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PAST AND PRESENT EFFECTS OF PROPAGULE PRESSURE ON SPATIAL DISTRIBUTIONS OF NON-NATIVE WOODY PLANTS IN CENTRAL TEXAS

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PAST AND PRESENT EFFECTS OF PROPAGULE PRESSURE ON SPATIAL DISTRIBUTIONS OF NON-NATIVE WOODY PLANTS IN CENTRAL TEXAS

by

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County Parks, City of Austin Parks and Recreation Department, Balcones Canyonlands Preserve (City of Austin), Texas Parks and Wildlife Department, Lyndon B Johnson National Historical Park (National Park Service), City of Dripping Springs, City of Wimberley, and Shield Ranch.

Abstract

PAST AND PRESENT EFFECTS OF PROPAGULE PRESSURE ON SPATIAL DISTRIBUTIONS OF NON-NATIVE WOODY PLANTS IN CENTRAL TEXAS

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The University of Texas at Austin, 2014

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Many recent studies have demonstrated that propagule pressure is a useful predictor of patterns of invasions by non-native species. However, most of these studies have used only current, not historical, data to estimate propagule pressure. Recognizing the potential importance of propagule pressure over time, I used surrogate variables that represent both past and present propagule pressure, for example, the length of time a surrounding area had been developed. I quantified the relationships between these surrogate variables and the distribution and abundance of non-native woody plant species in central Texas. I constructed statistical models predicting native and non-native species richness and the occurrence of five common species using a set of six ecological and five development-related predictor variables. I compared all models using the corrected Akaike information criterion (AICc).

Overall, age of residential development surrounding native woodlands was the best predictor, other than community type, of non-native species richness. As expected, areas near older developments had more non-native species than areas near newer developments. Surprisingly, age of development and average city age, two different measures of the length of time that landscaping (a major source of propagules of non-native woody species in this region) had been present nearby, were much better predictors than distance to source populations. Age of development and average city age (weighted by distance from the site) were also both correlated with distance to source populations; this may be true in other systems as well. This suggests that the reason distance to source population has been a successful predictor of invasion may be because it is a surrogate for an underlying causal variable, length of time of exposure to source populations. Future studies of non-native invasions would benefit from taking into account both past and present propagule pressure: age of residential development and city age could be useful surrogates in other systems.

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Introduction

While the majority of studies that investigate invasions by non-native species have focused on the invasiveness of species or the invasibility of communities (Alpert et al. 2000), propagule pressure is increasingly being recognized as a third critical variable (Lockwood et al. 2005, Simberloff 2009). Invasion is intrinsically a probabilistic process: the more propagules that reach a site, the more likely it is that species will become established there (Cassey et al. 2004, Colautti et al. 2006, Lockwood et al. 2005). Many invasions are still 'works in progress', in which the invasive species has not yet reached its maximum range or density (Dullinger et al. 2009). Under these conditions propagule pressure may account for substantial spatial variation in invasions (Dullinger et al. 2009, Simberloff 2009). Here I report the results of a study of the effects of propagule pressure on invasions by non-native woody species in central Texas, USA.

Propagule pressure is usually difficult to measure directly, so the use of surrogates such as visitation rates (e.g., Lonsdale 1999, McKinney 2002), human population density (e.g., McKinney 2001, Taylor and Irwin 2004), and rates of human transportation routes (e.g., Dullinger et al. 2009, Colautti et al. 2003, Schneider et al. 1998) are common. A frequent limitation of these studies is that they use only current data on human populations, human travel, and related variables, although conditions in the past may be as important or even more important (Heger and Trepl 2003). Recognizing the potential of past conditions, I used surrogates that represent both past and present propagule pressure, especially the length of time that the surrounding area has developed. Because the invasive woody species in this study area widely used in urban and suburban landscaping, and because central Texas has undergone very rapid development from rural to urban/suburban in the past 50 years with concommitant increases in landscaping, this region provides an excellent system for investigating the effects of propagule pressure over time.

Methods

Study area

All study sites were located on the eastern boundary of the Edwards Plateau in central Texas. This area is part of the Balcones Canyonlands Ecoregion (Bryce et al. 2004). It has a highly dissected landscape created by erosion of the limestone bedrock, with many springs and intermittent streams and movement of water in and out of aquifers. Compared to other ecoregions on the Edwards Plateau, this region has a greater representation of mesic woodlands, typically dominated by *Juniperus ashei* (Ashe juniper), *Quercus buckleyi* (Texas red oak) and *Q. fusiformis* (Plateau live oak). Other tree species, such as *Prunus serotina* var. *eximia* (escarpment black cherry), may also be common, especially in canyons. The small areas of alluvial deposition along the larger streams and rivers support distinct communities dominated by species such as *Carya illinoinensis* (pecan) or *Salix nigra* (black willow). There is a gradual change in vegetation toward the west, with the climate becoming more arid and oak savannas more common. Soils are typically rocky and shallow with the limestone bedrock often exposed at the surface. Due to these edaphic conditions and the uneven terrain, little of the region has ever been plowed, although livestock grazing has been widespread.

Study sites

I surveyed a total of 22 woodland sites in state, county, and city parks and preserves and on private properties. Each study site was a single contiguous area of woodland. Woodlands, savannas, and developed areas are commonly interspersed in this region, in a spatial pattern that makes defining fragment size difficult (González 2010). Sites were selected to represent a range of management histories, distances to surrounding development, and ages of that development. Most of the sites were in or near Austin, Texas, and its rapidly developing metropolitan area. To help distinguish between the effects of development age and geographical location, I also included sites in or near old rural towns (Johnson City, Wimberley, and Blanco) that are not yet part of the suburban development around Austin.

Vegetation surveys

I used a stratified sampling design: in each site I sampled each of three common, readily recognizable communities: streamside woodlands, mesic woodlands, and upland woodlands. Streamside woodlands were defined as closely associated with continuous or intermittent streams, having evidence of flooding, lacking *J. ashei*, which is intolerant of saturated soil conditions, and containing one or more of the following inundation-tolerant woody plant species: *Platanus occidentalis* (American sycamore), *Cephalanthus occidentalis* (common buttonbush), *Salix nigra* (black willow), *Populus deltoides* (cottonwood), or *Taxodium distichum* (bald cypress). Mesic woodlands were upslope from a stream (continuous or intermittent) and therefore unlikely to flood and did not contain inundation-tolerant species. Common species included *Quercus buckleyi* (Texas red oak), *Quercus fusiformis* (plateau live oak), *Ulmus crassifolia* (cedar elm), and *Celtis reticulata* (netleaf hackberry). Upland woodlands were defined as furthest upslope from streams, usually relatively flat, and dominated by *J. ashei* in the overstory and *Carex planostachys* (cedar sedge) in the understory. Upland woodlands had lower understory cover and lower understory species diversity than mesic woodlands.

In each of these three defined communities within a site, I set up a transect following an existing trail. Each transect had 10-12 plots. The center of each plot was located at a random distance between 0 and 200 m from the start of the transect and randomly to the left or to the right of the trail, 6 m away from the trail. There was no visible evidence of disturbance (trails, trash, damage to plants) this far away from the trails. There were 13 sites that contained all three of the target plant communities and thus had three transects, while 9 sites lacked one or two communities because they were unavailable.

At each plot I recorded the identities of all native and non-native woody species that were rooted within a 5 m radius from the plot center. Woody vines (lianas) were also recorded in a plot if any part of the plant crossed the plot boundary. Two native succulents, *Yucca rupicola* (twistleaf yucca) and *Opuntia engelmannii* var. *lindheimeri* (Texas prickly pear), were also recorded if found in the plots. Surveying began in May of 2011 and ended in December of 2012.

Predictor variables

To determine the community and landscape features that are associated with invasion, I measured a set of independent variables and categorized them as either development-related or ecological. The five development variables were (1) age of surrounding development, (2) distance to the nearest developed area, (3) average age of nearby cities, (4) distance to paved roads, and (5) road density. Age of development was calculated at the site level by averaging the ages of the 15 residential buildings found closest to my plots (typically within 500 m) along the site edge. Ages of residential buildings were obtained from county appraisal districts' records. Information on ages of cities was retrieved from the Texas Historical Association's online archives. I only included cities with population sizes greater than 800 in the 2010 U.S. census and less than 75 km away; they included small incorporated towns like Blanco, TX. Rather than choosing one city to associate with each site, I weighted the age of each city by the distance from its city center to the given site, which gave more weight to the cities that were closer to the given site. Distances from sites to city-centers were quantified using digitized maps in ArcMAP 10 (ESRI, Redlands, CA). Distance to the nearest developed area (usually homes, but development was defined to include commercial structures as well) and distance to paved roads were calculated at the plot level using digitized maps from the National Land Cover Database (NLCD2006). To calculate road densities I summed the length of paved roads within a 500 m radius around each plot center and divided these lengths by the total area of the circle, resulting in a variable with units of m/m^2. I then averaged these values to get a single road density value to describe each site.

My six ecological variables were (1) community (as defined above), (2) percent canopy cover, (3) distance to the nearest stream center, (4) soil order, (5) aspect, and (6) percent slope. To determine canopy cover, I used Digital Ortho Quarter Quad (USGS 2012) images, which are georectified aerial photographs (1 m^2 resolution), and ArcMAP

10. These images were converted to binary images, with black pixels representing areas with woody plant cover and white pixels representing areas with herbaceous plant cover or bare ground. Percent woody canopy cover was then calculated at the plot level using plot circumferences. Distances from plot centers to the nearest stream center were quantified using digitized maps from the City of Austin GIS database. Soil data were retrieved from the Soil Survey Geographic database (SSURGO), Natural Resource Conservation Service (NRCS). Digital elevation models (DEM) and ArcMAP were used to generate percent slopes and aspects for each plot.

Statistical analyses

I used generalized linear mixed models to test the effects of development on native and non-native species richness. My seven response variables were (1) native and (2) non-native woody species richness in each plot, and (3 - 7) the presence or absence of each of the five individual species abundant enough for analysis (see bellow). Each response variable was analyzed separately. The development-related and ecological variables were predictor variables. I used the SAS GLIMMIX procedure (SAS 9.3, Institute, Cary, NC), assuming a Poisson distribution with a log link function for each of the two measures of species richness, and a binomial distribution with a logit link function for each of the five individual species. City age, distance to roads, distance to streams and distance to development were transformed with the natural logarithm function to improve linearity. Site was included as a random term in all models.

To compare models, I used the corrected Akaike information criterion (AICc). The better the model, the lower its AICc value. Because of the large number of potential predictor variables, and because none of the pairs of predictor variables were correlated strongly enough to justify discarding one of them a priori, I first modeled the effects of the five development variables and then, separately, the effects of the six ecological variables. I tested all possible models for each set of predictor variables. I retained the predictor variables that appeared in at least one model whose AICc value differed by less than 2.0 from the AICc of the model with the lowest AICc value for that set of predictor variables. I then combined the two sets of retained predictor variables, and again constructed all possible models that used those variables. Models whose AICc values differed by less than 2.0 from the lowest AICc value for that response variable are reported in Table 3. Among the models of Table 3, the "best model" for each response variable was considered to be the model with the fewest predictor variables.

Results

In total, I sampled 550 plots, containing 123 woody plant species, 16 of which were non-native. The most common non-native species, based on total frequencies in all plots, were *Ligustrum lucidum* (glossy privet), *Nandina domestica* (heavenly bamboo), *Lonicera japonica* (Japanese honeysuckle), *Ligustrum sinense* (Chinese privet) and *Melia azedarach* (chinaberry). All five of these are used in landscaping in the region and were originally deliberately introduced (Diggs Jr. et al. 1999). Non-native species were between 0.0% and 33.3% of the plant species at any given site (mean = 9.8%, SD = 8.9).

As expected, the five development variables were significantly correlated: as development age, city age, and road density increased, distances to development and to roads decreased (Table 1). Thus sites surrounded by older residential development were on average closer to residential development and to roads, were near older cities, and had higher nearby road densities (Table 1). The three numerical ecological variables (slope, distance to stream, and overstory canopy cover) were not significantly correlated with each other. Unexpectedly, sites near older cities and older developments were significantly closer to the nearest stream; consistent with this, distance to the nearest stream was positively correlated, though not significantly, with distance to development and to roads. Canopy cover and slope did not have consistent or significant correlations with the development variables.

Overstory canopy cover was high in all three communities, but was highest in mesic woodlands and lowest in uplands (Table 2). On average, mesic woodlands had

Table 1. Pearson correlation coefficients (r) among predictor variables†

	age of development	distance to development	city age	distance to road	road density	% canopy cover	distance to stream
distance to development	-0.67***						
city age	0.87***	-0.64**					
distance to road	-0.65**	0.85***	-0.60**				
road density	0.49*	-0.66***	0.28	-0.60**			
% canopy cover	0.27	-0.18	0.35	-0.08	0.26		
distance to nearest stream	-0.55**	0.35	-0.45*	0.40	-0.21	-0.17	
% slope	-0.34	0.15	-0.33	0.39	0.04	0.39	0.35

† distance to development, city age, distance to road, and distance to nearest stream were transformed with the natural logarithm prior to calculation of correlation coefficients. *p <0.05 **p <0.01 ***p <0.001.

Table 2. Mean values and standard errors of predictor variables for three woodland plant communities

	streamside (SE)	mesic (SE)	upland (SE)
% canopy cover	85.6% (1.9)	90.7% (1.4)	80.4% (1.9)
% slope	13.4% (0.9)	25.7% (1.5)	15.6% (0.9)
distance to nearest stream (m)	28.1 (2.0)	43.7 (3.5)	111.0 (8.1)
distance to road (m)	392.8 (33.7)	402.1 (31.1)	302.8 (23.5)
distance to development (m)	541.8 (52.8)	588.0 (52.0)	667.9 (58.7)

steeper slopes. As expected, plots in streamside woodlands were closer to streams than plots in mesic woodlands, and upland plots were furthest from streams. Plots in uplands were on average closer to roads but further from development than plots in the other two communities.

Species richness

Native richness was best predicted by a model that included, in addition to the random variable site, community type, slope, soil order, and road density (Table 3). More native species were found in plots in mesic woodlands, on steeper slopes, on more developed soils, and near denser road networks (Fig. 1). All other models of native species richness with AICc values less than 2.0 larger than the best model also had more than four predictor variables (Table 3).

Non-native species richness was best predicted by a model that included, in addition to the random variable site, community type and age of development, but this model was not distinguishably better than a model that substituted city age for age of development (Table 3). More non-native species were found in plots near (or in) older developments and cities (Fig. 2). In contrast to native richness, more non-native species were found in streamside woodlands followed by mesic woodlands and then by uplands (Fig. 2). All other models of native species richness with AICc values less than 2.0 larger than the best model also had more than three predictor variables (Table 3).

Occurrences of individual species

Table 3. Predictors in all models whose AICc value differed from the best model by less than 2. Models are arranged in ascending order based on Δ AICc. The best model is in boldface. The best models have the fewest variables and an AICc value not distinguishable (Δ AICc < 2) from the lowest AICc value. All models also included site as a random factor.

Dependent variable	Predictor(s) in model	Number of predictor variables	AICc	Δ AICc	-2 Log Likelihood
native species richness	**community, road density, slope, soil order**	**4**	**2528.55**	**-**	**2510.21**
	community, distance to development, distance to road, road density, slope, soil order	6	2528.97	0.42	2506.48
	community, distance to road, road density, slope, soil order	5	2529.02	0.47	2508.61
	community, distance to road, road density, slope, soil order, distance to stream	6	2529.19	0.64	2506.70
	community, distance to development, distance to road, distance to stream, road density, slope, soil order	7	2529.39	0.84	2504.81
	community, distance to development, distance to road, slope, soil order	5	2530.28	1.73	2509.87
	community, distance to development, distance to road, distance to stream, slope, soil order	6	2530.44	1.89	2507.95

Table 3 continued

non-native species richness	**age of development, community**	**2**	**718.64**	**-**	**708.53**
	city age, community	2	719.07	0.43	708.96
	age of development, aspect, community	3	719.36	0.72	703.10
	age of development, city age, community	3	719.68	1.04	707.53
	age of development, community, distance to road	3	719.69	1.05	707.69
	aspect, city age, community	3	720.01	1.37	703.74
	age of development, aspect, city age, community	4	720.18	1.54	702.18
	age of development, community, slope	3	720.32	1.68	708.17
	city age, community, distance to road	3	720.53	1.89	708.37
presence/ absence of *Ligustrum lucidum*	city age, community, distance to development, distance to road, distance to stream	5	259.50	-	243.23
	age of development, city age, community, distance to development, distance to roads, distance to stream	6	260.01	0.51	241.68

Table 3 continued

	city age, community, distance to development, distance to road	**4**	**260.64**	**1.14**	**246.43**
	city age, distance to development, community, distance to road, slope, distance to stream	6	260.77	1.27	242.44
	age of development, city age, community, distance to development, distance to road, distance to stream, slope	7	261.17	1.67	240.76
presence/ absence of *Nandina domestica*	**aspect, city age, community**	**3**	**253.06**	**-**	**236.8**
	aspect, city age, community, slope	4	253.33	0.27	234.99
	aspect, city age, community, distance to stream	4	254.47	1.41	236.35
	aspect, city age, community, cover, slope	5	254.63	1.57	234.22
	aspect, city age, community, distance to stream, slope	5	254.87	1.81	234.46
presence/ absence of *Lonicera japonica*	aspect, city age, slope	3	153.98	-	139.65

Table 3 continued

	aspect, city age, distance to development, road density, slope	5	154.95	0.97	138.71
	aspect, city age, road density, slope	4	154.99	1.01	138.57
	aspect, slope	**2**	**155.19**	**1.21**	**142.95**
	aspect, city age, community, road density, slope	5	155.21	1.23	137.63
	aspect, city age, community, distance to development, slope	5	155.69	1.71	137.16
	aspect, city age, distance to development, slope	4	155.7	1.72	139.28
	aspect, road density, slope	3	155.84	1.86	141.51
presence/ absence of *Ligustrum sinense*	city age, community, distance to development	3	137.35	-	127.18
	city age, community, distance to development, soil order	4	138.7	1.35	124.37
	city age, community	**2**	**139.05**	**1.7**	**130.94**
presence/ absence of *Melia azedarach*	age of development, cover, community	3	205.72	-	193.57

Table 3 continued

age of development, community	2	206.18	0.46	196.07
age of development, city age, community, cover, road density	5	206.46	0.74	190.20
cover, community	2	206.61	0.89	196.50
age of development, community, cover, road density	4	206.66	0.94	192.46
age of development, aspect, community, cover, road density	5	207.11	1.39	186.70
age of development, city age, community, cover	4	207.11	1.39	192.90
community	**1**	**207.19**	**1.47**	**199.12**
age of development, community, road density	3	207.34	1.62	195.19
age of development, aspect, city age, community, cover,	5	207.35	1.63	186.94

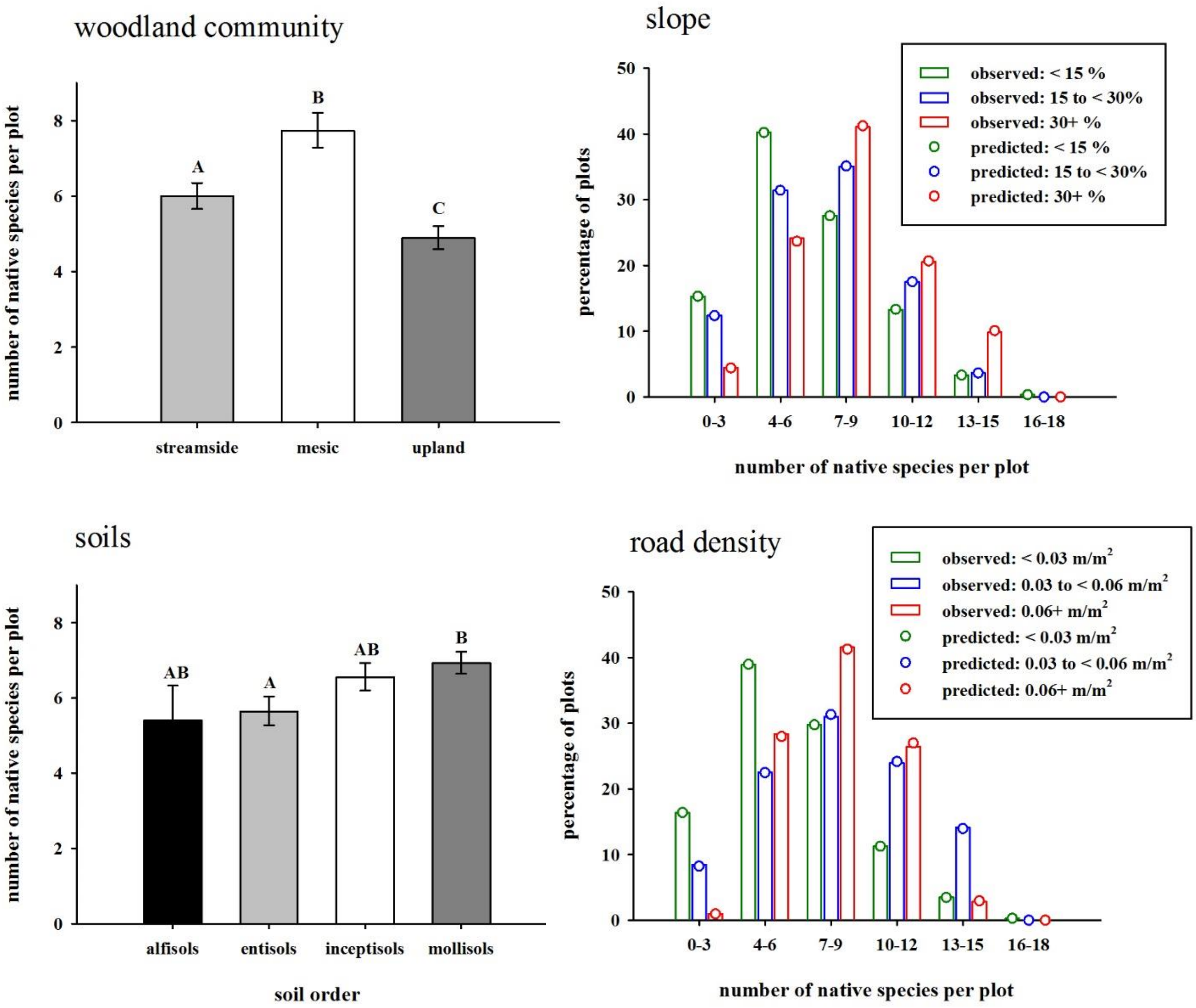

Figure 1. Relationships between native species richness and each of the predictor variables in the best model. Bar heights for categorical variables (community type, soils) are least squares means from the best model and error bars are estimated standard errors from the best model; bars with the same letter are not significantly different. For graphical purposes I have grouped continuous variables (slope, road density) into three categories each (categories distinguished by color) and present histograms of the resulting distributions (three distributions per predictor variable. In these histograms, bar heights represent the observed frequencies of numbers of native species per plot and circles represent the corresponding frequencies predicted by the best model.

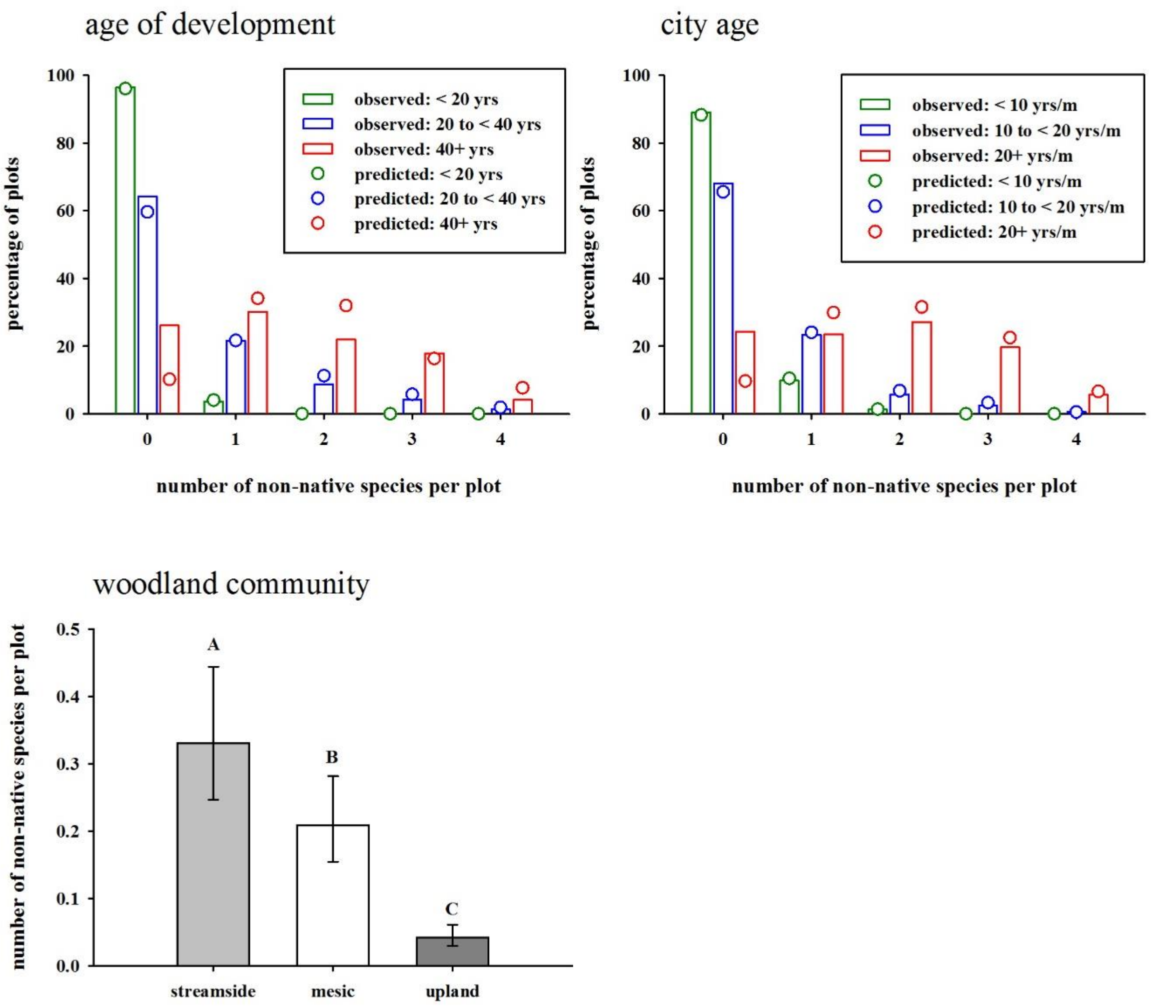

Figure 2. Relationships between non-native species richness and each of the predictor variables in the best model. For graphical purposes only I have grouped continuous variables (age of development, city age) into three categories each (categories distinguished by color) and present histograms of the resulting distributions (three distributions per predictor variable). In these histograms, bar heights represent the observed frequencies of numbers of native species per plot and circles represent the corresponding frequencies predicted by the best model. Bar heights for the categorical variable, community type, are least squares means from the best model and error bars are estimated standard errors from the best model; bars with the same letter are not significantly different.

Ligustrum lucidum occurrence was best predicted by a model that included city age, distance to development, distance to roads, and community type (Table 3). This model did not have the lowest AICc value, but had the fewest variables, while having an AICc value < 2.0 different from the lowest AICc value. Plots near older cities, nearer development, and further from roads were more likely to have this species (Fig. 3). It was significantly more likely to occur in streamside plots than in upland plots; mesic woodland plots were intermediate (Fig. 4).

Nandina domestica occurrence was best predicted by three variables: city age, community type, and aspect (Table 3). Plots near older cities were more likely to have this species (Fig. 5). It was significantly more likely to occur in streamside and mesic woodland plots than in upland plots (Fig. 4). *N. domestica* was more likely to be present on east-facing slopes than on slopes with other aspects (Fig. 5).

Lonicera japonica was never present in upland communities, so I could not include data from all three communities in a generalized linear model. A chi-square test for differences in *L. japonica* occurrence between the three communities was significant (df = 2, $\chi^2 = 44.12$, $P < 0.0001$). Combining streamside and mesic woodland communities into one category, I found that *L. japonica* occurrence differed significantly between uplands and the other two communities (df = 1, $\chi^2 = 23.70$, $P < 0.0001$). I then dropped all upland plots and proceeded with model selection. *L. japonica* occurrence was best predicted by two variables: aspect and slope (Table 3). Plots on gentler north and west-facing slopes were more likely to have this species (Fig. 6).

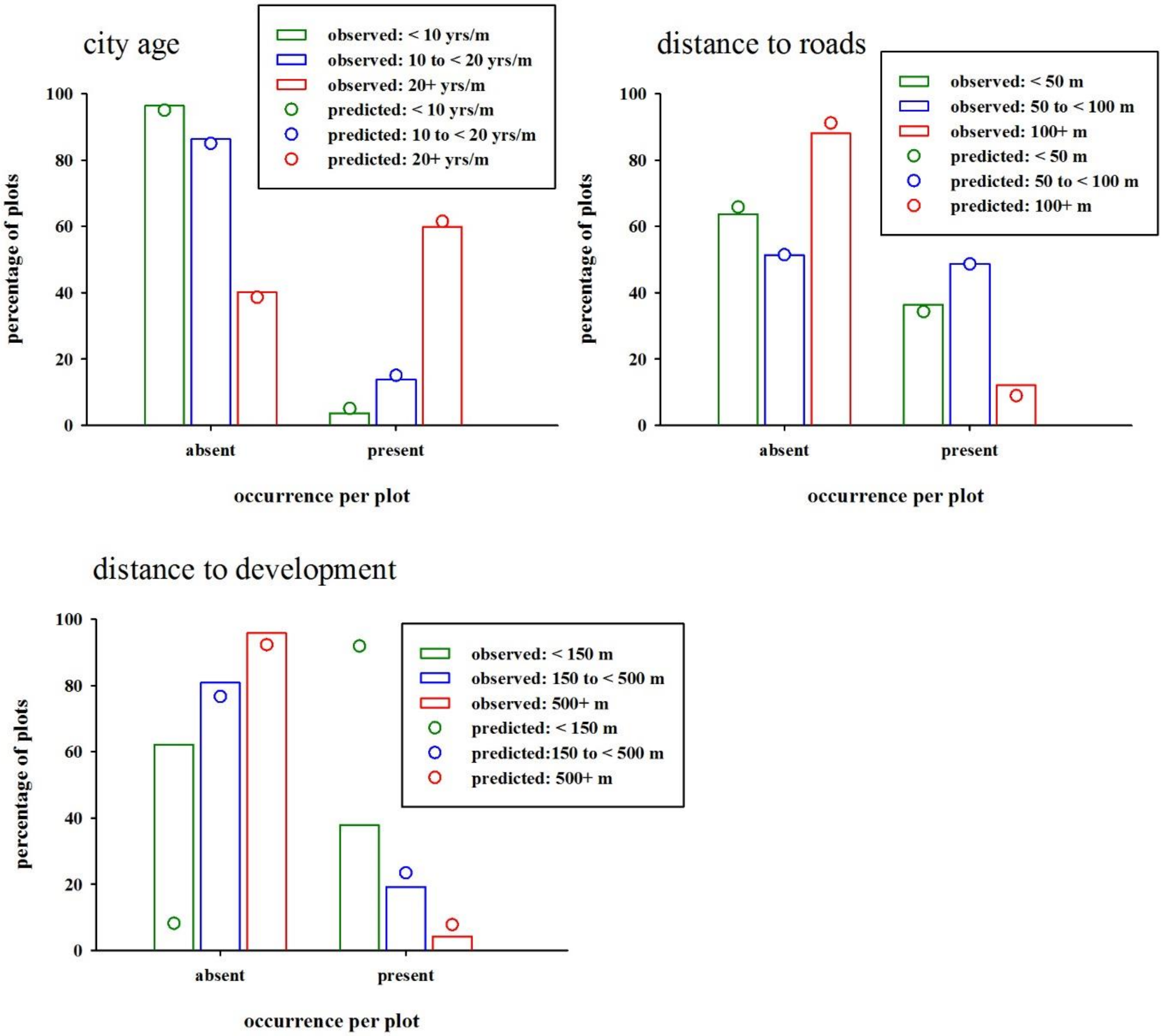

Figure 3. Relationships between *Ligustrum lucidum* occurrence and each of the predictor variables in the best model. For graphical purposes only I have grouped age of development, city age, and distance to development into three categories each (categories distinguished by color). Bar heights represent the observed percentages of plots and circles represent the predictions of the best model.

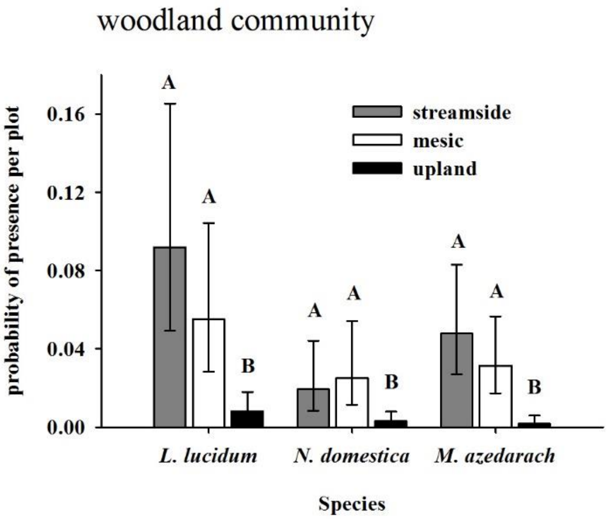

Figure 4. Relationships between occurrences of three non-native species and community type. Each species had community type as a term in their best model. Bar heights are least squares means from the best model and error bars are estimated standard errors from the best model; for each species, bars with the same letter are not significantly different.

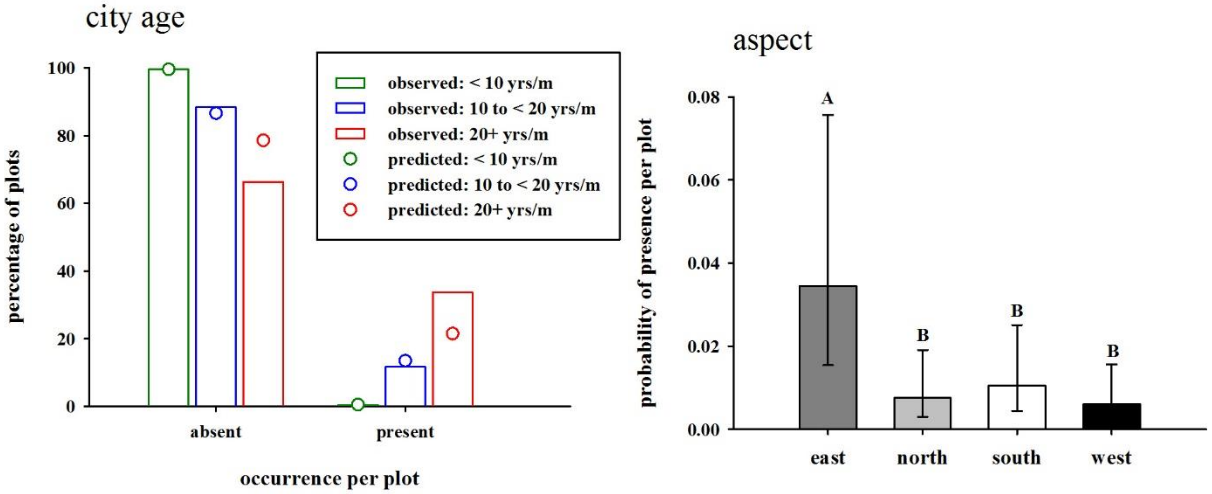

Figure 5. Relationships between *Nandina domestica* occurrence and each of the predictor variables in the best model. For graphical purposes only I have grouped the continuous variable, city age, into three categories (categories distinguished by color). Bar heights represent the observed percentages of plots and circles represent the predictions of the best model. Bar heights for the categorical variable, aspect, are least squares means from the best model and error bars are estimated standard errors from the best model; bars with the same letter are not significantly different.

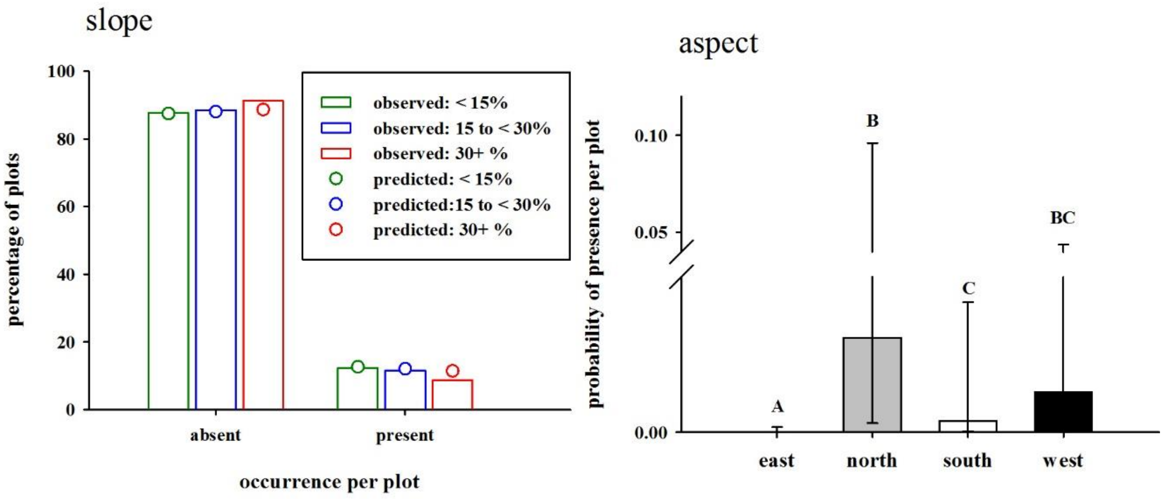

Figure 6. Relationships between *Lonicera japonica* occurrence and each of the predictor variables in the best model. For graphical purposes only I have grouped the continuous variable, slope, into three categories (categories distinguished by color). Bar heights represent the observed percentages of plots and circles represent the predictions of the best model. Bar heights for the categorical variable, aspect, are least squares means from the best model and error bars are estimated standard errors from the best model; bars with the same letter are not significantly different.

Ligustrum sinense was never present in plots in either upland communities or on west-facing slopes. A chi-square test on the probability of occurrence revealed significant differences between community types (df = 2, $\chi^2 = 35.26$, $P < 0.0001$). Combining streamside and mesic woodland communities into one category, I found that *L. sinense* occurrence differed significantly between uplands and the other two communities (df = 1, $\chi^2 = 16.21$, $P < 0.0001$). Dropping upland plots and plots with gentle (≤ 5%) slopes, I performed a Fisher's exact test on occurrences of *L. sinense* by aspect and found significant differences ($P = 0.0461$). With uplands and gentle slopes dropped, I then grouped all north-facing plots with east-facing plots and all south-facing plots with west-facing plots and found that *L. sinense* was more likely to be present on north- and east-facing slopes (df = 1, $\chi^2 = 6.30$, p = 0.012). I then dropped all upland plots and withheld aspect from the set of explanatory variables before proceeding with model selection. *L. sinense* was best predicted by a model that contained two predictor variables: city age and community type (Table 3). *L. sinense* was more likely to be present in plots near older cities and in streamside communities (Fig. 7).

Melia azedarach occurrence was best predicted by a model that contained one predictor variable: community type (Table 3). *M. azedarach* was significantly more likely to be present in plots in streamside woodlands than in mesic woodlands and uplands (Fig. 4).

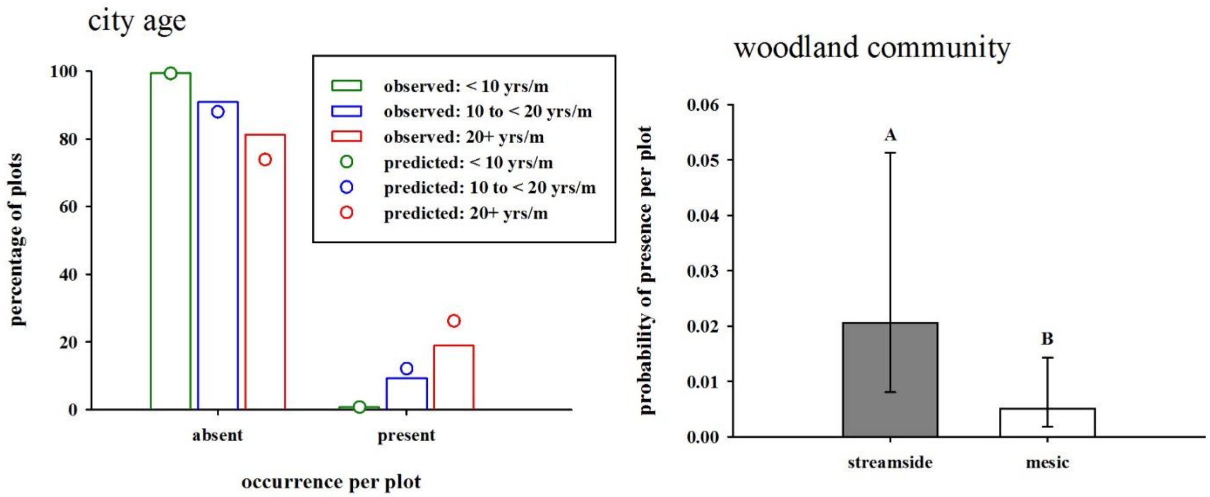

Figure 7. Relationships between *Ligustrum sinense* occurrence and each of the predictor variables in the best model. For graphical purposes only I have grouped the continuous variable, city age, into three categories (categories distinguished by color). Bar heights represent the observed percentages of plots and circles represent the predictions of the best model. Bar heights for the categorical variable, community type, are least squares means from the best model and error bars are estimated standard errors from the best model; bars with the same letter are not significantly different.

Discussion

Age of development and distance from development

My results underscore the importance of including a measure, direct or indirect, of propagule pressure and colonization pressure in studies of invasions by non-native species (Barney and Whitlow 2008, Lockwood et al. 2005, Rejmánek et al. 2005), and especially of including variables that are surrogates for the time span over which propagule pressure has been exerted. I found that the age of residential development surrounding native woodlands was the best predictor, other than community type, of non-native species richness. Native woodlands near older developments had more non-native species than woodlands near younger developments, as would be expected if the length of time over which propagule pressure had occurred was strongly influencing landscape patterns of invasions (Lockwood et al. 2005, Williamson 1996). City age, which was strongly correlated with age of development, was nearly as good a predictor of non-native species richness as age of the surrounding development.

Many studies have shown that distance from putative source populations (e.g., suburban edge, property lines, settlements) is an important predictor of non-native species richness (Alston and Richardson 2006, Fornwalt et al. 2003). However, in my analysis, proximity to residential development did not appear in my better models of non-native species richness (Table 3); the length of time that nearby source populations had been present (age of development, city age) was a substantially better predictor than distance from source populations. But had I not been able to use the length of time that source populations had been present, my final models would have included distance to development. Since invasions occur gradually, it is likely that age of source population and distance to source population, which were correlated in my data set (Table 1), are also correlated in other systems as well. My results suggest that at least some of the reported importance of distance to source populations in previous studies may in fact be due to correlations between distance to source populations and age of those source populations.

Age of residential development has rarely been used as a predictor of plant invasions; I am aware of only three. In a study in New Zealand, Sullivan et al. (2005) included both distance and age in their models but found that a model with the number of houses within 250 m of a site was the single best predictor of the number of non-native species. Similar to my study, they found that age of development and distance to residential development were significantly negatively correlated with each other and that, when analyzed separately, both development variables were strong predictors of non-native species richness. In Sidney, Australia, Rose and Fairweather (1997), found that native bushlands near older suburbs had higher proportions of non-native species, but they did not directly compare the effects of distance and age. Fensham and Cowie (1998) found a positive relationship between the number of non-native species in native communities and the age of nearby settlements on the Tiwi Islands, but they did not include distance in their analysis. I believe development age should be more widely used as a surrogate for the length of time over which propagule pressure and colonization pressure have operated, especially in other regions in which the invasive species in question are used in landscaping, as in my study, or grown in gardens.

Differences among community types

In my study, streamside communities were more heavily invaded by non-natives than other communities, a common finding in invisibility studies worldwide (Henderson and Wells 1986, Hood and Naiman 2000, Pyšek and Prach 1994). In central Texas, where soil moisture is often limiting, water is most available to plants in streamside woodlands, less available in mesic woodlands, and least available in upland woodlands. In addition to being farther from drainage areas, upland sites have thinner soils that are frequently broken up by areas of exposed limestone bedrock; these characteristics tend to prevent soil moisture retention. Plots in upland woodlands had on average the fewest non-native woody species. Lower water availability in upland woodlands is likely also limiting the establishment and spread of non-native woody species there. The importance of slope direction (aspect) for some of the common non-native species in this study is consistent with this. Differences in soil depth and fertility may also be involved in differences among communities in non-native species richness (Stohlgren et al. 1998).

While there are many invasive species that originate in dry areas of the world, in central Texas, landscaping plants have mostly been species from regions more mesic than central Texas. This is a form of propagule bias (Colautti et al. 2006). Until recently, landscaping plants, gardens, and lawns have all routinely been irrigated. With the recent promotion of xeriscaping (the use of landscaping plants that do not require irrigation), this may change. Xeriscaping, however desirable from a water-conservation viewpoint, could become a prolific source of new invasive species in the region if landscaping species are not selected with care.

Native versus non-native species

The best explanations for the distributions and abundances of native species differed from those for non-native species. The important factors for native species were mostly ecological, including community type, slope and soil type. Road density was the only important development-related predictor explaining the distribution and abundance of native species; there were more native species in areas with higher road densities. The underlying cause of this relationship is unknown, but could be due to a tendency for humans to settle in more productive areas in the landscape (Chown et al. 2003, Fjeldså and Burgess 2008) or due to differences in land use between densely populated areas and less densely populated areas. In the future, the most common of the non-native species may develop distributions that depend only, or mostly, on ecological factors, as they come to fill their potential ecological niches (Dullinger et al. 2009).

Seed dispersal

It is probably not chance that the five most common woody invasive species I found are all bird-dispersed. Among introduced species, rapid dispersal ability has been strongly associated with invasion success (Goodwin et al. 1999, Rejmánek 1996, Rejmánek and Richardson 1996) and is associated with many plant traits (Alpert et al.

2000). Globally, birds play important facilitative roles in plant invasions (Kruger et al. 1986, Mack and Lonsdale 2001, Williams and Karl 1996). Urban and suburban development have contributed to this trend by increasing the numbers of frugivorous birds in these environments (Debussche and Isenmann 1990). An association with a good disperser (or multiple dispersers) may allow a species to spread faster and over longer distances (Johnson and Adkisson 1985), possibly shortening the lag phase that characterizes many invasions (Kowarik 1995). The non-native species that are abundant now may represent the first "wave" of invasions. In the future, we may observe a new set of non-native species, the slower dispersers, spread across the landscape.

Other factors

In addition to a longer time period for colonization to occur, sites near older developments and older cities may have experienced longer recreational use, which might have made them more susceptible to species invasions (Catford et al. 2009 and others within); I was not able to quantify this. Development also may affect populations of seed dispersers, positively or negatively (Debussche and Isenmann 1990, Lockwood 2007). Mockingbirds, the most common fruit-disperser in this region, are common both in cities and in wildlands (De Jong, pers. obs.) but I have no data on their relative abundances in developed and undeveloped areas, or in different community types.

Conclusion: the importance of considering propagule pressure over time

To effectively understand and therefore be able to better manage invasions by non-natives, it is critical that we explain their distributions and abundances in space. To this end, I have shown that not only is it important that good predictors of present propagule pressure be included in studies of invasion (as many recent studies have), but it may be critical that surrogates be chosen that represent the time period over which propagule pressure has been exerted. Up to now, the latter type of surrogate has been used infrequently; I believe it should be included whenever possible. Had I not included variables that represent the history of propagule pressure in my system, including its variation in space and time, a significant driver of invasions would have been overlooked.

Appendices

Appendix 1. Background

Invasion ecology can be defined as the study of how and why organisms spread in environments to which they are not native and their impacts there (Alpert et al. 2000). This relatively new sub-discipline has gained considerable attention among ecologists in part because of the realization that non-native species can cause major environmental problems (Higgins et al. 1999, Luken and Thieret 1997, Vitousek et al. 1996). Rates of species introductions, both deliberate and accidental, are increasing and will likely continue to increase or accelerate in many regions, as has been demonstrated in the past (Pickard 1984, Ricciardi 2001, Ruiz et al. 2000, Wonham and Carlton 2005). Besides examining the impacts of non-native invaders, early research in invasion biology focused on two topics: invasiveness and invisibility. These two approaches, represented by these two foci, each centered on their own question in community ecology and so have differed not only in their explanations for invasion but also in how they propose to control invasions (Alpert et al. 2000).

Studies of invasiveness have sought to identify specific characteristics of a species that make them more or less likely to become invasive. This research focus was bolstered by early studies showing that, of the total number of introduced species, very few become invasive (Williamson 1996). Therefore, identifying the traits responsible for invasive behavior should be an effective way of analyzing risk and screening potential invasive species (Kolar and Lodge 2001, Simberloff 2005). Findings from invasiveness studies have lacked generality and predictive ability; the list of traits associated with invasions has turned out to be very long (Reichard and Hamilton 1997). Different traits are likely important at different stages in the invasion process (Heger and Trepl 2003) and their importance may depend on environmental conditions during establishment (Moyle and Marchetti 2006). Recent studies have found that, among certain taxonomic groups and regions, the likelihood of species establishment and spread may be much higher than that predicted by Williamson (1996) (Jeschke and Strayer 2005, Richardson and Pyšek 2006). Examining life history traits, therefore, may be most useful in understanding invasions on a case-by-case basis, rather than as a tool to make general predictions across multiple species and different geographic contexts (Alpert et al. 2000).

Invasibility studies have examined the characteristics of an environment that make it more or less susceptible to invasion. Considerable progress has been made in identifying differences in invasibility between habitats (Alpert et al. 2000, Lonsdale 1999). Habitats that are now recognized as having properties that resist invasions include arid habitats (Fleischmann 1997, Rejmánek 1989), large fragments of fragmented habitats (Harrison 1999), undisturbed tropical forests (Rejmánek 1996), and sandy or serpentine soils (Greenberg et al. 1997). Riparian zones have consistently been found to be more susceptible to invasions (Planty-Tabacchi et al. 1996, Kotanen et al. 1998, Stohlgren et al. 1998). Ecosystems with more available nutrients, or that are more disturbed, have a greater susceptibility to plant invasions (Smith and Knapp 1999). In his classical work, Elton (1958) postulated that more species-diverse habitats should be more resistant to invasion. However, subsequent studies have found that the nature of the diversity-invasibility relationship is often scale-dependent. Small-scale studies have often found a negative relationship between diversity and invability (Levine and D'Antonio 1999, Naeem et al. 2000, Tilman 1997), while at large scales the relationship is often positive (Lonsdale 1999, Stohlgren et al. 1999). Within a single ecosystem, the diversity-invasibility relationship may change depending on other ecosystem properties, such as productivity (Davies et al. 2007).

In spite of the progress made in understanding invasibility, the intrinsic characteristics of a system often fail to completely explain invasion patterns in the landscape; patterns often remain idiosyncratic in appearance (Lockwood et al. 2009). An emerging concensus is that while intrinsic qualities of habitats do affect vulnerability to invasion, there are external qualities, such as propagule pressure, that may better explain the distribution and abundances of non-native species at many scales (Lockwood et al. 2005, Simberloff 2009). Also, by not accounting for spatial and temporal variation in propagule pressure, many studies have incorrectly attributed the “level of invasion” in a system (Hierro et al. 2005, Chytry et al. 2005) to actual differences in system invasibility (Lockwood et al. 2007, Simberloff 2009). By including estimates of propagule pressure associated with invasions, the intrinsic properties of a system, those that make it more or less likely to be invaded, can then be disentangled from the actual level of invasion (Catford et al. 2012, Chytry et al. 2008). Likewise, colonization pressure, or the number of species introduced to an area, may explain why certain areas contain more non-native species than other areas (Lockwood et al. 2009).

Direct quantification of propagule pressure in invaded systems has proven to be difficult, if not impossible, in many studies (for some examples of studies in which propagule pressure was measured directly, see Wonham et al. 2001). Instead, ecologists have largely relied on surrogate measures, such as the number of visitors to nature reserves (Lonsdale 1999, McKinney 2002), human population density or size (McKinney 2001, McKinney 2002, Taylor and Irwin 2004), economic activity (Taylor and Irwin 2004), indicators of horticultural activity (Mulvaney 2001), length of roads (Dullinger et al. 2009), and boat and shipping traffic (Colautti et al. 2003, Schneider et al. 1998). Many studies have now shown that propagule pressure, not species traits or system traits, is the most important determinant of establishment success for introduced species (Cassey et al. 2004, Colautti et al. 2006, Lockwood et al. 2005). Propagule pressure can play an important role in population spread by allowing an invader to adapt to different environments (Lavergne and Molofsky 2007, Saltonstall 2002). Given this apparent ability of propagule pressure to explain spatial and temporal patterns of invasions, there is a need to test new putative surrogates for propagule pressure (Lockwood et al. 2005, Simberloff 2009). Accordingly, in this study, I investigated the role of propagule pressure and colonization pressure in explaining the distribution and abundance of woody non-native species in central Texas. I took advantage of the fact that most of the woody non-native species in this region are ornamentals that have spread from human-created landscapes; this is also a common occurrence world-wide (Reichard and Hamilton 1997, Rejmánek 2014). Therefore, I was able to use age of development as a surrogate for the length of time propagule pressure had been present, and distance to development as a surrogate for the magnitude of the propagule pressure.

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Appendix 2. List of species.

Scientific and common names of all plant species present in study plots. Names follow USDA Plants. Native status: 'e' for exotic, 'n' for native.

number	scientific name	common name	native status
1	*Abutilon incanum*	pelotazo	n
2	*Acacia farnesiana*	sweet acacia	n
3	*Acer negundo*	boxelder	n
4	*Aesculus pavia*	red buckeye	n
5	*Ageratina havanensis*	Havana snakeroot	n
6	*Ailanthus altissima*	tree of heaven	e
7	*Amorpha fruticosa*	false indigo bush	n
8	*Ampelopsis arborea*	peppervine	n
9	*Apocynum cannabinum*	Indianhemp	n
10	*Baccharis neglecta*	Rooseveltweed	n
11	*Berchemia scandens*	Alabama supplejack	n
12	*Bernardia myricifolia*	mouse's eye	n
13	*Broussonetia papyrifera*	paper mulberry	e
14	*Callicarapa americana*	American beautyberry	n
15	*Carya illinoinensis*	pecan	n
16	*Celtis laevigata* var. *laevigata*	sugarberry	n
17	*Celtis laevigata* var. *reticulata*	netleaf hackberry	n
18	*Celtis occidentalis*	common hackberry	n
19	*Cercis canadensis*	eastern redbud	n
20	*Cnidoscolus texanus*	Texas bullnettle	n
21	*Cocculus carolinus*	Carolina coralbead	n

22	*Colubrina texensis*	Texan hogplum	n
23	*Condalia hookeri*	Brazilian bluewood	n
24	*Cornus drummondii*	roughleaf dogwood	n
25	*Croton fruticulosus*	bush croton	n
26	*Croton* sp.		n
27	*Croton texensis*	Texas croton	n
28	*Cylindropuntia leptocaulis*	Christmas cactus	n
29	*Desmanthus* sp.	bundleflower	n
30	*Desmodium paniculatum*	panicledleaf ticktrefoil	n
31	*Diospyros texana*	Texas persimmon	n
32	*Eriobotrya japonica*	loquat	e
33	*Eysenhardtia texana*	Texas kidneywood	n
34	*Firmiana simplex*	Chinese parasoltree	e
35	*Forestiera pubescens*	stretchberry	n
36	*Frangula caroliniana*	Carolina buckthorn	n
37	*Fraxinus albicans*	Texas ash	n
38	*Fraxinus pennsylvanica*	green ash	n
39	*Fraxinus* sp.		n
40	*Funastrum cynanchoides* ssp. *cynanchoides*	fringed twinevine	n
41	*Garrya ovata* ssp. *lindheimeri*	Lindheimer's silktassel	n
42	*Ilex decidua*	deciduous holy	n
43	*Ilex vomitoria*	yaupon	n
44	*Ipomoea lindheimeri*	Lindheimer's morning-glory	n
45	*Jasminum mesnyi*	Japanese jasmine	e
46	*Juglans major*	Arizona walnut	n

47	*Juglans microcarpa*	little walnut	n
48	*Juglans nigra*	black walnut	n
49	*Juniperus ashei*	Ashe's juniper	n
50	*Juniperus virginiana*	eastern redcedar	n
51	*Lantana urticoides*	West Indian shrubverbena	n
52	*Leucophyllum frutescens*	Texas barometer bush	n
53	*Ligustrum lucidum*	glossy privet	e
54	*Ligustrum sinense*	Chinese privet	e
55	*Ligustrum* sp.		e
56	*Lindera benzoin*	northern spicebush	n
57	*Lonicera japonica*	Japanese honeysuckle	e
58	*Maclura pomifera*	osage orange	n
59	*Mahonia swaseyi*	Texas barberry	n
60	*Mahonia trifoliolata*	algerita	n
61	*Malvaviscus arboreus* var. *drummondii*	wax mallow	n
62	*Matelia reticulata*	netted milkvine	n
63	*Maurandella antirrhiniflora*	roving sailor	n
64	*Melia azedarach*	Chinaberrytree	e
65	*Mimosa aculeaticarpa* var. *biuncifera*	catclaw mimosa	n
66	*Mimosa borealis*	fragrant mimosa	n
67	*Morus alba*	white mulberry	e
68	*Morus rubra*	red mulberry	n
69	*Nandina domestica*	sacred bamboo	e
70	*Nolina lindheimeriana*	devil's shoestring	n

71	*Nolina texana*	Texas sacahuista	n
72	*Opuntia engelmannii* var. *lindheimeri*	Texas pricklypear	n
73	*Parthenocissus quinquefolia*	Virginia creeper	n
74	*Passiflora lutea*	yellow passionflower	n
75	*Philadelphus ernestii*	canyon mock orange	n
76	*Phoradendron tomentosum*	Christmas mistletoe	n
77	*Photinia ×fraseri*	Fraser's photinia	e
78	*Photinia serratifolia*	Taiwanese photinia	e
79	*Platanus occidentalis*	American sycamore	n
80	*Populus deltoides*	eastern cottonwood	n
81	*Prosopis glandulosa*	honey mesquite	n
82	*Prunus caroliniana*	Carolina laurelcherry	n
83	*Prunus mexicana*	Mexican plum	n
84	*Prunus serotina* var. *eximia*	black cherry	n
85	*Ptelea trifoliata*	common hoptree	n
86	*Quercus buckleyi*	Texas red oak	n
87	*Quercus fusiformis*	Texas live oak	n
88	*Quercus sinuata*	bastard oak	n
89	*Quercus stellata*	post oak	n
90	*Rhubus trivialis*	southern dewberry	n
91	*Rhus copalinum*	winged sumac	n
92	*Rhus lanceolata*	prairie sumac	n
93	*Rhus trilobata* var. *trilobata*	skunkbush sumac	n
94	*Rhus virens*	evergreen sumac	n
95	*Sabal minor*	dwarf palmetto	n

96	*Salix nigra*	black willow	n
97	*Sapindus saponaria*	wingleaf soapberry	n
98	*Senna lindheimeriana*	velvet leaf senna	n
99	*Sesbania drummondii*	poisonbean	n
100	*Sideroxylon lanuginosum*	gum bully	n
101	*Smilax bona-nox*	saw greenbrier	n
102	*Sophora secundiflora*	mescal bean	n
103	*Styphnolobium affine*	Eve's necklacepod	n
104	*Taxodium distichum*	bald cypress	n
105	*Tilia americana*	Carolina basswood	n
106	*Toxicodendron radicans*	eastern poison ivy	n
107	*Tragia betonicifolia*	betonyleaf noseburn	n
108	*Triadica sebifera*	Chinese tallow	e
109	*Ulmus americana*	American elm	n
110	*Ulmus crassifolia*	cedar elm	n
111	*Ungnadia speciosa*	Mexican buckeye	n
112	*Unknown sp 1*		n
113	*Unknown sp 2*		n
114	*Unknown sp 3*		n
115	*Viburnum rufidulum*	rusty blackhaw	n
116	*Vicia villosa*	winter vetch	n
117	*Vitex agnus-castus*	lilac chastetree	e
118	*Vitis cinerea* var. *helleri*	Heller's grape	n
119	*Vitis mustangensis*	mustang grape	n
120	*Vitis* sp.		n
121	*Yucca rupicola*	twisted-leaf yucca	n

122	*Zanthoxylum hirsutum*	Texas Hercules' club	n
123	*Ziziphus obtusifolia*	lotebush	n

Appendix 3. Raw data

site	community	join	lat	lon	numspn	numspe	lilu	nado	loja	lisi	meaz	aspect	cityage	cover	devage	devdist	roaddens	roaddist	slope	streamdist	soilorder
alex	u	12	30.3216	-97.8357	8	0	0	0	0	0	0	SO	2.663	97.4	25.13	4.988	0.065	4.803	36.05	5.520	inc
alex	u	13	30.3216	-97.8358	10	0	0	0	0	0	0	SO	2.663	100.0	25.13	5.051	0.065	4.848	31.32	5.503	inc
alex	u	14	30.3215	-97.836	8	0	0	0	0	0	0	SO	2.663	92.4	25.13	5.157	0.065	5.032	40.15	5.561	inc
alex	u	15	30.3215	-97.8362	6	0	0	0	0	0	0	SO	2.663	97.4	25.13	5.265	0.065	5.128	35.00	5.537	inc
alex	u	16	30.3216	-97.8365	5	0	0	0	0	0	0	SO	2.663	100.0	25.13	5.414	0.065	5.274	30.73	5.435	inc
alex	u	17	30.3215	-97.8365	6	0	0	0	0	0	0	SO	2.663	87.0	25.13	5.407	0.065	5.286	33.75	5.407	inc
alex	u	18	30.3217	-97.8366	7	0	0	0	0	0	0	SO	2.663	97.4	25.13	5.465	0.065	5.323	33.29	5.384	inc
alex	u	19	30.3217	-97.8372	5	0	0	0	0	0	0	SO	2.663	98.7	25.13	5.654	0.065	5.442	14.76	5.130	inc
alex	u	20	30.3218	-97.8373	4	0	0	0	0	0	0	SO	2.663	96.1	25.13	5.727	0.065	5.442	9.75	5.074	inc
alex	u	21	30.3218	-97.8374	6	0	0	0	0	0	0	SO	2.663	100.0	25.13	5.727	0.065	5.442	9.75	5.048	inc
alex	u	22	30.3218	-97.8374	8	0	0	0	0	0	0	SO	2.663	80.3	25.13	5.758	0.065	5.442	9.27	5.009	inc
alex	u	23	30.3219	-97.8375	9	0	0	0	0	0	0	WE	2.663	92.6	25.13	5.765	0.065	5.398	7.50	5.025	inc
alex	w	0	30.3222	-97.8369	8	0	0	0	0	0	0	NO	2.663	100.0	25.13	5.602	0.065	5.198	65.31	5.198	mol

alex	w	1	30.3223	-97.8367	10	0	0	0	0	0	0	NO	2.663	100.0	25.13	5.525	0.065	5.142	47.16	5.130	mol
alex	w	2	30.3223	-97.8367	7	0	0	0	0	0	0	NO	2.663	83.9	25.13	5.525	0.065	5.142	47.16	5.153	mol
alex	w	3	30.3223	-97.8365	7	0	0	0	0	0	0	NO	2.663	100.0	25.13	5.442	0.065	5.142	38.61	5.124	mol
alex	w	4	30.3223	-97.8363	10	0	0	0	0	0	0	NO	2.663	100.0	25.13	5.352	0.065	5.142	77.86	5.124	mol
alex	w	5	30.3221	-97.836	9	0	0	0	0	0	0	NO	2.663	100.0	25.13	5.198	0.065	4.959	65.11	5.220	mol
alex	w	6	30.322	-97.8357	11	0	0	0	0	0	0	SO	2.663	100.0	25.13	5.017	0.065	4.714	6.69	5.283	mol
alex	w	7	30.322	-97.8356	10	0	0	0	0	0	0	SO	2.663	100.0	25.13	5.017	0.065	4.615	7.34	5.295	mol
alex	w	8	30.322	-97.8355	11	0	0	0	0	0	0	SO	2.663	100.0	25.13	4.875	0.065	4.511	13.80	5.297	mol
alex	w	9	30.3221	-97.8354	13	0	0	0	0	0	0	NO	2.663	100.0	25.13	4.796	0.065	4.402	53.17	5.270	mol
alex	w	10	30.322	-97.8354	11	0	0	0	0	0	0	SO	2.663	88.9	25.13	4.796	0.065	4.394	13.08	5.306	mol
alex	w	11	30.3221	-97.8353	12	0	0	0	0	0	0	NO	2.663	100.0	25.13	4.710	0.065	4.273	65.29	5.285	mol
basa	u	24	30.4797	-97.8696	2	0	0	0	0	0	0	EA	2.060	88.3	4.87	6.771	0.002	5.998	9.13	4.247	mol
basa	u	25	30.4796	-97.8697	6	0	0	0	0	0	0	EA	2.060	50.0	4.87	6.783	0.002	6.044	8.56	4.510	mol
basa	u	26	30.4795	-97.8697	4	0	0	0	0	0	0	EA	2.060	66.7	4.87	6.790	0.002	6.065	7.11	4.580	mol
basa	u	27	30.4795	-97.8697	5	0	0	0	0	0	0	EA	2.060	61.5	4.87	6.790	0.002	6.065	7.11	4.594	mol

basa	u	28	30.4795	-97.8696	3	0	0	0	0	0	0	EA	2.060	81.7	4.87	6.790	0.002	6.074	8.73	4.557	mol
basa	u	29	30.4795	-97.8696	2	0	0	0	0	0	0	EA	2.060	63.6	4.87	6.780	0.002	6.074	8.73	4.534	mol
basa	u	30	30.4794	-97.8697	2	0	0	0	0	0	0	EA	2.060	61.5	4.87	6.802	0.002	6.085	5.49	4.678	mol
basa	u	31	30.479	-97.8694	1	0	0	0	0	0	0	EA	2.060	32.9	4.87	6.808	0.002	6.200	8.53	4.800	mol
basa	u	32	30.479	-97.8692	6	0	0	0	0	0	0	EA	2.060	88.6	4.87	6.790	0.002	6.197	5.70	4.656	mol
basa	u	33	30.479	-97.8692	6	0	0	0	0	0	0	EA	2.060	60.0	4.87	6.790	0.002	6.216	5.70	4.660	mol
basa	u	34	30.4789	-97.8689	6	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.761	0.002	6.238	8.65	4.376	mol
basa	u	35	30.4789	-97.8688	5	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.742	0.002	6.254	12.61	4.215	mol
basa	w	36	30.48	-97.869	13	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.688	0.002	6.000	4.96	2.605	mol
basa	w	37	30.4799	-97.8688	9	0	0	0	0	0	0	SO	2.060	100.0	4.87	6.677	0.002	6.033	12.97	2.250	mol
basa	w	38	30.4799	-97.8687	13	0	0	0	0	0	0	SO	2.060	100.0	4.87	6.667	0.002	6.044	12.97	1.700	mol
basa	w	39	30.4792	-97.8682	9	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.671	0.002	6.245	6.41	1.657	mol
basa	w	40	30.4791	-97.8681	14	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.668	0.002	6.270	7.18	1.991	mol
basa	w	41	30.479	-97.8681	12	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.676	0.002	6.287	14.89	2.345	mol
basa	w	42	30.479	-97.8681	10	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.676	0.002	6.296	5.74	2.176	mol

basa	w	43	30.4789	-97.868	9	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.681	0.002	6.312	13.59	2.581	mol
basa	w	44	30.4789	-97.8679	7	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.672	0.002	6.320	7.91	2.250	mol
basa	w	45	30.4788	-97.8679	9	0	0	0	0	0	0	EA	2.060	100.0	4.87	6.672	0.002	6.336	7.91	2.324	mol
basa	w	46	30.4787	-97.8679	6	0	0	0	0	0	0	EA	2.060	89.6	4.87	6.688	0.002	6.352	11.96	2.989	mol
basa	w	47	30.4787	-97.8679	6	0	0	0	0	0	0	EA	2.060	91.4	4.87	6.688	0.002	6.367	8.74	3.016	mol
bcgb	r	72	30.2575	-97.7856	7	3	1	1	0	0	0	SO	3.210	100.0	34.67	5.002	0.000	4.557	10.49	2.539	ent
bcgb	r	73	30.2575	-97.7857	7	2	1	1	0	0	0	SO	3.210	100.0	34.67	4.971	0.000	4.557	10.49	2.701	ent
bcgb	r	74	30.2574	-97.7858	5	4	1	1	0	0	1	SO	3.210	85.0	34.67	4.920	0.000	4.371	11.11	2.729	ent
bcgb	r	75	30.2574	-97.7858	7	2	1	1	0	0	0	SO	3.210	100.0	34.67	4.920	0.000	4.453	9.52	2.384	ent
bcgb	r	76	30.2573	-97.786	8	2	0	1	0	0	0	SO	3.210	100.0	34.67	4.875	0.000	4.371	8.51	2.297	ent
bcgb	r	77	30.2573	-97.7862	11	3	1	1	0	0	0	SO	3.210	100.0	34.67	4.693	0.000	4.263	7.25	1.991	ent
bcgb	r	78	30.2572	-97.7864	7	2	1	0	0	0	1	SO	3.210	100.0	34.67	4.676	0.000	3.951	15.82	1.634	ent
bcgb	r	79	30.257	-97.7867	6	3	1	1	0	0	0	SO	3.210	100.0	34.67	4.535	0.000	3.612	4.42	0.000	ent
bcgb	r	80	30.2569	-97.7868	3	2	0	1	0	0	1	SO	3.210	100.0	34.67	4.535	0.000	3.743	11.52	0.000	ent
bcgb	r	81	30.257	-97.787	4	2	0	0	0	0	1	SO	3.210	81.0	34.67	4.371	0.000	3.485	25.56	2.668	ent

bcgb	u	48	30.2555	-97.7847	7	1	0	1	0	0	0	EA	3.210	100.0	34.67	3.932	0.000	4.394	16.54	5.411	mol
bcgb	u	49	30.2554	-97.7847	10	2	1	1	0	0	0	EA	3.210	87.2	34.67	3.932	0.000	4.394	11.60	5.454	mol
bcgb	u	50	30.2555	-97.7848	8	1	1	0	0	0	0	NO	3.210	71.8	34.67	4.111	0.000	4.511	8.37	5.390	mol
bcgb	u	51	30.2554	-97.7849	4	0	0	0	0	0	0	NO	3.210	32.1	34.67	4.263	0.000	4.615	9.36	5.420	mol
bcgb	u	52	30.2555	-97.7849	9	2	0	1	0	0	0	NO	3.210	46.2	34.67	4.263	0.000	4.615	8.85	5.376	mol
bcgb	u	53	30.2556	-97.7851	7	0	0	0	0	0	0	NO	3.210	69.6	34.67	4.511	0.000	4.796	7.91	5.323	inc
bcgb	u	54	30.2555	-97.7851	8	0	0	0	0	0	0	NO	3.210	90.5	34.67	4.511	0.000	4.796	7.94	5.355	inc
bcgb	u	55	30.2557	-97.7852	11	1	0	1	0	0	0	NO	3.210	100.0	34.67	4.615	0.000	4.878	5.24	5.226	inc
bcgb	u	56	30.2555	-97.7857	7	0	0	0	0	0	0	NO	3.210	74.0	34.67	5.017	0.000	5.198	25.38	5.273	inc
bcgb	u	57	30.2555	-97.7858	13	0	0	0	0	0	0	NO	3.210	71.4	34.67	5.081	0.000	5.252	23.15	5.247	inc
bcgb	u	58	30.2554	-97.7861	8	0	0	0	0	0	0	EA	3.210	98.8	34.67	5.198	0.000	5.352	15.66	5.240	inc
bcgb	u	59	30.2555	-97.786	14	2	1	1	0	0	0	EA	3.210	80.0	34.67	5.198	0.000	5.352	15.39	5.212	inc
bcgb	w	60	30.2575	-97.7848	8	3	1	1	0	1	0	NO	3.210	51.3	34.67	5.089	0.000	5.115	3.92	3.221	mol
bcgb	w	61	30.2574	-97.7849	8	2	1	1	0	0	0	NO	3.210	78.2	34.67	5.070	0.000	5.070	5.17	3.289	mol
bcgb	w	62	30.2574	-97.7849	11	4	1	1	0	0	1	NO	3.210	97.8	34.67	5.070	0.000	5.091	2.35	3.277	mol

bcgb	w	63	30.2573	-97.7851	13	2	1	1	0	0	0	NO	3.210	100.0	34.67	5.099	0.000	5.002	2.01	3.277	mol
bcgb	w	64	30.2571	-97.7852	14	3	1	1	0	0	1	NO	3.210	98.7	34.67	5.058	0.000	5.017	8.03	3.664	mol
bcgb	w	65	30.2571	-97.7855	11	3	1	1	0	0	1	NO	3.210	87.3	34.67	5.154	0.000	4.909	3.49	3.373	mol
bcgb	w	66	30.257	-97.7856	9	3	1	1	0	0	0	NO	3.210	100.0	34.67	5.170	0.000	4.848	11.51	3.731	mol
bcgb	w	67	30.2569	-97.7858	13	4	1	1	0	1	0	NO	3.210	98.7	34.67	5.154	0.000	4.803	9.25	3.868	mol
bcgb	w	68	30.2568	-97.7858	12	2	0	1	0	0	1	NO	3.210	91.4	34.67	5.143	0.000	4.726	9.25	3.945	mol
bcgb	w	69	30.2567	-97.7861	11	3	1	1	0	0	0	NO	3.210	100.0	34.67	5.099	0.000	4.615	11.24	3.938	mol
bcgb	w	70	30.2567	-97.7864	12	2	0	1	0	1	0	NO	3.210	100.0	34.67	4.964	0.000	4.466	17.13	3.842	mol
bcgb	w	71	30.2566	-97.7866	8	0	0	0	0	0	0	WE	3.210	100.0	34.67	4.771	0.000	4.459	8.98	3.741	mol
bchp	r	94	30.3032	-97.9173	5	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.603	0.021	5.827	17.33	3.720	mol
bchp	r	95	30.3032	-97.9173	7	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.603	0.021	5.827	17.33	3.741	mol
bchp	r	96	30.3033	-97.9172	5	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.608	0.021	5.818	17.38	3.617	mol
bchp	r	97	30.3033	-97.9171	10	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.571	0.021	5.818	17.38	3.643	mol
bchp	r	98	30.3033	-97.9171	8	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.576	0.021	5.827	18.57	3.676	mol
bchp	r	99	30.3034	-97.9169	8	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.545	0.021	5.809	16.40	3.641	mol

bchp	r	100	30.3034	-97.9169	9	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.545	0.021	5.809	16.40	3.720	mol
bchp	r	101	30.3037	-97.9165	7	1	1	0	0	0	0	SO	2.285	100.0	13.80	5.475	0.021	5.778	17.84	3.953	mol
bchp	r	102	30.3037	-97.9164	8	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.492	0.021	5.791	17.84	3.970	mol
bchp	r	103	30.3037	-97.9164	9	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.492	0.021	5.791	17.84	4.007	mol
bchp	u	104	30.3038	-97.9163	3	0	0	0	0	0	0	EA	2.285	100.0	13.80	5.435	0.021	5.750	19.00	4.248	mol
bchp	u	105	30.3039	-97.9155	2	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.571	0.021	5.827	32.86	3.725	mol
bchp	u	106	30.3049	-97.9134	2	0	0	0	0	0	0	EA	2.285	100.0	13.80	5.563	0.021	6.055	15.44	2.250	ent
bchp	u	107	30.3048	-97.9135	3	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.563	0.021	6.065	16.25	2.297	ent
bchp	u	108	30.3048	-97.9136	2	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.590	0.021	6.044	17.01	2.297	ent
bchp	u	109	30.3047	-97.9137	2	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.583	0.021	6.033	17.88	2.079	ent
bchp	u	110	30.3047	-97.914	6	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.605	0.021	5.967	18.45	0.000	ent
bchp	u	111	30.3046	-97.914	2	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.605	0.021	5.980	19.35	1.609	ent
bchp	u	112	30.3046	-97.914	4	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.605	0.021	5.980	19.35	1.634	ent
bchp	u	113	30.3046	-97.9142	5	0	0	0	0	0	0	SO	2.285	100.0	13.80	5.638	0.021	5.936	14.24	1.342	mol
bchp	u	114	30.3043	-97.9144	4	0	0	0	0	0	0	EA	2.285	100.0	13.80	5.740	0.021	5.938	3.26	2.642	ent

bchp	u	115	30.3042	-97.9146	4	0	0	0	0	0	0	EA	2.285	100.0	13.80	5.750	0.021	5.931	19.43	2.619	ent
bchp	w	82	30.3036	-97.9179	10	0	0	0	0	0	0	SO	2.285	32.1	13.80	5.442	0.021	5.654	5.18	4.626	mol
bchp	w	83	30.3037	-97.918	9	0	0	0	0	0	0	EA	2.285	0.0	13.80	5.391	0.021	5.613	4.70	4.721	mol
bchp	w	84	30.3037	-97.9181	10	0	0	0	0	0	0	EA	2.285	46.8	13.80	5.391	0.021	5.576	5.33	4.809	mol
bchp	w	85	30.3035	-97.9184	8	0	0	0	0	0	0	SO	2.285	73.4	13.80	5.333	0.021	5.580	8.02	4.796	mol
bchp	w	86	30.3035	-97.9185	9	1	0	1	0	0	0	SO	2.285	7.7	13.80	5.353	0.021	5.580	7.38	4.775	mol
bchp	w	87	30.303	-97.9187	11	0	0	0	0	0	0	SO	2.285	0.0	13.80	5.399	0.021	5.653	5.41	4.609	mol
bchp	w	88	30.3026	-97.9192	7	0	0	0	0	0	0	EA	2.285	69.2	13.80	5.356	0.021	5.599	6.93	4.640	mol
bchp	w	89	30.3025	-97.9195	4	0	0	0	0	0	0	EA	2.285	53.8	13.80	5.263	0.021	5.571	7.20	4.769	mol
bchp	w	90	30.3025	-97.9195	5	0	0	0	0	0	0	EA	2.285	100.0	13.80	5.296	0.021	5.543	6.43	4.757	mol
bchp	w	91	30.3024	-97.9195	5	0	0	0	0	0	0	EA	2.285	86.8	13.80	5.329	0.021	5.571	7.49	4.663	mol
bchp	w	92	30.3023	-97.9196	7	0	0	0	0	0	0	EA	2.285	31.2	13.80	5.329	0.021	5.574	7.00	4.698	mol
bchp	w	93	30.302	-97.9197	12	0	0	0	0	0	0	EA	2.285	79.2	13.80	5.399	0.021	5.660	7.62	4.639	mol
bcwp	r	140	30.2659	-97.8237	7	2	0	1	0	1	0	EA	2.926	100.0	26.47	5.768	0.030	5.911	26.04	3.011	mol
bcwp	r	141	30.2659	-97.8236	9	1	0	0	0	1	0	EA	2.926	100.0	26.47	5.744	0.030	5.872	21.33	2.642	mol

bcwp	r	142	30.2676	-97.8241	6	3	0	1	0	1	0	EA	2.926	100.0	26.47	5.590	0.030	5.710	9.01	3.437	ent
bcwp	r	143	30.2678	-97.8241	3	2	0	0	0	1	0	EA	2.926	100.0	26.47	5.576	0.030	5.727	8.50	3.348	ent
bcwp	r	144	30.2678	-97.8242	3	2	0	0	0	1	0	EA	2.926	85.7	26.47	5.576	0.030	5.721	10.67	3.355	ent
bcwp	r	145	30.2679	-97.8241	9	1	0	0	0	0	0	EA	2.926	100.0	26.47	5.571	0.030	5.716	7.31	3.129	ent
bcwp	r	146	30.2681	-97.8242	6	3	0	1	0	1	0	EA	2.926	100.0	26.47	5.565	0.030	5.712	8.68	3.100	ent
bcwp	r	147	30.2685	-97.8243	3	0	0	0	0	0	0	EA	2.926	100.0	26.47	5.599	0.030	5.772	7.39	2.729	ent
bcwp	r	148	30.2687	-97.8245	3	3	0	1	0	0	1	EA	2.926	92.3	26.47	5.545	0.030	5.698	8.03	3.072	ent
bcwp	r	149	30.2689	-97.8247	4	0	0	0	0	0	0	NO	2.926	100.0	26.47	5.479	0.030	5.661	7.89	3.267	mol
bcwp	r	150	30.269	-97.8246	6	2	0	1	0	0	0	EA	2.926	100.0	26.47	5.443	0.030	5.629	4.58	2.722	ent
bcwp	r	151	30.2693	-97.8249	1	3	1	0	0	1	0	NO	2.926	98.7	26.47	5.395	0.030	5.567	3.78	2.989	ent
bcwp	u	117	30.2741	-97.8258	6	0	0	0	0	0	0	WE	2.926	6.5	26.47	3.951	0.030	4.813	26.91	4.216	inc
bcwp	u	118	30.2745	-97.8259	7	0	0	0	0	0	0	SO	2.926	31.2	26.47	4.163	0.030	4.689	40.69	4.057	inc
bcwp	u	119	30.2744	-97.826	6	0	0	0	0	0	0	SO	2.926	60.7	26.47	4.163	0.030	4.689	34.72	4.001	inc
bcwp	u	120	30.2744	-97.826	7	0	0	0	0	0	0	SO	2.926	100.0	26.47	4.221	0.030	4.689	34.72	3.968	inc
bcwp	u	121	30.2746	-97.8261	3	0	0	0	0	0	0	SO	2.926	0.0	26.47	4.175	0.030	4.644	28.52	3.950	inc

bcwp	u	122	30.2745	-97.8263	9	0	0	0	0	0	0	SO	2.926	92.3	26.47	4.453	0.030	4.745	25.98	3.583	inc
bcwp	u	123	30.2745	-97.8271	10	0	0	0	0	0	0	WE	2.926	92.3	26.47	4.964	0.030	5.188	16.17	4.026	inc
bcwp	u	124	30.2748	-97.8273	6	0	0	0	0	0	0	SO	2.926	50.7	26.47	4.944	0.030	5.168	26.35	4.562	inc
bcwp	u	125	30.2749	-97.8274	5	0	0	0	0	0	0	SO	2.926	91.0	26.47	5.008	0.030	5.168	28.33	4.612	inc
bcwp	u	126	30.2749	-97.8273	6	0	0	0	0	0	0	SO	2.926	78.4	26.47	4.944	0.030	5.147	25.99	4.612	inc
bcwp	u	127	30.275	-97.8273	8	1	0	1	0	0	0	SO	2.926	71.0	26.47	4.920	0.030	5.147	25.99	4.685	inc
bcwp	w	128	30.2702	-97.8254	13	1	1	0	0	0	0	SO	2.926	100.0	26.47	5.099	0.030	5.371	15.59	3.714	ent
bcwp	w	129	30.2701	-97.8252	12	0	0	0	0	0	0	SO	2.926	100.0	26.47	5.070	0.030	5.362	14.99	3.446	ent
bcwp	w	130	30.27	-97.825	11	1	0	0	0	0	1	WE	2.926	100.0	26.47	5.115	0.030	5.362	34.88	3.191	ent
bcwp	w	131	30.2699	-97.8249	10	1	1	0	0	0	0	WE	2.926	84.8	26.47	5.147	0.030	5.329	52.29	3.082	ent
bcwp	w	132	30.2699	-97.8249	15	2	0	1	0	0	1	WE	2.926	100.0	26.47	5.147	0.030	5.329	52.29	3.136	ent
bcwp	w	133	30.2698	-97.8248	13	1	0	0	0	1	0	SO	2.926	100.0	26.47	5.183	0.030	5.371	62.85	3.056	ent
bcwp	w	134	30.2698	-97.8247	15	0	0	0	0	0	0	WE	2.926	98.4	26.47	5.143	0.030	5.343	79.06	3.289	ent
bcwp	w	135	30.2694	-97.8246	14	1	0	0	0	0	1	WE	2.926	98.7	26.47	5.263	0.030	5.473	42.58	2.500	ent
bcwp	w	136	30.2695	-97.8245	11	2	1	0	0	0	1	WE	2.926	100.0	26.47	5.188	0.030	5.414	63.16	3.235	ent

bcwp	w	137	30.2692	-97.8241	14	1	1	0	0	0	0	WE	2.926	3.8	26.47	5.288	0.030	5.487	81.77	3.628	ent
bcwp	w	138	30.2691	-97.8242	13	2	1	0	0	0	1	WE	2.926	100.0	26.47	5.333	0.030	5.525	63.37	3.242	ent
bcwp	w	139	30.269	-97.8241	10	1	1	0	0	0	0	WE	2.926	86.8	26.47	5.377	0.030	5.590	74.44	3.282	ent
blan	r	152	30.0933	-98.4209	5	3	1	0	1	1	0	NO	5.043	98.8	41.87	5.053	0.000	4.083	11.09	3.863	ent
blan	r	153	30.0935	-98.4208	6	2	1	0	1	0	0	NO	5.043	100.0	41.87	5.070	0.000	4.175	17.98	3.842	ent
blan	r	154	30.0936	-98.4207	2	2	1	0	0	1	0	NO	5.043	92.3	41.87	5.089	0.000	4.175	18.24	3.863	ent
blan	r	155	30.0939	-98.4204	6	2	1	0	1	0	0	WE	5.043	100.0	41.87	5.128	0.000	4.292	14.01	3.787	ent
blan	r	156	30.0944	-98.4199	3	1	1	0	0	0	0	NO	5.043	100.0	41.87	4.951	0.000	4.714	17.03	3.820	ent
blan	r	157	30.0944	-98.4198	5	4	1	0	1	1	1	NO	5.043	98.7	41.87	4.949	0.000	4.710	10.94	3.950	ent
blan	r	158	30.0945	-98.4197	8	3	1	0	1	1	0	NO	5.043	100.0	41.87	4.875	0.000	4.796	11.78	3.976	ent
blan	r	159	30.0945	-98.4197	7	2	1	0	1	0	0	NO	5.043	100.0	41.87	4.796	0.000	4.796	17.40	3.834	ent
blan	r	160	30.0945	-98.4196	5	3	1	0	1	0	1	NO	5.043	97.6	41.87	4.796	0.000	4.796	11.78	3.990	ent
blan	r	161	30.0946	-98.4197	5	1	1	0	0	0	0	NO	5.043	100.0	41.87	4.796	0.000	4.875	17.61	3.868	ent
blan	w	162	30.0946	-98.4196	10	2	1	0	1	0	0	NO	5.043	100.0	41.87	4.796	0.000	4.875	17.61	3.908	ent
blan	w	163	30.0939	-98.4208	2	1	1	0	0	0	0	WE	5.043	100.0	41.87	4.971	0.000	4.535	0.90	3.101	ent

blan	w	164	30.0939	-98.4206	5	2	1	0	1	0	0	WE	5.043	96.1	41.87	5.008	0.000	4.535	5.27	3.221	ent
blan	w	165	30.0941	-98.4205	6	1	1	0	0	0	0	NO	5.043	98.7	41.87	5.037	0.000	4.557	7.46	3.249	ent
blan	w	166	30.0942	-98.4203	5	2	1	0	1	0	0	WE	5.043	96.2	41.87	5.112	0.000	4.600	6.42	3.470	ent
blan	w	167	30.0942	-98.4203	3	1	1	0	0	0	0	WE	5.043	95.9	41.87	5.051	0.000	4.600	6.42	3.348	ent
blan	w	168	30.0942	-98.4202	4	1	1	0	0	0	0	WE	5.043	100.0	41.87	5.112	0.000	4.459	21.40	3.628	ent
blan	w	169	30.0943	-98.4201	4	1	1	0	0	0	0	WE	5.043	93.6	41.87	5.037	0.000	4.658	11.51	3.503	ent
blan	w	170	30.0943	-98.4202	4	2	1	1	0	0	0	WE	5.043	100.0	41.87	4.971	0.000	4.658	11.51	3.424	ent
blan	w	171	30.0945	-98.4198	8	1	1	0	0	0	0	NO	5.043	95.9	41.87	4.796	0.000	4.796	18.28	3.669	ent
blan	w	172	30.0946	-98.4198	6	1	1	0	0	0	0	NO	5.043	97.5	41.87	4.710	0.000	4.875	11.89	3.512	ent
blue	r	173	30.004	-98.0901	7	3	1	1	1	0	0	NO	3.470	100.0	40.73	6.137	0.027	5.802	1.63	4.126	mol
blue	r	174	30.0039	-98.0902	8	2	1	0	1	0	0	NO	3.470	100.0	40.73	6.093	0.027	5.772	1.22	4.187	mol
blue	r	175	30.0039	-98.0902	7	3	1	1	1	0	0	WE	3.470	100.0	40.73	6.095	0.027	5.765	16.24	4.120	mol
blue	r	176	30.0038	-98.0901	7	2	1	0	1	0	0	WE	3.470	100.0	40.73	6.070	0.027	5.710	3.55	4.315	mol
blue	r	177	30.0035	-98.0903	5	1	0	0	1	0	0	WE	3.470	100.0	40.73	6.002	0.027	5.599	14.42	4.350	inc
blue	r	178	30.003	-98.0902	6	1	0	0	1	0	0	WE	3.470	93.6	40.73	5.843	0.027	5.404	9.68	4.614	mol

blue	r	179	30.0029	-98.0903	6	0	0	0	0	0	0	WE	3.470	96.1	40.73	5.843	0.027	5.361	7.14	4.592	mol
blue	r	180	30.003	-98.0902	6	0	0	0	0	0	0	WE	3.470	92.2	40.73	5.839	0.027	5.377	9.85	4.690	mol
blue	r	181	30.0028	-98.0902	5	0	0	0	0	0	0	WE	3.470	90.0	40.73	5.779	0.027	5.286	7.71	4.732	mol
blue	r	182	30.0036	-98.0907	4	0	0	0	0	0	0	WE	3.470	96.3	40.73	6.042	0.027	5.608	5.89	3.676	mol
blue	r	183	30.0037	-98.0906	4	0	0	0	0	0	0	WE	3.470	51.4	40.73	6.065	0.027	5.644	18.92	3.646	mol
blue	r	184	30.0039	-98.0905	6	0	0	0	0	0	0	WE	3.470	100.0	40.73	6.105	0.027	5.716	33.95	3.687	mol
blue	u	195	30.0027	-98.0914	6	0	0	0	0	0	0	SO	3.470	100.0	40.73	5.832	0.027	5.142	3.93	1.991	mol
blue	u	196	30.0025	-98.0914	4	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.779	0.027	5.017	8.75	2.787	mol
blue	u	197	30.0025	-98.0914	5	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.779	0.027	5.017	13.18	2.822	mol
blue	u	198	30.0024	-98.0914	7	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.779	0.027	4.949	13.18	2.862	mol
blue	u	199	30.0023	-98.0915	6	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.769	0.027	4.878	15.10	2.745	mol
blue	u	200	30.0019	-98.0917	7	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.676	0.027	4.563	3.85	2.308	mol
blue	u	201	30.0017	-98.0918	5	1	0	1	0	0	0	WE	3.470	100.0	40.73	5.648	0.027	4.402	5.50	1.634	mol
blue	u	202	30.0016	-98.0918	4	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.624	0.027	4.175	6.55	1.386	mol
blue	u	203	30.0015	-98.0919	2	0	0	0	0	0	0	WE	3.470	100.0	40.73	5.599	0.027	4.175	5.70	1.527	mol

blue	u	551	30.0042	-98.09	5	0	0	0	0	0	0	WE	3.470	100.0	40.73	6.157	0.027	5.866	2.10	3.978	mol
blue	w	185	30.004	-98.0905	12	1	0	1	0	0	0	WE	3.470	87.5	40.73	6.123	0.027	5.753	32.96	3.617	mol
blue	w	186	30.0043	-98.0903	9	1	0	0	1	0	0	WE	3.470	100.0	40.73	6.204	0.027	5.875	38.84	3.330	mol
blue	w	187	30.0044	-98.0903	9	1	0	0	1	0	0	WE	3.470	100.0	40.73	6.202	0.027	5.907	33.04	3.156	mol
blue	w	188	30.0044	-98.0902	11	1	0	0	1	0	0	WE	3.470	100.0	40.73	6.222	0.027	5.907	33.04	3.151	mol
blue	w	189	30.0045	-98.0902	11	0	0	0	0	0	0	WE	3.470	100.0	40.73	6.241	0.027	5.934	37.39	2.729	mol
blue	w	190	30.0046	-98.0901	12	1	0	0	1	0	0	WE	3.470	100.0	40.73	6.259	0.027	5.964	26.24	1.921	mol
blue	w	191	30.0046	-98.09	13	0	0	0	0	0	0	WE	3.470	100.0	40.73	6.257	0.027	5.970	33.00	1.896	mol
blue	w	192	30.003	-98.0913	9	0	0	0	0	0	0	EA	3.470	100.0	40.73	5.921	0.027	5.303	2.44	1.386	mol
blue	w	193	30.0029	-98.0914	7	1	0	0	1	0	0	SO	3.470	97.5	40.73	5.907	0.027	5.252	1.51	0.000	mol
blue	w	194	30.0027	-98.0914	8	0	0	0	0	0	0	SO	3.470	100.0	40.73	5.858	0.027	5.198	3.94	1.634	mol
bucr	r	227	30.3818	-97.7706	4	0	0	0	0	0	0	NO	2.278	96.1	31.07	4.111	0.111	4.535	14.05	3.721	inc
bucr	r	228	30.3818	-97.7707	10	2	1	0	0	0	0	NO	2.278	100.0	31.07	4.111	0.111	4.535	16.67	3.685	inc
bucr	r	229	30.3817	-97.7708	7	2	0	0	0	0	1	WE	2.278	100.0	31.07	4.263	0.111	4.563	11.69	3.719	inc
bucr	r	230	30.3817	-97.7709	10	1	0	0	0	0	0	WE	2.278	94.9	31.07	4.263	0.111	4.615	24.89	3.559	mol

bucr	r	231	30.3815	-97.7709	11	0	0	0	0	0	0	WE	2.278	97.4	31.07	4.453	0.111	4.767	21.99	3.983	inc
bucr	r	232	30.3808	-97.7713	6	0	0	0	0	0	0	WE	2.278	100.0	31.07	4.799	0.111	5.106	15.07	4.554	inc
bucr	r	233	30.3808	-97.7714	10	1	0	0	1	0	0	WE	2.278	100.0	31.07	4.860	0.111	5.070	15.07	4.528	inc
bucr	r	234	30.3808	-97.7714	7	0	0	0	0	0	0	WE	2.278	100.0	31.07	4.860	0.111	5.070	14.73	4.517	inc
bucr	r	235	30.3806	-97.7715	10	0	0	0	0	0	0	WE	2.278	100.0	31.07	4.839	0.111	5.089	15.40	4.552	inc
bucr	u	204	30.3821	-97.7711	8	0	0	0	0	0	0	SO	2.278	71.3	31.07	3.045	0.111	3.932	1.58	2.841	mol
bucr	u	205	30.382	-97.7714	5	0	0	0	0	0	0	SO	2.278	57.1	31.07	2.398	0.111	3.743	3.69	3.119	mol
bucr	u	206	30.382	-97.7716	10	0	0	0	0	0	0	EA	2.278	41.0	31.07	2.717	0.111	3.612	2.62	3.170	mol
bucr	u	207	30.3819	-97.7716	9	0	0	0	0	0	0	EA	2.278	32.4	31.07	3.151	0.111	3.612	4.27	3.213	mol
bucr	u	208	30.3818	-97.7718	9	0	0	0	0	0	0	SO	2.278	44.9	31.07	3.485	0.111	3.823	4.50	3.164	mol
bucr	u	209	30.3817	-97.772	11	0	0	0	0	0	0	SO	2.278	37.7	31.07	3.377	0.111	3.932	4.58	3.170	mol
bucr	u	210	30.3814	-97.7723	7	0	0	0	0	0	0	SO	2.278	57.5	31.07	3.485	0.111	4.005	2.61	2.789	mol
bucr	u	211	30.3813	-97.7724	6	1	1	0	0	0	0	SO	2.278	82.5	31.07	3.714	0.111	4.163	2.61	2.568	mol
bucr	u	212	30.3811	-97.7726	7	1	1	0	0	0	0	SO	2.278	70.1	31.07	4.005	0.111	4.175	2.47	2.568	mol
bucr	u	214	30.3823	-97.7695	8	1	1	0	0	0	0	NO	2.278	100.0	31.07	4.394	0.111	3.714	34.59	3.296	inc

bucr	u	215	30.3823	-97.7695	10	0	0	0	0	0	0	NO	2.278	100.0	31.07	4.263	0.111	3.714	34.59	3.296	inc
bucr	u	216	30.3822	-97.7699	9	0	0	0	0	0	0	NO	2.278	100.0	31.07	3.612	0.111	3.714	27.67	3.700	inc
bucr	w	217	30.3822	-97.7687	10	1	1	0	0	0	0	NO	2.278	100.0	31.07	4.466	0.111	4.292	36.32	2.889	inc
bucr	w	218	30.3822	-97.7686	15	0	0	0	0	0	0	NO	2.278	100.0	31.07	4.453	0.111	4.346	31.09	2.568	inc
bucr	w	219	30.3821	-97.7683	11	0	0	0	0	0	0	NO	2.278	86.1	31.07	4.292	0.111	4.557	14.54	1.657	inc
bucr	w	220	30.3822	-97.7683	10	1	1	0	0	0	0	SO	2.278	93.4	31.07	4.083	0.111	4.535	13.27	1.634	mol
bucr	w	221	30.3824	-97.7683	10	1	1	0	0	0	0	SO	2.278	77.9	31.07	3.771	0.111	4.301	12.95	2.437	mol
bucr	w	222	30.383	-97.7683	13	0	0	0	0	0	0	NO	2.278	98.6	31.07	3.485	0.111	2.398	23.01	2.605	mol
bucr	w	223	30.3829	-97.7684	11	1	0	0	0	0	1	NO	2.278	100.0	31.07	3.743	0.111	3.045	20.73	1.896	mol
bucr	w	224	30.382	-97.7702	10	1	1	0	0	0	0	NO	2.278	100.0	31.07	3.714	0.111	4.111	17.50	3.666	inc
bucr	w	225	30.382	-97.7704	8	0	0	0	0	0	0	NO	2.278	84.6	31.07	3.434	0.111	4.111	27.99	3.424	inc
bucr	w	226	30.3819	-97.7705	9	0	0	0	0	0	0	NO	2.278	83.5	31.07	3.932	0.111	4.394	15.27	3.719	inc
char	u	236	30.1639	-98.074	3	0	0	0	0	0	0	SO	2.346	75.6	21.87	6.890	0.019	5.605	4.22	3.719	mol
char	u	237	30.164	-98.074	5	1	0	0	0	0	1	SO	2.346	100.0	21.87	6.882	0.019	5.608	3.79	3.721	mol
char	u	238	30.164	-98.0739	3	0	0	0	0	0	0	SO	2.346	100.0	21.87	6.888	0.019	5.571	3.79	3.761	inc

char	u	239	30.1641	-98.074	5	0	0	0	0	0	0	SO	2.346	100.0	21.87	6.873	0.019	5.583	3.47	3.950	inc
char	u	240	30.1645	-98.074	5	0	0	0	0	0	0	SO	2.346	48.8	21.87	6.839	0.019	5.644	1.71	4.358	inc
char	u	241	30.1647	-98.0741	2	0	0	0	0	0	0	WE	2.346	62.0	21.87	6.815	0.019	5.694	0.65	4.655	inc
char	u	242	30.1647	-98.0742	4	0	0	0	0	0	0	SO	2.346	51.7	21.87	6.808	0.019	5.707	1.91	4.709	inc
char	u	243	30.1647	-98.0742	6	0	0	0	0	0	0	SO	2.346	9.6	21.87	6.799	0.019	5.707	1.91	4.760	inc
char	u	244	30.1655	-98.0747	4	0	0	0	0	0	0	SO	2.346	70.9	21.87	6.689	0.019	5.398	5.62	5.330	inc
char	u	245	30.1656	-98.0748	4	0	0	0	0	0	0	SO	2.346	55.3	21.87	6.671	0.019	5.352	6.80	5.400	inc
cofo	r	246	30.3323	-97.8916	4	1	0	0	0	0	1	NO	2.317	100.0	25.60	6.312	0.017	6.320	19.70	4.043	inc
cofo	r	247	30.3324	-97.8916	4	0	0	0	0	0	0	NO	2.317	100.0	25.60	6.294	0.017	6.304	22.10	4.008	inc
cofo	r	248	30.3326	-97.8914	9	1	0	0	0	0	1	NO	2.317	100.0	25.60	6.276	0.017	6.292	12.68	3.726	inc
cofo	r	249	30.3326	-97.8913	9	1	0	0	0	0	1	NO	2.317	100.0	25.60	6.257	0.017	6.274	12.68	3.596	inc
cofo	r	250	30.3329	-97.8912	9	1	0	0	0	0	1	NO	2.317	100.0	25.60	6.224	0.017	6.246	9.61	3.270	inc
cofo	r	251	30.3331	-97.8911	6	1	0	0	0	1	0	NO	2.317	53.9	25.60	6.229	0.017	6.245	7.75	3.016	inc
cofo	r	252	30.3332	-97.8911	11	0	0	0	0	0	0	NO	2.317	55.1	25.60	6.236	0.017	6.206	4.74	3.182	inc
cofo	r	253	30.3336	-97.891	9	1	1	0	0	0	0	EA	2.317	81.5	25.60	6.236	0.017	6.109	17.10	3.373	inc

cofo	r	254	30.3337	-97.8911	10	0	0	0	0	0	0	EA	2.317	41.4	25.60	6.257	0.017	6.104	17.10	3.497	inc
cofo	r	255	30.3339	-97.8911	7	0	0	0	0	0	0	EA	2.317	98.6	25.60	6.260	0.017	6.060	21.33	3.718	inc
cofo	r	256	30.3341	-97.8912	6	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.286	0.017	5.983	25.63	3.852	inc
cofo	u	257	30.3366	-97.8919	6	0	0	0	0	0	0	NO	2.317	100.0	25.60	6.438	0.017	4.689	6.16	2.350	mol
cofo	u	258	30.3362	-97.8917	5	0	0	0	0	0	0	EA	2.317	97.5	25.60	6.434	0.017	5.089	13.70	0.693	mol
cofo	u	259	30.3361	-97.8911	6	0	0	0	0	0	0	WE	2.317	88.5	25.60	6.353	0.017	5.235	4.34	2.944	mol
cofo	u	260	30.3361	-97.8911	6	0	0	0	0	0	0	WE	2.317	88.9	25.60	6.353	0.017	5.235	4.34	2.944	mol
cofo	u	261	30.3362	-97.891	5	0	0	0	0	0	0	WE	2.317	69.6	25.60	6.353	0.017	5.183	6.43	2.822	mol
cofo	u	262	30.336	-97.8909	3	0	0	0	0	0	0	SO	2.317	100.0	25.60	6.331	0.017	5.316	6.06	0.000	mol
cofo	u	263	30.3361	-97.8908	2	0	0	0	0	0	0	SO	2.317	100.0	25.60	6.322	0.017	5.269	11.10	1.527	mol
cofo	u	264	30.3357	-97.8909	1	0	0	0	0	0	0	WE	2.317	67.9	25.60	6.328	0.017	5.487	0.06	2.764	mol
cofo	u	265	30.3356	-97.891	2	0	0	0	0	0	0	EA	2.317	80.8	25.60	6.336	0.017	5.475	0.19	2.224	mol
cofo	u	266	30.3356	-97.891	6	0	0	0	0	0	0	WE	2.317	76.9	25.60	6.336	0.017	5.513	0.14	2.593	mol
cofo	u	267	30.3354	-97.891	6	0	0	0	0	0	0	NO	2.317	100.0	25.60	6.322	0.017	5.550	1.40	2.639	mol
cofo	w	268	30.3354	-97.8919	7	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.462	0.017	5.498	13.90	4.277	inc

cofo	w	269	30.3354	-97.8919	7	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.462	0.017	5.498	13.90	4.277	inc
cofo	w	270	30.3351	-97.8915	3	0	0	0	0	0	0	NO	2.317	100.0	25.60	6.379	0.017	5.677	23.06	3.788	inc
cofo	w	271	30.335	-97.8915	4	0	0	0	0	0	0	NO	2.317	100.0	25.60	6.379	0.017	5.677	23.06	3.749	inc
cofo	w	272	30.3349	-97.8915	5	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.369	0.017	5.710	21.67	3.743	inc
cofo	w	273	30.3345	-97.8911	5	1	1	0	0	0	0	EA	2.317	100.0	25.60	6.282	0.017	5.886	23.17	3.258	inc
cofo	w	274	30.3344	-97.8911	6	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.278	0.017	5.886	23.17	3.424	inc
cofo	w	275	30.3343	-97.891	6	0	0	0	0	0	0	EA	2.317	100.0	25.60	6.274	0.017	5.945	21.54	3.485	inc
cofo	w	276	30.334	-97.8912	8	0	0	0	0	0	0	EA	2.317	78.2	25.60	6.283	0.017	6.007	24.71	3.869	inc
cofo	w	277	30.3339	-97.8911	4	0	0	0	0	0	0	EA	2.317	92.7	25.60	6.260	0.017	6.060	21.33	3.714	inc
cold	u	278	30.3581	-97.8145	2	0	0	0	0	0	0	WE	2.437	78.5	15.87	5.070	0.018	5.142	19.81	3.897	inc
cold	u	279	30.3581	-97.8146	3	0	0	0	0	0	0	WE	2.437	88.6	15.87	5.112	0.018	5.168	9.12	3.909	inc
cold	u	280	30.3578	-97.8148	4	0	0	0	0	0	0	WE	2.437	97.4	15.87	5.205	0.018	5.168	9.02	3.889	inc
cold	u	281	30.3576	-97.8148	4	0	0	0	0	0	0	WE	2.437	86.3	15.87	5.198	0.018	5.205	17.66	4.065	inc
cold	u	282	30.3576	-97.8149	3	0	0	0	0	0	0	WE	2.437	100.0	15.87	5.252	0.018	5.258	11.43	3.907	inc
cold	u	283	30.3573	-97.8151	5	1	0	0	0	0	0	WE	2.437	88.6	15.87	5.303	0.018	5.308	26.45	3.993	inc

cold	u	284	30.3572	-97.8152	7	0	0	0	0	0	0	WE	2.437	98.8	15.87	5.352	0.018	5.356	22.87	3.832	inc
cold	u	285	30.3572	-97.8152	3	0	0	0	0	0	0	WE	2.437	98.2	15.87	5.352	0.018	5.362	32.50	3.870	inc
cold	u	286	30.3571	-97.8153	7	0	0	0	0	0	0	WE	2.437	79.5	15.87	5.399	0.018	5.414	24.66	3.785	inc
cold	u	287	30.357	-97.8153	2	0	0	0	0	0	0	WE	2.437	98.6	15.87	5.402	0.018	5.423	25.87	3.884	inc
cold	u	288	30.357	-97.8154	5	0	0	0	0	0	0	WE	2.437	100.0	15.87	5.446	0.018	5.465	15.62	3.704	inc
cold	w	289	30.357	-97.8158	8	0	0	0	0	0	0	EA	2.437	100.0	15.87	5.567	0.018	5.583	33.38	2.870	inc
cold	w	290	30.3571	-97.8157	10	0	0	0	0	0	0	EA	2.437	100.0	15.87	5.567	0.018	5.576	23.36	2.963	inc
cold	w	291	30.3572	-97.8157	15	0	0	0	0	0	0	EA	2.437	100.0	15.87	5.525	0.018	5.533	39.74	2.454	inc
cold	w	292	30.3574	-97.8155	9	0	0	0	0	0	0	SO	2.437	94.9	15.87	5.485	0.018	5.486	50.53	2.256	inc
cold	w	293	30.3575	-97.8153	9	0	0	0	0	0	0	EA	2.437	81.8	15.87	5.442	0.018	5.399	47.47	2.963	inc
cold	w	294	30.3578	-97.8152	7	0	0	0	0	0	0	SO	2.437	100.0	15.87	5.353	0.018	5.370	35.43	3.050	inc
cold	w	295	30.3578	-97.8152	6	1	0	0	0	0	0	SO	2.437	100.0	15.87	5.356	0.018	5.370	40.41	2.963	inc
cold	w	296	30.358	-97.815	8	0	0	0	0	0	0	SO	2.437	92.3	15.87	5.274	0.018	5.300	41.34	3.289	inc
cold	w	297	30.358	-97.8149	10	0	0	0	0	0	0	SO	2.437	97.7	15.87	5.274	0.018	5.316	43.41	3.267	inc
cold	w	298	30.3581	-97.815	8	0	0	0	0	0	0	SO	2.437	100.0	15.87	5.286	0.018	5.316	43.41	3.082	inc

elmp	r	323	30.3428	-97.841	6	3	1	1	0	0	1	EA	2.493	80.5	23.07	6.497	0.003	6.172	43.38	0.693	mol
elmp	r	324	30.3432	-97.8408	7	4	1	1	0	1	0	EA	2.493	100.0	23.07	6.436	0.003	6.216	37.00	0.693	mol
elmp	r	325	30.3433	-97.8408	8	2	1	0	0	1	0	EA	2.493	94.9	23.07	6.420	0.003	6.221	40.23	0.000	mol
elmp	r	326	30.3438	-97.8407	11	1	1	0	0	0	0	EA	2.493	84.8	23.07	6.340	0.003	6.289	18.27	1.792	mol
elmp	r	327	30.3439	-97.8407	6	1	1	0	0	0	0	EA	2.493	61.3	23.07	6.302	0.003	6.277	17.36	2.204	mol
elmp	r	328	30.3441	-97.8407	6	1	1	0	0	0	0	EA	2.493	100.0	23.07	6.265	0.003	6.286	15.27	1.958	mol
elmp	r	329	30.3442	-97.8408	7	1	1	0	0	0	0	EA	2.493	92.4	23.07	6.226	0.003	6.296	16.11	2.154	mol
elmp	r	330	30.3446	-97.8409	6	2	1	0	0	0	1	EA	2.493	100.0	23.07	6.142	0.003	6.296	3.31	0.693	mol
elmp	r	331	30.3447	-97.8409	8	1	1	0	0	0	0	WE	2.493	97.0	23.07	6.118	0.003	6.278	6.54	0.693	mol
elmp	r	332	30.3447	-97.8409	9	1	1	0	0	0	0	WE	2.493	100.0	23.07	6.118	0.003	6.278	6.54	0.881	mol
elmp	u	299	30.3407	-97.8384	7	0	0	0	0	0	0	WE	2.493	96.1	23.07	6.846	0.003	6.166	10.51	3.191	mol
elmp	u	300	30.3407	-97.8382	4	0	0	0	0	0	0	WE	2.493	98.7	23.07	6.853	0.003	6.127	37.28	3.470	mol
elmp	u	301	30.3405	-97.838	4	0	0	0	0	0	0	WE	2.493	97.4	23.07	6.876	0.003	6.114	53.41	3.580	mol
elmp	u	302	30.3406	-97.8378	5	0	0	0	0	0	0	SO	2.493	100.0	23.07	6.887	0.003	6.042	20.47	4.039	mol
elmp	u	303	30.3407	-97.8377	7	0	0	0	0	0	0	SO	2.493	76.3	23.07	6.868	0.003	6.037	17.06	4.241	mol

elmp	u	304	30.3407	-97.8377	2	0	0	0	0	0	0	SO	2.493	97.3	23.07	6.872	0.003	6.009	17.08	4.346	mol
elmp	u	305	30.3409	-97.8378	5	0	0	0	0	0	0	SO	2.493	98.7	23.07	6.849	0.003	6.029	18.72	4.344	mol
elmp	u	306	30.3409	-97.8378	8	0	0	0	0	0	0	WE	2.493	100.0	23.07	6.845	0.003	6.024	17.69	4.351	mol
elmp	u	307	30.341	-97.838	8	0	0	0	0	0	0	WE	2.493	96.3	23.07	6.821	0.003	6.065	46.33	4.240	mol
elmp	u	308	30.3411	-97.838	8	0	0	0	0	0	0	WE	2.493	100.0	23.07	6.810	0.003	6.060	43.92	4.219	mol
elmp	u	309	30.3413	-97.838	9	0	0	0	0	0	0	WE	2.493	100.0	23.07	6.796	0.003	6.070	40.53	4.120	mol
elmp	u	310	30.3415	-97.838	8	0	0	0	0	0	0	WE	2.493	97.5	23.07	6.775	0.003	6.060	49.69	4.060	mol
elmp	w	311	30.3458	-97.8417	11	1	1	0	0	0	0	SO	2.493	100.0	23.07	5.802	0.003	6.176	29.17	2.862	mol
elmp	w	312	30.3456	-97.8419	11	0	0	0	0	0	0	EA	2.493	94.9	23.07	5.861	0.003	6.151	51.73	2.708	mol
elmp	w	313	30.3454	-97.8419	10	0	0	0	0	0	0	EA	2.493	84.2	23.07	5.916	0.003	6.140	47.00	2.324	mol
elmp	w	314	30.3452	-97.8419	10	0	0	0	0	0	0	EA	2.493	100.0	23.07	5.969	0.003	6.131	53.98	1.657	mol
elmp	w	315	30.3452	-97.8418	11	1	0	1	0	0	0	EA	2.493	100.0	23.07	5.994	0.003	6.151	30.74	0.000	mol
elmp	w	316	30.3452	-97.8418	10	2	1	1	0	0	0	EA	2.493	100.0	23.07	5.994	0.003	6.151	30.74	0.693	mol
elmp	w	317	30.3451	-97.8417	12	1	0	1	0	0	0	EA	2.493	100.0	23.07	5.994	0.003	6.166	28.42	0.000	mol
elmp	w	318	30.3452	-97.8415	11	0	0	0	0	0	0	SO	2.493	100.0	23.07	5.994	0.003	6.186	12.62	2.324	mol

elmp	w	319	30.3447	-97.8409	14	1	0	0	0	0	1	WE	2.493	96.1	23.07	6.120	0.003	6.300	6.54	1.792	mol
elmp	w	320	30.3444	-97.8408	15	1	0	1	0	0	0	EA	2.493	97.5	23.07	6.184	0.003	6.286	8.89	1.386	mol
elmp	w	321	30.3444	-97.8408	10	1	0	1	0	0	0	EA	2.493	83.3	23.07	6.204	0.003	6.300	13.95	1.700	mol
elmp	w	322	30.3444	-97.8408	18	0	0	0	0	0	0	EA	2.493	100.0	23.07	6.207	0.003	6.300	13.95	1.700	mol
foun	r	333	30.1977	-98.081	6	1	1	0	0	0	0	WE	2.797	1.3	30.73	5.565	0.020	4.620	1.02	0.693	mol
foun	r	334	30.1977	-98.0811	8	1	0	1	0	0	0	WE	2.797	44.7	30.73	5.513	0.020	4.511	0.50	1.099	mol
foun	r	335	30.1976	-98.0811	6	0	0	0	0	0	0	WE	2.797	82.3	30.73	5.509	0.020	4.402	1.06	0.000	mol
foun	r	336	30.1975	-98.0814	7	0	0	0	0	0	0	WE	2.797	75.6	30.73	5.456	0.020	4.163	0.77	0.693	mol
foun	r	337	30.1975	-98.0816	5	0	0	0	0	0	0	WE	2.797	36.3	30.73	5.381	0.020	3.932	0.89	1.609	mol
foun	r	338	30.1974	-98.0817	7	1	0	1	0	0	0	WE	2.797	32.9	30.73	5.371	0.020	3.771	1.14	1.792	mol
foun	r	339	30.1973	-98.082	6	1	1	0	0	0	0	WE	2.797	64.6	30.73	5.293	0.020	3.377	1.11	1.099	mol
foun	r	340	30.1973	-98.0821	7	0	0	0	0	0	0	SO	2.797	66.7	30.73	5.258	0.020	3.151	1.08	1.386	mol
foun	r	341	30.1973	-98.0824	7	1	0	0	1	0	0	SO	2.797	100.0	30.73	5.188	0.020	2.717	1.42	0.693	mol
foun	r	342	30.1972	-98.0825	3	0	0	0	0	0	0	SO	2.797	34.6	30.73	5.200	0.020	2.398	1.45	1.609	mol
gade	r	343	30.3266	-97.8493	9	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.949	0.072	5.017	8.79	4.428	inc

gade	r	344	30.3265	-97.8491	9	0	0	0	0	0	0	SO	2.536	100.0	20.73	5.017	0.072	5.106	7.79	4.167	mol
gade	r	345	30.3262	-97.849	9	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.767	0.072	5.053	7.64	3.590	mol
gade	r	346	30.3262	-97.8489	9	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.693	0.072	5.008	7.60	3.388	mol
gade	r	347	30.3262	-97.8488	9	2	1	1	0	0	0	SO	2.536	100.0	20.73	4.693	0.072	5.008	7.60	3.329	mol
gade	r	348	30.3263	-97.8485	10	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.535	0.072	4.909	25.64	2.989	mol
gade	r	349	30.3265	-97.8485	9	1	1	0	0	0	0	EA	2.536	100.0	20.73	4.693	0.072	4.909	26.94	3.353	mol
gade	r	350	30.3265	-97.8485	10	1	0	1	0	0	0	EA	2.536	100.0	20.73	4.644	0.072	4.964	22.53	3.447	mol
gade	r	351	30.3266	-97.8483	11	1	0	1	0	0	0	EA	2.536	100.0	20.73	4.689	0.072	4.978	23.08	3.339	mol
gade	r	352	30.3266	-97.8483	7	1	1	0	0	0	0	EA	2.536	100.0	20.73	4.771	0.072	4.978	23.08	3.355	mol
gade	u	364	30.3255	-97.8492	5	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.615	0.072	4.860	40.79	2.946	mol
gade	u	365	30.3256	-97.8491	5	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.615	0.072	4.839	32.61	2.224	mol
gade	u	366	30.3259	-97.849	8	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.635	0.072	4.878	28.61	2.088	mol
gade	u	367	30.3258	-97.849	5	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.726	0.072	4.906	28.61	2.197	mol
gade	u	368	30.3259	-97.8491	8	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.726	0.072	4.941	37.26	2.518	mol
gade	u	369	30.326	-97.8496	5	0	0	0	0	0	0	EA	2.536	100.0	20.73	5.106	0.072	5.170	27.80	4.171	mol

gade	u	370	30.326	-97.8496	7	0	0	0	0	0	0	EA	2.536	100.0	20.73	5.143	0.072	5.142	27.80	4.261	mol
gade	u	371	30.3261	-97.85	8	0	0	0	0	0	0	EA	2.536	100.0	20.73	5.254	0.072	5.002	18.65	4.643	inc
gade	u	372	30.3262	-97.85	4	0	0	0	0	0	0	EA	2.536	100.0	20.73	5.254	0.072	4.941	14.76	4.727	inc
gade	u	373	30.3262	-97.8501	4	0	0	0	0	0	0	EA	2.536	100.0	20.73	5.205	0.072	4.941	14.76	4.749	inc
gade	w	353	30.3265	-97.8479	8	1	0	1	0	0	0	EA	2.536	100.0	20.73	4.402	0.072	4.726	48.23	2.722	mol
gade	w	354	30.3264	-97.8479	7	1	0	1	0	0	0	EA	2.536	98.8	20.73	4.273	0.072	4.689	48.92	2.758	mol
gade	w	355	30.3264	-97.848	9	1	0	1	0	0	0	EA	2.536	100.0	20.73	4.371	0.072	4.644	53.39	2.250	mol
gade	w	356	30.3263	-97.8481	11	0	0	0	0	0	0	EA	2.536	98.7	20.73	4.301	0.072	4.615	42.40	2.568	mol
gade	w	357	30.3263	-97.8482	8	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.301	0.072	4.615	52.06	2.324	mol
gade	w	358	30.3261	-97.8483	6	1	1	0	0	0	0	EA	2.536	100.0	20.73	4.175	0.072	4.676	50.70	2.384	mol
gade	w	359	30.326	-97.8485	8	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.175	0.072	4.676	46.71	2.389	mol
gade	w	360	30.326	-97.8485	8	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.083	0.072	4.605	46.71	2.736	mol
gade	w	361	30.326	-97.8485	8	0	0	0	0	0	0	SO	2.536	100.0	20.73	4.221	0.072	4.676	34.76	2.642	mol
gade	w	362	30.3257	-97.8489	9	1	0	1	0	0	0	EA	2.536	97.5	20.73	4.453	0.072	4.726	22.58	2.437	mol
gade	w	363	30.3255	-97.8493	5	0	0	0	0	0	0	EA	2.536	100.0	20.73	4.676	0.072	4.920	36.76	3.219	mol

hapo	r	385	30.3458	-98.1317	4	0	0	0	0	0	0	NO	1.957	98.7	11.87	6.507	0.000	6.434	9.68	1.657	mol
hapo	r	386	30.3459	-98.1319	5	0	0	0	0	0	0	NO	1.957	98.7	11.87	6.505	0.000	6.450	5.40	2.088	mol
hapo	r	387	30.3459	-98.1319	2	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.505	0.000	6.450	5.40	2.262	mol
hapo	r	388	30.3459	-98.132	2	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.511	0.000	6.444	5.40	2.297	mol
hapo	r	389	30.3459	-98.132	8	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.497	0.000	6.444	21.50	2.729	mol
hapo	r	390	30.3459	-98.1321	8	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.497	0.000	6.444	21.50	2.787	mol
hapo	r	391	30.346	-98.1321	6	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.504	0.000	6.438	37.23	2.729	mol
hapo	r	392	30.3462	-98.1326	2	0	0	0	0	0	0	NO	1.957	96.1	11.87	6.512	0.000	6.461	36.73	2.736	mol
hapo	r	393	30.3464	-98.1327	4	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.520	0.000	6.481	9.31	2.224	mol
hapo	r	394	30.3464	-98.1327	3	0	0	0	0	0	0	NO	1.957	100.0	11.87	6.520	0.000	6.481	16.62	2.204	mol
hapo	w	374	30.3479	-98.1362	11	0	0	0	0	0	0	NO	1.957	97.5	11.87	6.687	0.000	6.347	35.90	3.294	mol
hapo	w	375	30.3478	-98.1361	5	0	0	0	0	0	0	NO	1.957	91.0	11.87	6.674	0.000	6.365	29.79	3.582	mol
hapo	w	376	30.3478	-98.136	7	0	0	0	0	0	0	NO	1.957	97.1	11.87	6.661	0.000	6.365	32.92	3.624	mol
hapo	w	377	30.3477	-98.1359	8	0	0	0	0	0	0	NO	1.957	93.7	11.87	6.661	0.000	6.382	24.69	3.696	mol
hapo	w	378	30.3477	-98.1357	6	0	0	0	0	0	0	NO	1.957	75.0	11.87	6.661	0.000	6.428	26.58	3.437	mol

hapo	w	379	30.3477	-98.1354	5	0	0	0	0	0	0	NO	1.957	96.2	11.87	6.648	0.000	6.455	15.69	3.503	mol
hapo	w	380	30.3475	-98.1353	8	0	0	0	0	0	0	EA	1.957	72.7	11.87	6.635	0.000	6.452	24.48	3.700	mol
hapo	w	381	30.3475	-98.1352	9	0	0	0	0	0	0	EA	1.957	53.2	11.87	6.622	0.000	6.479	25.11	3.551	mol
hapo	w	382	30.3475	-98.1351	7	0	0	0	0	0	0	EA	1.957	88.4	11.87	6.622	0.000	6.492	29.43	3.403	mol
hapo	w	383	30.3474	-98.135	11	0	0	0	0	0	0	EA	1.957	83.3	11.87	6.609	0.000	6.490	26.62	3.425	mol
hapo	w	384	30.347	-98.1348	11	0	0	0	0	0	0	EA	1.957	19.2	11.87	6.555	0.000	6.458	36.33	3.762	mol
june	u	395	30.4772	-97.9625	4	0	0	0	0	0	0	SO	2.293	84.6	15.00	5.811	0.020	5.883	37.88	5.720	inc
june	u	396	30.477	-97.9624	5	0	0	0	0	0	0	SO	2.293	21.5	15.00	5.742	0.020	5.827	17.77	5.667	inc
june	u	397	30.4771	-97.9623	4	0	0	0	0	0	0	SO	2.293	88.6	15.00	5.725	0.020	5.820	25.65	5.669	inc
june	u	398	30.477	-97.9622	4	0	0	0	0	0	0	SO	2.293	55.8	15.00	5.708	0.020	5.778	16.18	5.647	inc
june	u	399	30.4769	-97.9621	1	0	0	0	0	0	0	SO	2.293	45.5	15.00	5.679	0.020	5.734	13.67	5.600	inc
june	u	400	30.4769	-97.9619	4	0	0	0	0	0	0	SO	2.293	0.0	15.00	5.596	0.020	5.680	13.40	5.587	inc
june	u	401	30.477	-97.9618	3	0	0	0	0	0	0	SO	2.293	88.2	15.00	5.624	0.020	5.676	12.54	5.628	inc
june	u	402	30.4769	-97.9616	5	0	0	0	0	0	0	EA	2.293	1.3	15.00	5.543	0.020	5.599	8.96	5.614	inc
june	u	403	30.4771	-97.9616	5	0	0	0	0	0	0	SO	2.293	71.1	15.00	5.580	0.020	5.648	15.93	5.668	inc

june	u	404	30.4771	-97.9615	3	0	0	0	0	0	0	SO	2.293	89.7	15.00	5.545	0.020	5.624	14.07	5.682	inc
june	u	405	30.4771	-97.9613	4	0	0	0	0	0	0	SO	2.293	32.1	15.00	5.473	0.020	5.571	11.53	5.692	inc
june	u	406	30.4771	-97.9612	6	0	0	0	0	0	0	SO	2.293	57.1	15.00	5.435	0.020	5.543	11.19	5.705	inc
lbjp	r	407	30.2745	-98.4132	8	4	1	1	1	1	0	SO	4.905	96.2	51.00	4.875	0.070	4.826	6.66	3.103	mol
lbjp	r	408	30.2745	-98.413	7	2	1	0	0	1	0	EA	4.905	100.0	51.00	4.710	0.070	4.658	1.67	1.386	mol
lbjp	r	409	30.2745	-98.4129	9	2	1	0	1	0	0	NO	4.905	98.7	51.00	4.615	0.070	4.563	12.11	0.881	mol
lbjp	r	410	30.2746	-98.4129	5	3	1	0	1	1	0	NO	4.905	96.1	51.00	4.511	0.070	4.424	1.96	0.693	mol
lbjp	r	411	30.2751	-98.4128	4	3	1	0	1	1	0	SO	4.905	100.0	51.00	4.371	0.070	4.263	1.37	2.500	mol
lbjp	r	412	30.2751	-98.4127	5	3	1	1	0	1	0	EA	4.905	96.8	51.00	4.371	0.070	4.263	1.42	1.792	mol
lbjp	r	413	30.2751	-98.4126	6	3	1	1	0	1	0	EA	4.905	98.2	51.00	4.292	0.070	4.111	4.85	1.792	mol
lbjp	r	414	30.2751	-98.4126	6	3	1	1	0	1	0	EA	4.905	100.0	51.00	4.292	0.070	4.111	4.85	1.700	mol
lbjp	r	415	30.2751	-98.4126	9	3	1	0	1	1	0	NO	4.905	100.0	51.00	4.175	0.070	3.932	4.04	0.693	mol
lbjp	r	416	30.2752	-98.4126	8	3	1	0	1	1	0	EA	4.905	100.0	51.00	3.932	0.070	3.932	4.45	1.386	mol
pede	r	417	30.3111	-98.2391	4	0	0	0	0	0	0	NO	2.008	0.0	17.33	7.878	0.002	7.263	2.86	2.105	ent
pede	r	418	30.3111	-98.2389	4	0	0	0	0	0	0	WE	2.008	37.0	17.33	7.875	0.002	7.268	1.35	2.324	ent

pede	r	419	30.3113	-98.2388	3	0	0	0	0	0	0	WE	2.008	5.1	17.33	7.879	0.002	7.272	1.62	0.693	ent
pede	r	420	30.3112	-98.2388	4	0	0	0	0	0	0	NO	2.008	80.0	17.33	7.876	0.002	7.272	1.61	1.792	ent
pede	r	421	30.3113	-98.2387	5	0	0	0	0	0	0	WE	2.008	2.6	17.33	7.874	0.002	7.283	1.95	1.174	ent
pede	r	422	30.3113	-98.2385	6	0	0	0	0	0	0	NO	2.008	67.1	17.33	7.872	0.002	7.290	0.83	2.568	ent
pede	r	423	30.3114	-98.2383	5	0	0	0	0	0	0	WE	2.008	98.7	17.33	7.873	0.002	7.300	5.96	2.568	ent
pede	r	424	30.3115	-98.238	4	0	0	0	0	0	0	NO	2.008	71.8	17.33	7.869	0.002	7.317	12.10	2.736	ent
pede	r	425	30.3116	-98.2379	3	0	0	0	0	0	0	NO	2.008	82.5	17.33	7.870	0.002	7.322	8.55	2.605	ent
pede	r	426	30.312	-98.2373	3	0	0	0	0	0	0	NO	2.008	97.4	17.33	7.871	0.002	7.350	8.01	2.764	ent
pede	u	438	30.3346	-98.2528	9	0	0	0	0	0	0	NO	2.008	94.9	17.33	8.087	0.002	4.860	7.52	5.898	alf
pede	u	439	30.3348	-98.2529	8	0	0	0	0	0	0	EA	2.008	97.5	17.33	8.088	0.002	5.017	9.33	5.914	alf
pede	u	440	30.3349	-98.2529	6	0	0	0	0	0	0	EA	2.008	93.2	17.33	8.090	0.002	5.070	9.18	5.906	alf
pede	u	441	30.3349	-98.2531	4	0	0	0	0	0	0	EA	2.008	92.3	17.33	8.094	0.002	5.143	5.58	5.925	alf
pede	u	442	30.3351	-98.253	6	0	0	0	0	0	0	NO	2.008	100.0	17.33	8.089	0.002	5.245	7.07	5.849	alf
pede	u	443	30.3354	-98.2528	2	0	0	0	0	0	0	NO	2.008	92.1	17.33	8.084	0.002	5.288	9.09	5.748	alf
pede	u	444	30.3354	-98.2528	3	0	0	0	0	0	0	NO	2.008	91.5	17.33	8.080	0.002	5.333	7.27	5.731	alf

pede	u	445	30.3356	-98.2527	4	0	0	0	0	0	0	NO	2.008	81.8	17.33	8.076	0.002	5.404	12.69	5.662	alf
pede	u	446	30.3358	-98.2523	4	0	0	0	0	0	0	EA	2.008	84.4	17.33	8.062	0.002	5.493	4.78	5.490	alf
pede	u	447	30.3359	-98.2521	6	0	0	0	0	0	0	NO	2.008	64.5	17.33	8.058	0.002	5.529	5.44	5.435	alf
pede	u	448	30.3361	-98.252	3	0	0	0	0	0	0	NO	2.008	78.2	17.33	8.051	0.002	5.565	6.54	5.345	alf
pede	u	449	30.3361	-98.2513	4	0	0	0	0	0	0	NO	2.008	44.3	17.33	8.032	0.002	5.590	4.53	5.224	alf
pede	w	427	30.3106	-98.2388	3	0	0	0	0	0	0	NO	2.008	74.1	17.33	7.858	0.002	7.288	49.55	4.196	mol
pede	w	428	30.3105	-98.2391	7	0	0	0	0	0	0	NO	2.008	89.3	17.33	7.862	0.002	7.270	58.12	4.177	mol
pede	w	429	30.3104	-98.2393	9	0	0	0	0	0	0	NO	2.008	87.2	17.33	7.864	0.002	7.259	60.36	4.288	mol
pede	w	430	30.3103	-98.2395	8	0	0	0	0	0	0	NO	2.008	81.0	17.33	7.867	0.002	7.248	57.94	4.333	mol
pede	w	431	30.3102	-98.2399	7	0	0	0	0	0	0	NO	2.008	87.3	17.33	7.868	0.002	7.232	57.29	4.459	mol
pede	w	432	30.3102	-98.2402	5	0	0	0	0	0	0	NO	2.008	93.8	17.33	7.872	0.002	7.212	44.14	4.404	mol
pede	w	433	30.3101	-98.2403	9	0	0	0	0	0	0	WE	2.008	82.3	17.33	7.875	0.002	7.207	26.79	4.427	mol
pede	w	434	30.3101	-98.2404	9	0	0	0	0	0	0	NO	2.008	98.7	17.33	7.877	0.002	7.198	24.33	4.371	mol
pede	w	435	30.3101	-98.2405	9	0	0	0	0	0	0	NO	2.008	92.3	17.33	7.879	0.002	7.191	27.51	4.330	mol
pede	w	436	30.31	-98.2407	9	0	0	0	0	0	0	NO	2.008	87.0	17.33	7.881	0.002	7.182	38.00	4.404	mol

pede	w	437	30.3101	-98.2408	8	0	0	0	0	0	0	NO	2.008	93.6	17.33	7.884	0.002	7.172	25.79	4.326	mol
priv	r	462	30.482	-97.9011	10	0	0	0	0	0	0	SO	2.166	68.4	17.87	5.428	0.021	5.461	14.57	0.881	mol
priv	r	463	30.4819	-97.901	8	0	0	0	0	0	0	NO	2.166	64.6	17.87	5.333	0.021	5.399	2.02	0.000	mol
priv	r	464	30.4818	-97.901	11	0	0	0	0	0	0	SO	2.166	80.6	17.87	5.333	0.021	5.364	3.44	1.342	mol
priv	r	465	30.4817	-97.9009	13	0	0	0	0	0	0	SO	2.166	39.2	17.87	5.263	0.021	5.296	5.38	2.176	mol
priv	r	466	30.4817	-97.9008	10	1	0	0	1	0	0	NO	2.166	0.0	17.87	5.188	0.021	5.222	8.13	2.105	mol
priv	r	467	30.4816	-97.9006	4	0	0	0	0	0	0	SO	2.166	41.0	17.87	5.106	0.021	5.106	8.16	1.792	mol
priv	r	468	30.4814	-97.9006	7	0	0	0	0	0	0	EA	2.166	88.3	17.87	4.964	0.021	5.058	8.48	1.700	mol
priv	r	469	30.4814	-97.9005	8	1	0	0	1	0	0	WE	2.166	60.7	17.87	4.920	0.021	4.964	7.08	1.342	mol
priv	r	470	30.4809	-97.9005	8	0	0	0	0	0	0	EA	2.166	19.5	17.87	4.615	0.021	4.676	10.11	1.634	mol
priv	r	471	30.4808	-97.9005	10	0	0	0	0	0	0	SO	2.166	83.3	17.87	4.505	0.021	4.557	3.78	2.324	mol
priv	u	450	30.4854	-97.8921	6	0	0	0	0	0	0	SO	2.166	67.9	17.87	4.466	0.021	4.005	18.92	5.954	inc
priv	u	451	30.4854	-97.8921	3	0	0	0	0	0	0	EA	2.166	9.1	17.87	4.535	0.021	4.083	16.06	5.969	inc
priv	u	452	30.4852	-97.8922	8	0	0	0	0	0	0	EA	2.166	85.7	17.87	4.615	0.021	4.083	11.49	5.948	inc
priv	u	453	30.4851	-97.8924	5	0	0	0	0	0	0	EA	2.166	85.0	17.87	4.635	0.021	4.005	12.24	5.903	inc

priv	u	454	30.4849	-97.8923	3	0	0	0	0	0	0	EA	2.166	94.8	17.87	4.620	0.021	4.175	9.75	5.852	inc
priv	u	455	30.4848	-97.8923	4	0	0	0	0	0	0	EA	2.166	58.2	17.87	4.615	0.021	4.273	10.60	5.826	inc
priv	u	456	30.4848	-97.8924	2	0	0	0	0	0	0	SO	2.166	94.8	17.87	4.511	0.021	4.175	10.94	5.829	inc
priv	u	457	30.4845	-97.8924	1	0	0	0	0	0	0	EA	2.166	38.0	17.87	4.535	0.021	4.535	9.31	5.701	inc
priv	u	458	30.4844	-97.8926	4	0	0	0	0	0	0	SO	2.166	98.7	17.87	4.346	0.021	4.505	8.38	5.666	inc
priv	u	459	30.4842	-97.8926	2	0	0	0	0	0	0	SO	2.166	13.6	17.87	4.466	0.021	4.535	10.63	5.603	inc
priv	u	460	30.4842	-97.8927	2	0	0	0	0	0	0	SO	2.166	58.1	17.87	4.466	0.021	4.535	10.63	5.594	inc
priv	u	461	30.4842	-97.8927	2	0	0	0	0	0	0	SO	2.166	92.3	17.87	4.371	0.021	4.453	8.29	5.600	inc
shie	r	472	30.2642	-97.9933	4	0	0	0	0	0	0	WE	2.140	55.8	21.67	7.633	0.000	7.346	5.21	4.038	mol
shie	r	473	30.2642	-97.9934	5	0	0	0	0	0	0	WE	2.140	83.8	21.67	7.637	0.000	7.345	5.89	4.143	mol
shie	r	474	30.2643	-97.9936	7	0	0	0	0	0	0	WE	2.140	94.9	21.67	7.640	0.000	7.349	4.45	4.174	mol
shie	r	475	30.2643	-97.9937	4	0	0	0	0	0	0	WE	2.140	19.3	21.67	7.635	0.000	7.349	4.59	4.159	mol
shie	r	476	30.2643	-97.9937	5	0	0	0	0	0	0	WE	2.140	0.0	21.67	7.640	0.000	7.349	4.59	4.174	mol
shie	r	477	30.2645	-97.994	4	0	0	0	0	0	0	WE	2.140	79.7	21.67	7.647	0.000	7.358	5.47	4.470	mol
shie	r	478	30.2644	-97.9942	5	0	0	0	0	0	0	WE	2.140	68.4	21.67	7.642	0.000	7.357	8.05	4.401	mol

shie	r	479	30.2645	-97.9942	2	0	0	0	0	0	0	WE	2.140	20.0	21.67	7.646	0.000	7.362	6.89	4.475	mol
shie	r	480	30.2645	-97.9943	3	0	0	0	0	0	0	WE	2.140	20.4	21.67	7.646	0.000	7.356	9.01	4.406	mol
shie	r	481	30.2646	-97.9945	7	1	0	0	0	0	1	WE	2.140	73.1	21.67	7.650	0.000	7.367	7.90	4.464	mol
shie	r	482	30.2646	-97.9945	2	0	0	0	0	0	0	WE	2.140	100.0	21.67	7.650	0.000	7.367	7.90	4.419	mol
shie	u	493	30.2642	-97.9942	8	0	0	0	0	0	0	WE	2.140	100.0	21.67	7.628	0.000	7.337	15.63	4.012	mol
shie	u	494	30.2632	-97.9926	3	0	0	0	0	0	0	NO	2.140	17.5	21.67	7.591	0.000	7.287	5.05	1.342	mol
shie	u	495	30.2633	-97.9929	3	0	0	0	0	0	0	NO	2.140	21.3	21.67	7.593	0.000	7.295	7.06	2.398	ent
shie	u	496	30.2635	-97.9932	4	0	0	0	0	0	0	SO	2.140	9.1	21.67	7.600	0.000	7.297	8.33	2.571	ent
shie	u	497	30.2636	-97.9935	3	0	0	0	0	0	0	SO	2.140	5.2	21.67	7.603	0.000	7.300	18.47	2.518	ent
shie	u	498	30.2638	-97.9935	7	0	0	0	0	0	0	SO	2.140	100.0	21.67	7.612	0.000	7.312	40.90	2.197	ent
shie	u	499	30.2638	-97.9937	6	0	0	0	0	0	0	SO	2.140	96.2	21.67	7.611	0.000	7.310	40.86	2.197	ent
shie	u	500	30.2638	-97.9937	3	0	0	0	0	0	0	SO	2.140	86.0	21.67	7.610	0.000	7.309	40.58	2.197	ent
shie	u	501	30.2638	-97.9939	5	0	0	0	0	0	0	SO	2.140	86.1	21.67	7.610	0.000	7.308	36.67	2.398	ent
shie	u	502	30.2638	-97.9939	4	0	0	0	0	0	0	SO	2.140	77.9	21.67	7.614	0.000	7.313	40.91	2.773	ent
shie	u	503	30.2638	-97.994	4	0	0	0	0	0	0	SO	2.140	41.3	21.67	7.609	0.000	7.312	42.66	2.639	ent

shie	u	504	30.2638	-97.9941	6	0	0	0	0	0	0	SO	2.140	25.0	21.67	7.613	0.000	7.312	40.88	2.890	ent
shie	w	483	30.2646	-97.9946	5	0	0	0	0	0	0	WE	2.140	72.7	21.67	7.650	0.000	7.360	9.22	4.302	mol
shie	w	484	30.2635	-97.9927	5	0	0	0	0	0	0	SO	2.140	63.3	21.67	7.604	0.000	7.303	30.82	2.500	mol
shie	w	485	30.2635	-97.9927	8	0	0	0	0	0	0	SO	2.140	80.8	21.67	7.604	0.000	7.310	20.53	2.668	mol
shie	w	486	30.2637	-97.993	7	0	0	0	0	0	0	SO	2.140	94.9	21.67	7.611	0.000	7.313	59.76	2.605	mol
shie	w	487	30.2637	-97.9932	9	0	0	0	0	0	0	SO	2.140	93.7	21.67	7.609	0.000	7.315	57.27	2.500	mol
shie	w	488	30.2639	-97.9935	6	0	0	0	0	0	0	SO	2.140	96.2	21.67	7.617	0.000	7.319	43.35	3.086	mol
shie	w	489	30.2639	-97.9936	6	0	0	0	0	0	0	SO	2.140	100.0	21.67	7.617	0.000	7.325	34.80	3.182	mol
shie	w	490	30.2639	-97.9937	6	0	0	0	0	0	0	SO	2.140	100.0	21.67	7.616	0.000	7.323	31.99	3.135	mol
shie	w	491	30.264	-97.9938	7	0	0	0	0	0	0	SO	2.140	91.1	21.67	7.620	0.000	7.329	20.84	3.497	mol
shie	w	492	30.2641	-97.9939	11	0	0	0	0	0	0	SO	2.140	100.0	21.67	7.624	0.000	7.334	14.70	3.761	mol
sted	r	529	30.4042	-97.7905	13	1	0	0	1	0	0	NO	2.169	58.6	29.93	6.525	0.052	5.258	19.99	3.330	mol
sted	r	530	30.4042	-97.7905	11	1	0	0	1	0	0	NO	2.169	84.0	29.93	6.525	0.052	5.265	19.99	3.348	mol
sted	r	531	30.4042	-97.7907	10	1	0	0	1	0	0	NO	2.169	67.9	29.93	6.539	0.052	5.274	24.17	3.160	mol
sted	r	532	30.4042	-97.7907	6	1	0	0	1	0	0	NO	2.169	98.5	29.93	6.554	0.052	5.323	25.52	3.397	mol

sted	r	533	30.4042	-97.7908	4	1	0	0	1	0	0	NO	2.169	88.9	29.93	6.554	0.052	5.333	35.28	3.364	mol
sted	r	534	30.4042	-97.7909	6	1	0	0	1	0	0	NO	2.169	94.8	29.93	6.568	0.052	5.346	40.30	3.355	mol
sted	r	535	30.4041	-97.7909	7	1	0	0	1	0	0	NO	2.169	100.0	29.93	6.568	0.052	5.346	40.30	3.373	mol
sted	r	536	30.4042	-97.7911	14	1	0	0	1	0	0	NO	2.169	100.0	29.93	6.596	0.052	5.377	48.27	3.258	mol
sted	r	537	30.4041	-97.7919	11	0	0	0	0	0	0	NO	2.169	100.0	29.93	6.700	0.052	5.550	79.32	3.091	mol
sted	r	538	30.4041	-97.792	7	0	0	0	0	0	0	NO	2.169	100.0	29.93	6.712	0.052	5.603	59.00	3.178	mol
sted	r	539	30.4041	-97.7923	8	0	0	0	0	0	0	NO	2.169	100.0	29.93	6.736	0.052	5.650	61.54	3.219	mol
sted	r	540	30.404	-97.7924	8	0	0	0	0	0	0	NO	2.169	100.0	29.93	6.749	0.052	5.673	61.18	3.296	mol
sted	u	505	30.4044	-97.7929	4	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.815	0.052	5.707	0.87	2.437	mol
sted	u	506	30.4045	-97.7928	6	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.792	0.052	5.680	3.47	3.046	mol
sted	u	507	30.4045	-97.7927	7	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.792	0.052	5.680	4.00	3.108	mol
sted	u	508	30.4045	-97.7926	9	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.770	0.052	5.626	4.30	3.091	mol
sted	u	509	30.4045	-97.7923	10	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.746	0.052	5.545	4.88	3.170	mol
sted	u	510	30.4046	-97.7922	10	0	0	0	0	0	0	SO	2.169	96.2	29.93	6.735	0.052	5.488	5.27	3.415	mol
sted	u	511	30.4045	-97.7922	10	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.735	0.052	5.516	3.78	3.045	mol

sted	u	512	30.4044	-97.7922	12	0	0	0	0	0	0	NO	2.169	100.0	29.93	6.735	0.052	5.543	16.28	2.350	mol
sted	u	513	30.4047	-97.7922	9	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.723	0.052	5.428	1.04	3.714	mol
sted	u	514	30.4045	-97.7921	6	0	0	0	0	0	0	SO	2.169	88.5	29.93	6.723	0.052	5.487	5.20	3.108	mol
sted	u	515	30.4046	-97.7919	10	0	0	0	0	0	0	SO	2.169	89.9	29.93	6.698	0.052	5.395	3.12	3.332	mol
sted	u	516	30.4047	-97.7915	13	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.648	0.052	5.222	3.93	3.643	mol
sted	w	517	30.4047	-97.7915	8	2	0	0	1	1	0	SO	2.169	87.3	29.93	6.635	0.052	5.188	2.95	3.537	mol
sted	w	518	30.4047	-97.7914	8	0	0	0	0	0	0	SO	2.169	96.0	29.93	6.635	0.052	5.188	2.95	3.584	mol
sted	w	519	30.4047	-97.7911	11	0	0	0	0	0	0	SO	2.169	100.0	29.93	6.594	0.052	5.035	2.50	3.685	mol
sted	w	520	30.4047	-97.7909	9	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.567	0.052	5.032	1.29	3.389	mol
sted	w	521	30.4048	-97.7909	6	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.567	0.052	4.971	1.80	3.596	mol
sted	w	522	30.4047	-97.7909	12	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.567	0.052	5.032	1.26	3.373	mol
sted	w	523	30.4047	-97.7908	8	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.567	0.052	5.032	1.29	3.382	mol
sted	w	524	30.4048	-97.7906	7	0	0	0	0	0	0	EA	2.169	98.7	29.93	6.538	0.052	4.901	1.13	3.576	mol
sted	w	525	30.4049	-97.7904	10	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.509	0.052	4.726	4.02	3.800	mol
sted	w	526	30.4049	-97.7903	8	0	0	0	0	0	0	EA	2.169	100.0	29.93	6.494	0.052	4.799	3.49	3.640	mol

sted	w	527	30.405	-97.79	8	1	0	0	0	0	1	EA	2.169	100.0	29.93	6.431	0.052	4.535	6.66	3.778	mol
sted	w	528	30.4043	-97.7905	9	0	0	0	0	0	0	NO	2.169	55.1	29.93	6.510	0.052	5.205	40.41	3.151	mol
wall	r	541	30.2854	-97.734	5	1	1	0	0	0	0	WE	5.159	82.1	76.53	0.000	0.082	2.398	9.62	1.527	mol
wall	r	542	30.2852	-97.7342	4	1	1	0	0	0	0	SO	5.159	91.3	76.53	0.000	0.082	3.045	3.70	1.174	mol
wall	r	543	30.285	-97.7346	4	2	1	0	0	0	0	SO	5.159	30.9	76.53	2.398	0.082	3.434	7.72	1.921	mol
wall	r	544	30.2849	-97.7347	10	3	1	1	0	0	1	SO	5.159	61.3	76.53	0.000	0.082	4.005	6.96	0.881	mol
wall	r	545	30.2846	-97.7348	6	2	1	0	0	0	1	WE	5.159	94.9	76.53	3.434	0.082	4.459	4.55	2.500	mol
wall	r	546	30.2842	-97.735	3	2	1	0	0	0	1	EA	5.159	100.0	76.53	3.434	0.082	4.535	16.23	0.693	mol
wall	r	547	30.284	-97.7348	10	1	1	0	0	0	0	EA	5.159	100.0	76.53	3.377	0.082	4.263	10.92	0.000	mol
wall	r	548	30.2839	-97.7347	6	1	1	0	0	0	0	WE	5.159	100.0	76.53	2.398	0.082	4.111	6.87	1.609	mol
wall	r	549	30.2836	-97.7346	4	4	1	1	0	0	0	SO	5.159	100.0	76.53	3.045	0.082	3.485	4.89	0.693	mol
wall	r	550	30.2835	-97.7346	6	2	1	1	0	0	0	EA	5.159	93.5	76.53	3.151	0.082	3.151	6.29	1.426	mol

Variable	Explanation	Measured
site	site code	
	code	**meaning**
	alex	Alexander's property - private
	basa	Baker Sanctuary
	bcgb	Barton Creek Greenbelt
	bchp	Barton Creek Habitat Preserve
	bcwp	Barton Creek Wilderness Park
	blan	Blanco State Park
	blue	The Blue Hole
	bucr	Bull Creek Greenbelt
	char	Charro Ranch
	cofo	Commons Ford Metro. Park
	cold	Coldwater creek – private property
	elmp	Emma Long Metro. Park
	foun	Founder's Memorial Park
	gade	Gaderson's property - private
	hapo	Hamilton Pool
	june	June's property - private
	lbjp	LBJ National Historical Park
	pede	Pedernales Falls State Park
	shie	Shield Ranch – private property
	sted	St. Edwards Park
	wall	Waller Creek
community	community type a plot was located in	
	code	**meaning**
	r	streamside woodland
	u	upland woodland
	w	mesic woodland
join	unique numerical identifier of plot	
lat	latitude north	7 sigfig, NAD 1983 UTM, meters
lon	longitude west	7 sigfig, NAD 1983 UTM, meters
numspn	number of native species in plot	count of number of native woody species in plot
numspe	number of exotic species in plot	count of the number of non-native woody species in plot
lilu	*Ligustrum lucidum*	0 is absent, 1 is present in plot
nado	*Nandina domestica*	0 is absent, 1 is present in plot
loja	*Lonicera japonica*	0 is absent, 1 is present in plot
lisi	*Ligustrum sinsense*	0 is absent, 1 is present in plot

meaz	*Melia azedarach*	0 is absent, 1 is present in plot
aspect	direction slope was facing in plot	calculated using topographic maps in ArcGIS
	code	**meaning**
	NO	north, 315-45 compass degrees
	SO	south, 135-225 compass degrees
	EA	east, 45-135 compass degrees
	WE	west, 225-315 compass degrees
cityage	age of city, site-level value	ages of cities weighted by distances from site to all cities, transformed with natural logarithm, rounded to 3 decimals
cover	overstory canopy cover in plot	percentage based on aerial photographs, rounded to 1 decimal
devage	age of development, site level	average of 15 residential or commercial homes, county records, rounded to 2 decimals
devdist	distance to development from plot	meters to nearest in ArcGIS, transformed with the natural logarithm, rounded to 3 decimals
roaddens	road density, site level	average from all plots in site, length of road in 500m radius circle around plot center in ArcGIS, rounded to 3 decimals
roaddist	distance to road from plot	meters to nearest in ArcGIS, transformed with the natural logarithm, rounded to 3 decimals
slope	percentage slope in plot	calculated in ArcGIS from topographic maps, rounded to 2 decimals
streamdist	distance to nearest stream center	calculated in meters in ArcGIS, transformed with the natural logarithm, rounded to 3 decimals
soilorder	soil type (order) in plot	used digitized maps in ArcGIS
	code	**meaning**
	ent	entisol
	inc	inceptisol
	mol	mollisol
	alf	alfisol

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