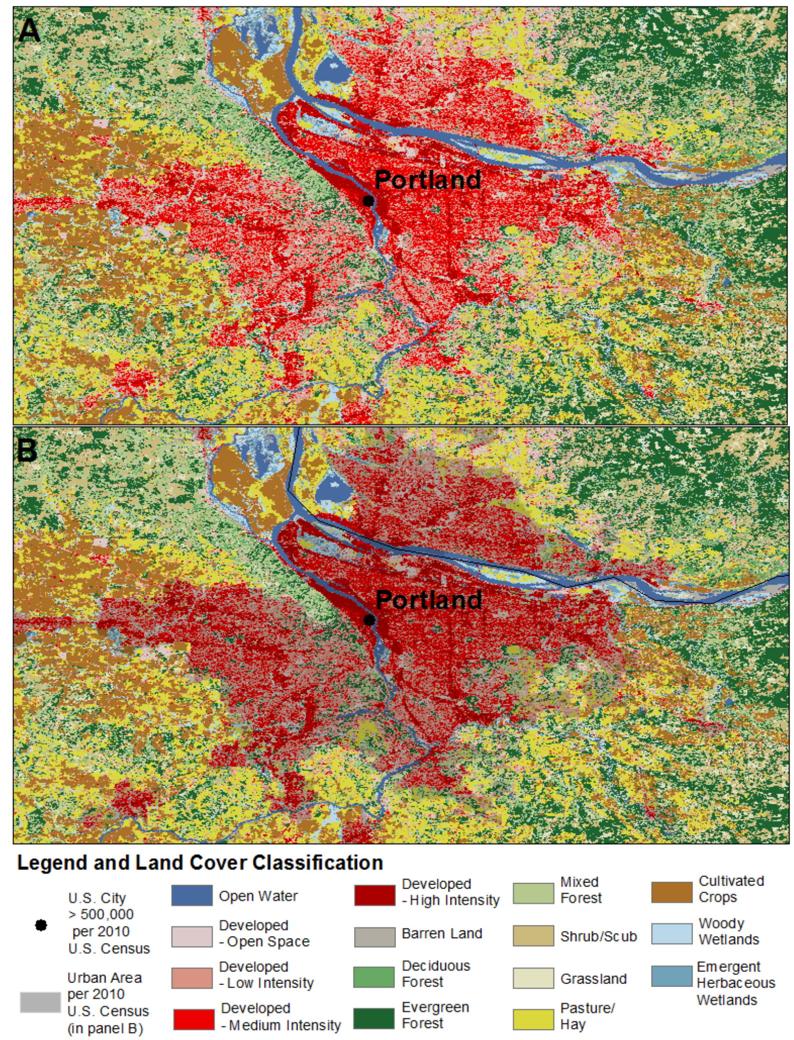


Figure A2: Map of EV for eBird Users based on the 2020s (BBS) forecasts

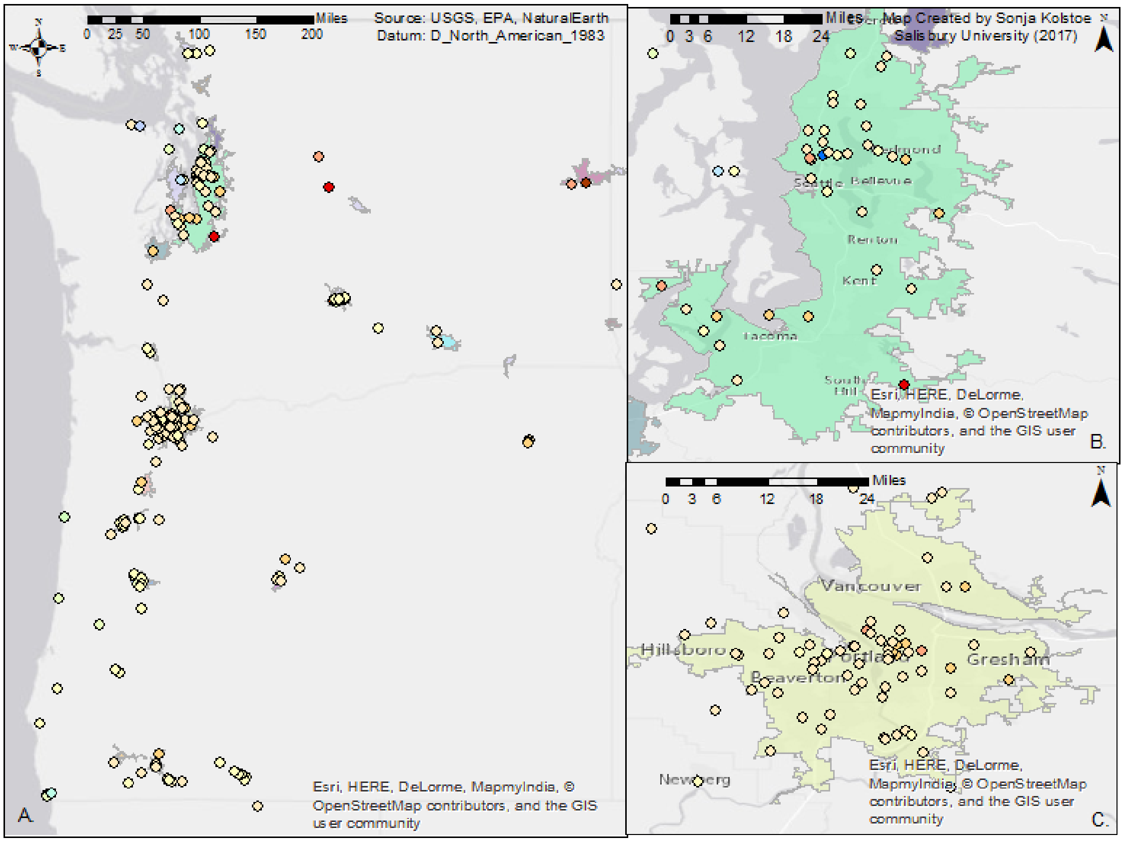


Figure: These maps shows the areas that are currently defined as Urban Areas per the 2010 U.S. Census. The dots represent where eBirders in the sample live and the color of the dot represent the monetized difference in utility welfare measure.

Map A: Map of the states of Oregon and Washington
Map B: Map of the greater Seattle area
Map C: Map of the greater Portland area

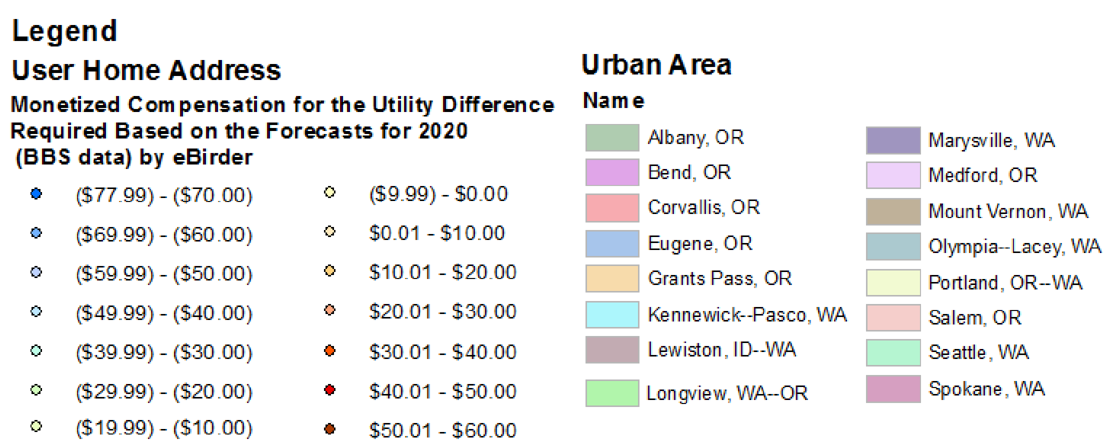


Figure A3: Map of EV for eBird Users based on the 2050s (BBS) forecasts

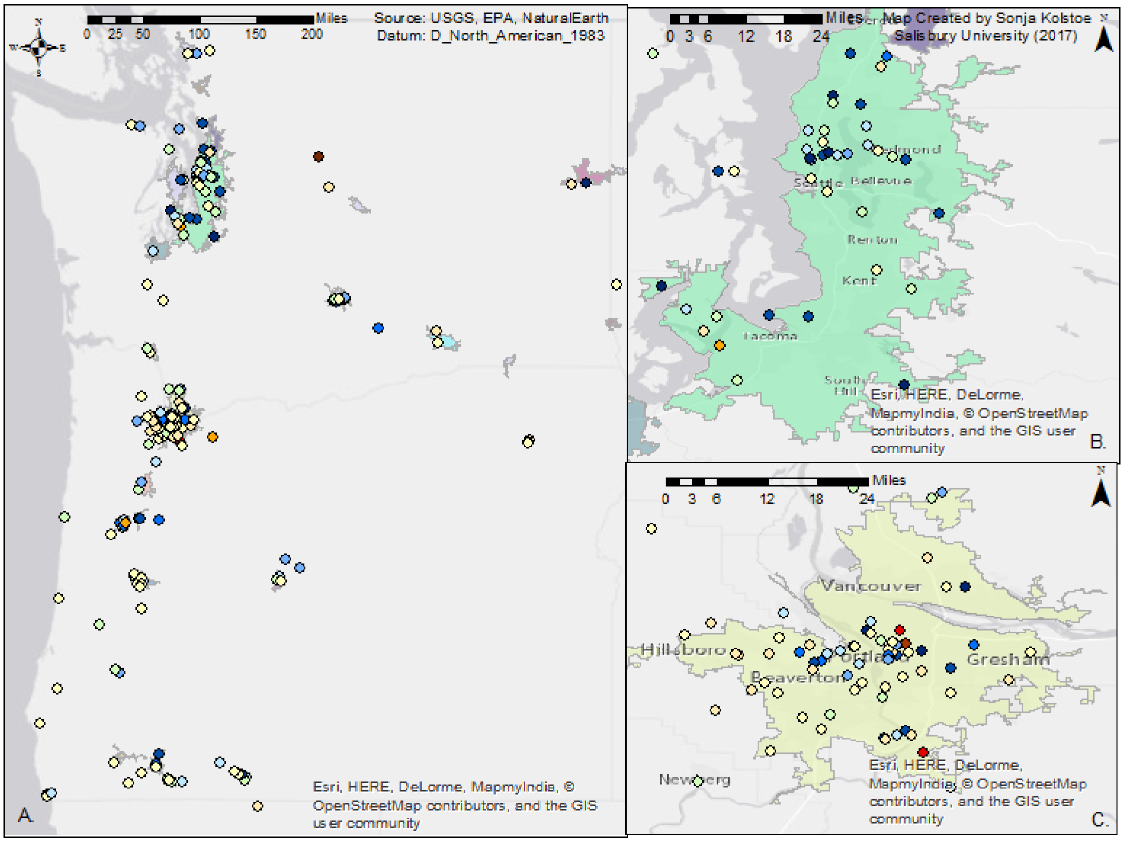


Figure: These maps shows the areas that are currently defined as Urban Areas per the 2010 U.S. Census. The dots represent where eBirders in the sample live and the color of the dot represent the monetized difference in utility welfare measure.

Map A: Map of the states of Oregon and Washington
Map B: Map of the greater Seattle area
Map C: Map of the greater Portland area

Legend

User Home Address

Monetized Compensation for the Utility Difference Required Based on the Forecasts for 2050 (BBS data) by eBirder

- ($285.45) - ($200.00)
- ($199.99) - ($100.00)
- ($99.99) - ($80.00)
- ($79.99) - ($60.00)
- ($59.99) - ($40.00)
- ($39.99) - ($20.00)
- ($19.99) - $0.00
- $0.01 - $20.00
- $20.01 - $40.00
- $40.01 - $60.00
- $60.01 - $80.00
- $80.01 - $100.00

Urban Area

Name

- Albany, OR
- Bend, OR
- Corvallis, OR
- Eugene, OR
- Grants Pass, OR
- Kennewick--Pasco, WA
- Lewiston, ID--WA
- Longview, WA--OR
- Marysville, WA
- Medford, OR
- Mount Vernon, WA
- Olympia--Lacey, WA
- Portland, OR--WA
- Salem, OR
- Seattle, WA
- Spokane, WA

Figure A4: Map of EV for eBird Users based on the 2020 (CBC) forecasts

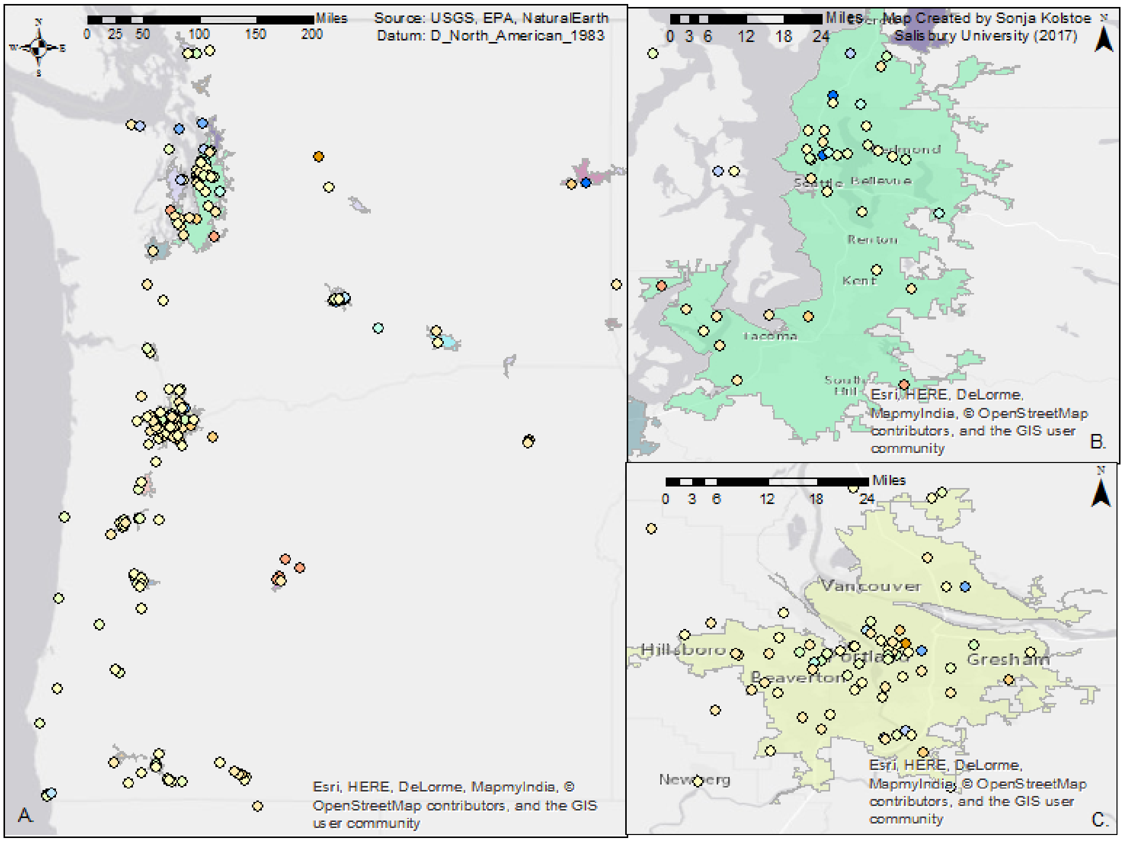


Figure: These maps shows the areas that are currently defined as Urban Areas per the 2010 U.S. Census. The dots represent where eBirders in the sample live and the color of the dot represent the monetized difference in utility welfare measure.

Map A: Map of the states of Oregon and Washington
Map B: Map of the greater Seattle area
Map C: Map of the greater Portland area

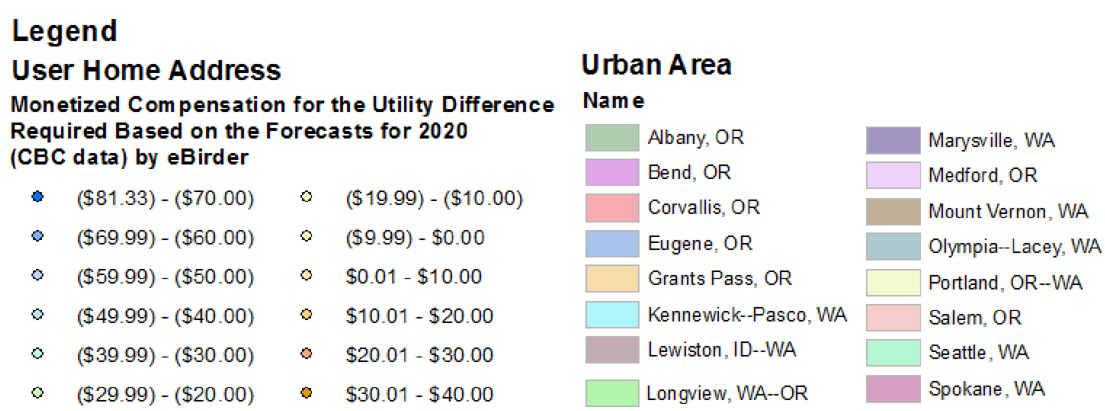


Figure A5: Map of EV for eBird Users based on the 2050s (CBC) forecasts

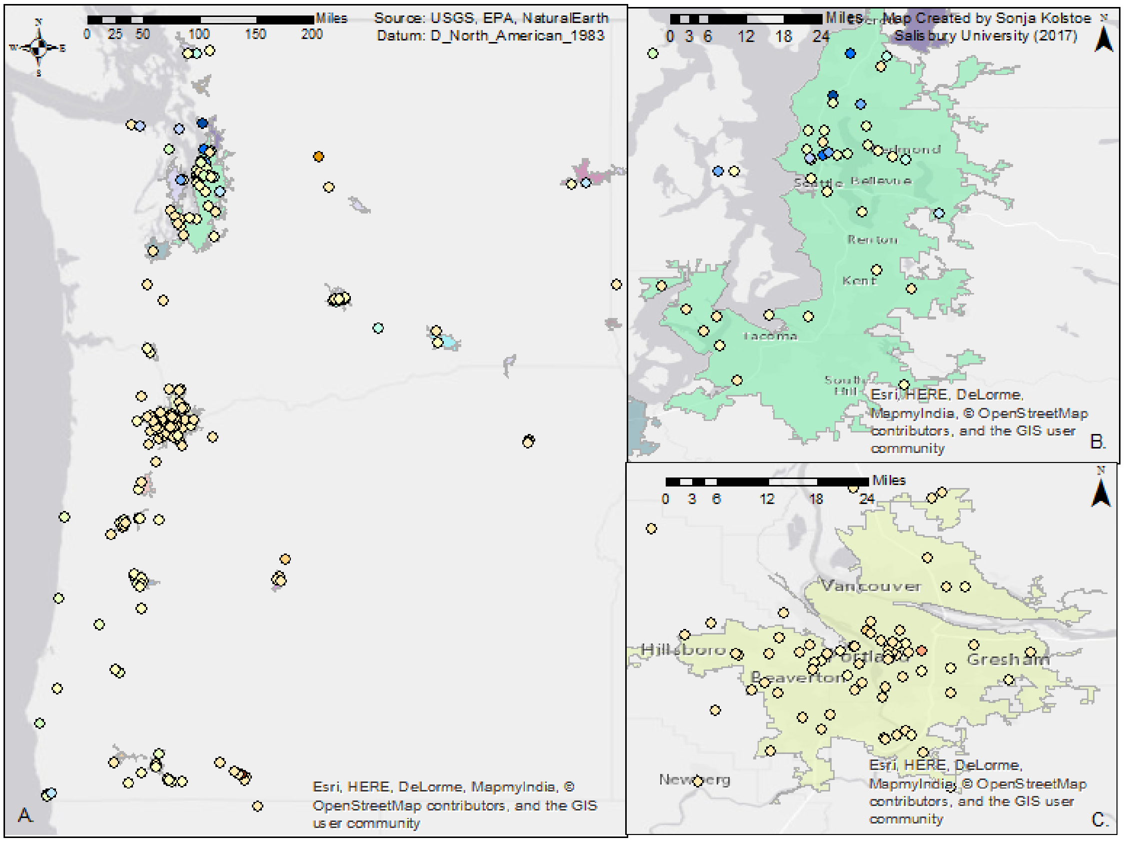


Figure: These maps shows the areas that are currently defined as Urban Areas per the 2010 U.S. Census. The dots represent where eBirders in the sample live and the color of the dot represent the monetized difference in utility welfare measure.

Map A: Map of the states of Oregon and Washington
Map B: Map of the greater Seattle area
Map C: Map of the greater Portland area

Legend

User Home Address

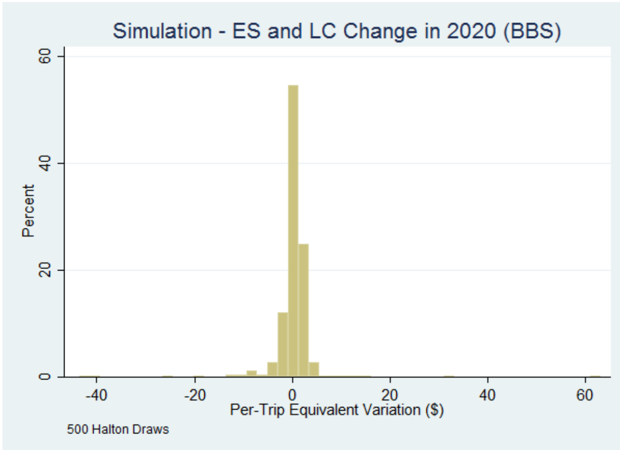
Monetized Compensation for the Utility Difference Required Based on the Forecasts for 2050 (CBC data) by eBirder

- ($112.07) - ($100.00)
- ($99.99) - ($90.00)
- ($89.99) - ($80.00)
- ($79.99) - ($70.00)
- ($69.99) - ($60.00)
- ($59.99) - ($50.00)
- ($49.99) - ($40.00)
- ($39.99) - ($30.00)
- ($29.99) - ($20.00)
- ($19.99) - ($10.00)
- ($9.99) - $0.00
- $0.01 - $10.00
- $10.01 - $20.00
- $20.01 - $30.00
- $30.01 - $40.00
- $40.01 - $50.00
- $50.01 - $60.00
- $60.01 - $70.00
- $70.01 - $80.00
- $80.01 - $90.00
- $90.01 - $100.00
- $100.01 - $146.62

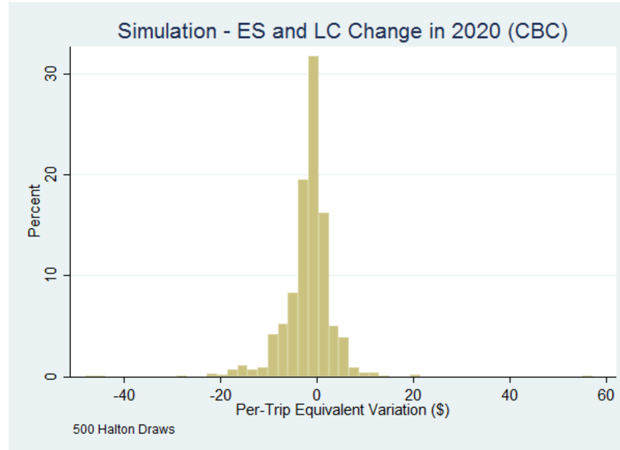
Urban Area

Name

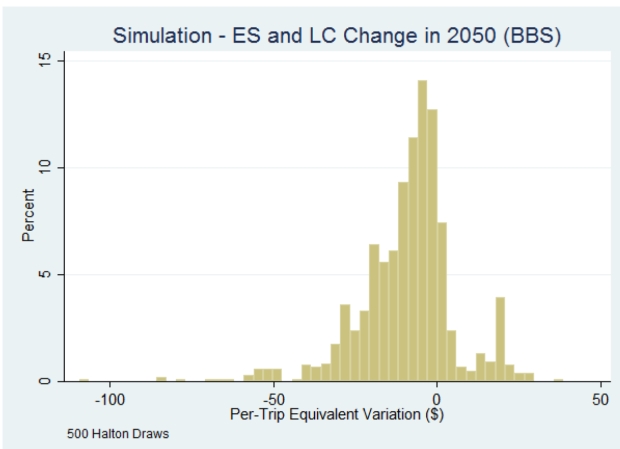
- Albany, OR
- Bend, OR
- Corvallis, OR
- Eugene, OR
- Grants Pass, OR
- Kennewick--Pasco, WA
- Lewiston, ID--WA
- Longview, WA--OR
- Marysville, WA
- Medford, OR
- Mount Vernon, WA
- Olympia--Lacey, WA
- Portland, OR--WA
- Salem, OR
- Seattle, WA
- Spokane, WA



(a)



(b)



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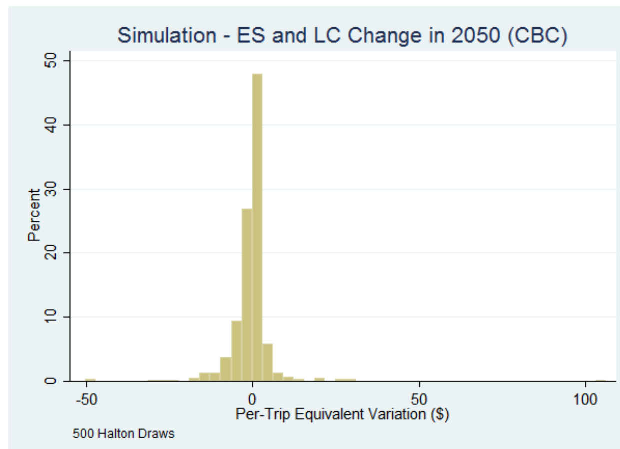
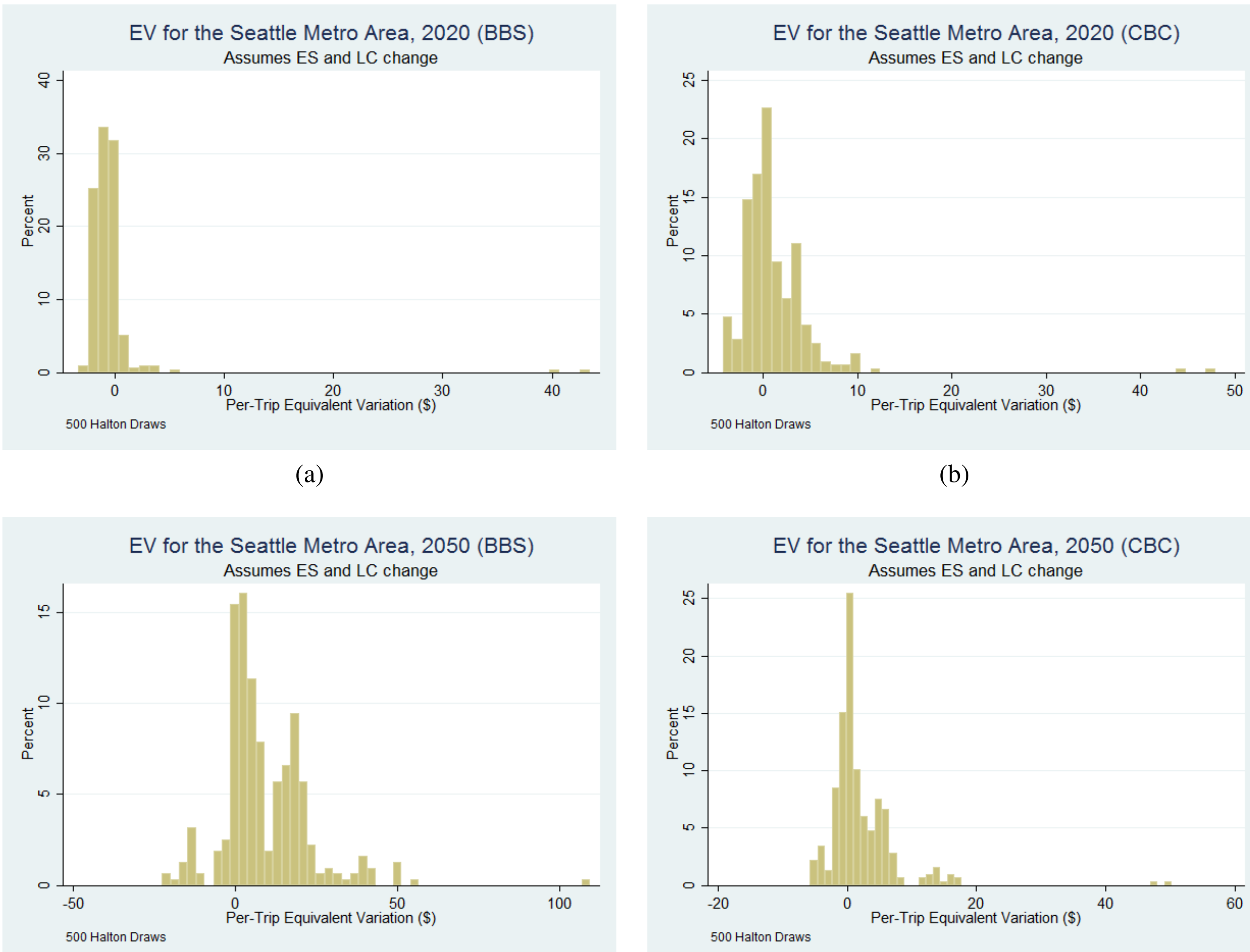


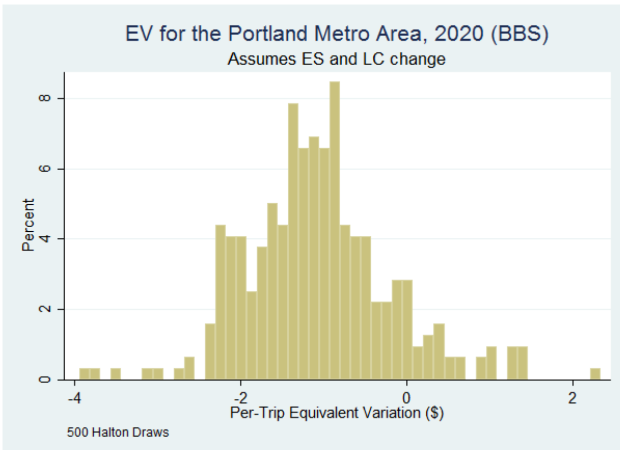
(d)

Figure A6: Per-trip EV simulations allowing both the expected number of bird species and land cover to change based on based on the forecasts

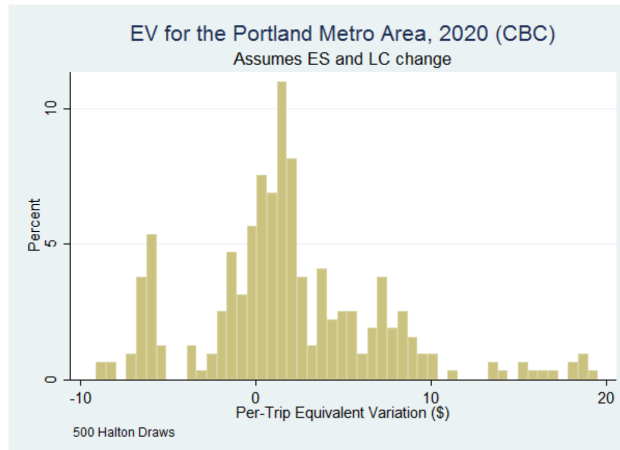


(a) (b) (c) (d)

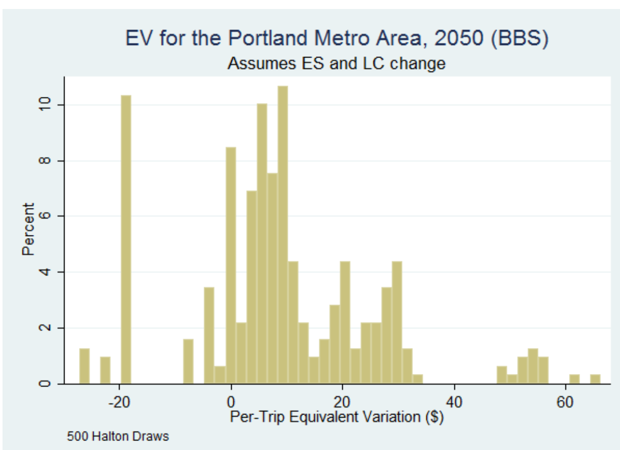
Figure A7: Per-trip EV simulations allowing both the expected number of bird species and land cover to change based on based on the forecasts for trips of users in the Seattle metropolitan area



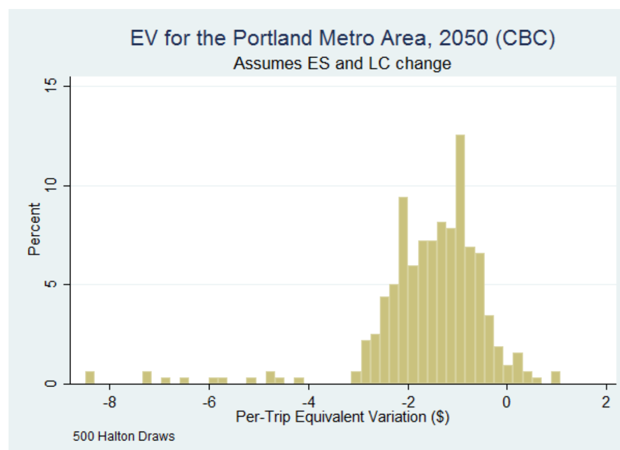
(a)



(b)



(c)



(d)

Figure A8: Per-trip EV simulations allowing both the expected number of bird species and land cover to change based on based on the forecasts for trips of users in the Portland metropolitan area

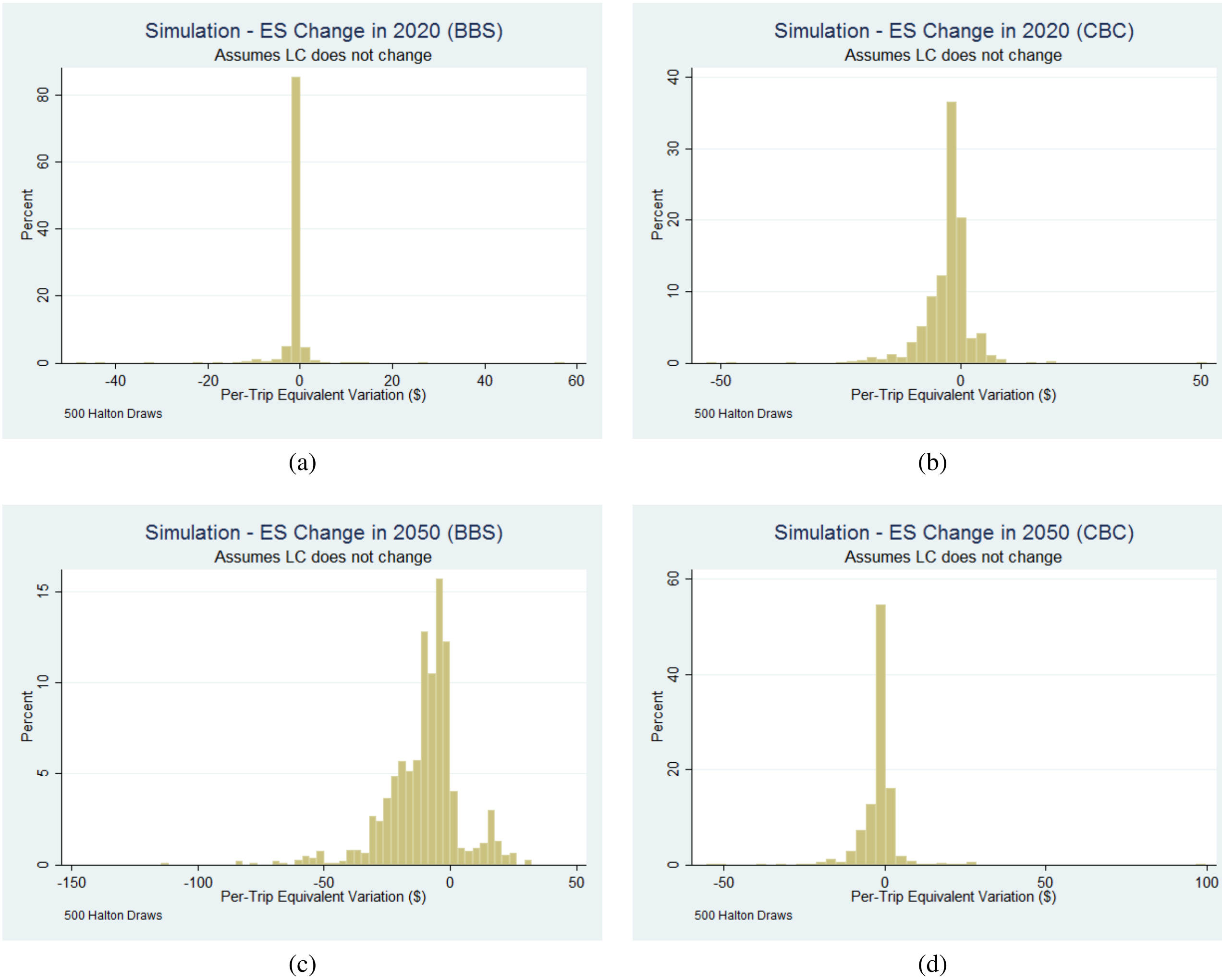
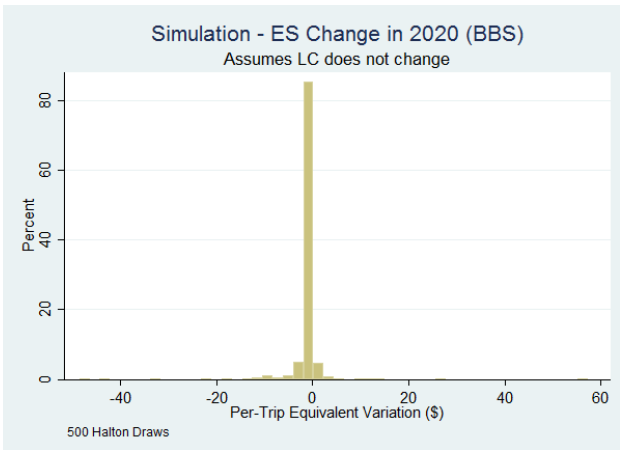
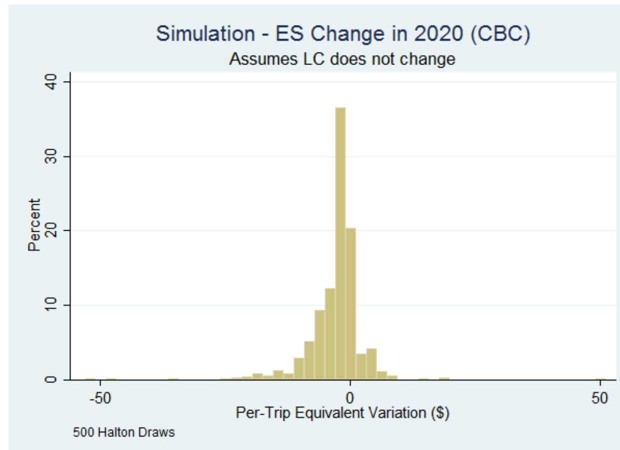


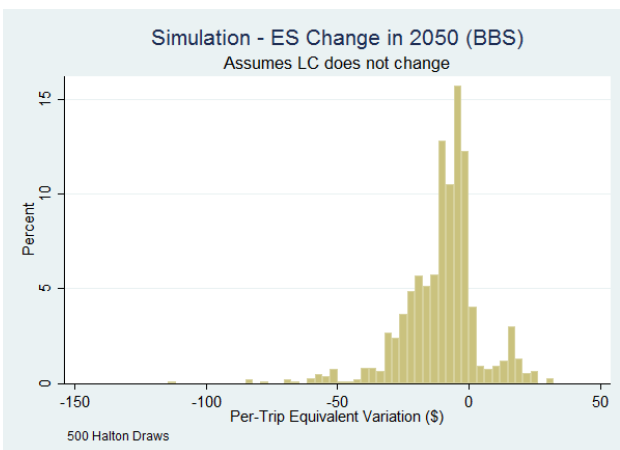
Figure A9: Per-trip EV simulations allowing only the expected number of bird species to change based on based on the forecasts



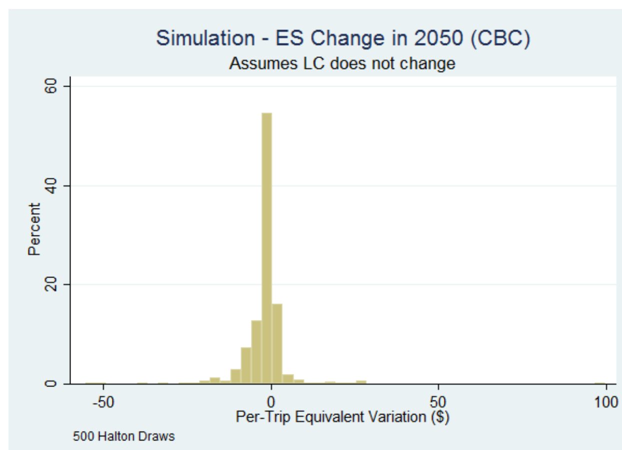
(a)



(b)

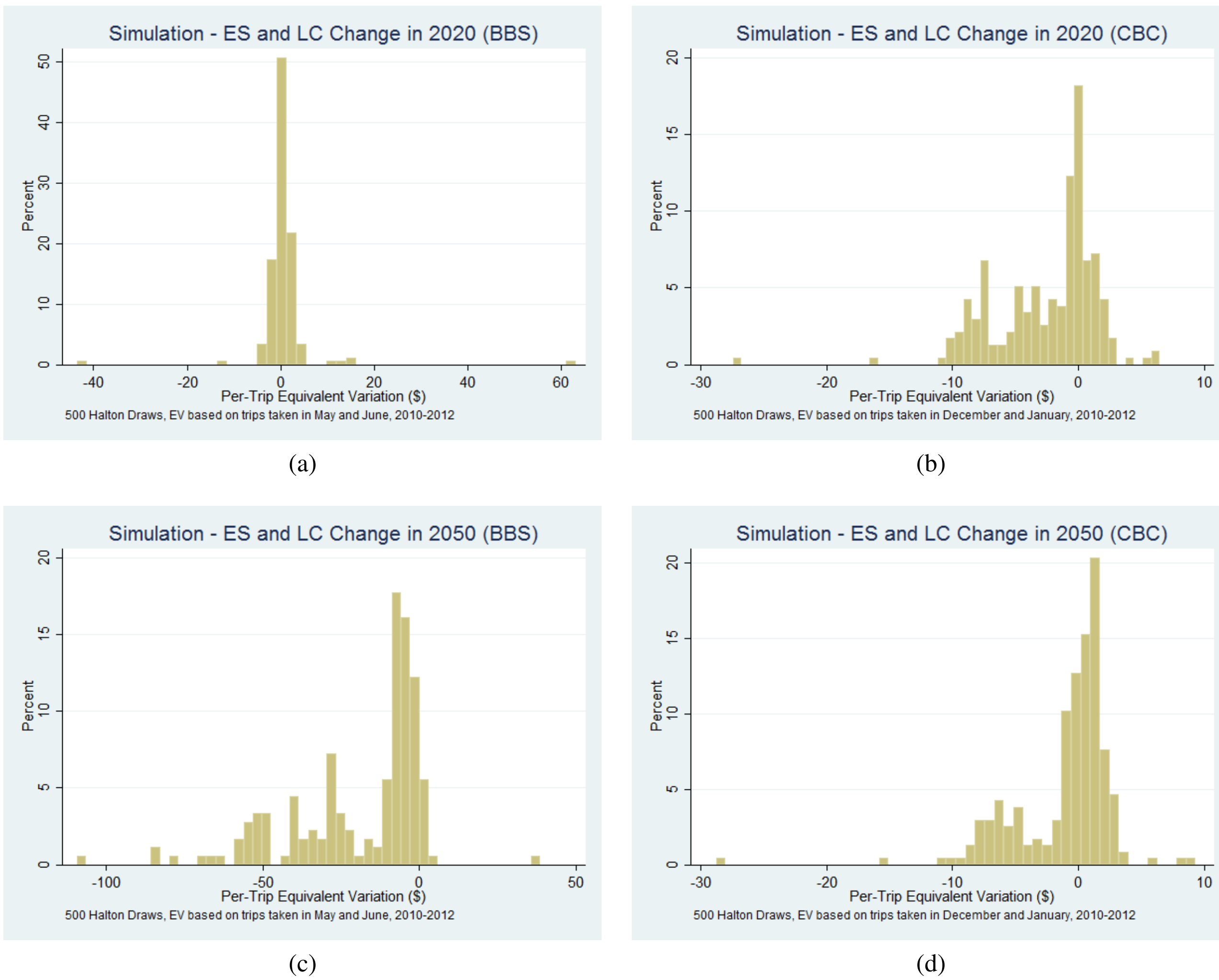


(c)



(d)

Figure A10: Per-trip EV simulations allowing only the land cover to change based on based on the forecasts



(a) (b) (c) (d)

Figure A11: Per-trip EV simulations allowing both the expected number of bird species and land cover to change based on based on the forecasts – using only trips taken in May and June for the BBS forecasts and only trips taken in December and January for the CBC forecasts