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Impacts of Increasing Temperature on the Future Incidence of West Nile Neuroinvasive Disease in the United States

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Abstract

Multiple studies have identified links between climate and West Nile virus disease since the virus arrived in North America. Here we sought to extend these results by developing a Health Impact Function (HIF) to generate county-level estimates of the expected annual number of West Nile neuroinvasive disease (WNND) cases based on the county's historical WNND incidence, annual average temperature, and population size. To better understand the potential impact of projected temperature change on WNND risk, we used the HIF to project the change in expected annual number of WNND cases attributable to changing temperatures by 2050 and by 2090 using data from five global climate models under two representative concentration pathways (RCP4.5 and RCP8.5). To estimate the costs of anticipated changes, as well as to enable comparisons with other public health impacts, projected WNND cases were allocated to nonfatal and fatal outcomes, then monetized using a cost-of-illness estimate and the U.S. Environmental Protection Agency's value of a statistical life, respectively. We found that projected future temperature and population changes could increase the expected annual number of WNND cases to ≈2000 - 2200 cases by 2050 and to ≈2700 - 4300 cases by 2090, from a baseline of 970 cases. Holding population constant at future levels while varying temperature from a 1995 baseline, we estimated projected temperature change alone is responsible for ≈590 and ≈960 incremental WNND cases in 2050 and 2090 (respectively) under the RCP4.5 scenario, and ≈820 and ≈2500 cases in 2050 and 2090 (respectively) for the RCP8.5 scenario, with substantial regional variation. The monetized impact of these temperature-attributable incremental cases is estimated at $0.5 billion in 2050 and $1.0 billion in 2090 under the RCP4.5 scenario, and $0.7 billion in 2050 and $2.6 billion in 2090 under the RCP8.5 scenario (undiscounted 2015 U.S. dollars).

Keywords

Human Health, Climate Change, Temperature, West Nile Virus, West Nile Neuroinvasive Disease, Economic Impacts

1. Introduction

West Nile virus (WNV) is the most widely distributed arthropod-borne virus in the world and the leading cause of arthropod-borne viral disease in the United States [1] [2]. WNV's ability to exploit new ecological niches is exemplified by its rapid spread across the Western Hemisphere: after being first detected in the Western Hemisphere in 1999, it was present in much of the Americas by 2005 [3] [4]. The virus is now endemic throughout most of the continental United States, being transmitted between passerine birds and several species of mosquitoes in the genus *Culex*, with incidental infection of humans during periods of high transmission [1] [5].

WNV disease is classified as a nationally notifiable health outcome; accordingly, state health agencies are responsible for reporting cases to the Centers for Disease Control and Prevention (CDC) [6] [7]. West Nile disease cases can be distinguished by severity of the patient's symptoms [6] [7]. Milder cases may produce symptoms (e.g., fever, headache, rash, vomiting) that are indistinguishable from other illnesses [6] [8], raising questions about the reporting accuracy for these milder WNV expressions because of potential under-reporting and misclassification. In contrast, cases of West Nile neuroinvasive disease (WNND), which occur for less than 1% of people infected with the disease, affect the brain or cause neurologic dysfunction and typically result in a patient's hospitalization [6] [9]. Because it is unlikely that these WNV patients could or would avoid hospitalization given the severity of their symptoms, there is more certainty in summaries of WNND cases [7] [10].

Climate change has the potential to alter the geographic distributions of WNV and its vectors (e.g., [11] [12] [13] [14]). WNV disease outbreaks have been associated with climate variables, including temperature and precipitation, in a number of studies [10] [13] [15] [16] [17] [18] [19]. While the nature and strength of the observed associations have varied in these studies according to the region and lag-times among other factors, above-normal temperatures have been among the most consistent predictors of outbreaks, due in part to the acceleration of viral incubation in mosquitoes and increased mosquito reproduction rates at higher temperatures [19] [20] [21] [22] [23].

This analysis was undertaken as part of the U.S. Environmental Protection Agency's (USEPA's) Climate Change Impacts and Risk Analysis (CIRA) project [24]. CIRA focuses on quantifying the degree to which global greenhouse gas

(GHG) mitigation and climate adaptation may reduce climate change-related risks and damages in the United States compared to futures with little or no action across multiple sectors (e.g., human health, infrastructure, water resources). The CIRA framework is designed to enable comparisons of impacts across space, time, and sectors by combining existing quantitative relationship estimates with a consistent set of socioeconomic and climate projection data. This analysis expands CIRA's sectoral coverage to the health impacts of climate-sensitive, vector-borne disease. Given the WNV reporting accuracy concerns, we focused on relationships that could be used to quantify the future incidence of WNND. Like WNV incidence, WNND incidence has been previously linked to several climate variables, including temperature [10] [18], precipitation [10] [18], and drought [18]. We incorporated and expand on the relationship between temperature and the probability of above-average WNND incidence by region developed in [10] to quantify future cases and economic impacts under two climate scenarios.

We generated county-level estimates of the expected annual WNND incidence rate for 2050 and 2090 using temperature data from five global climate models (GCMs) under two representative concentration pathways (RCP4.5 and RCP8.5). We then combined these results with projections of county-level populations to calculate the potential number of WNND cases for 2050 and 2090. To isolate the impact of projected temperature changes, we computed the change in the expected number of WNND cases holding populations constant. Finally, we monetized these climate-attributable WNND effects to express the impact in dollars so that they can be more readily compared with other sectoral impact estimates within the CIRA framework [24].

2. Materials and Methods

We designed and implemented a health impact assessment model to estimate the effect of projected temperature changes on the future number of WNND cases. Section 2.1 describes the development of the Health Impact Function (HIF), which relates temperature to the expected annual number of WNND cases. Section 2.2 summarizes the data and approach used to project the change in expected annual number of WNND cases in the United States. Section 2.3 describes our approach to monetizing temperature-attributable changes in the number of WNND cases.

2.1. Linking Temperature and Expected Annual Number of WNND Cases in the U.S. Population

The HIF was developed based on the approach, as well as the environmental, WNND case, and population data for 2004-2012, used in [10]. Specifically, we obtained estimates of the model used in [10] that linked a county's standardized annual temperature to the probability that its year-specific, standardized WNND incidence rate (IR) would exceed a z-score value of 0.5. The model allowed for regional heterogeneity in the effect of temperature on the probability of elevated WNND IR by estimating these relationships separately for 10 climate regions.

Notably, these relationships were not originally statistically significant in three of the regions. Because this model involved county-level standardization of temperature and WNND IR, we parameterized the HIF separately for each county with reported cases.

We used four analytical steps to specify a county-specific HIF. First, we used observed county-specific average annual temperature data for 2004-2012, corresponding to years of elevated county-level WNND data, to develop annual average-temperature standardization formulas for each county. Second, we developed region-specific relationships that convert standardized temperature values to the probability that the standardized WNND IR would exceed 0.5. Third, we used historical WNND IR data to compute a county-specific high incidence rate threshold (HIRT), one that corresponded to the standardized WNND IR of 0.5. Fourth, we specified a functional relationship that linked the estimated probability of the WNND IR to exceed a county-specific HIRT and the expected number of WNND cases per person per year, under the assumption that the WNND county-level counts are generated by a Poisson process. Numerical optimization techniques were used to solve for the expected county-level number of WNND cases per person per year, based on the HIRT and the temperature-dependent HIRT exceedance probability. Additional details on this method are presented in Appendix 1.

2.2. Projecting Change in the Expected Annual Number of WNND Cases in the United States

For consistency with the CIRA project modeling framework [23], we projected the potential change in the expected annual number of WNND cases in the United States between a baseline climate year of 1995 and two future reporting years of 2050 and 2090. The expected annual number of WNND cases for each of these three climate periods was estimated using 20 years of modeled climate data around the reporting year (*i.e.*, 1986-2005 for 1995, 2040-2059 for 2050, and 2080-2099 for 2090). We used the county-level HIFs to integrate the reporting year-specific annual average temperature data and population size estimates.

We obtained future temperature projections from a subset of five GCMs from the full suite of the fifth Coupled Model Intercomparison Project (CMIP5; [25]): CCSM4, GISS-E2-R, CanESM2, HadGEM2-ES, and MIROC5. These models reflect a large range of variability in climate outcomes observed across the entire CMIP5 ensemble. Each GCM was paired with two RCPs that captured a range of plausible emissions futures. The RCPs, originally developed for the Intergovernmental Panel on Climate Change's Fifth Assessment Report, are identified by their approximate total radiative forcing in the year 2100, relative to 1750: 8.5 W/m^2 (RCP8.5) and 4.5 W/m^2 (RCP4.5). RCP8.5 reflects a future with continued high emissions growth with limited efforts to reduce GHGs, whereas RCP4.5 represents a future under a global GHG mitigation regimen. These combinations of GCMs and RCPs, selected for use in the CIRA project and the fourth National Climate Assessment [26], are used here to support integration and comparison of our results with other impact estimates. **Appendix 2** provides additional details regarding the GCM selection process; an overview of the selected models; and processes for producing the relevant, county-level annual temperature measures. **Appendix 2** also describes the modeled baseline climate dataset for the years 1986-2005, designated for use with the GCM projections.

All-age, county-level population projections were obtained from the Integrated Climate and Land Use Scenarios (ICLUS) v2.0 [27] for 2010, 2050, and 2090. The 2010 population estimates were used with the modeled baseline climate period for 1986-2005 to provide a more recent representation of the population. The choice to incorporate the ICLUS population projections was also made for consistency with CIRA methods where impact estimates are sensitive to population estimates.

Projections of WNND cases were created separately for each county and GCM/RCP combination for 1995 (baseline year), and two future reporting years, 2050 and 2090, by applying the county-specific HIF to the 20 annual average temperature estimates for each time period, and multiplying the per-person level of expected annual number of WNND cases by the corresponding county-level population estimate from the ICLUS v2.0 data. Given the uncertainty in choosing a single year to represent temperature conditions in baseline and future years, we calculated the change in the expected annual number of WNND cases for each of the 400 possible combinations of 20 baseline and 20 future years for 2050 and 2090. From initial county-level estimates, we separately computed results by state, region, and nationally for each GCM/RCP using the results of the 400 possible combinations of baseline and future years to define the potential distribution in our average results.

2.3. Monetizing Temperature-Related WNND Cases

We monetized future changes in the expected annual number of WNND cases attributable to rising global temperatures to reflect the potential benefits of climate mitigation to future generations from avoiding these health effects. To isolate the impact of projected changes in temperature, we calculated projected changes in the expected annual number of WNND cases while holding population sizes constant at their future values.

The appropriate economic value per WNND case depends on the case disposition with respect to the patient's survival (*i.e.*, nonfatal or fatal). For nonfatal outcomes, [28] reported the mean reimbursement for incurred hospital charges for subsets of WNND patients distinguished by their syndromes. Sixty-two patients in this group were determined to have conditions consistent with CDC's clinical criteria for WNND, including diagnoses of meningitis, encephalitis, or acute flaccid paralysis [8]. The weighted mean hospital reimbursement for these 62 patients was $41,391 after adjusting the original study values using a government price index [29] (values in our paper are in undiscounted 2015 U.S. dollars unless stated otherwise). These hospitalization costs do not account for lost productivity during the hospitalization, related follow-up outpatient costs, or pain and suffering associated with the episode [28]. Thus, this represents a conservative estimate of the value of a nonfatal WNND case. We monetized fatal WNND cases using the following year-appropriate value of a statistical life (VSL) estimates: $12,436,623 for 2050 and $15,182,273 for 2090 [24] [30].

Cohort studies and national summaries of WNND cases provide information to allocate WNND cases to fatal and nonfatal outcomes (e.g., [2] [28]). The [28]] study reported 6 of the 62 patients (9.7%) with conditions consistent with WNND died during their initial hospitalization. The mortality rate in this sample contrasts with a 6.5% mortality rate reported in the national summary of 2014 WNND cases, reflecting 87 deaths from among 1347 WNND cases [2]. We applied the lower national 2014 WNND mortality rate to allocate projected WNND cases to fatal and nonfatal outcome categories.

3. Results

3.1. Projected Temperature Increases

Approximately half of all U.S. counties reported at least one WNND case between 2004 and 2012. Differences in future temperatures from 2004 to 2012 are a major contributor to the modeled future expected annual number of WNND cases. **Figure 1** summarizes the number of years out of the 20 years modeled for each future reporting period (*i.e.*, 2050 and 2090), in which future temperatures

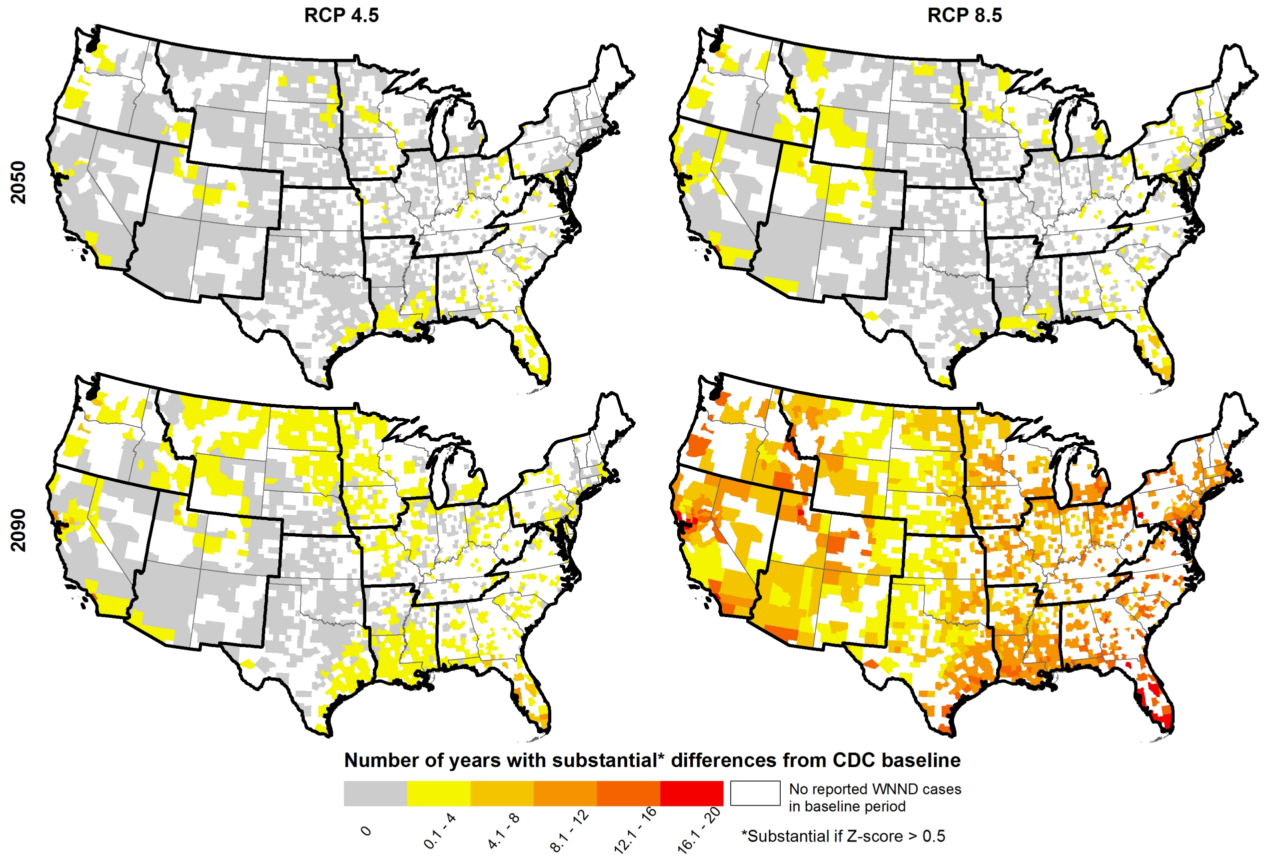

Figure 1. Summary of years with a substantial difference in projected future average temperature compared to average temperature observed during 2004-2012, among U.S. counties with at least one reported WNND case during 2004-2012.

represent a substantial difference from the baseline observed mean temperature. In the figure, a substantial difference is defined using a z-score threshold value of 0.5, when projected temperatures from a GCM are compared to mean observed temperatures for 2004-2012. Counts of years in Figure 1 reflect results averaged across the five GCMs.

The averaged results across GCMs for 2050 under both RCP4.5 and RCP8.5, and in 2009 under RCP4.5, show that few counties are projected to have more than 4 out of 20 years during which projected temperatures are substantially higher compared to the observed 2004-2012 average temperature, using the 0.5 z-score threshold. However, results for 2090 under RCP8.5 stand out in contrast: even after averaging across the five GCMs, many counties are projected to have four or more future years in which temperatures are substantially different compared to the observed 2004-2012 average temperature. In particular, the results for 2090 under RCP8.5 identify a number of areas (e.g., Gulf of Mexico coast, South Florida, San Francisco Bay) where substantial annual average temperature increases are projected to occur in more than 10 of the possible 20 years. Figure 1 also indicates that there are counties in which future annual average temperatures are not substantially different from the observed 2004-2012 average temperature. However, this does not mean there is no observed temperature change in these counties. Instead, this is a reflection of our incorporating the z-score threshold to identify relatively large temperature changes. In this regard, what is particularly noticeable is the increased frequency in counties over time and the nearly complete lack of counties in 2090 under the RCP8.5 scenario, in which this threshold is not exceeded.

3.2. Projected WNND Cases

Table 1 summarizes our estimates of the expected annual number of WNND cases by climate region and RCP. Each entry in the table is an average of results over the GCMs for the calendar years corresponding to either the baseline period or one of two future climate periods. Table 1 also includes results combining the baseline climate data with future populations to support our economic analyses (results in columns 5 and 6).

Comparing the results in columns 3 and 4 in Table 1 with those in column 2 show that the expected annual average number of WNND cases increase across all climate regions in both future time periods and for both RCPs. Specifically, the results show an expected increase in WNND cases across the nation from nearly 1000 cases in the baseline period to approximately 2000 by 2050 and 2700 by 2090 under RCP4.5, and to approximately 2200 by 2050 and 4,300 by 2090 under RCP8.5. Collectively, this suggests more than a doubling of the anticipated number of annual cases by mid-century relative to the baseline (under either RCP), and a near tripling to quadrupling of the number of annual cases by late-century. Consistent with the temperature differences presented in Figure 1, the largest increase in cases in Table 1 are seen for 2090 under RCP8.5. The nearly 4,300 WNND cases for 2090 under RCP8.5 represent an increase of more than

Table 1. Projections of the expected annual number of WNND cases averaged across GCMs for RCP4.5 and RCP8.5.

Region	Results averaged over GCMs and calendar years				
	1995 climate with 2010 population	2050 climate with 2050 population	2090 climate with 2090 population	1995 climate with 2050 population	1995 climate with 2090 population
(1)	(2)	(3)	(4)	(5)	(6)
RCP4.5					
Northeast	47	171	252	65	79
Southeast	17	138	231	26	30
Ohio Valley	101	201	263	133	153
Upper Midwest	52	99	125	61	64
East South Central	80	216	288	112	130
Northern Rockies and Plains	32	111	179	49	65
Southwest[a]	164	253	309	241	291
West[a]	239	380	473	366	452
Northwest[a]	21	27	31	27	31
West South Central	219	414	549	347	441
Total cases	**971**	**2010**	**2699**	**1425**	**1736**
Total cases[a]	548	1350	1886	792	962
RCP8.5					
Northeast	47	212	524	65	79
Southeast	17	197	646	26	30
Ohio Valley	101	231	464	133	153
Upper Midwest	52	112	223	61	64
East South Central	80	250	509	112	130
Northern Rockies and Plains	32	134	365	49	65
Southwest[a]	164	257	325	241	291
West[a]	239	385	495	366	452
Northwest[a]	21	27	32	27	31
West South Central	219	439	671	347	441
Total cases	971	2244	4253	**1425**	**1736**
Total cases[b]	548	1575	3403	792	962

a. Regions where [10] did not report a statistically significant result. Totals may not sum due to rounding. b. Totals may not sum due to rounding.

2000 cases from estimates for 2050 (under either RCP) and an increase of nearly 1500 cases relative to 2090 estimates under RCP4.5.

Columns 5-6 in Table 1 provide results combining baseline climates with projected future populations to enable comparisons that isolate the relative importance of the projected temperature changes. These results do not vary by RCP because of the use of the baseline temperature data. Comparing the results in column 3 to those in column 5 shows the impact of temperature changes by 2050 on the expected annual number of WNND cases by holding the affected population constant at its 2050 value. Likewise, comparing results in column 4 to the results in column 6 shows impacts of projected temperature changes by 2090, holding the affected population constant at its 2090 value. The resulting differences in the cases from these comparisons are used to monetize the impact of the projected temperature-related changes on the expected annual number of WNND cases.

In their research, [10] did not find statistically significant associations between temperature and the WNND incidence rate in the Southwest, West, and Northwest regions. Therefore, Table 1 also provides a second set of projected national total case estimates that exclude the projected results for these regions. Removing these regions leads to projections of annual WNND cases of approximately 550 cases in the baseline period, with nearly 800 and 1300 additional WNND cases in 2050 and 2090, respectively, under RCP4.5, and roughly 1000 and 2900 additional cases in 2050 and 2090, respectively, under RCP8.5, while allowing for projected changes in population.

Figure 2 summarizes the results in columns 2, 3, and 4 of Table 1, which reflect impacts of temperature and population over time. Consistent with Figure 1, the estimates of the expected annual average number of WNND cases for 2090 under RCP8.5 in Figure 2 differ considerably from the other estimates. While all regions show increases in the future expected annual number of cases, the results for the Southeast are the most striking: the number of cases grows from fewer than 20 in the baseline to more than 640 in 2090 under RCP8.5. Appendix 3 provides detailed state-level projections (mean and distribution) of expected annual number of WNND cases across all time periods, GCMs, and RCPs, using the projected 2050 population for 2050 estimates and the projected 2090 population for 2090 estimates.

Table 2 summarizes the estimated temperature-related increases in the expected annual number of WNND cases in the United States for 2050 and 2090, along with the potential economic benefits of avoiding these additional cases. In 2050, the monetized impacts of temperature on the expected annual number of WNND cases are approximately \$0.5 billion (under RCP4.5) and \$0.7 billion (under RCP8.5), across all U.S. regions. In 2090 these impacts increase to \$1.0 billion (under RCP4.5) to \$2.6 billion (under RCP8.5). These estimates are driven almost entirely by the underlying VSL used to monetize projected fatal WNND cases, as it is nearly three orders of magnitude larger than the value for nonfatal WNND cases. Removing cases from regions where [10]'s relationships

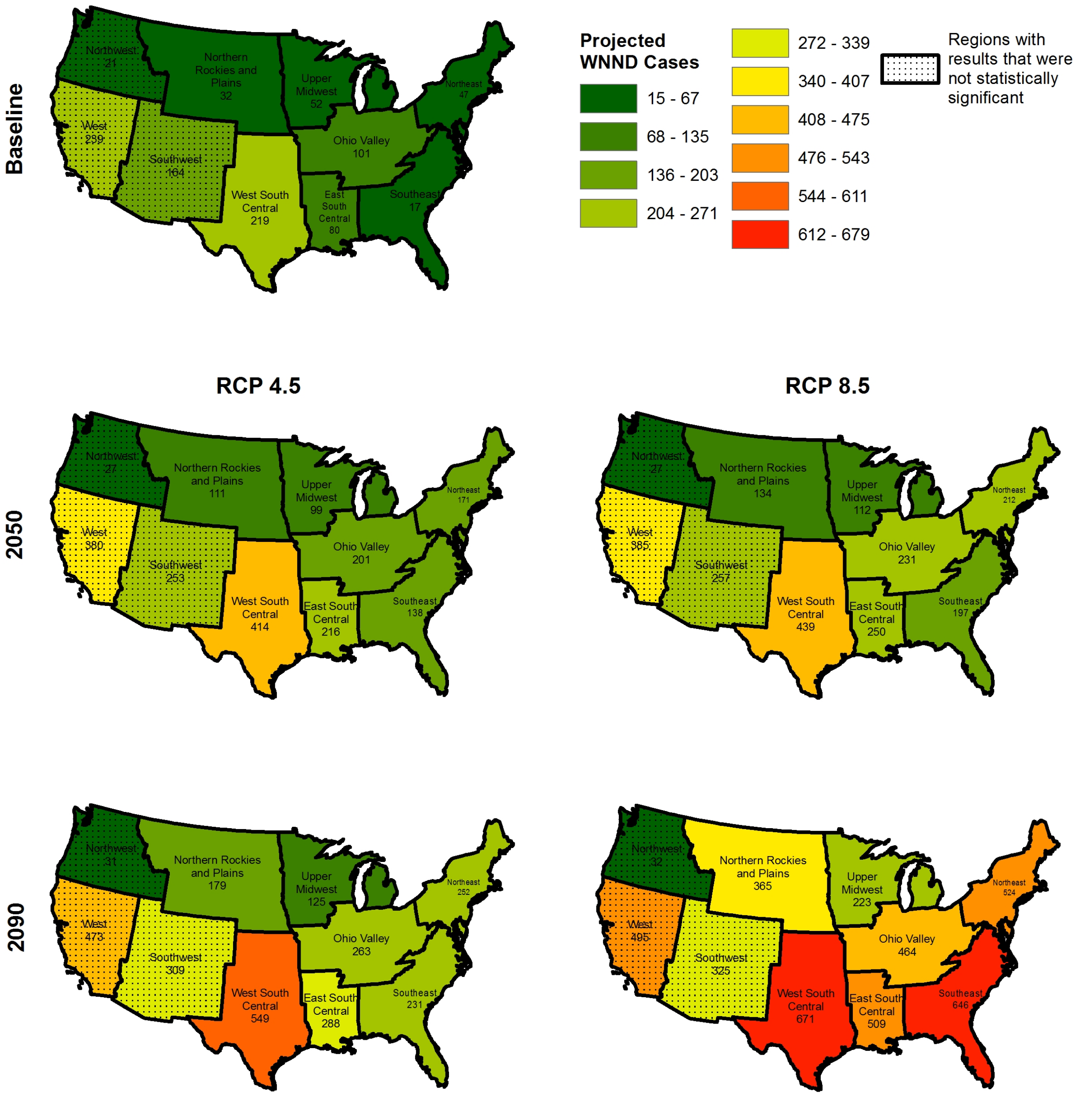

Figure 2. Projected regional WNND cases by time period and RCP. Populations are consistent with the representative year, and results are averaged over GCMs and calendar year.

were not statistically significant reduces the estimated monetized impacts only slightly.

3.3. Discussion

We projected approximately 590 additional WNND cases per year due to temperature increases by 2050 under the RCP4.5 scenario, with a monetized impact of nearly $0.5 billion. This represents an increase of approximately 40% relative to the annual number of WNND cases expected under baseline temperatures for a 2050 population, and is the most conservative estimated increase in WNND

Table 2. Monetized impact of temperature-related increases in expected annual number of WNND cases for 2050 and 2090 under RCP4.5 and RCP8.5.

	2050[a]		2090[a]	
	Annual additional cases[b]	Estimated value (millions of 2015 U.S. dollars)[c]	Annual additional cases[b]	Estimated value (millions of 2015 U.S. dollars)[c]
		RCP4.5		
Fatal	38	$470	62	$945
Nonfatal	547	$23	901	$37
Total	585	$493	963	$982
Total[d]	559	$470	924	$941
		RCP8.5		
Fatal	53	$658	163	$2469
Nonfatal	766	$32	2355	$97
Total	819	$689	2518	$2566
Total[d]	783	$660	2440	$2487

a. Case counts are in addition to the 1425 cases projected using the 1995 climate with a 2050 population and the 1736 cases projected using the 1995 climate with a 2090 population (see Table 1). b. Average of results across GCMs and modeled climate years. c. Values are U.S. dollars in year 2015 dollars and are not discounted. d. Excludes three regions (Southwest, West, and Northwest) where temperature-WNND relationships were not statistically significant in [10].

incidence we modeled. Projected temperature changes for 2050 under the RCP8.5 scenario result in roughly 820 additional WNND cases, or a 60% increase relative to the number of WNND cases expected under baseline temperatures. By 2090, the temperature-related additional WNND incidence is estimated at approximately 960 cases (under RCP4.5) and 2500 cases (under RCP8.5), representing respective increases of roughly 60% and 150%, respectively, relative to the number of WNND cases expected under baseline temperatures for the 2090 population.

There are a limited number of studies that provide a direct basis for comparison with our results. The [18] study reported a near doubling of cases from a baseline estimate while evaluating an ensemble of models using the RCP8.5 scenario for a period centered roughly around 2043. While there are significant differences in approach, the [18] results are consistent with our estimates (60% increase by 2050). Projected increases in the number of cases in our results are also within the bounds of year-to-year changes observed in recent history. For example, national totals for reported WNND cases increased from 486 in 2011 to 2873 in 2012 [7]. This suggests that our modeling reflects changes in projected cases on the order of those currently seen in outbreak years. A limitation to our method and the presentation of our results for future years is the emphasis on presenting impacts averaged over 20 years of observations across 5 climate models for a given RCP, which produced outcomes that muted the signal from particularly severe (*i.e.*, outbreak) years in these future samples. However, there is nothing in our work to suggest a diminished potential for future WNND outbreaks.

The plausibility of our results is also indirectly supported by research (e.g., [13]), concluding that climate change will increase the habitat suitable to support WNV.

A clear limit to our modeled relationship is that we only account for projected changes in temperature, one of a number of factors that can influence WNV incidence [2] [14] [15] [16] [17]. Our modeling could be enhanced by adopting a framework that accounts for both temperature and precipitation. Other factors that may be important for modeling WNND incidence, but could not be accounted for within the scope of this study, include changes in land use characteristics may affect bird, mosquito, and human distributions. However, consistent with the complexity of the WNND transmission cycle, there remains uncertainty in how these climate-sensitive factors may interact, often at different timescales, to affect WNND incidence. By highlighting these issues with respect to precipitation [18], hypotheses can be described, including, for example, how increased precipitation will increase mosquito abundance by creating breeding habitat or limit it by washing out existing suitable habitat. A related issue is that our modeling does not account for potential shifts in the suitability of habitat, which would support the expansion of WNND into counties excluded from our modeling on the basis of not having any reported cases from 2004 to 2012. The limits of this restriction are highlighted by research (e.g., [13]) that projects an increase in the habitat suitable for WNV over the 21st century.

Our modeling is also constrained by the difficulty in predicting how human behavior may respond to a changing climate. By extrapolating current statistical associations into the future, we assume that future human behavior patterns and resulting mosquito-biting exposure will vary with temperature in the same way they currently do. As regional temperatures increase, along with possible behavioral changes or modifications to housing and lifestyles, this may be an increasingly tenuous assumption. Similarly, our analysis assumes that the effects of interventions (e.g., mosquito control and public outreach regarding personal protection from mosquito biting) are captured by the original temperature-WNND incidence relationships and that the nature of those relationships will not change over time.

The projected temperature-related increases in the U.S. incidence of WNND are noteworthy considering the number of additional WNND cases, the severity of associated health impacts, and the magnitude of these increases relative to the projected baseline. The monetary impact that ranges from the hundreds of millions to billions of dollars per year, depending on the evaluated future reporting period and scenario, provides additional context for these results. At these levels, incorporating the projected impacts to WNND with other similar impact estimates could make a difference in potential future benefit-cost analyses of the risks and impacts of climate change and proposed mitigation strategies. These differences in monetized impacts between the RCPs over time also highlight some of the benefits that could be realized by adopting strategies consistent with the RCP4.5 scenario, which could mitigate the extent and pace of future climate change. With respect to WNND, these benefits could be equivalent to avoiding hundreds of WNND cases annually by the middle to end of the century.

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Appendix 1: Development of the Health Impact Function to Link Temperature and Expected Annual Number of West Nile Neuroinvasive Disease Cases in the U.S. Population

To develop the Health Impact Function (HIF), we first re-estimated the model from [10] using the same information as the authors.

Following this approach, we estimated a logistic regression model that linked a county's standardized annual average temperature to the probability that the county's standardized West Nile neuroinvasive disease (WNND) case incidence rate (IR) would exceed 0.5:

$$P\left(z\left(\frac{c_{iy}}{N_{iy}}, m_i, s_i\right) > 0.5\right) = \frac{\exp\left(\alpha_r + \beta_r \cdot z\left(t_{iy}, a_i, d_i\right)\right)}{1 + \exp\left(\alpha_r + \beta_r \cdot z\left(t_{iy}, a_i, d_i\right)\right)} \quad \text{(A1.1)}$$

where:

c_{iy} is the number of WNND cases observed in county *i* during year *y*;

N_{iy} is the size of the population in county *i* during year *y*;

c_{iy}/N_{iy} is the WNND IR in county *i* during year *y*;

m_i is the average WNND IR for county *i* during 2004-2012;

s_i is the standard deviation of WNND IR for county *i* during 2004-2012;

$z\left(\frac{c_i}{p_i}, m_i, s_i\right) = \frac{\frac{c_i}{p_i} - m_i}{s_i}$ is the standardized WNND IR in county *i* during year *y*;

t_{iy} is the annual average temperature in county *i* during year *y*;

a_i is the average t_{iy} in county *i* during 2004-2012;

d_i is the standard deviation of t_{iy} in county *i* during 2004-2012;

$z\left(t_{iy}, a_i, d_i\right) = \frac{t_{iy} - a_i}{d_i}$ is the standardized annual average temperature in county *i* during year *y*;

α_r and β_r are National Oceanic and Atmospheric Administration region-specific coefficient estimates.

Because of the spatial variability in standardization parameters for WNND IR (*i.e.*, m_i and s_i) and annual temperature (*i.e.*, a_i and d_i), we implemented HIF calculations at the county level. Below we describe these calculations for county *i* and a new annual average temperature value, t_i^*.

Step 1: Standardize annual average temperature using county-level parameters a_i and d_i as follows:

$$z\left(t_i^*, a_i, d_i\right) = \frac{t_i^* - a_i}{d_i}. \quad \text{(A1.2)}$$

Step 2: Estimate probability of a high WNND IR using model coefficient estimates for the climate region that contain county *i* (*i.e.*, α_r and β_r) and the standardized annual average temperature:

$$p_i^* = \frac{\exp\left(\alpha_r + \beta_r \cdot z\left(t_i^*, a_i, d_i\right)\right)}{1 + \exp\left(\alpha_r + \beta_r \cdot z\left(t_i^*, a_i, d_i\right)\right)}. \tag{A1.3}$$

Step 3: Estimate the county-specific high incidence rate threshold (HIRT): A WNND IR that corresponds to the standardized WNND IR of 0.5:

$$z\left(\text{HIRT}_i, m_i, s_i\right) = 0.5. \tag{A1.4}$$

$$\frac{\text{HIRT}_i - m_i}{s_i} = 0.5. \tag{A1.5}$$

$$\text{HIRT}_i = m_i + 0.5 \cdot s_i. \tag{A1.6}$$

Step 4: Estimate the expected person-level number annual of WNND cases using the estimates developed in Steps 2 - 3, and assuming that the county-level population is a known fixed value of 1 and that the county-level counts of WNND cases, C_i, is a Poisson-distributed random variable:

$$P\left(z\left(\frac{C_i}{1}, m_i, s_i\right) > 0.5\right) = p_i^* \tag{A1.7}$$

$$P\left(C_i > \text{HIRT}_i\right) = p_i^* \tag{A1.8}$$

$$P\left(C_i \le \text{HIRT}_i\right) = 1 - p_i^* \tag{A1.9}$$

$$\frac{\Gamma\left(\text{HIRT}_i + 1, \lambda_i\right)}{\text{HIRT}_i\,!} = 1 - p_i^* \tag{A1.10}$$

where $\Gamma(.)$ is the incomplete gamma function, $\lfloor . \rfloor$ is the floor function, and $\Gamma\left(\lfloor \text{HIRT}_i + 1 \rfloor, \lambda_i\right) / \lfloor \text{HIRT}_i \rfloor!$ is the cumulative Poisson density function with an expected mean rate of λ_i. We solve Equation (A1.10) for λ_i numerically, for each average annual temperature value evaluated in the county using the R base package function optim () [31]. To obtain estimates of the expected annual number of WNND cases in the county, we multiply λ_i by the appropriate county population size estimate.

Appendix 2: Rationale for Selection of Climate Models and Process for Generating Meteorological Variables

The selection of a subset of global climate models (GCMs) was necessary due to computational, time, and resource constraints. As such, five GCMs were chosen (**Table A2.1**) to ensure that the subset captures a large range of the variability in climate outcomes observed across the entire ensemble from the fifth phase of the Coupled Model Inter comparison Project (CMIP5; [25]).

Variability in Climate Outcomes

While many different metrics could be used in this type of comparison, a logical approach was to compare the projections from CMIP5 GCMs for annual and seasonal temperature and precipitation. While these averaged metrics may not be perfect substitutes for comparing extreme weather effects, the relationship should be sufficiently strong for selecting climate models from the broader ensemble.

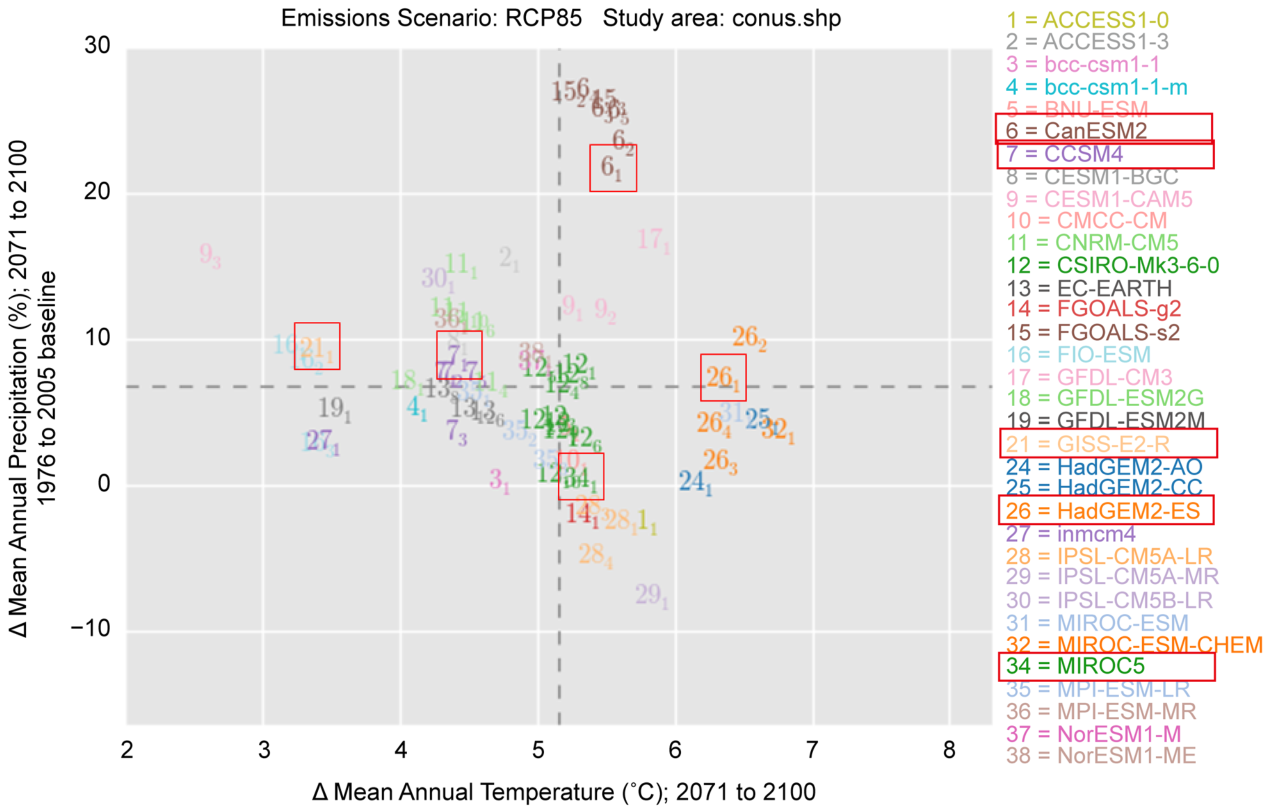
The following scatter plots show the variability across the CMIP5 ensemble for projected changes (2071-2100 compared to 1976-2005 baseline) in annual and seasonal (primarily summertime) temperature and precipitation.

As shown in Figures A2.1-A2.3, the five selected GCMs (CanESM2, CCSM4, GISS-E2-R, HadGEM2-ES, and MIROC5) cover a large range of variability across the entire ensemble in terms of annual and seasonal temperature and precipitation. This selection also balances the range alongside considerations of model

Table A2.1. Overview of selected GCMs.

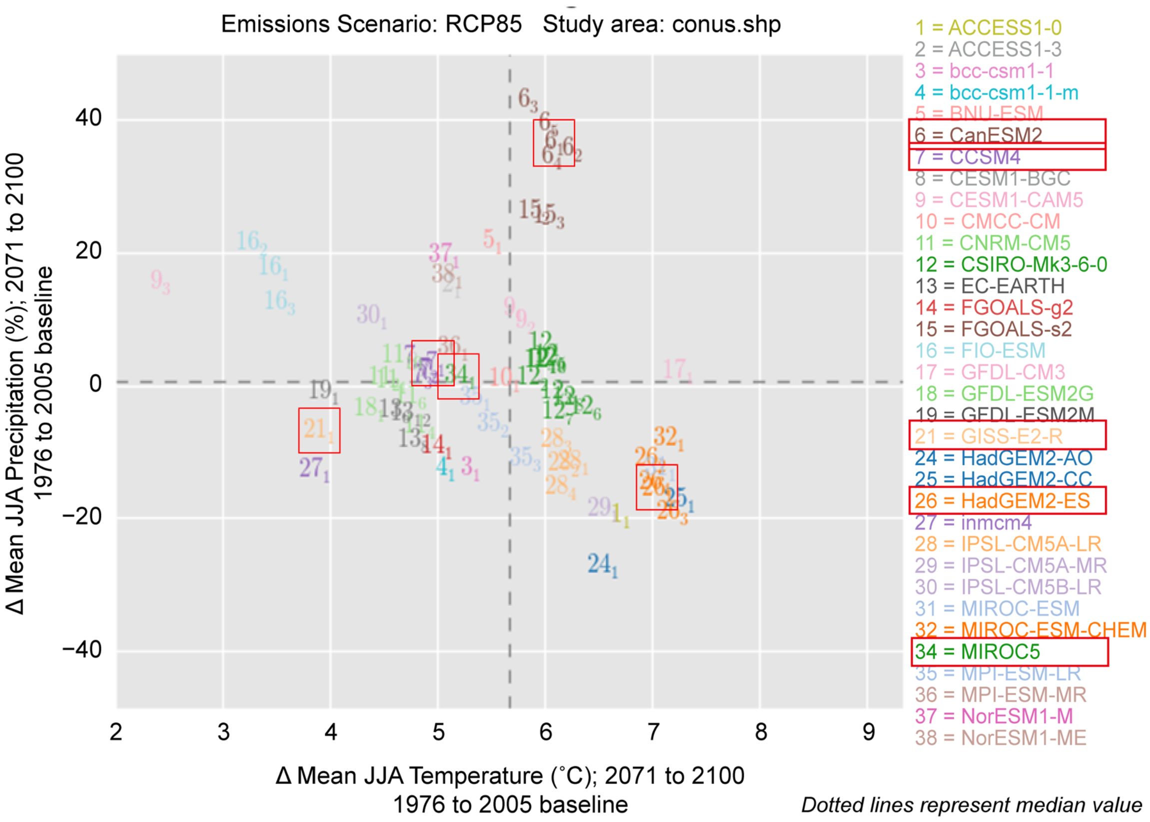
Center (modeling group)	Model acronym	Availability		References
		LOCA	SNAP	
National Center for Atmospheric Research	CCSM4	X	X	[32] [33]
National Aeronautics and Space Administration (NASA) Goddard Institute for Space Studies	GISS-E2-R	X	X	[34]
Canadian Centre for Climate Modeling and Analysis	CanESM2	X		[35]
Met Office Hadley Centre	HadGEM2-ES	X		[36] [37]
Atmosphere and Ocean Research Institute, National Institute for Environmental Studies, and Japan Agency for Marine-Earth Science and Technology	MIROC5	X		[38]

LOCA: Localized Constructed Analogs. SNAP: Scenarios Network for Alaska and Arctic Planning.



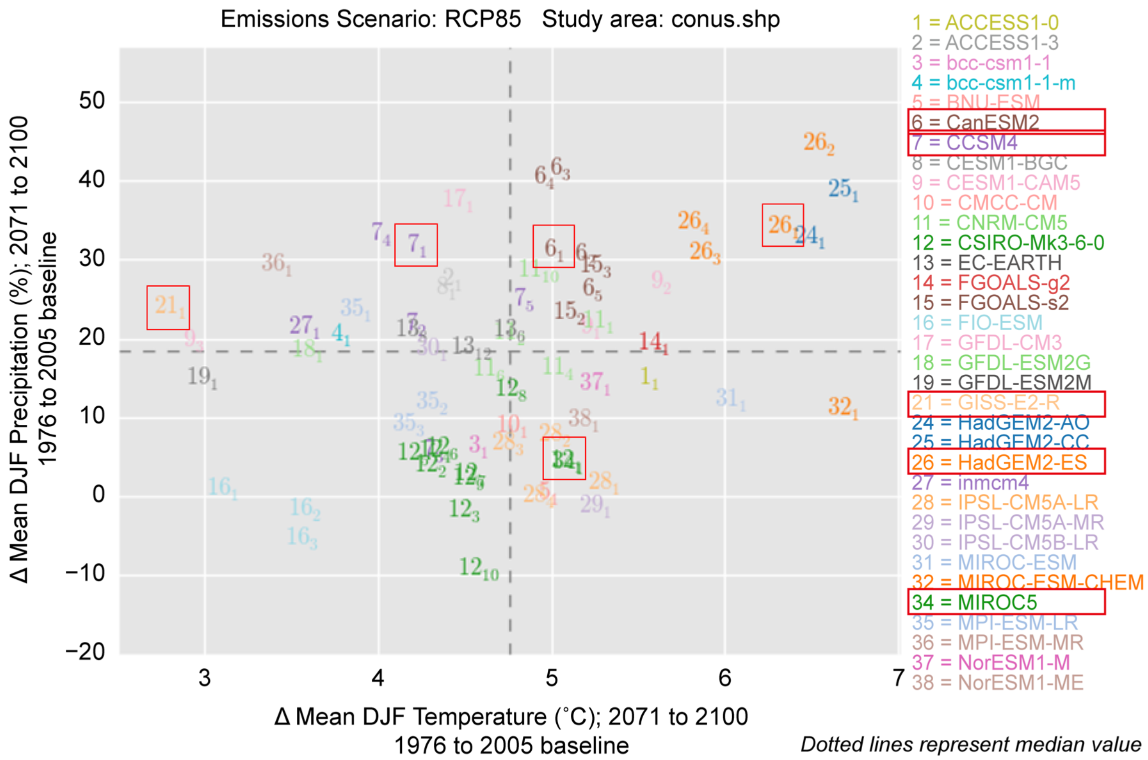
Dotted lines represent median value

Figure A2.1. Variability of projected annual temperature and precipitation change across the CMIP5 ensemble for the contiguous United States.



Dotted lines represent median value

Figure A2.2. Variability of projected summertime temperature and precipitation change across the CMIP5 ensemble for the contiguous United States.



Dotted lines represent median value

Figure A2.3. Variability of projected wintertime temperature and precipitation change across the CMIP5 ensemble for the contiguous United States.

independence, broader usage by the scientific community, and skill at reproducing observed climate. [39] [40] provide analysis of both models' skill at the global scale and independence of underlying code. These criteria were considered in the selection process. Note that a number of GCMs in the scatterplots contain multiple initializations which are designated with numbers in subscript. The dashed lines in the plots represent the median value for each axis.

To provide localized climate projections and to bias correct the projections to improve consistency with the historical period, we used the LOCA dataset [41]] [42] [43]. The LOCA projections, which are derived from the CMIP5 ensemble outputs, are the primary dataset being used in the forthcoming Climate Science Special Report of the U.S. Global Change Research Program's Fourth National Climate Assessment. The LOCA downscaled dataset provides daily maximum and minimum temperatures (Tmin and Tmax), and daily precipitation values at 1/16-degree resolution from 2006 to 2100. For each climate scenario, we calculated an average daily change factor for temperature and precipitation at each grid cell by comparing 20 years of LOCA projections centered on 2050 and 2090 to an historical 1/16-degree gridded dataset from the 1986-2005 period [44]. We calculated these daily change factors as a spatial average of nine 1/16-degree LOCA grid cells (3 × 3 window) surrounding each location.

We calculated annual average temperature by first averaging daily model-projected changes in Tmin and Tmax to produce a daily average temperature. Annual averages, in a grid cell, were calculated as the average of all daily temperatures over the course of the West Nile neuroinvasive disease case year as defined in [10] (October-September). A county-level value was calculated by averaging the values for all grid cells that intersected a county boundary.

Elsewhere in the manuscript, results from the selected GCMs are referenced with the following abbreviations:

- CanESM2 (can),
- CCSM4 (ccs),
- GISS-E2-R (gis),
- HadGEM2-ES (had),
- MIROC5 (mir).

Appendix 3: Detailed State-Level Projections of the Expected Annual Number of West Nile Neuroinvasive Disease Cases across All Time Periods, Global Climate Models, and Representative Concentration Pathways —With Constant and Varying Population Sizes

Results in the following tables (Tables A3.1-A3.5) for the specific global climate models (GCMs) are presented using the following abbreviations for the full model names:

- CanESM2 (can),
- CCSM4 (ccs),
- GISS-E2-R (gis),
- HadGEM2-ES (had),

- MIROC5 (mir).

The *mean* value reflects the average of modeled results for the given combination of model, representative concentration pathway (RCP), and population while the 2.5% *Quantile* and 97.5% *Quantile* values reflect the values from different points in the same distribution of the modeled results.

Table A3.1. Detailed state-level projections of the expected annual number of West Nile Neuroinvasive disease cases across all global climate models for the 2010 population and baseline climate period.

Population	2010			
Climate	1995			
State	Mean	SD	2.5% Quantile	97.5% Quantile
AL	3.70	0.96	2.65	5.92
AR	7.93	1.70	5.81	11.32
AZ	98.02	0.79	96.64	99.21
CA	226.17	2.14	222.52	229.96
CO	37.17	0.62	36.00	38.01
CT	2.22	0.64	1.49	3.38
DC	2.78	0.76	1.85	4.37
DE	0.13	0.11	0.04	0.37
FL	7.35	2.33	5.04	13.06
GA	4.11	1.63	2.67	8.11
IA	5.18	1.14	3.37	7.65
ID	16.90	0.06	16.75	17.00
IL	65.24	3.51	59.95	71.70
IN	5.07	1.13	3.61	7.22
KS	6.49	0.74	5.18	7.57
KY	2.38	0.71	1.54	3.76
LA	44.91	5.13	38.71	55.24
MA	2.62	0.85	1.75	4.39
MD	5.93	2.66	3.36	12.34
ME	0.02	0.02	0.01	0.06
MI	34.54	3.31	30.60	41.02
MN	6.38	2.10	3.51	11.22

Continued

MO	11.61	1.37	9.43	13.70
MS	27.64	4.55	22.55	37.15
MT	2.65	1.02	1.06	4.60
NC	0.36	0.48	0.06	1.65
ND	6.63	2.09	3.53	10.93
NE	9.94	2.03	5.94	12.97
NH	0.02	0.01	0.01	0.05
NJ	2.04	1.11	0.99	4.35
NM	12.86	0.34	12.30	13.36
NV	13.29	0.31	12.68	13.77
NY	25.09	4.71	20.02	33.87
OH	10.65	2.05	8.38	15.01
OK	19.20	1.14	17.41	21.25
OR	1.08	0.01	1.06	1.09
PA	6.02	2.25	3.80	10.75
RI	0.12	0.08	0.05	0.28
SC	0.55	0.57	0.14	2.04
SD	9.60	2.48	5.39	14.25
TN	5.54	0.71	4.63	6.90
TX	192.83	7.20	183.06	207.34
UT	15.75	0.26	15.20	16.13
VA	1.03	0.62	0.47	2.38
VT	0.07	0.06	0.02	0.21
WA	2.59	0.01	2.56	2.61
WI	5.86	0.98	4.43	7.95
WV	0.20	0.13	0.08	0.48
WY	2.91	0.49	1.96	3.73

Table A3.2. Detailed state-level projections of the expected annual number of West Nile neuroinvasive disease cases across all global climate models for the 2050 population and 2050 climate period.

Population	2050					Population	2050				
Climate	2050					Climate	2050				
RCP	4.5					RCP	8.5				
State	Model	Mean	SD	2.5% Quantile	97.5% Quantile	State	Model	Mean	SD	2.5% Quantile	97.5% Quantile
AL	can	21.13	7.18	11.95	36.93	AL	can	27.95	8.71	12.67	44.46
AL	ccs	15.83	6.17	9.96	31.28	AL	ccs	21.11	8.60	10.12	36.80
AL	gis	11.22	3.20	7.44	18.82	AL	gis	17.39	6.56	10.14	32.23
AL	had	38.86	16.34	18.21	67.54	AL	had	56.58	22.38	27.26	99.79
AL	mir	22.89	7.95	9.10	35.77	AL	mir	27.23	10.29	12.85	45.64
AR	can	28.66	5.68	23.77	42.90	AR	can	34.84	5.70	26.80	46.14
AR	ccs	23.02	4.61	15.93	30.89	AR	ccs	31.97	5.57	21.98	41.79
AR	gis	18.89	3.26	14.18	25.16	AR	gis	23.69	4.76	16.59	31.55
AR	had	41.59	10.45	24.94	59.15	AR	had	53.81	10.68	38.83	72.42
AR	mir	34.31	7.13	21.69	43.56	AR	mir	36.25	8.90	24.17	49.89
AZ	can	145.15	1.15	143.65	147.37	AZ	can	146.69	1.48	144.16	149.45
AZ	ccs	143.06	1.00	140.84	144.28	AZ	ccs	144.94	1.11	143.33	146.85
AZ	gis	141.90	1.13	140.32	144.44	AZ	gis	143.13	1.57	140.63	145.65
AZ	had	144.28	1.31	142.04	146.57	AZ	had	146.19	1.76	143.49	149.80
AZ	mir	143.65	1.35	141.47	145.53	AZ	mir	144.71	1.30	142.82	147.36
CA	can	365.61	4.40	358.78	373.56	CA	can	371.23	5.43	362.65	382.78
CA	ccs	362.00	4.43	353.42	369.15	CA	ccs	366.64	3.56	359.43	372.49
CA	gis	357.09	3.83	352.40	364.86	CA	gis	360.50	4.34	354.13	367.78
CA	had	364.36	4.90	357.46	374.09	CA	had	369.49	6.74	359.28	382.56
CA	mir	361.78	3.61	355.89	366.46	CA	mir	365.25	3.90	359.64	372.84
CO	can	61.01	1.14	59.43	63.24	CO	can	62.57	1.35	60.19	65.08
CO	ccs	59.68	0.99	57.62	61.13	CO	ccs	61.36	0.81	59.76	62.57
CO	gis	58.74	0.92	57.37	60.43	CO	gis	59.62	0.96	58.19	61.10
CO	had	61.35	1.01	59.94	63.56	CO	had	62.65	1.40	60.50	64.80
CO	mir	60.86	1.38	58.39	62.67	CO	mir	62.08	1.34	60.34	64.94
CT	can	7.50	1.97	5.03	11.60	CT	can	9.03	2.80	4.93	14.29
CT	ccs	5.79	1.30	3.96	8.23	CT	ccs	6.78	1.78	4.31	10.63
CT	gis	5.19	0.88	3.28	6.47	CT	gis	6.92	1.58	4.72	10.35
CT	had	9.99	2.82	6.08	14.53	CT	had	11.15	4.37	5.37	20.34
CT	mir	7.82	2.02	5.33	12.57	CT	mir	11.52	2.88	6.25	16.38
DC	can	7.61	1.13	6.07	9.90	DC	can	8.59	1.03	6.64	9.91
DC	ccs	5.83	0.84	4.74	7.54	DC	ccs	6.73	1.07	5.04	8.92
DC	gis	5.48	0.69	4.03	6.45	DC	gis	6.72	1.17	5.08	9.05

Continued

DC	had	8.99	1.70	6.19	11.43	DC	had	9.83	1.39	7.52	12.53
DC	mir	7.52	1.06	6.06	9.68	DC	mir	8.84	1.24	6.45	11.00
DE	can	1.81	0.81	0.93	3.57	DE	can	2.56	0.88	1.11	3.95
DE	ccs	0.73	0.37	0.31	1.52	DE	ccs	1.10	0.61	0.36	2.56
DE	gis	0.60	0.24	0.18	1.03	DE	gis	1.21	0.71	0.41	2.84
DE	had	2.50	1.17	0.85	4.30	DE	had	2.89	1.45	0.87	5.92
DE	mir	1.61	0.79	0.67	3.40	DE	mir	2.69	0.99	1.03	4.57
FL	can	47.30	16.80	17.37	71.13	FL	can	70.88	27.64	24.32	119.16
FL	ccs	29.10	13.12	15.93	58.28	FL	ccs	42.95	25.56	15.33	88.70
FL	gis	25.82	10.57	11.20	45.98	FL	gis	43.23	21.90	19.62	89.19
FL	had	63.08	23.41	25.95	102.62	FL	had	85.99	34.20	44.01	145.09
FL	mir	43.38	20.04	14.80	77.77	FL	mir	56.20	27.51	21.66	113.30
GA	can	36.39	11.44	17.28	60.04	GA	can	49.91	15.25	22.61	77.44
GA	ccs	25.99	13.58	14.39	60.57	GA	ccs	35.18	17.06	14.67	67.01
GA	gis	16.63	5.05	10.70	27.12	GA	gis	31.02	13.98	16.77	64.28
GA	had	64.88	26.20	28.44	107.32	GA	had	95.22	39.85	45.76	168.19
GA	mir	38.10	14.71	12.67	60.56	GA	mir	45.77	17.79	18.08	77.08
IA	can	16.90	2.43	13.66	21.59	IA	can	18.98	2.75	13.70	23.27
IA	ccs	14.17	2.16	10.60	18.13	IA	ccs	17.66	2.51	14.44	22.90
IA	gis	12.91	1.77	10.25	16.58	IA	gis	14.56	2.15	11.69	18.37
IA	had	19.86	3.66	13.57	25.84	IA	had	24.48	3.72	18.79	31.11
IA	mir	18.77	4.26	12.43	28.47	IA	mir	19.95	3.43	13.91	24.48
ID	can	22.08	0.09	21.92	22.22	ID	can	22.19	0.10	22.02	22.37
ID	ccs	22.04	0.11	21.80	22.17	ID	ccs	22.14	0.09	22.00	22.27
ID	gis	21.88	0.09	21.72	22.02	ID	gis	21.92	0.10	21.76	22.12
ID	had	22.04	0.12	21.84	22.24	ID	had	22.14	0.16	21.88	22.39
ID	mir	22.04	0.11	21.82	22.22	ID	mir	22.10	0.11	21.96	22.36
IL	can	108.90	5.44	101.63	120.58	IL	can	114.78	5.97	104.86	125.69
IL	ccs	100.97	3.52	94.91	105.61	IL	ccs	109.20	6.32	100.96	121.19
IL	gis	102.06	4.23	94.85	110.00	IL	gis	107.66	6.06	100.36	119.23
IL	had	120.46	8.23	105.69	132.28	IL	had	131.69	8.02	119.16	144.62
IL	mir	113.81	7.41	103.34	131.44	IL	mir	118.30	7.68	104.53	129.45
IN	can	14.57	2.58	11.05	20.52	IN	can	17.93	3.24	12.75	24.46
IN	ccs	11.03	1.74	8.69	14.10	IN	ccs	14.77	3.43	10.67	22.07
IN	gis	11.18	1.90	8.05	15.20	IN	gis	14.05	3.22	10.55	20.46
IN	had	22.77	5.72	13.63	31.52	IN	had	29.82	5.51	21.93	38.69
IN	mir	17.31	4.28	11.89	27.97	IN	mir	19.98	4.15	12.95	26.29
KS	can	16.56	1.77	14.33	20.99	KS	can	17.88	1.99	15.53	22.26

Continued

KS	ccs	14.18	1.72	11.16	16.61	KS	ccs	17.49	1.90	14.67	21.12
KS	gis	12.70	1.08	11.38	15.20	KS	gis	14.46	1.65	11.73	17.32
KS	had	18.39	1.98	15.17	22.14	KS	had	22.25	2.04	19.08	25.61
KS	mir	17.63	2.33	12.92	20.50	KS	mir	18.80	1.83	15.75	21.51
KY	can	7.93	2.10	5.48	12.56	KY	can	10.49	2.90	6.40	16.94
KY	ccs	6.03	1.87	3.58	9.99	KY	ccs	9.11	2.98	4.54	15.27
KY	gis	4.62	1.31	2.68	7.16	KY	gis	6.73	2.18	4.29	11.45
KY	had	15.37	5.83	6.90	24.61	KY	had	21.82	5.44	13.41	31.04
KY	mir	9.68	3.39	5.06	17.98	KY	mir	11.93	3.32	6.79	16.40
LA	can	99.31	14.81	81.73	129.10	LA	can	107.98	24.87	72.83	157.29
LA	ccs	91.01	12.02	76.04	116.21	LA	ccs	107.35	16.44	77.51	136.34
LA	gis	77.34	8.93	63.81	93.07	LA	gis	93.38	13.22	75.40	120.06
LA	had	139.10	26.47	97.45	183.98	LA	had	157.18	27.19	118.79	206.58
LA	mir	112.40	17.92	80.71	138.69	LA	mir	119.91	20.51	87.67	153.21
MA	can	10.26	2.82	6.52	16.41	MA	can	12.67	4.14	6.93	21.27
MA	ccs	6.38	1.65	3.90	9.59	MA	ccs	7.64	2.54	4.19	13.09
MA	gis	5.52	1.10	3.22	6.72	MA	gis	7.57	1.93	4.83	11.68
MA	had	12.52	3.91	6.82	19.78	MA	had	15.43	6.10	7.63	27.62
MA	mir	8.85	2.62	5.56	14.80	MA	mir	14.52	4.56	6.15	22.80
MD	can	28.66	6.95	20.15	43.29	MD	can	35.47	6.69	23.26	44.81
MD	ccs	18.43	4.32	13.08	27.43	MD	ccs	23.35	6.17	14.26	36.87
MD	gis	16.80	3.30	10.04	21.99	MD	gis	23.48	6.68	14.62	38.33
MD	had	37.10	10.43	21.17	52.06	MD	had	41.73	9.90	26.42	61.87
MD	mir	28.38	7.18	19.44	44.38	MD	mir	36.67	8.03	22.47	51.10
ME	can	0.37	0.15	0.19	0.64	ME	can	0.59	0.26	0.27	1.17
ME	ccs	0.15	0.06	0.07	0.27	ME	ccs	0.21	0.13	0.06	0.48
ME	gis	0.12	0.05	0.04	0.20	ME	gis	0.20	0.08	0.10	0.35
ME	had	0.43	0.19	0.18	0.78	ME	had	0.66	0.42	0.18	1.48
ME	mir	0.27	0.11	0.11	0.49	ME	mir	0.72	0.32	0.18	1.31
MI	can	51.95	4.26	46.68	61.55	MI	can	57.36	5.55	47.40	66.49
MI	ccs	46.07	3.19	41.37	51.82	MI	ccs	51.67	5.85	44.72	63.44
MI	gis	47.71	3.66	40.18	54.01	MI	gis	52.75	6.34	45.28	65.24
MI	had	63.82	7.69	50.54	75.54	MI	had	71.24	7.00	61.62	84.56
MI	mir	55.94	6.37	46.77	71.30	MI	mir	62.52	6.98	48.73	71.98
MN	can	18.08	4.19	12.21	25.80	MN	can	21.07	4.41	12.48	27.27
MN	ccs	14.47	3.61	8.91	21.47	MN	ccs	18.08	3.60	12.56	24.20
MN	gis	13.07	3.36	8.34	20.15	MN	gis	13.77	3.68	9.54	22.19
MN	had	22.71	6.60	13.81	35.75	MN	had	25.80	6.89	16.43	39.64

Continued

MN	mir	18.84	6.76	12.23	35.80	MN	mir	20.56	5.53	11.40	28.72
MO	can	23.72	2.68	20.35	29.33	MO	can	26.89	3.14	22.69	33.54
MO	ccs	19.86	2.13	16.33	23.08	MO	ccs	25.36	2.95	21.41	31.00
MO	gis	18.52	1.94	15.83	22.73	MO	gis	21.44	2.48	17.54	25.50
MO	had	28.35	4.17	21.66	35.67	MO	had	35.76	4.54	28.35	43.26
MO	mir	26.86	4.25	20.20	35.79	MO	mir	27.98	3.82	21.52	33.61
MS	can	79.53	14.35	61.56	107.43	MS	can	91.06	17.08	62.25	121.99
MS	ccs	69.31	12.34	54.28	96.76	MS	ccs	84.22	15.34	57.59	110.00
MS	gis	57.47	8.77	46.00	76.00	MS	gis	70.98	13.61	52.65	98.67
MS	had	119.40	29.45	78.84	163.34	MS	had	143.48	28.76	98.26	192.25
MS	mir	87.70	18.40	53.84	117.30	MS	mir	95.69	20.85	64.48	128.34
MT	can	18.56	8.09	7.07	29.40	MT	can	29.19	11.69	10.34	50.01
MT	ccs	12.83	7.51	2.88	29.09	MT	ccs	18.76	9.54	7.52	37.94
MT	gis	6.52	2.63	3.34	11.17	MT	gis	8.04	4.36	3.79	18.81
MT	had	19.09	11.65	4.49	42.29	MT	had	24.90	14.05	6.15	54.06
MT	mir	12.22	6.38	3.44	23.27	MT	mir	15.63	9.18	6.93	38.76
NC	can	8.29	4.29	2.80	16.99	NC	can	13.60	6.00	4.62	25.11
NC	ccs	5.45	4.32	1.81	15.89	NC	ccs	8.82	5.79	1.94	21.88
NC	gis	2.56	1.59	0.68	5.71	NC	gis	7.24	5.13	1.80	17.66
NC	had	20.03	10.79	5.00	36.16	NC	had	28.43	12.40	10.29	47.79
NC	mir	9.65	5.52	2.17	21.33	NC	mir	13.33	6.64	3.81	23.49
ND	can	23.41	5.70	14.65	33.54	ND	can	27.22	5.99	16.66	36.39
ND	ccs	18.35	5.38	9.60	30.47	ND	ccs	22.23	5.67	13.18	33.56
ND	gis	15.26	3.39	9.37	20.95	ND	gis	15.93	4.08	10.54	22.42
ND	had	28.99	9.80	15.85	47.76	ND	had	32.14	9.89	18.18	49.83
ND	mir	20.07	6.23	12.98	34.91	ND	mir	22.52	6.48	11.41	32.74
NE	can	33.83	7.41	23.15	48.30	NE	can	39.53	8.27	27.10	54.46
NE	ccs	26.26	5.86	16.66	37.82	NE	ccs	35.37	6.86	27.44	49.64
NE	gis	20.50	3.88	14.50	28.29	NE	gis	25.56	5.12	17.80	34.12
NE	had	44.24	9.43	29.92	62.86	NE	had	57.97	9.77	42.90	73.53
NE	mir	38.78	10.65	20.37	56.51	NE	mir	42.47	9.40	28.25	59.10
NH	can	0.43	0.21	0.21	0.90	NH	can	0.66	0.34	0.25	1.43

Continued

NH	ccs	0.20	0.09	0.07	0.37	NH	ccs	0.28	0.16	0.10	0.64
NH	gis	0.14	0.05	0.04	0.20	NH	gis	0.26	0.12	0.10	0.49
NH	had	0.63	0.28	0.24	1.13	NH	had	0.94	0.47	0.32	1.95
NH	mir	0.35	0.17	0.13	0.76	NH	mir	0.88	0.39	0.20	1.59
NJ	can	16.20	6.48	8.95	30.40	NJ	can	20.48	7.15	9.13	32.83
NJ	ccs	10.10	3.54	5.59	16.69	NJ	ccs	13.04	5.43	6.12	25.85
NJ	gis	8.42	2.38	3.66	12.44	NJ	gis	13.42	5.36	7.04	25.25
NJ	had	22.27	8.74	10.26	36.95	NJ	had	25.75	12.32	9.20	52.36
NJ	mir	16.16	6.22	9.00	30.63	NJ	mir	24.58	7.97	10.84	38.72
NM	can	25.24	0.43	24.66	26.15	NM	can	25.78	0.62	24.65	26.77
NM	ccs	24.18	0.35	23.47	24.60	NM	ccs	25.10	0.37	24.46	25.72
NM	gis	23.88	0.41	23.44	24.66	NM	gis	24.53	0.44	23.82	25.22
NM	had	25.04	0.40	24.48	25.89	NM	had	25.82	0.44	25.09	26.54
NM	mir	24.64	0.47	23.82	25.17	NM	mir	25.20	0.52	24.30	26.03
NV	can	18.33	0.48	17.49	19.09	NV	can	19.03	0.59	18.14	20.18
NV	ccs	17.84	0.51	16.85	18.47	NV	ccs	18.44	0.42	17.72	19.15
NV	gis	17.13	0.43	16.53	17.87	NV	gis	17.47	0.64	16.53	18.45
NV	had	18.13	0.46	17.43	19.04	NV	had	18.76	0.79	17.54	20.38
NV	mir	17.75	0.44	16.99	18.38	NV	mir	18.20	0.49	17.69	19.26
NY	can	77.37	13.02	59.91	103.89	NY	can	88.11	16.10	61.64	115.81
NY	ccs	63.56	8.82	51.41	79.61	NY	ccs	70.21	11.47	52.61	94.51
NY	gis	59.97	6.83	44.69	70.17	NY	gis	71.85	11.02	55.95	95.08
NY	had	92.67	18.02	65.63	121.71	NY	had	100.87	23.33	66.98	149.19
NY	mir	79.14	13.66	61.37	110.27	NY	mir	100.41	17.72	65.95	128.55
OH	can	28.44	5.34	22.29	41.03	OH	can	34.43	6.47	24.29	46.77
OH	ccs	21.10	3.57	17.23	28.35	OH	ccs	26.05	5.58	18.68	38.23
OH	gis	21.33	3.42	15.12	28.09	OH	gis	26.75	6.12	19.70	38.89
OH	had	42.87	11.72	25.85	59.78	OH	had	53.59	9.65	40.67	71.49
OH	mir	31.12	7.52	22.63	50.25	OH	mir	38.05	7.60	24.33	50.42
OK	can	34.06	2.47	31.75	40.63	OK	can	36.24	2.64	32.36	41.91
OK	ccs	31.16	2.91	26.31	35.22	OK	ccs	35.58	2.32	32.21	39.96
OK	gis	28.59	1.49	26.11	31.56	OK	gis	31.45	2.19	27.33	34.58
OK	had	36.17	2.60	31.58	41.24	OK	had	41.37	2.98	36.43	46.63
OK	mir	35.81	2.68	30.72	39.30	OK	mir	37.12	2.56	32.82	40.77
OR	can	1.66	0.01	1.65	1.68	OR	can	1.68	0.01	1.66	1.69

Continued

OR	ccs	1.65	0.01	1.63	1.67	OR	ccs	1.66	0.01	1.65	1.68
OR	gis	1.63	0.01	1.62	1.65	OR	gis	1.64	0.01	1.62	1.66
OR	had	1.66	0.01	1.64	1.68	OR	had	1.67	0.02	1.64	1.70
OR	mir	1.65	0.01	1.62	1.66	OR	mir	1.65	0.01	1.64	1.68
PA	can	30.76	10.37	19.80	54.48	PA	can	39.65	10.13	21.98	55.32
PA	ccs	19.11	5.38	12.08	29.27	PA	ccs	25.27	8.95	13.65	46.23
PA	gis	17.47	4.28	8.55	24.51	PA	gis	26.07	9.17	14.79	47.27
PA	had	46.61	16.15	23.46	73.66	PA	had	56.99	16.20	33.27	92.18
PA	mir	31.56	10.42	19.58	55.73	PA	mir	46.64	13.44	23.32	71.38
RI	can	1.33	0.58	0.57	2.60	RI	can	1.81	0.85	0.59	3.49
RI	ccs	0.66	0.28	0.27	1.21	RI	ccs	0.85	0.46	0.27	1.90
RI	gis	0.53	0.17	0.20	0.77	RI	gis	0.90	0.39	0.42	1.82
RI	had	1.81	0.87	0.66	3.33	RI	had	2.23	1.38	0.61	4.94
RI	mir	1.08	0.56	0.49	2.43	RI	mir	2.06	0.89	0.53	3.75
SC	can	13.36	5.83	4.07	24.26	SC	can	20.77	8.67	7.17	36.56
SC	ccs	9.50	7.68	3.33	29.00	SC	ccs	14.42	9.24	3.40	32.85
SC	gis	4.37	2.59	1.47	9.45	SC	gis	11.93	7.80	3.48	28.82
SC	had	29.84	15.28	8.40	54.26	SC	had	44.80	19.95	17.15	77.53
SC	mir	15.50	8.07	2.67	31.16	SC	mir	19.27	9.42	5.40	32.25
SD	can	34.78	6.99	23.42	46.10	SD	can	38.97	7.19	26.38	49.71
SD	ccs	29.79	6.14	18.84	42.65	SD	ccs	35.66	5.93	27.17	46.76
SD	gis	23.37	4.15	17.28	31.12	SD	gis	25.89	4.96	19.73	35.77
SD	had	44.44	10.73	29.04	62.09	SD	had	50.16	10.54	32.56	68.43
SD	mir	35.13	8.86	21.63	54.95	SD	mir	37.67	8.20	23.77	50.07
TN	can	12.79	2.46	10.05	17.78	TN	can	16.06	3.37	11.52	23.88
TN	ccs	10.49	2.22	7.35	15.23	TN	ccs	14.10	3.30	9.27	20.93
TN	gis	8.79	1.38	6.87	11.67	TN	gis	11.47	2.54	8.26	16.40
TN	had	21.39	6.96	11.66	33.60	TN	had	29.31	7.77	18.35	43.58
TN	mir	14.12	3.06	9.30	20.08	TN	mir	16.27	3.84	11.11	21.73
TX	can	373.82	14.07	359.58	406.97	TX	can	390.90	18.65	357.84	422.66
TX	ccs	350.95	14.33	326.98	373.33	TX	ccs	377.40	13.83	351.99	401.46
TX	gis	336.23	11.08	319.47	354.81	TX	gis	355.96	13.83	330.96	378.45
TX	had	387.70	16.93	357.78	414.38	TX	had	410.05	17.35	383.22	438.90
TX	mir	376.07	14.71	347.90	397.17	TX	mir	385.93	19.03	355.22	417.73
UT	can	24.50	0.36	23.90	25.04	UT	can	24.96	0.45	24.21	25.85

Continued

UT	ccs	24.36	0.37	23.51	24.85	UT	ccs	24.95	0.30	24.37	25.36
UT	gis	23.73	0.40	23.12	24.45	UT	gis	24.06	0.53	23.33	25.09
UT	had	24.63	0.47	23.92	25.50	UT	had	25.07	0.65	24.03	26.15
UT	mir	24.70	0.52	23.69	25.53	UT	mir	25.05	0.52	24.53	26.24
VA	can	15.14	6.32	8.50	28.18	VA	can	20.97	6.84	9.91	32.88
VA	ccs	8.69	3.54	5.12	16.22	VA	ccs	12.94	5.49	5.61	25.84
VA	gis	6.37	2.00	3.08	9.90	VA	gis	11.60	5.88	5.05	23.67
VA	had	25.53	11.67	9.12	41.29	VA	had	30.45	11.78	14.27	54.21
VA	mir	15.03	7.10	6.93	32.51	VA	mir	21.57	8.17	8.80	36.84
VT	can	1.26	0.49	0.74	2.21	VT	can	1.79	0.76	0.69	3.49
VT	ccs	0.38	0.17	0.15	0.74	VT	ccs	0.54	0.32	0.16	1.27
VT	gis	0.39	0.17	0.11	0.66	VT	gis	0.65	0.30	0.24	1.18
VT	had	1.50	0.69	0.57	2.61	VT	had	2.04	1.13	0.68	4.56
VT	mir	0.80	0.45	0.26	1.71	VT	mir	2.10	0.98	0.44	4.10
WA	can	3.31	0.02	3.27	3.35	WA	can	3.34	0.02	3.29	3.36
WA	ccs	3.28	0.02	3.24	3.32	WA	ccs	3.30	0.02	3.27	3.34
WA	gis	3.26	0.02	3.23	3.29	WA	gis	3.27	0.03	3.22	3.31
WA	had	3.31	0.03	3.27	3.36	WA	had	3.32	0.03	3.26	3.37
WA	mir	3.27	0.02	3.24	3.30	WA	mir	3.29	0.02	3.26	3.33
WI	can	12.07	2.08	9.50	16.32	WI	can	13.64	2.23	10.02	17.17
WI	ccs	10.03	1.22	8.26	12.28	WI	ccs	12.48	2.14	9.91	16.32
WI	gis	10.45	1.55	8.04	13.68	WI	gis	11.86	2.08	9.52	16.08
WI	had	15.51	2.85	10.52	19.70	WI	had	18.20	3.01	13.71	23.94
WI	mir	13.59	2.69	10.12	20.21	WI	mir	15.53	3.01	10.34	20.25
WV	can	1.81	0.77	1.04	3.58	WV	can	2.49	0.80	1.24	4.01
WV	ccs	1.01	0.42	0.53	1.91	WV	ccs	1.56	0.69	0.66	3.09
WV	gis	0.81	0.32	0.31	1.46	WV	gis	1.43	0.66	0.68	2.83
WV	had	3.68	1.80	1.24	6.36	WV	had	4.82	1.66	2.59	8.07
WV	mir	1.84	0.95	0.87	4.28	WV	mir	2.81	1.12	1.13	5.02
WY	can	10.53	3.12	6.07	16.94	WY	can	15.42	5.41	8.00	26.37
WY	ccs	8.94	2.95	4.27	14.84	WY	ccs	12.82	3.26	7.17	17.98
WY	gis	5.97	1.47	3.86	9.00	WY	gis	7.07	1.73	4.97	10.41
WY	had	12.09	4.29	6.61	21.04	WY	had	14.52	5.96	7.14	25.09
WY	mir	10.25	3.92	4.72	18.03	WY	mir	12.29	5.78	7.20	26.88

Table A3.3. Detailed state-level projections of the expected annual number of West Nile neuroinvasive disease cases across all global climate models for the 2090 population and 2090 climate period.

Population		2090				Population		2090			
Climate		2090				Climate		2090			
RCP		4.5				RCP		8.5			
State	Model	Mean	SD	2.5% Quantile	97.5% Quantile	State	Model	Mean	SD	2.5% Quantile	97.5% Quantile
AL	can	31.48	12.63	17.13	57.49	AL	can	94.44	32.97	42.47	151.30
AL	ccs	23.14	8.82	12.14	42.27	AL	ccs	82.66	26.81	45.50	128.78
AL	gis	15.98	6.39	9.43	28.15	AL	gis	40.63	15.63	16.37	67.49
AL	had	65.32	19.31	30.74	95.74	AL	had	154.67	19.63	122.28	182.39
AL	mir	31.49	12.11	15.13	56.18	AL	mir	85.91	15.58	63.33	113.57
AR	can	35.97	6.49	26.26	49.25	AR	can	76.06	16.91	47.38	108.55
AR	ccs	32.02	5.37	23.40	42.34	AR	ccs	69.03	16.75	43.99	97.54
AR	gis	24.61	3.79	19.14	32.54	AR	gis	42.27	11.92	26.84	58.96
AR	had	56.20	10.56	38.32	75.93	AR	had	117.62	18.29	92.03	142.50
AR	mir	45.89	9.09	31.52	63.27	AR	mir	88.02	13.02	66.13	111.90
AZ	can	179.83	1.32	177.43	182.29	AZ	can	188.20	2.43	183.73	192.04
AZ	ccs	177.90	1.01	175.81	179.49	AZ	ccs	183.38	1.76	179.93	185.60
AZ	gis	174.83	1.19	173.08	176.79	AZ	gis	180.12	1.27	177.85	182.73
AZ	had	180.46	1.46	177.74	182.83	AZ	had	188.43	2.09	185.34	192.61
AZ	mir	179.02	1.39	176.36	181.09	AZ	mir	184.39	2.14	180.32	188.30
CA	can	455.06	3.95	447.72	460.52	CA	can	481.23	6.54	469.66	493.69
CA	ccs	450.24	4.26	442.16	456.92	CA	ccs	466.10	4.53	456.27	471.96
CA	gis	440.25	4.12	433.69	447.76	CA	gis	456.36	4.52	451.40	465.16
CA	had	459.13	5.80	448.44	468.57	CA	had	481.82	4.98	473.49	490.15
CA	mir	453.58	4.01	446.44	460.45	CA	mir	467.46	6.10	455.40	478.39
CO	can	74.47	1.05	72.43	75.94	CO	can	80.27	1.62	77.27	82.80
CO	ccs	72.36	0.87	71.07	73.95	CO	ccs	77.15	1.82	73.66	79.37
CO	gis	70.33	0.85	69.06	71.67	CO	gis	74.11	1.32	72.46	76.98
CO	had	74.67	1.34	72.24	76.93	CO	had	80.50	1.76	77.90	83.11
CO	mir	73.99	1.21	71.81	76.06	CO	mir	78.97	1.64	76.42	81.76
CT	can	11.35	2.83	7.04	15.64	CT	can	24.95	4.78	17.02	32.65
CT	ccs	7.75	1.64	5.24	10.62	CT	ccs	19.35	3.54	14.62	25.91
CT	gis	6.83	1.27	4.61	8.94	CT	gis	13.62	3.95	8.28	21.79
CT	had	16.95	3.47	11.26	22.91	CT	had	32.68	3.87	26.32	40.35
CT	mir	11.93	2.07	8.31	15.96	CT	mir	27.20	3.10	22.16	32.53
DC	can	9.85	1.30	8.06	12.38	DC	can	15.72	1.69	13.13	19.08
DC	ccs	7.79	1.05	6.23	9.91	DC	ccs	13.38	1.27	11.34	15.64
DC	gis	7.38	1.09	5.57	9.50	DC	gis	11.31	1.62	8.35	14.05

Continued

DC	had	12.57	1.41	10.02	14.71	DC	had	18.26	1.20	16.48	20.24
DC	mir	10.31	1.12	8.11	12.45	DC	mir	15.39	0.95	14.04	16.93
DE	can	2.78	0.97	1.58	4.57	DE	can	8.40	2.01	5.63	12.64
DE	ccs	1.12	0.60	0.43	2.54	DE	ccs	5.43	1.34	3.57	7.90
DE	gis	0.98	0.47	0.30	1.96	DE	gis	3.69	1.53	1.31	6.73
DE	had	4.56	1.35	2.17	6.70	DE	had	10.59	1.48	8.34	13.02
DE	mir	2.73	0.88	1.31	4.61	DE	mir	7.89	1.19	6.00	9.96
FL	can	78.26	25.24	40.28	119.12	FL	can	215.02	44.11	148.24	280.89
FL	ccs	47.17	21.75	24.33	92.57	FL	ccs	164.09	45.90	100.52	237.12
FL	gis	44.93	28.26	16.56	99.80	FL	gis	105.07	47.69	32.25	186.38
FL	had	115.03	27.35	63.60	153.07	FL	had	250.21	22.97	206.92	290.15
FL	mir	66.75	30.48	25.31	125.36	FL	mir	178.76	35.56	112.27	228.10
GA	can	63.33	23.11	31.09	107.94	GA	can	175.49	48.86	99.56	255.70
GA	ccs	40.88	17.68	18.84	79.90	GA	ccs	150.78	41.47	94.92	218.32
GA	gis	30.37	15.01	14.93	59.13	GA	gis	86.19	33.23	34.16	142.98
GA	had	124.67	35.05	56.94	168.51	GA	had	265.28	27.82	217.21	309.39
GA	mir	55.40	23.18	26.75	103.82	GA	mir	149.88	27.90	110.63	197.35
IA	can	21.44	2.98	16.19	27.30	IA	can	39.20	6.70	28.79	51.50
IA	ccs	19.10	2.36	16.02	24.29	IA	ccs	33.08	5.70	23.54	43.76
IA	gis	15.48	2.27	12.20	19.20	IA	gis	24.40	5.43	16.70	34.07
IA	had	28.38	4.99	18.88	36.83	IA	had	54.69	7.31	41.15	65.58
IA	mir	24.75	4.68	17.76	33.56	IA	mir	47.03	4.55	39.81	55.68
ID	can	25.19	0.09	25.00	25.29	ID	can	25.62	0.10	25.41	25.78
ID	ccs	25.09	0.12	24.90	25.27	ID	ccs	25.44	0.10	25.25	25.56
ID	gis	24.78	0.11	24.61	24.97	ID	gis	25.07	0.12	24.89	25.28
ID	had	25.22	0.12	25.00	25.37	ID	had	25.68	0.12	25.51	25.90
ID	mir	25.12	0.11	24.95	25.32	ID	mir	25.45	0.11	25.21	25.62
IL	can	135.10	6.44	124.47	145.93	IL	can	177.52	17.80	153.33	214.34
IL	ccs	127.27	5.65	120.35	138.51	IL	ccs	159.13	12.16	140.88	183.51
IL	gis	124.55	5.79	115.50	135.58	IL	gis	147.36	12.45	130.21	170.80
IL	had	156.76	10.00	136.12	169.30	IL	had	220.45	15.87	190.03	242.75
IL	mir	142.83	9.38	127.92	161.46	IL	mir	189.41	11.74	172.23	210.65
IN	can	21.38	3.90	15.86	28.45	IN	can	50.79	13.72	31.79	80.19
IN	ccs	17.38	3.46	13.16	24.42	IN	ccs	39.77	9.32	26.03	58.98
IN	gis	15.66	3.27	10.62	22.99	IN	gis	29.48	8.76	17.90	46.37

Continued

IN	had	36.21	7.18	23.16	47.13	IN	had	85.47	12.12	64.84	102.55
IN	mir	26.16	5.47	17.65	37.26	IN	mir	56.31	8.10	45.42	71.31
KS	can	24.67	2.31	20.10	27.56	KS	can	36.98	5.20	28.84	46.66
KS	ccs	23.13	1.87	20.56	26.89	KS	ccs	33.25	4.97	24.40	42.50
KS	gis	18.75	1.32	17.18	21.44	KS	gis	25.90	3.94	20.65	32.85
KS	had	27.43	2.49	22.22	30.26	KS	had	44.02	5.54	35.24	52.40
KS	mir	26.06	2.27	22.13	30.07	KS	mir	40.76	4.41	34.83	49.39
KY	can	11.31	3.73	6.57	19.09	KY	can	33.30	11.11	16.68	55.58
KY	ccs	8.96	2.96	5.20	15.45	KY	ccs	30.38	8.65	17.54	47.37
KY	gis	6.61	2.40	3.05	12.26	KY	gis	16.51	6.53	7.14	29.29
KY	had	22.08	6.03	12.18	32.09	KY	had	58.46	9.17	44.97	70.63
KY	mir	13.95	4.42	7.57	22.66	KY	mir	34.51	5.70	26.06	44.45
LA	can	126.78	22.62	97.72	168.35	LA	can	219.58	54.44	141.20	311.73
LA	ccs	120.94	17.17	96.54	156.74	LA	ccs	211.84	40.16	150.99	275.16
LA	gis	102.47	13.99	84.25	128.60	LA	gis	144.47	28.71	97.89	191.74
LA	had	186.21	25.69	142.68	223.11	LA	had	313.76	32.97	263.56	369.24
LA	mir	151.18	24.10	111.16	200.80	LA	mir	258.67	26.11	208.22	297.78
MA	can	15.81	4.40	8.95	23.32	MA	can	38.96	7.38	27.03	50.49
MA	ccs	8.92	2.36	5.05	12.76	MA	ccs	25.64	5.28	18.36	34.79
MA	gis	7.12	1.62	4.25	9.84	MA	gis	16.57	5.80	8.88	28.43
MA	had	22.53	5.34	13.94	31.87	MA	had	51.00	6.44	40.44	63.38
MA	mir	14.77	3.00	9.49	19.94	MA	mir	39.26	5.02	31.48	48.18
MD	can	37.57	8.51	26.44	53.67	MD	can	79.30	13.89	58.76	108.11
MD	ccs	23.86	6.14	15.34	37.36	MD	ccs	60.61	9.70	46.32	78.19
MD	gis	21.94	5.50	13.37	33.61	MD	gis	46.89	11.32	27.49	67.33
MD	had	54.30	10.06	36.69	70.35	MD	had	98.35	9.69	83.48	114.42
MD	mir	39.33	7.33	26.30	53.93	MD	mir	76.71	7.78	65.09	89.36
ME	can	0.71	0.27	0.32	1.20	ME	can	2.92	0.55	2.02	3.60
ME	ccs	0.23	0.09	0.09	0.39	ME	ccs	1.35	0.39	0.80	1.99
ME	gis	0.15	0.07	0.06	0.32	ME	gis	0.71	0.35	0.22	1.35
ME	had	1.10	0.37	0.58	1.79	ME	had	3.46	0.31	2.63	3.60
ME	mir	0.65	0.19	0.33	1.03	ME	mir	2.91	0.42	2.23	3.55
MI	can	63.52	5.95	54.60	72.78	MI	can	102.15	13.60	83.11	128.84
MI	ccs	54.03	3.83	48.52	61.32	MI	ccs	84.95	9.56	69.05	100.31
MI	gis	53.22	5.16	43.61	62.19	MI	gis	73.99	11.29	59.91	95.46

Continued

MI	had	82.09	9.20	66.37	96.12	MI	had	136.69	11.60	115.92	155.96
MI	mir	67.88	6.80	56.24	81.03	MI	mir	110.14	9.61	99.80	131.56
MN	can	24.60	4.82	16.31	33.99	MN	can	53.16	10.11	38.47	70.15
MN	ccs	18.73	3.92	13.22	26.92	MN	ccs	43.54	9.03	24.43	55.10
MN	gis	13.90	3.74	9.19	20.46	MN	gis	25.89	6.50	15.85	36.55
MN	had	33.28	10.09	17.41	54.69	MN	had	73.12	12.39	49.70	93.41
MN	mir	26.41	7.26	16.50	40.96	MN	mir	61.73	8.92	51.21	81.35
MO	can	28.22	3.18	22.32	33.53	MO	can	50.75	10.60	35.93	73.71
MO	ccs	25.91	2.87	22.23	32.19	MO	ccs	44.30	8.00	32.09	59.98
MO	gis	21.91	2.58	18.31	27.31	MO	gis	32.24	6.21	23.19	43.12
MO	had	37.36	4.74	27.85	43.49	MO	had	71.33	9.97	54.27	83.87
MO	mir	32.37	4.49	25.74	41.58	MO	mir	55.98	7.09	45.07	68.19
MS	can	102.89	20.41	75.28	140.29	MS	can	191.93	47.77	118.68	274.84
MS	ccs	93.79	16.61	70.33	127.95	MS	ccs	183.02	36.97	128.92	244.14
MS	gis	75.40	12.40	58.98	100.72	MS	gis	117.26	25.36	74.87	156.31
MS	had	162.49	26.42	117.85	207.52	MS	had	293.63	35.35	242.37	345.02
MS	mir	121.44	22.36	84.05	166.39	MS	mir	215.81	25.36	173.87	259.49
MT	can	34.59	9.36	16.00	46.86	MT	can	82.06	13.64	56.49	106.59
MT	ccs	18.91	11.04	5.88	44.13	MT	ccs	52.75	15.95	24.52	73.73
MT	gis	7.22	4.09	3.39	16.65	MT	gis	21.49	12.01	7.29	48.96
MT	had	38.96	19.42	9.77	73.30	MT	had	90.29	19.56	64.20	129.74
MT	mir	23.11	10.43	9.95	39.14	MT	mir	58.52	15.00	32.10	84.77
NC	can	15.39	8.24	6.07	34.75	NC	can	59.62	20.80	29.16	99.03
NC	ccs	8.92	6.49	2.36	25.09	NC	ccs	50.71	14.20	31.91	78.90
NC	gis	6.16	4.85	1.01	16.68	NC	gis	28.87	13.74	7.54	53.94
NC	had	37.40	12.13	12.96	52.78	NC	had	94.02	10.27	77.06	106.22
NC	mir	15.20	7.27	5.69	28.80	NC	mir	52.61	10.20	37.24	68.91
ND	can	36.25	6.38	24.44	48.20	ND	can	71.67	11.30	53.75	89.19
ND	ccs	26.20	6.53	16.88	40.46	ND	ccs	56.05	12.72	31.75	72.46
ND	gis	19.09	5.31	13.15	30.63	ND	gis	33.69	8.71	19.05	47.32
ND	had	48.57	16.42	25.43	81.11	ND	had	92.73	16.94	63.76	122.82
ND	mir	34.26	8.42	22.81	48.45	ND	mir	71.22	11.89	54.83	94.81
NE	can	49.87	7.45	35.35	62.92	NE	can	103.40	17.30	72.43	133.09
NE	ccs	40.79	7.55	30.74	57.03	NE	ccs	82.28	15.75	52.48	108.18
NE	gis	26.81	4.25	21.13	35.26	NE	gis	51.80	16.08	33.42	81.24

Continued

NE	had	64.69	15.22	38.30	87.44	NE	had	134.66	23.06	100.20	169.02
NE	mir	56.33	11.06	37.89	76.12	NE	mir	117.44	13.04	97.22	141.07
NH	can	0.82	0.35	0.31	1.47	NH	can	3.15	0.75	1.97	4.33
NH	ccs	0.29	0.12	0.11	0.50	NH	ccs	1.86	0.50	1.12	2.66
NH	gis	0.19	0.09	0.07	0.38	NH	gis	0.95	0.47	0.31	1.87
NH	had	1.33	0.46	0.64	2.18	NH	had	4.52	0.62	3.51	5.66
NH	mir	0.78	0.25	0.38	1.24	NH	mir	3.28	0.48	2.54	4.21
NJ	can	28.49	8.00	17.08	39.50	NJ	can	71.09	16.32	47.45	101.95
NJ	ccs	17.25	5.62	9.51	28.82	NJ	ccs	53.70	11.72	38.15	76.26
NJ	gis	14.85	4.49	7.44	23.83	NJ	gis	37.16	14.00	17.44	66.45
NJ	had	44.46	11.31	25.34	63.40	NJ	had	96.18	12.82	75.37	118.81
NJ	mir	29.52	7.27	17.81	45.71	NJ	mir	75.13	10.33	58.40	94.12
NM	can	31.80	0.48	30.94	32.62	NM	can	35.10	0.90	33.43	36.72
NM	ccs	30.83	0.31	30.37	31.32	NM	ccs	33.33	0.77	31.94	34.24
NM	gis	30.08	0.37	29.50	30.71	NM	gis	32.06	0.55	31.22	33.12
NM	had	31.96	0.52	31.03	32.82	NM	had	35.49	0.90	34.13	37.14
NM	mir	31.41	0.42	30.76	32.17	NM	mir	33.84	0.84	32.42	35.27
NV	can	22.34	0.49	21.40	22.98	NV	can	25.19	0.68	23.86	26.37
NV	ccs	21.65	0.53	20.68	22.29	NV	ccs	23.68	0.58	22.62	24.29
NV	gis	20.27	0.50	19.48	21.09	NV	gis	22.02	0.61	21.08	23.07
NV	had	22.53	0.58	21.43	23.38	NV	had	25.23	0.58	24.30	26.33
NV	mir	21.85	0.46	20.84	22.48	NV	mir	23.64	0.67	22.21	24.74
NY	can	109.97	16.95	83.49	134.36	NY	can	191.49	25.71	149.53	234.49
NY	ccs	84.76	11.13	67.17	104.60	NY	ccs	155.82	19.10	128.06	189.90
NY	gis	78.96	9.79	61.35	96.71	NY	gis	125.54	24.42	89.94	172.00
NY	had	141.39	19.78	108.95	175.63	NY	had	232.45	16.55	202.91	263.00
NY	mir	113.19	14.05	87.91	142.28	NY	mir	202.10	16.20	176.62	233.29
OH	can	37.74	7.62	27.64	52.94	OH	can	89.86	22.66	56.85	139.85
OH	ccs	27.67	5.50	20.07	38.86	OH	ccs	68.80	17.17	45.92	104.00
OH	gis	26.23	5.65	16.88	38.80	OH	gis	50.95	15.82	29.46	82.63
OH	had	62.07	14.28	40.51	85.59	OH	had	147.22	20.35	115.71	179.48
OH	mir	43.27	9.13	28.66	61.80	OH	mir	97.05	13.63	80.49	123.53
OK	can	41.91	3.17	36.54	47.20	OK	can	56.41	6.37	46.55	68.60
OK	ccs	39.79	2.32	36.55	43.32	OK	ccs	52.54	5.85	41.93	61.90
OK	gis	35.33	1.58	33.28	38.75	OK	gis	43.51	4.18	37.68	50.54

Continued

OK	had	45.40	2.86	40.34	49.60	OK	had	64.58	6.04	55.31	72.92
OK	mir	43.81	2.87	39.34	49.62	OK	mir	60.87	5.41	53.95	71.14
OR	can	1.68	0.01	1.66	1.69	OR	can	1.73	0.01	1.71	1.74
OR	ccs	1.66	0.01	1.64	1.68	OR	ccs	1.69	0.01	1.68	1.71
OR	gis	1.63	0.01	1.61	1.65	OR	gis	1.66	0.01	1.64	1.69
OR	had	1.68	0.01	1.66	1.70	OR	had	1.73	0.01	1.71	1.75
OR	mir	1.66	0.01	1.64	1.68	OR	mir	1.69	0.01	1.67	1.71
PA	can	43.04	12.11	27.30	67.00	PA	can	113.78	21.45	79.21	153.31
PA	ccs	25.87	8.02	14.68	42.13	PA	ccs	86.34	18.08	60.65	118.55
PA	gis	22.90	6.45	11.80	37.06	PA	gis	59.56	18.70	30.11	94.43
PA	had	75.22	17.60	46.43	104.98	PA	had	155.61	13.33	132.80	178.97
PA	mir	47.41	11.45	27.93	70.66	PA	mir	116.91	12.70	99.25	140.38
RI	can	2.21	0.88	0.87	3.70	RI	can	6.65	1.55	4.24	9.07
RI	ccs	0.94	0.46	0.28	1.79	RI	ccs	4.00	1.11	2.47	6.01
RI	gis	0.66	0.28	0.22	1.18	RI	gis	2.24	1.17	0.83	4.79
RI	had	3.62	1.04	1.95	5.58	RI	had	8.49	1.40	6.31	11.22
RI	mir	1.87	0.61	0.81	2.99	RI	mir	6.39	1.13	4.60	8.33
SC	can	24.69	13.30	8.28	54.79	SC	can	85.13	27.62	42.51	131.68
SC	ccs	14.64	9.94	4.02	38.91	SC	ccs	74.21	20.47	45.96	111.50
SC	gis	9.95	7.54	2.42	25.81	SC	gis	41.25	18.75	11.51	73.75
SC	had	56.41	17.26	20.14	76.89	SC	had	129.40	14.05	105.77	147.55
SC	mir	21.88	11.09	8.34	43.79	SC	mir	73.35	15.54	50.07	99.12
SD	can	59.57	8.48	43.83	74.14	SD	can	105.96	13.49	82.71	125.01
SD	ccs	50.28	9.61	35.96	71.82	SD	ccs	92.49	15.52	59.17	112.93
SD	gis	35.55	6.53	26.96	48.95	SD	gis	58.27	13.79	38.70	82.28
SD	had	78.17	20.82	45.30	117.27	SD	had	138.89	20.92	102.93	175.50
SD	mir	63.13	11.06	46.63	81.33	SD	mir	115.71	11.47	100.40	139.43
TN	can	16.64	4.44	10.91	25.62	TN	can	45.29	15.19	22.69	75.05
TN	ccs	13.73	3.14	9.13	20.97	TN	ccs	40.63	11.67	25.11	62.19
TN	gis	10.91	2.37	7.77	16.21	TN	gis	22.59	7.46	12.23	36.09
TN	had	29.31	7.24	17.05	42.73	TN	had	77.22	13.03	58.82	93.50
TN	mir	18.27	4.77	11.85	27.54	TN	mir	41.97	6.48	31.90	51.82
TX	can	492.27	19.46	465.31	529.96	TX	can	598.09	40.18	537.50	670.14
TX	ccs	469.07	15.10	442.55	494.81	TX	ccs	559.19	37.15	490.59	612.44
TX	gis	445.45	10.65	432.46	465.18	TX	gis	497.55	26.08	460.34	544.93

Continued

TX	had	512.35	21.28	475.43	552.91	TX	had	640.90	34.17	593.18	704.57
TX	mir	498.26	20.93	463.57	540.00	TX	mir	602.82	33.15	552.16	657.57
UT	can	25.97	0.36	25.21	26.48	UT	can	27.82	0.52	26.75	28.54
UT	ccs	25.78	0.41	25.09	26.38	UT	ccs	27.29	0.50	26.23	27.89
UT	gis	24.65	0.45	23.94	25.43	UT	gis	25.99	0.47	25.28	26.86
UT	had	26.39	0.50	25.60	27.19	UT	had	28.45	0.56	27.71	29.38
UT	mir	26.15	0.46	25.37	26.94	UT	mir	27.78	0.54	26.59	28.53
VA	can	22.32	9.27	11.57	42.75	VA	can	75.69	23.62	42.14	124.48
VA	ccs	12.77	5.80	6.61	27.18	VA	ccs	56.60	14.63	35.46	85.92
VA	gis	10.34	5.08	4.07	22.44	VA	gis	35.02	14.58	12.99	64.09
VA	had	41.66	12.67	20.42	60.56	VA	had	105.66	15.18	83.72	129.24
VA	mir	23.60	8.31	11.00	40.82	VA	mir	70.58	12.55	52.34	90.13
VT	can	2.27	0.83	0.92	3.78	VT	can	7.76	1.45	5.36	9.84
VT	ccs	0.62	0.25	0.28	1.03	VT	ccs	3.83	1.09	2.29	5.57
VT	gis	0.55	0.32	0.18	1.33	VT	gis	2.48	1.14	0.81	4.59
VT	had	3.22	1.03	1.60	5.10	VT	had	9.42	0.83	7.62	10.28
VT	mir	1.91	0.71	0.75	3.21	VT	mir	7.80	1.16	5.80	9.96
WA	can	4.48	0.02	4.43	4.51	WA	can	4.58	0.02	4.55	4.63
WA	ccs	4.43	0.03	4.38	4.48	WA	ccs	4.50	0.02	4.47	4.52
WA	gis	4.38	0.02	4.34	4.42	WA	gis	4.44	0.03	4.39	4.50
WA	had	4.49	0.03	4.42	4.53	WA	had	4.58	0.03	4.55	4.63
WA	mir	4.43	0.02	4.39	4.47	WA	mir	4.49	0.02	4.45	4.53
WI	can	15.12	2.40	11.09	19.07	WI	can	29.19	5.88	21.50	39.89
WI	ccs	12.49	1.44	10.72	15.42	WI	ccs	23.66	4.15	16.66	30.40
WI	gis	11.34	1.71	8.93	14.51	WI	gis	18.72	3.92	13.17	25.89
WI	had	21.37	3.78	14.13	27.72	WI	had	44.95	6.19	32.81	54.60
WI	mir	17.18	3.38	12.37	23.52	WI	mir	35.68	4.47	30.58	45.31
WV	can	2.83	1.20	1.50	5.43	WV	can	11.44	4.13	5.46	20.13
WV	ccs	1.56	0.70	0.76	3.18	WV	ccs	8.16	2.78	4.53	13.72
WV	gis	1.29	0.65	0.38	2.89	WV	gis	4.59	2.23	1.52	9.24
WV	had	6.07	2.09	3.01	9.27	WV	had	19.79	3.58	14.71	25.64
WV	mir	3.15	1.22	1.30	5.62	WV	mir	10.85	1.89	8.34	14.38
WY	can	19.85	4.55	11.24	27.10	WY	can	47.96	9.12	30.82	61.29
WY	ccs	13.96	4.42	8.18	22.82	WY	ccs	34.51	8.41	17.12	43.63
WY	gis	7.19	1.59	5.40	10.66	WY	gis	16.28	6.02	9.24	28.43
WY	had	22.54	8.05	10.64	36.01	WY	had	57.17	11.02	41.82	76.65
WY	mir	17.37	5.91	8.92	28.99	WY	mir	39.59	8.29	25.49	53.54

Table A3.4. Detailed state-level projections of the expected annual number of West Nile neuroinvasive disease cases across all global climate models for the 2010 population and 2050 climate period.

Population		2010				Population		2010			
Climate		2050				Climate		2050			
RCP		4.5				RCP		8.5			
State	Model	Mean	SD	2.5% Quantile	97.5% Quantile	State	Model	Mean	SD	2.5% Quantile	97.5% Quantile
AL	can	17.25	6.47	9.16	31.56	AL	can	23.55	7.89	9.94	38.77
AL	ccs	12.57	5.50	7.43	26.43	AL	ccs	17.33	7.75	7.60	31.61
AL	gis	8.50	2.73	5.35	15.07	AL	gis	13.85	5.87	7.53	27.19
AL	had	33.73	15.32	14.57	60.89	AL	had	50.57	21.33	22.90	92.04
AL	mir	18.81	7.10	6.76	30.55	AL	mir	22.76	9.40	9.89	39.77
AR	can	21.45	5.05	17.15	34.13	AR	can	26.91	5.11	19.79	37.15
AR	ccs	16.59	3.92	10.61	23.36	AR	ccs	24.42	4.92	15.74	33.19
AR	gis	13.13	2.73	9.30	18.46	AR	gis	17.21	4.09	11.22	24.07
AR	had	33.08	9.48	18.19	49.14	AR	had	44.32	9.90	30.51	61.65
AR	mir	26.45	6.30	15.48	34.83	AR	mir	28.23	7.95	17.66	40.55
AZ	can	102.76	0.97	101.50	104.65	AZ	can	104.07	1.25	101.93	106.39
AZ	ccs	101.00	0.84	99.14	102.03	AZ	ccs	102.59	0.94	101.22	104.20
AZ	gis	100.03	0.95	98.70	102.17	AZ	gis	101.07	1.32	98.97	103.19
AZ	had	102.04	1.11	100.14	103.97	AZ	had	103.65	1.49	101.37	106.70
AZ	mir	101.50	1.14	99.66	103.09	AZ	mir	102.39	1.10	100.80	104.63
CA	can	238.94	3.50	233.52	245.27	CA	can	243.41	4.33	236.59	252.63
CA	ccs	236.08	3.52	229.29	241.75	CA	ccs	239.78	2.83	234.06	244.42
CA	gis	232.16	3.03	228.47	238.31	CA	gis	234.85	3.43	229.83	240.62
CA	had	237.95	3.89	232.49	245.69	CA	had	242.02	5.37	233.92	252.46
CA	mir	235.90	2.85	231.24	239.60	CA	mir	238.65	3.10	234.19	244.69
CO	can	40.95	0.93	39.67	42.78	CO	can	42.25	1.11	40.28	44.32
CO	ccs	39.86	0.81	38.17	41.03	CO	ccs	41.24	0.67	39.93	42.24
CO	gis	39.08	0.75	37.97	40.46	CO	gis	39.80	0.79	38.62	41.03
CO	had	41.22	0.83	40.06	43.05	CO	had	42.31	1.15	40.53	44.09
CO	mir	40.83	1.13	38.81	42.33	CO	mir	41.84	1.11	40.41	44.22
CT	can	6.62	1.88	4.28	10.54	CT	can	8.08	2.68	4.19	13.15
CT	ccs	4.99	1.22	3.28	7.30	CT	ccs	5.92	1.69	3.61	9.60
CT	gis	4.43	0.82	2.66	5.62	CT	gis	6.06	1.50	3.99	9.32
CT	had	9.00	2.70	5.27	13.37	CT	had	10.12	4.22	4.60	19.04
CT	mir	6.90	1.93	4.55	11.46	CT	mir	10.45	2.77	5.41	15.17
DC	can	6.54	1.05	5.12	8.68	DC	can	7.45	0.96	5.64	8.69
DC	ccs	4.90	0.77	3.91	6.48	DC	ccs	5.73	0.98	4.18	7.76
DC	gis	4.59	0.63	3.27	5.46	DC	gis	5.72	1.08	4.21	7.89

Continued

DC	had	7.83	1.59	5.23	10.12	DC	had	8.62	1.31	6.46	11.17
DC	mir	6.46	0.99	5.11	8.48	DC	mir	7.69	1.16	5.46	9.72
DE	can	1.81	0.81	0.93	3.57	DE	can	2.56	0.88	1.11	3.95
DE	ccs	0.73	0.37	0.31	1.52	DE	ccs	1.10	0.61	0.36	2.56
DE	gis	0.60	0.24	0.18	1.03	DE	gis	1.21	0.71	0.41	2.84
DE	had	2.50	1.17	0.85	4.30	DE	had	2.89	1.45	0.87	5.92
DE	mir	1.61	0.79	0.67	3.40	DE	mir	2.69	0.99	1.03	4.57
FL	can	42.22	15.96	13.88	64.76	FL	can	65.07	26.56	20.70	111.55
FL	ccs	24.77	12.47	12.41	52.61	FL	ccs	38.20	24.44	12.08	82.20
FL	gis	21.63	9.94	8.26	40.77	FL	gis	38.23	21.09	15.87	82.78
FL	had	57.49	22.44	22.03	95.42	FL	had	79.74	33.03	39.35	136.88
FL	mir	38.42	19.00	11.64	71.16	FL	mir	50.94	26.47	18.03	106.13
GA	can	28.48	10.21	11.91	49.94	GA	can	40.65	13.91	16.28	66.00
GA	ccs	19.53	12.08	9.56	50.51	GA	ccs	27.63	15.24	9.76	56.30
GA	gis	11.44	4.16	6.64	20.20	GA	gis	23.94	12.51	11.50	54.06
GA	had	54.64	24.07	21.49	94.05	GA	had	82.95	37.38	36.81	151.59
GA	mir	30.10	12.98	8.20	50.37	GA	mir	36.98	16.04	12.48	65.59
IA	can	11.52	2.12	8.74	15.66	IA	can	13.38	2.41	8.80	17.21
IA	ccs	9.15	1.83	6.21	12.54	IA	ccs	12.19	2.22	9.36	16.82
IA	gis	8.14	1.50	5.93	11.28	IA	gis	9.55	1.84	7.10	12.79
IA	had	14.15	3.22	8.63	19.48	IA	had	18.30	3.37	13.19	24.35
IA	mir	13.22	3.76	7.76	21.91	IA	mir	14.26	3.04	8.96	18.30
ID	can	17.22	0.07	17.10	17.33	ID	can	17.32	0.08	17.18	17.46
ID	ccs	17.18	0.09	17.00	17.29	ID	ccs	17.27	0.07	17.15	17.37
ID	gis	17.05	0.07	16.93	17.17	ID	gis	17.09	0.08	16.95	17.25
ID	had	17.19	0.10	17.03	17.36	ID	had	17.27	0.13	17.06	17.48
ID	mir	17.18	0.09	17.01	17.32	ID	mir	17.23	0.09	17.13	17.44
IL	can	80.72	4.76	74.41	90.99	IL	can	85.92	5.26	77.32	95.68
IL	ccs	73.88	3.02	68.70	77.86	IL	ccs	81.08	5.54	73.93	91.65
IL	gis	74.74	3.63	68.61	81.60	IL	gis	79.60	5.26	73.30	89.68
IL	had	91.00	7.36	77.92	101.74	IL	had	101.18	7.32	89.80	113.01
IL	mir	85.07	6.59	75.82	100.85	IL	mir	89.04	6.80	76.96	98.97
IN	can	11.71	2.31	8.59	17.06	IN	can	14.75	2.95	10.12	20.76
IN	ccs	8.65	1.55	6.61	11.45	IN	ccs	11.98	3.09	8.31	18.64
IN	gis	8.67	1.65	5.97	12.19	IN	gis	11.23	2.86	8.15	16.95

Continued

IN	had	19.25	5.30	10.88	27.44	IN	had	25.80	5.18	18.38	34.16
IN	mir	14.22	3.91	9.33	24.03	IN	mir	16.65	3.77	10.32	22.42
KS	can	11.58	1.46	9.77	15.25	KS	can	12.66	1.66	10.75	16.33
KS	ccs	9.65	1.37	7.29	11.60	KS	ccs	12.36	1.58	10.04	15.37
KS	gis	8.47	0.86	7.46	10.47	KS	gis	9.88	1.31	7.72	12.16
KS	had	13.07	1.65	10.42	16.22	KS	had	16.32	1.75	13.64	19.21
KS	mir	12.48	1.89	8.70	14.87	KS	mir	13.42	1.52	10.90	15.69
KY	can	8.31	2.09	5.87	12.93	KY	can	10.86	2.88	6.77	17.26
KY	ccs	6.43	1.87	3.96	10.39	KY	ccs	9.49	2.96	4.93	15.62
KY	gis	5.01	1.32	3.05	7.55	KY	gis	7.12	2.17	4.69	11.81
KY	had	15.72	5.79	7.29	24.90	KY	had	22.14	5.38	13.82	31.28
KY	mir	10.06	3.38	5.47	18.36	KY	mir	12.33	3.30	7.18	16.76
LA	can	79.38	13.34	63.67	106.42	LA	can	87.26	22.57	55.92	132.36
LA	ccs	72.20	10.68	59.09	94.77	LA	ccs	86.72	14.78	60.28	112.97
LA	gis	60.22	7.75	48.59	74.00	LA	gis	74.35	11.74	58.60	98.31
LA	had	115.59	24.34	77.64	157.20	LA	had	132.23	25.32	96.76	178.46
LA	mir	91.25	16.18	62.93	115.29	LA	mir	98.10	18.72	69.01	128.85
MA	can	10.26	2.82	6.52	16.41	MA	can	12.67	4.14	6.93	21.27
MA	ccs	6.38	1.65	3.90	9.59	MA	ccs	7.64	2.54	4.19	13.09
MA	gis	5.52	1.10	3.22	6.72	MA	gis	7.57	1.93	4.83	11.68
MA	had	12.52	3.91	6.82	19.78	MA	had	15.43	6.10	7.63	27.62
MA	mir	8.85	2.62	5.56	14.80	MA	mir	14.52	4.56	6.15	22.80
MD	can	26.41	6.71	18.24	40.57	MD	can	33.00	6.49	21.20	42.09
MD	ccs	16.59	4.11	11.52	25.18	MD	ccs	21.26	5.92	12.61	34.29
MD	gis	15.04	3.10	8.70	19.96	MD	gis	21.43	6.42	12.98	35.76
MD	had	34.54	10.11	19.17	49.08	MD	had	39.01	9.68	24.12	58.73
MD	mir	26.10	6.94	17.51	41.60	MD	mir	34.10	7.79	20.40	48.15
ME	can	0.37	0.15	0.19	0.64	ME	can	0.59	0.26	0.27	1.17
ME	ccs	0.15	0.06	0.07	0.27	ME	ccs	0.21	0.13	0.06	0.48
ME	gis	0.12	0.05	0.04	0.20	ME	gis	0.20	0.08	0.10	0.35
ME	had	0.43	0.19	0.18	0.78	ME	had	0.66	0.42	0.18	1.48
ME	mir	0.27	0.11	0.11	0.49	ME	mir	0.72	0.32	0.18	1.31
MI	can	48.38	3.97	43.47	57.35	MI	can	53.45	5.21	44.15	62.06
MI	ccs	42.85	2.96	38.50	48.20	MI	ccs	48.06	5.48	41.57	59.09
MI	gis	44.41	3.40	37.40	50.23	MI	gis	49.11	5.94	42.14	60.82

Continued

MI	had	59.48	7.27	46.99	70.59	MI	had	66.46	6.66	57.30	79.15
MI	mir	52.06	6.00	43.48	66.58	MI	mir	58.26	6.57	45.29	67.19
MN	can	16.11	4.00	10.53	23.52	MN	can	18.98	4.21	10.81	24.92
MN	ccs	12.67	3.41	7.48	19.32	MN	ccs	16.11	3.44	10.88	21.98
MN	gis	11.37	3.18	6.96	18.10	MN	gis	12.04	3.48	8.06	20.05
MN	had	20.56	6.35	12.02	33.15	MN	had	23.54	6.66	14.52	36.95
MN	mir	16.87	6.50	10.57	33.22	MN	mir	18.51	5.29	9.79	26.34
MO	can	20.05	2.44	17.00	25.18	MO	can	22.95	2.88	19.11	29.08
MO	ccs	16.60	1.89	13.47	19.50	MO	ccs	21.54	2.70	17.91	26.72
MO	gis	15.42	1.72	13.02	19.17	MO	gis	18.02	2.23	14.55	21.73
MO	had	24.34	3.84	18.23	31.12	MO	had	31.19	4.25	24.28	38.23
MO	mir	22.87	3.88	16.84	31.11	MO	mir	23.94	3.50	18.06	29.13
MS	can	62.77	13.03	46.72	88.68	MS	can	73.49	15.42	47.73	101.79
MS	ccs	53.13	11.19	39.55	78.09	MS	ccs	66.80	14.03	42.74	90.56
MS	gis	42.58	7.76	32.57	59.07	MS	gis	54.56	12.31	38.14	79.68
MS	had	99.54	27.63	61.77	141.17	MS	had	122.22	27.17	79.81	168.48
MS	mir	70.04	16.80	39.42	97.35	MS	mir	77.30	19.21	48.87	107.64
MT	can	16.25	7.61	5.56	26.44	MT	can	26.49	11.31	8.61	46.92
MT	ccs	10.85	6.97	1.98	26.13	MT	ccs	16.46	9.10	5.91	34.88
MT	gis	5.07	2.33	2.33	9.28	MT	gis	6.44	4.05	2.62	16.51
MT	had	16.73	10.93	3.31	38.74	MT	had	22.41	13.65	4.67	51.41
MT	mir	10.26	5.89	2.42	20.61	MT	mir	13.44	8.70	5.47	35.46
NC	can	8.29	4.29	2.80	16.99	NC	can	13.60	6.00	4.62	25.11
NC	ccs	5.45	4.32	1.81	15.89	NC	ccs	8.82	5.79	1.94	21.88
NC	gis	2.56	1.59	0.68	5.71	NC	gis	7.24	5.13	1.80	17.66
NC	had	20.03	10.79	5.00	36.16	NC	had	28.43	12.40	10.29	47.79
NC	mir	9.65	5.52	2.17	21.33	NC	mir	13.33	6.64	3.81	23.49
ND	can	17.73	4.93	10.24	26.61	ND	can	21.06	5.24	11.90	29.20
ND	ccs	13.38	4.58	6.20	23.86	ND	ccs	16.69	4.92	9.03	26.67
ND	gis	10.79	2.80	6.03	15.56	ND	gis	11.36	3.39	6.95	16.82
ND	had	22.66	8.71	11.23	39.55	ND	had	25.46	8.83	13.21	41.46
ND	mir	14.85	5.41	8.89	27.85	ND	mir	16.98	5.57	7.63	25.90
NE	can	25.56	6.14	16.97	37.56	NE	can	30.34	6.97	19.95	43.04
NE	ccs	19.39	4.74	11.85	28.92	NE	ccs	27.02	5.78	20.55	39.19
NE	gis	14.77	3.06	10.19	21.09	NE	gis	18.84	4.21	12.53	25.99

Continued

NE	had	34.57	8.23	22.11	50.90	NE	had	46.74	8.63	33.70	60.42
NE	mir	30.11	9.07	14.89	45.77	NE	mir	33.20	8.10	20.92	47.32
NH	can	0.43	0.21	0.21	0.90	NH	can	0.66	0.34	0.25	1.43
NH	ccs	0.20	0.09	0.07	0.37	NH	ccs	0.28	0.16	0.10	0.64
NH	gis	0.14	0.05	0.04	0.20	NH	gis	0.26	0.12	0.10	0.49
NH	had	0.63	0.28	0.24	1.13	NH	had	0.94	0.47	0.32	1.95
NH	mir	0.35	0.17	0.13	0.76	NH	mir	0.88	0.39	0.20	1.59
NJ	can	13.54	5.96	7.03	26.70	NJ	can	17.47	6.57	7.15	28.94
NJ	ccs	7.92	3.12	4.05	13.85	NJ	ccs	10.53	4.94	4.43	22.34
NJ	gis	6.45	2.03	2.51	9.97	NJ	gis	10.93	4.89	5.22	21.79
NJ	had	18.97	8.12	7.97	32.70	NJ	had	22.21	11.59	7.00	47.43
NJ	mir	13.34	5.72	6.87	26.74	NJ	mir	21.05	7.41	8.51	34.35
NM	can	14.88	0.33	14.42	15.58	NM	can	15.28	0.48	14.40	16.03
NM	ccs	14.06	0.27	13.52	14.38	NM	ccs	14.76	0.28	14.28	15.24
NM	gis	13.84	0.31	13.50	14.43	NM	gis	14.33	0.33	13.81	14.85
NM	had	14.72	0.32	14.27	15.38	NM	had	15.31	0.34	14.76	15.87
NM	mir	14.40	0.35	13.79	14.79	NM	mir	14.83	0.40	14.14	15.46
NV	can	15.26	0.43	14.50	15.95	NV	can	15.90	0.53	15.08	16.94
NV	ccs	14.82	0.46	13.93	15.39	NV	ccs	15.37	0.38	14.71	16.01
NV	gis	14.18	0.39	13.63	14.85	NV	gis	14.49	0.58	13.65	15.38
NV	had	15.08	0.42	14.45	15.92	NV	had	15.66	0.72	14.55	17.13
NV	mir	14.74	0.40	14.05	15.31	NV	mir	15.15	0.45	14.68	16.11
NY	can	57.99	11.72	42.53	82.09	NY	can	67.79	14.57	43.97	93.25
NY	ccs	45.36	7.63	34.93	59.39	NY	ccs	51.23	10.14	35.98	72.97
NY	gis	42.44	5.81	29.49	51.18	NY	gis	52.90	9.81	38.95	73.76
NY	had	71.94	16.43	47.61	98.69	NY	had	79.84	21.36	49.64	124.66
NY	mir	59.27	12.39	43.30	87.72	NY	mir	78.85	16.29	47.43	105.00
OH	can	24.79	5.06	19.04	36.75	OH	can	30.43	6.16	20.86	42.20
OH	ccs	17.97	3.31	14.40	24.70	OH	ccs	22.53	5.23	15.68	34.00
OH	gis	18.13	3.15	12.47	24.37	OH	gis	23.20	5.77	16.60	34.66
OH	had	38.55	11.24	22.36	54.85	OH	had	48.82	9.35	36.33	66.21
OH	mir	27.26	7.15	19.28	45.51	OH	mir	33.84	7.23	20.84	45.70
OK	can	27.33	2.20	25.28	33.20	OK	can	29.26	2.36	25.83	34.34
OK	ccs	24.79	2.54	20.58	28.36	OK	ccs	28.69	2.07	25.69	32.61
OK	gis	22.55	1.30	20.41	25.14	OK	gis	25.04	1.92	21.45	27.79

Continued

OK	had	29.22	2.32	25.14	33.77	OK	had	33.88	2.69	29.40	38.65
OK	mir	28.92	2.38	24.41	32.04	OK	mir	30.06	2.29	26.22	33.34
OR	can	1.12	0.01	1.10	1.13	OR	can	1.13	0.01	1.11	1.14
OR	ccs	1.11	0.01	1.09	1.12	OR	ccs	1.12	0.01	1.10	1.13
OR	gis	1.09	0.01	1.08	1.10	OR	gis	1.10	0.01	1.08	1.11
OR	had	1.11	0.01	1.09	1.13	OR	had	1.12	0.02	1.10	1.15
OR	mir	1.10	0.01	1.08	1.11	OR	mir	1.11	0.01	1.10	1.13
PA	can	29.91	10.19	19.19	53.24	PA	can	38.61	9.96	21.24	54.03
PA	ccs	18.50	5.25	11.67	28.44	PA	ccs	24.51	8.75	13.18	45.06
PA	gis	16.91	4.16	8.27	23.79	PA	gis	25.31	8.98	14.29	46.10
PA	had	45.45	15.91	22.71	72.15	PA	had	55.65	16.01	32.24	90.46
PA	mir	30.66	10.24	18.96	54.44	PA	mir	45.46	13.23	22.55	69.85
RI	can	1.33	0.58	0.57	2.60	RI	can	1.81	0.85	0.59	3.49
RI	ccs	0.66	0.28	0.27	1.21	RI	ccs	0.85	0.46	0.27	1.90
RI	gis	0.53	0.17	0.20	0.77	RI	gis	0.90	0.39	0.42	1.82
RI	had	1.81	0.87	0.66	3.33	RI	had	2.23	1.38	0.61	4.94
RI	mir	1.08	0.56	0.49	2.43	RI	mir	2.06	0.89	0.53	3.75
SC	can	12.61	5.68	3.59	23.28	SC	can	19.83	8.49	6.53	35.38
SC	ccs	8.88	7.47	2.95	27.88	SC	ccs	13.62	9.01	2.97	31.63
SC	gis	3.97	2.48	1.21	8.77	SC	gis	11.30	7.60	3.07	27.79
SC	had	28.68	14.95	7.78	52.63	SC	had	43.36	19.67	16.14	75.62
SC	mir	14.73	7.87	2.30	30.05	SC	mir	18.38	9.20	4.89	31.07
SD	can	23.05	5.58	14.17	32.28	SD	can	26.39	5.78	16.45	35.16
SD	ccs	19.12	4.76	10.94	29.30	SD	ccs	23.71	4.78	17.01	32.78
SD	gis	14.33	3.16	9.86	20.46	SD	gis	16.13	3.88	11.42	24.01
SD	had	31.07	8.96	18.47	46.10	SD	had	35.84	8.89	21.24	51.59
SD	mir	23.37	7.22	13.07	40.05	SD	mir	25.38	6.58	14.41	35.49
TN	can	12.09	2.36	9.52	16.87	TN	can	15.19	3.24	10.90	22.76
TN	ccs	9.91	2.08	6.97	14.36	TN	ccs	13.37	3.15	8.81	19.90
TN	gis	8.31	1.28	6.54	11.01	TN	gis	10.80	2.41	7.79	15.50
TN	had	20.38	6.74	11.01	32.27	TN	had	28.11	7.58	17.44	42.07
TN	mir	13.36	2.92	8.76	18.98	TN	mir	15.38	3.67	10.52	20.71
TX	can	238.31	10.72	227.50	263.52	TX	can	251.43	14.34	226.23	276.17
TX	ccs	221.11	10.67	203.45	237.95	TX	ccs	241.16	10.60	221.75	259.72
TX	gis	210.17	8.24	197.68	224.17	TX	gis	224.88	10.37	206.38	241.83

Continued

TX	had	249.35	13.18	226.36	270.38	TX	had	266.55	13.62	245.43	289.32
TX	mir	240.54	11.28	219.13	256.88	TX	mir	247.90	14.72	224.35	272.85
UT	can	16.96	0.29	16.48	17.39	UT	can	17.33	0.37	16.71	18.05
UT	ccs	16.85	0.30	16.16	17.24	UT	ccs	17.33	0.25	16.85	17.67
UT	gis	16.34	0.32	15.85	16.92	UT	gis	16.61	0.43	16.02	17.43
UT	had	17.06	0.39	16.49	17.77	UT	had	17.41	0.53	16.57	18.28
UT	mir	17.14	0.43	16.31	17.84	UT	mir	17.42	0.44	16.98	18.41
VA	can	12.58	5.88	6.46	24.77	VA	can	18.04	6.44	7.70	29.38
VA	ccs	6.67	3.21	3.52	13.57	VA	ccs	10.50	5.09	3.91	22.53
VA	gis	4.58	1.72	1.84	7.63	VA	gis	9.31	5.43	3.40	20.49
VA	had	22.19	10.98	6.93	37.05	VA	had	26.78	11.32	11.44	49.74
VA	mir	12.40	6.64	4.96	28.82	VA	mir	18.47	7.68	6.63	32.91
VT	can	1.26	0.49	0.74	2.21	VT	can	1.79	0.76	0.69	3.49
VT	ccs	0.38	0.17	0.15	0.74	VT	ccs	0.54	0.32	0.16	1.27
VT	gis	0.39	0.17	0.11	0.66	VT	gis	0.65	0.30	0.24	1.18
VT	had	1.50	0.69	0.57	2.61	VT	had	2.04	1.13	0.68	4.56
VT	mir	0.80	0.45	0.26	1.71	VT	mir	2.10	0.98	0.44	4.10
WA	can	2.67	0.02	2.64	2.70	WA	can	2.69	0.02	2.65	2.72
WA	ccs	2.64	0.02	2.60	2.68	WA	ccs	2.66	0.02	2.63	2.69
WA	gis	2.63	0.02	2.60	2.65	WA	gis	2.63	0.02	2.59	2.67
WA	had	2.67	0.02	2.63	2.71	WA	had	2.68	0.03	2.63	2.73
WA	mir	2.63	0.02	2.60	2.66	WA	mir	2.65	0.02	2.62	2.69
WI	can	10.40	1.86	8.12	14.22	WI	can	11.80	2.00	8.58	14.97
WI	ccs	8.61	1.06	7.08	10.56	WI	ccs	10.77	1.91	8.50	14.20
WI	gis	9.00	1.36	6.91	11.86	WI	gis	10.24	1.86	8.16	14.04
WI	had	13.51	2.58	9.04	17.34	WI	had	15.95	2.76	11.88	21.24
WI	mir	11.74	2.42	8.67	17.74	WI	mir	13.51	2.71	8.87	17.81
WV	can	1.81	0.77	1.04	3.58	WV	can	2.49	0.80	1.24	4.01
WV	ccs	1.01	0.42	0.53	1.91	WV	ccs	1.56	0.69	0.66	3.09
WV	gis	0.81	0.32	0.31	1.46	WV	gis	1.43	0.66	0.68	2.83
WV	had	3.68	1.80	1.24	6.36	WV	had	4.82	1.66	2.59	8.07
WV	mir	1.84	0.95	0.87	4.28	WV	mir	2.81	1.12	1.13	5.02
WY	can	8.94	2.89	4.85	14.93	WY	can	13.52	5.12	6.60	23.94
WY	ccs	7.46	2.70	3.31	12.95	WY	ccs	11.02	3.03	5.82	15.89
WY	gis	4.77	1.30	2.95	7.50	WY	gis	5.74	1.55	3.88	8.77
WY	had	10.36	4.01	5.32	18.82	WY	had	12.69	5.60	5.84	22.70
WY	mir	8.68	3.59	3.70	15.88	WY	mir	10.58	5.47	5.85	24.43

Table A3.5. Detailed state-level projections of the expected annual number of West Nile neuroinvasive disease cases across all global climate models for the 2010 population and 2090 climate period.

Population		2010				Population		2010			
Climate		2090				Climate		2090			
RCP		4.5				RCP		8.5			
State	Model	Mean	SD	2.5% Quantile	97.5% Quantile	State	Model	Mean	SD	2.5% Quantile	97.5% Quantile
AL	can	25.96	11.61	13.05	50.11	AL	can	85.40	31.62	35.86	140.09
AL	ccs	18.54	7.89	8.98	35.79	AL	ccs	74.15	25.67	38.74	118.60
AL	gis	12.11	5.37	6.64	22.50	AL	gis	34.28	14.39	12.44	59.31
AL	had	57.49	18.21	25.21	86.57	AL	had	142.44	17.79	112.20	164.84
AL	mir	25.83	11.02	11.41	48.58	AL	mir	76.95	14.97	55.41	103.62
AR	can	26.23	5.72	17.79	38.02	AR	can	62.92	15.84	36.37	93.61
AR	ccs	22.81	4.66	15.49	31.92	AR	ccs	56.44	15.57	33.38	83.21
AR	gis	16.51	3.21	11.95	23.26	AR	gis	32.03	10.64	18.43	47.06
AR	had	44.54	9.69	28.30	62.74	AR	had	102.28	17.46	77.91	126.03
AR	mir	35.00	8.18	22.25	50.81	AR	mir	73.99	12.26	53.49	96.56
AZ	can	103.76	0.98	101.99	105.58	AZ	can	109.97	1.82	106.62	112.86
AZ	ccs	102.33	0.74	100.81	103.50	AZ	ccs	106.37	1.30	103.83	108.03
AZ	gis	100.09	0.87	98.81	101.53	AZ	gis	103.96	0.94	102.27	105.88
AZ	had	104.21	1.08	102.21	105.96	AZ	had	110.13	1.57	107.81	113.28
AZ	mir	103.17	1.02	101.21	104.69	AZ	mir	107.14	1.59	104.12	110.04
CA	can	242.40	2.84	237.12	246.32	CA	can	261.49	4.82	253.01	270.69
CA	ccs	238.93	3.07	233.13	243.73	CA	ccs	250.37	3.28	243.29	254.61
CA	gis	231.76	2.93	227.10	237.11	CA	gis	243.26	3.27	239.67	249.63
CA	had	245.29	4.18	237.61	252.12	CA	had	261.87	3.66	255.76	267.98
CA	mir	241.29	2.88	236.15	246.22	CA	mir	251.32	4.43	242.57	259.26
CO	can	42.61	0.80	41.06	43.73	CO	can	47.06	1.25	44.75	49.03
CO	ccs	41.02	0.65	40.03	42.23	CO	ccs	44.66	1.39	42.02	46.37
CO	gis	39.48	0.64	38.51	40.50	CO	gis	42.33	0.99	41.10	44.49
CO	had	42.75	1.01	40.94	44.49	CO	had	47.23	1.36	45.21	49.28
CO	mir	42.25	0.92	40.60	43.83	CO	mir	46.06	1.27	44.09	48.21
CT	can	9.34	2.64	5.37	13.36	CT	can	22.26	4.59	14.67	29.69
CT	ccs	6.02	1.48	3.77	8.62	CT	ccs	16.86	3.38	12.35	23.15
CT	gis	5.19	1.13	3.24	7.07	CT	gis	11.44	3.72	6.48	19.18
CT	had	14.59	3.29	9.23	20.27	CT	had	29.71	3.76	23.54	37.17
CT	mir	9.84	1.93	6.51	13.61	CT	mir	24.39	2.99	19.52	29.54
DC	can	7.58	1.15	6.01	9.83	DC	can	12.86	1.55	10.50	15.95
DC	ccs	5.78	0.90	4.45	7.63	DC	ccs	10.73	1.15	8.89	12.78
DC	gis	5.43	0.93	3.90	7.26	DC	gis	8.88	1.44	6.26	11.33

Continued

DC	had	10.00	1.26	7.72	11.93	DC	had	15.19	1.11	13.55	17.03
DC	mir	7.98	0.99	6.05	9.89	DC	mir	12.55	0.87	11.32	13.96
DE	can	2.78	0.97	1.58	4.57	DE	can	8.37	1.92	5.63	12.31
DE	ccs	1.12	0.60	0.43	2.54	DE	ccs	5.43	1.34	3.57	7.90
DE	gis	0.98	0.47	0.30	1.96	DE	gis	3.69	1.53	1.31	6.73
DE	had	4.56	1.35	2.17	6.70	DE	had	10.58	1.46	8.34	12.93
DE	mir	2.73	0.88	1.31	4.61	DE	mir	7.89	1.19	6.00	9.96
FL	can	67.05	23.57	31.82	105.51	FL	can	190.87	36.89	133.87	247.32
FL	ccs	37.76	20.05	17.57	79.96	FL	ccs	146.50	41.17	87.89	208.69
FL	gis	36.02	25.74	10.95	87.17	FL	gis	91.78	44.68	24.18	166.77
FL	had	101.86	25.61	53.23	137.62	FL	had	220.60	18.88	185.47	253.65
FL	mir	56.12	28.15	18.73	110.71	FL	mir	160.89	32.42	99.15	203.11
GA	can	47.98	20.55	20.02	88.23	GA	can	146.53	40.69	80.32	210.66
GA	ccs	28.78	15.21	10.69	62.84	GA	ccs	126.66	36.58	76.39	184.11
GA	gis	20.05	12.38	7.82	44.14	GA	gis	68.73	29.96	22.76	120.49
GA	had	104.16	31.95	43.04	144.21	GA	had	213.63	18.93	181.01	241.94
GA	mir	41.17	20.39	16.90	84.32	GA	mir	125.97	24.78	90.56	167.15
IA	can	14.02	2.60	9.52	19.20	IA	can	30.17	6.20	20.62	41.61
IA	ccs	11.98	2.03	9.38	16.47	IA	ccs	24.44	5.19	15.88	34.31
IA	gis	9.01	1.89	6.33	12.14	IA	gis	16.75	4.82	9.98	25.41
IA	had	20.27	4.46	11.87	27.87	IA	had	44.66	6.86	31.95	54.94
IA	mir	16.99	4.16	10.86	24.91	IA	mir	37.41	4.25	30.70	45.56
ID	can	17.34	0.06	17.20	17.42	ID	can	17.66	0.07	17.51	17.78
ID	ccs	17.26	0.09	17.12	17.40	ID	ccs	17.51	0.07	17.38	17.60
ID	gis	17.03	0.08	16.91	17.17	ID	gis	17.25	0.09	17.11	17.40
ID	had	17.36	0.09	17.20	17.48	ID	had	17.70	0.09	17.58	17.86
ID	mir	17.28	0.08	17.16	17.42	ID	mir	17.52	0.08	17.35	17.65
IL	can	87.07	5.35	78.41	96.16	IL	can	124.03	16.00	102.41	157.38
IL	ccs	80.78	4.68	75.13	90.09	IL	ccs	107.94	10.84	91.88	129.96
IL	gis	78.41	4.70	71.20	87.56	IL	gis	97.44	10.67	82.89	117.72
IL	had	105.59	8.64	87.89	116.68	IL	had	162.83	14.59	135.07	183.33
IL	mir	93.73	7.98	81.28	109.81	IL	mir	134.56	10.59	119.04	153.64
IN	can	15.38	3.32	10.75	21.45	IN	can	41.53	12.68	24.17	68.85
IN	ccs	12.15	2.91	8.65	18.15	IN	ccs	31.75	8.50	19.41	49.43
IN	gis	10.66	2.68	6.69	16.81	IN	gis	22.36	7.69	12.38	37.41

Continued

IN	had	28.27	6.39	16.82	38.12	IN	had	73.71	11.42	54.42	89.85
IN	mir	19.52	4.73	12.28	29.25	IN	mir	46.44	7.46	36.41	60.17
KS	can	13.14	1.56	10.04	15.12	KS	can	21.85	3.89	15.90	29.25
KS	ccs	12.14	1.26	10.43	14.65	KS	ccs	19.16	3.56	13.06	26.01
KS	gis	9.33	0.87	8.28	11.18	KS	gis	14.02	2.73	10.35	18.80
KS	had	15.05	1.72	11.42	16.93	KS	had	27.30	4.23	20.60	33.75
KS	mir	14.17	1.57	11.47	16.98	KS	mir	24.83	3.36	20.33	31.48
KY	can	11.69	3.71	7.00	19.43	KY	can	33.53	11.01	17.09	55.65
KY	ccs	9.37	2.94	5.64	15.81	KY	ccs	30.63	8.57	17.92	47.48
KY	gis	7.00	2.39	3.41	12.61	KY	gis	16.88	6.48	7.57	29.59
KY	had	22.40	5.98	12.60	32.32	KY	had	58.53	9.10	45.14	70.62
KY	mir	14.34	4.39	7.97	22.99	KY	mir	34.77	5.65	26.43	44.63
LA	can	91.51	19.39	66.95	127.50	LA	can	174.41	49.75	103.74	259.49
LA	ccs	86.76	14.66	66.41	117.69	LA	ccs	167.35	36.56	112.39	225.42
LA	gis	71.34	11.66	56.45	93.42	LA	gis	107.19	24.95	67.39	148.75
LA	had	143.76	23.04	104.95	177.10	LA	had	261.13	30.92	214.21	313.35
LA	mir	112.75	21.25	78.13	157.09	LA	mir	209.88	24.11	163.42	246.11
MA	can	14.75	4.30	8.08	22.11	MA	can	37.54	7.30	25.75	48.95
MA	ccs	8.05	2.28	4.35	11.77	MA	ccs	24.39	5.20	17.22	33.42
MA	gis	6.33	1.55	3.60	8.94	MA	gis	15.51	5.68	8.01	27.15
MA	had	21.35	5.25	12.92	30.54	MA	had	49.39	6.27	39.00	61.28
MA	mir	13.73	2.93	8.59	18.80	MA	mir	37.84	4.97	30.14	46.66
MD	can	33.72	7.99	23.31	48.89	MD	can	73.56	13.41	53.77	101.38
MD	ccs	21.00	5.62	13.28	33.43	MD	ccs	55.52	9.31	41.88	72.42
MD	gis	19.26	4.98	11.62	29.93	MD	gis	42.50	10.72	24.28	62.01
MD	had	49.54	9.58	32.89	64.90	MD	had	91.87	9.23	77.57	107.01
MD	mir	35.35	6.86	23.28	49.14	MD	mir	71.03	7.53	59.80	83.30
ME	can	0.71	0.27	0.32	1.20	ME	can	2.95	0.59	2.02	3.78
ME	ccs	0.23	0.09	0.09	0.39	ME	ccs	1.35	0.39	0.80	1.99
ME	gis	0.15	0.07	0.06	0.32	ME	gis	0.71	0.35	0.22	1.35
ME	had	1.10	0.37	0.58	1.79	ME	had	3.87	0.68	2.63	5.03
ME	mir	0.65	0.19	0.33	1.03	ME	mir	2.93	0.46	2.23	3.75
MI	can	56.76	5.43	48.65	65.26	MI	can	92.72	12.86	74.80	118.03
MI	ccs	48.10	3.45	43.18	54.66	MI	ccs	76.51	8.91	61.76	90.88
MI	gis	47.44	4.64	38.85	55.50	MI	gis	66.37	10.45	53.44	86.36

Continued

MI	had	73.84	8.56	59.31	86.96	MI	had	125.53	11.11	105.68	144.04
MI	mir	60.70	6.22	50.09	72.79	MI	mir	100.21	9.14	90.44	120.62
MN	can	21.67	4.56	13.88	30.59	MN	can	49.10	9.81	34.89	65.59
MN	ccs	16.15	3.68	11.03	23.85	MN	ccs	39.81	8.67	21.49	50.94
MN	gis	11.68	3.45	7.37	17.75	MN	gis	22.92	6.16	13.46	33.07
MN	had	29.95	9.68	14.90	50.58	MN	had	68.49	12.08	45.70	88.28
MN	mir	23.41	6.90	14.05	37.30	MN	mir	57.40	8.68	47.19	76.51
MO	can	22.84	2.83	17.65	27.59	MO	can	43.64	9.98	29.84	65.35
MO	ccs	20.80	2.57	17.51	26.38	MO	ccs	37.65	7.46	26.37	52.35
MO	gis	17.31	2.27	14.16	22.10	MO	gis	26.55	5.64	18.40	36.49
MO	had	31.24	4.34	22.59	36.90	MO	had	63.17	9.48	47.01	75.13
MO	mir	26.58	4.09	20.61	35.04	MO	mir	48.44	6.67	38.21	59.94
MS	can	75.44	18.17	51.05	109.03	MS	can	156.98	44.49	89.31	234.96
MS	ccs	66.96	14.68	46.28	97.21	MS	ccs	148.37	34.48	98.22	205.94
MS	gis	50.87	10.56	37.00	72.78	MS	gis	87.88	22.81	50.61	123.51
MS	had	129.16	24.44	88.27	171.40	MS	had	252.92	33.90	203.92	302.20
MS	mir	91.79	20.24	58.57	132.83	MS	mir	178.86	23.99	139.61	220.52
MT	can	31.19	9.23	13.02	43.48	MT	can	81.41	13.17	55.44	103.88
MT	ccs	15.94	10.47	3.99	40.36	MT	ccs	50.14	16.51	21.31	72.30
MT	gis	5.12	3.57	1.94	13.47	MT	gis	18.33	11.57	5.16	45.01
MT	had	35.43	19.08	7.29	69.41	MT	had	88.81	19.13	62.46	125.90
MT	mir	19.71	9.84	7.39	34.91	MT	mir	55.24	15.85	28.03	82.92
NC	can	15.39	8.24	6.07	34.75	NC	can	57.79	17.94	29.16	88.67
NC	ccs	8.92	6.49	2.36	25.09	NC	ccs	50.24	13.36	31.91	75.48
NC	gis	6.16	4.85	1.01	16.68	NC	gis	28.84	13.65	7.54	53.58
NC	had	37.40	12.13	12.96	52.78	NC	had	86.46	6.66	74.68	93.96
NC	mir	15.20	7.27	5.69	28.80	NC	mir	52.32	9.82	37.24	67.52
ND	can	23.84	5.12	14.53	33.60	ND	can	54.02	9.96	38.33	69.63
ND	ccs	15.99	5.05	9.13	27.22	ND	ccs	40.47	10.79	20.18	54.62
ND	gis	10.73	3.86	6.58	19.24	ND	gis	21.88	6.86	10.66	32.86
ND	had	34.21	13.91	15.27	62.34	ND	had	72.84	15.24	47.10	100.19
ND	mir	22.29	6.74	13.32	33.81	ND	mir	53.59	10.50	39.30	74.61
NE	can	33.74	6.01	22.08	44.40	NE	can	79.12	15.30	52.27	105.79
NE	ccs	26.94	5.91	19.52	39.72	NE	ccs	61.15	13.38	36.37	83.71
NE	gis	16.45	3.23	12.16	23.01	NE	gis	35.83	13.15	20.76	60.04

Continued

NE	had	46.21	12.61	24.45	65.32	NE	had	107.47	20.78	76.57	138.66
NE	mir	39.45	9.09	24.64	56.04	NE	mir	92.28	11.65	74.18	113.46
NH	can	0.82	0.35	0.31	1.47	NH	can	3.15	0.75	1.97	4.33
NH	ccs	0.29	0.12	0.11	0.50	NH	ccs	1.86	0.50	1.12	2.66
NH	gis	0.19	0.09	0.07	0.38	NH	gis	0.95	0.47	0.31	1.87
NH	had	1.33	0.46	0.64	2.18	NH	had	4.52	0.62	3.51	5.66
NH	mir	0.78	0.25	0.38	1.24	NH	mir	3.28	0.48	2.54	4.21
NJ	can	20.15	6.69	10.81	29.57	NJ	can	58.02	14.89	36.67	86.32
NJ	ccs	10.91	4.44	5.03	20.30	NJ	ccs	42.15	10.55	28.30	62.61
NJ	gis	9.09	3.42	3.69	16.16	NJ	gis	27.67	12.21	11.00	53.61
NJ	had	33.99	9.94	17.45	50.89	NJ	had	81.12	11.76	61.88	101.54
NJ	mir	20.96	6.17	11.28	34.90	NJ	mir	61.60	9.51	46.34	79.18
NM	can	15.33	0.33	14.72	15.90	NM	can	17.65	0.64	16.46	18.83
NM	ccs	14.67	0.21	14.35	15.00	NM	ccs	16.40	0.53	15.44	17.02
NM	gis	14.14	0.25	13.75	14.57	NM	gis	15.51	0.38	14.93	16.25
NM	had	15.44	0.36	14.79	16.05	NM	had	17.93	0.65	16.95	19.13
NM	mir	15.05	0.29	14.61	15.59	NM	mir	16.74	0.59	15.74	17.76
NV	can	15.86	0.41	15.07	16.40	NV	can	18.28	0.58	17.15	19.29
NV	ccs	15.29	0.45	14.48	15.83	NV	ccs	17.01	0.49	16.11	17.53
NV	gis	14.12	0.41	13.46	14.80	NV	gis	15.59	0.51	14.81	16.48
NV	had	16.02	0.49	15.10	16.74	NV	had	18.32	0.50	17.52	19.26
NV	mir	15.45	0.38	14.61	15.98	NV	mir	16.97	0.57	15.76	17.90
NY	can	74.90	14.91	51.79	96.75	NY	can	149.86	24.15	110.93	190.97
NY	ccs	52.48	9.13	38.27	68.87	NY	ccs	115.83	17.57	90.33	147.15
NY	gis	48.03	8.06	33.74	62.76	NY	gis	88.94	21.84	57.69	130.54
NY	had	103.02	17.97	74.16	134.39	NY	had	190.18	16.42	160.75	219.66
NY	mir	77.26	12.48	55.26	103.28	NY	mir	159.26	15.37	135.77	189.77
OH	can	32.88	7.25	23.37	47.40	OH	can	83.08	22.10	51.06	131.91
OH	ccs	23.41	5.11	16.45	33.83	OH	ccs	62.68	16.61	40.68	96.79
OH	gis	22.08	5.23	13.54	33.80	OH	gis	45.47	15.18	25.06	76.01
OH	had	56.16	13.74	35.54	78.85	OH	had	139.17	19.97	108.31	170.88
OH	mir	38.03	8.68	24.22	55.72	OH	mir	89.95	13.29	73.84	115.77
OK	can	29.75	2.64	25.32	34.21	OK	can	42.09	5.57	33.53	52.83
OK	ccs	28.04	1.93	25.36	30.99	OK	ccs	38.79	5.01	29.85	46.95
OK	gis	24.41	1.29	22.72	27.21	OK	gis	31.13	3.52	26.20	37.05

Continued

OK	had	32.74	2.43	28.51	36.38	OK	had	49.35	5.32	41.27	56.75
OK	mir	31.42	2.44	27.68	36.41	OK	mir	46.11	4.76	40.01	55.19
OR	can	1.13	0.01	1.11	1.14	OR	can	1.17	0.01	1.16	1.19
OR	ccs	1.11	0.01	1.10	1.13	OR	ccs	1.14	0.01	1.13	1.15
OR	gis	1.09	0.01	1.08	1.11	OR	gis	1.12	0.01	1.10	1.14
OR	had	1.13	0.01	1.12	1.15	OR	had	1.17	0.01	1.16	1.19
OR	mir	1.12	0.01	1.10	1.13	OR	mir	1.14	0.01	1.12	1.16
PA	can	41.96	11.92	26.51	65.57	PA	can	112.50	22.40	77.60	155.53
PA	ccs	25.12	7.85	14.20	41.07	PA	ccs	84.74	17.95	59.29	116.81
PA	gis	22.20	6.31	11.39	36.08	PA	gis	58.22	18.48	29.18	92.73
PA	had	73.67	17.42	45.21	103.16	PA	had	159.49	16.23	131.72	187.72
PA	mir	46.22	11.29	27.07	69.17	PA	mir	115.37	13.11	97.51	140.11
RI	can	2.21	0.88	0.87	3.70	RI	can	6.65	1.55	4.24	9.07
RI	ccs	0.94	0.46	0.28	1.79	RI	ccs	4.00	1.11	2.47	6.01
RI	gis	0.66	0.28	0.22	1.18	RI	gis	2.24	1.17	0.83	4.79
RI	had	3.62	1.04	1.95	5.58	RI	had	8.48	1.38	6.31	11.13
RI	mir	1.87	0.61	0.81	2.99	RI	mir	6.39	1.13	4.60	8.33
SC	can	23.70	13.04	7.71	53.24	SC	can	80.62	23.84	41.19	117.26
SC	ccs	13.85	9.75	3.55	37.67	SC	ccs	71.59	18.94	44.47	104.09
SC	gis	9.37	7.36	2.10	24.90	SC	gis	40.00	18.46	10.82	72.09
SC	had	54.88	17.02	19.20	75.13	SC	had	116.03	8.93	99.56	126.99
SC	mir	20.95	10.87	7.69	42.46	SC	mir	71.19	14.73	48.54	94.36
SD	can	29.95	5.74	19.61	40.15	SD	can	64.09	10.47	46.29	79.01
SD	ccs	23.85	6.25	15.06	38.26	SD	ccs	53.91	11.49	29.75	69.40
SD	gis	14.96	3.88	10.13	23.04	SD	gis	29.35	9.25	16.74	46.04
SD	had	43.43	15.13	20.58	72.93	SD	had	90.67	17.04	61.71	120.94
SD	mir	32.40	7.69	21.31	45.62	SD	mir	71.81	9.10	59.88	90.77
TN	can	15.72	4.28	10.17	24.41	TN	can	43.71	15.00	21.52	73.14
TN	ccs	13.00	2.99	8.64	19.91	TN	ccs	39.15	11.51	23.88	60.44
TN	gis	10.29	2.23	7.42	15.30	TN	gis	21.44	7.23	11.49	34.58
TN	had	28.05	7.06	16.22	41.21	TN	had	75.39	13.04	57.08	91.79
TN	mir	17.33	4.59	11.23	26.31	TN	mir	40.43	6.41	30.48	50.18
TX	can	252.88	13.32	234.77	279.07	TX	can	328.24	29.74	284.18	382.18
TX	ccs	237.57	10.07	219.83	254.92	TX	ccs	300.26	26.57	252.25	338.96
TX	gis	221.97	6.94	213.47	234.95	TX	gis	256.48	17.93	231.08	289.62

Continued

TX	had	267.23	14.76	242.05	295.66	TX	had	360.58	25.74	325.02	408.97
TX	mir	257.61	14.49	233.83	286.68	TX	mir	332.39	24.33	295.11	373.02
UT	can	17.42	0.29	16.80	17.84	UT	can	18.92	0.43	18.04	19.51
UT	ccs	17.27	0.33	16.72	17.77	UT	ccs	18.50	0.41	17.64	18.99
UT	gis	16.36	0.36	15.79	16.99	UT	gis	17.43	0.39	16.86	18.15
UT	had	17.76	0.41	17.12	18.41	UT	had	19.43	0.47	18.82	20.21
UT	mir	17.58	0.38	16.94	18.25	UT	mir	18.91	0.44	17.94	19.53
VA	can	19.31	8.78	9.21	38.77	VA	can	70.60	22.57	38.17	116.58
VA	ccs	10.35	5.39	4.71	23.88	VA	ccs	52.10	14.24	31.63	80.72
VA	gis	8.16	4.64	2.69	19.30	VA	gis	31.37	13.98	10.55	59.54
VA	had	37.61	12.22	17.21	55.95	VA	had	99.47	14.32	78.42	120.56
VA	mir	20.37	7.87	8.63	36.80	VA	mir	65.68	12.31	47.79	84.90
VT	can	2.27	0.83	0.92	3.78	VT	can	7.78	1.49	5.36	10.05
VT	ccs	0.62	0.25	0.28	1.03	VT	ccs	3.83	1.09	2.29	5.57
VT	gis	0.55	0.32	0.18	1.33	VT	gis	2.48	1.14	0.81	4.59
VT	had	3.22	1.03	1.60	5.10	VT	had	9.63	1.07	7.62	11.07
VT	mir	1.91	0.71	0.75	3.21	VT	mir	7.82	1.21	5.80	10.24
WA	can	2.70	0.02	2.66	2.72	WA	can	2.78	0.02	2.75	2.81
WA	ccs	2.66	0.02	2.62	2.70	WA	ccs	2.71	0.01	2.69	2.73
WA	gis	2.62	0.02	2.60	2.66	WA	gis	2.67	0.02	2.63	2.71
WA	had	2.70	0.02	2.66	2.74	WA	had	2.78	0.02	2.75	2.81
WA	mir	2.66	0.02	2.63	2.69	WA	mir	2.70	0.02	2.68	2.74
WI	can	13.15	2.17	9.53	16.74	WI	can	26.18	5.55	18.96	36.32
WI	ccs	10.76	1.28	9.19	13.38	WI	ccs	21.01	3.84	14.57	27.30
WI	gis	9.78	1.51	7.67	12.59	WI	gis	16.45	3.59	11.40	23.07
WI	had	18.89	3.50	12.26	24.81	WI	had	41.18	5.92	29.62	50.44
WI	mir	15.01	3.08	10.67	20.83	WI	mir	32.29	4.26	27.46	41.49
WV	can	2.83	1.20	1.50	5.43	WV	can	11.44	4.13	5.46	20.13
WV	ccs	1.56	0.70	0.76	3.18	WV	ccs	8.16	2.78	4.53	13.72
WV	gis	1.29	0.65	0.38	2.89	WV	gis	4.59	2.23	1.52	9.24
WV	had	6.07	2.09	3.01	9.27	WV	had	19.79	3.58	14.71	25.64
WV	mir	3.15	1.22	1.30	5.62	WV	mir	10.85	1.89	8.34	14.38
WY	can	15.95	4.08	8.34	22.60	WY	can	42.20	8.71	26.02	55.28
WY	ccs	10.76	3.90	5.73	18.65	WY	ccs	29.48	7.77	13.48	37.98
WY	gis	5.00	1.30	3.58	7.88	WY	gis	12.70	5.37	6.57	23.65
WY	had	18.45	7.35	7.77	30.85	WY	had	51.03	10.71	36.32	70.55
WY	mir	13.72	5.27	6.38	24.19	WY	mir	34.18	7.82	20.99	47.47