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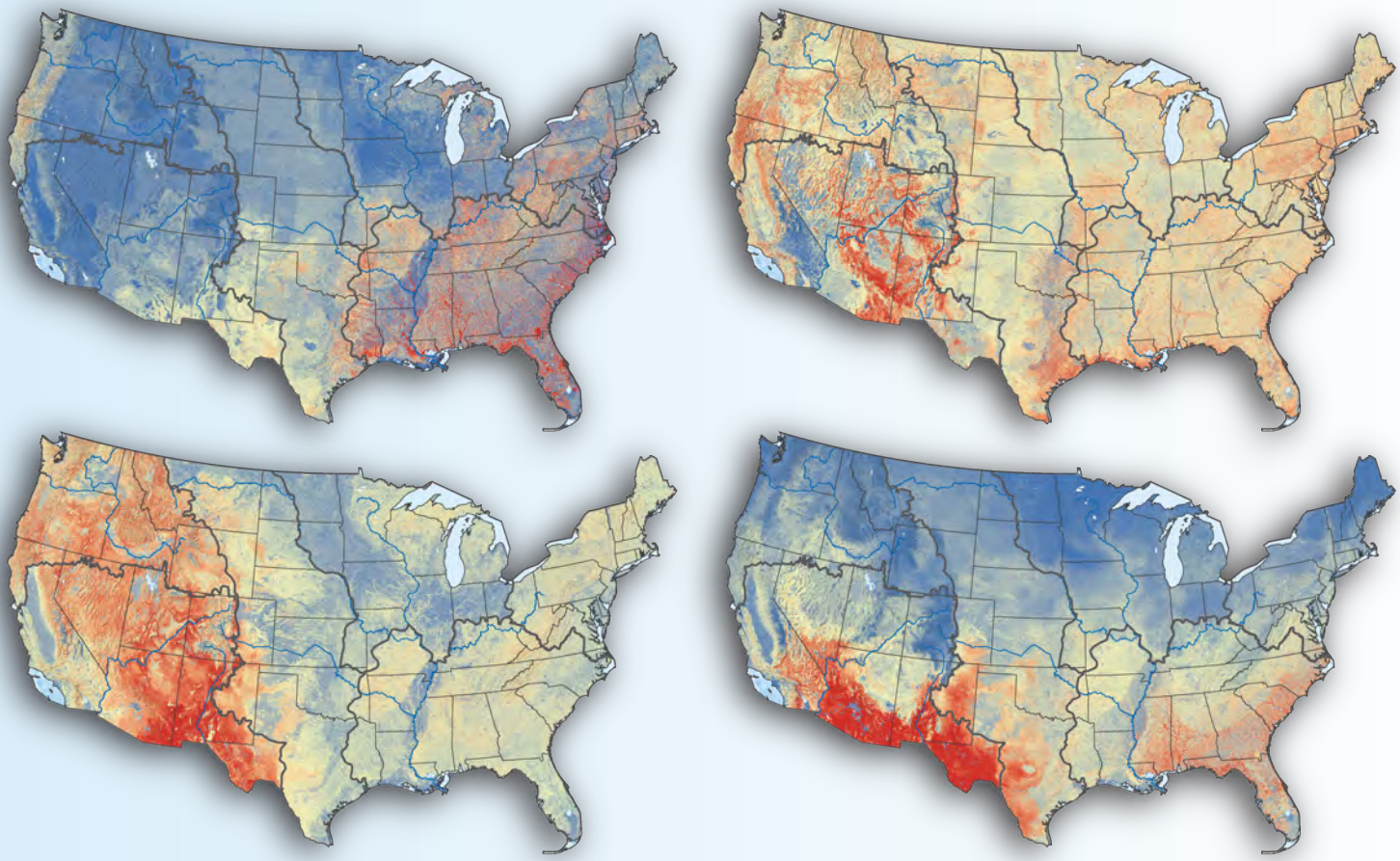
Gap Analysis Project (GAP) Terrestrial Vertebrate Species Richness Maps for the Conterminous U.S.



Scientific Investigations Report 2019–5034

U.S. Department of the Interior
U.S. Geological Survey

Cover. Mosaic of amphibian, bird, mammal, and reptile species richness maps derived from species' habitat distribution models of the conterminous United States.

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DAVID BERNHARDT, Secretary

U.S. Geological Survey
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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Area	
acre	4,047	square meter (m^2)
acre	0.4047	hectare (ha)
acre	0.4047	square hectometer (hm^2)
acre	0.004047	square kilometer (km^2)
square mile (mi^2)	259.0	hectare (ha)
section (640 acres or 1 square mile)	259.0	square hectometer (hm^2)

Conversion Factors—Continued

International System of Units to U.S. customary units

Multiply	By	To obtain
	Length	
meter (m)	3.281	foot (ft)
	Area	
square meter (m^2)	0.0002471	acre
hectare (ha)	2.471	acre
square hectometer (hm^2)	2.471	acre
square kilometer (km^2)	247.1	acre
square meter (m^2)	10.76	square foot (ft^2)
square hectometer (hm^2)	0.003861	section (640 acres or 1 square mile)
hectare (ha)	0.003861	square mile (mi^2)

Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83), using the Geodetic Reference System 1980 (GRS 80).

Elevation, as used in this report, refers to distance above sea level.

Supplemental Information

Note to USGS users: Use of hectare (ha) as an alternative name for square hectometer (hm^2) is restricted to the measurement of small land or water areas.

Gap Analysis Project (GAP) Terrestrial Vertebrate Species Richness Maps for the Conterminous U.S.

Kevin J. Gergely,[1] Kenneth G. Boykin,[2] Alexa J. McKerrow,[1] Matthew J. Rubino,[3] Nathan M. Tarr,[3] and Steven G. Williams[3]

Abstract

The mission of the Gap Analysis Project (GAP) is to support national and regional assessments of the conservation status of vertebrate species and plant communities. This report explains conterminous United States species richness maps created by the U.S. Geological Survey for four major classes in the phylum Chordata: mammals, birds, reptiles, and amphibians. In this work, we focus on terrestrial vertebrate species and the spatial patterns of richness derived from species' habitat distribution models. We created species' habitat distribution models for 1,590 species (282 amphibians, 621 birds, 365 mammals, 322 reptiles) and an additional 129 subspecies (2 amphibians, 28 birds, 94 mammals, 5 reptiles) that occur in the conterminous United States. The 1,590 species level models were spatially combined to create the taxa richness maps at a spatial resolution of 30 meters. Based on those maps we identified the maximum species richness for each of the taxa (43 amphibians, 163 birds, 72 mammals, and 54 reptiles) and show variation in richness across the conterminous United States. Because these habitat models remove unsuitable areas within the range of the species, the patterns of richness presented here are different from the coarse-resolution species' habitat distribution models commonly presented in the literature. These maps provide a new, more spatially refined richness map. In addition, since these models are logically linked to mapped data layers that constitute habitat suitability, this suite of data can provide an intuitive data system for further exploration of biodiversity and implications for change at ecosystem and landscape scales.

Introduction

A simple definition of biodiversity is the variety of life on the planet (Ryan, 1992). Historically, many United States' (U.S.) agencies have worked to maintain biodiversity through habitat improvement activities related to specific wildlife population goals. Maintaining biodiversity has been established as a socially accepted goal through legislation such as the Endangered Species Act (ESA; 16 U.S.C. § 1531 et seq.) that maintains biodiversity by protecting species that are moving towards extinction. Focus of the Gap Analysis Project (GAP) is broad and includes all terrestrial vertebrates in the U.S. that occupy habitat in summer, winter, or year-round. Through this effort the U.S. Geological Survey (USGS) contributes a biodiversity measure to the other major Earth science datasets developed by the USGS, such as those for hydrography and geology.

Specifically, the mission of the GAP is

> To provide state, regional, and national biodiversity assessments of the conservation status of native vertebrate species, aquatic species, and natural land cover types and to facilitate the application of this information to land management activities. Species and habitat distribution models are used to conduct a biodiversity assessment for species across the U.S. The goal of GAP is to keep common species common by identifying species and plant communities that are not adequately represented in the existing conservation lands network. By providing these data, land managers and policy makers can make better-informed decisions when identifying priority areas for conservation (https://gapanalysis.usgs.gov/about-gap/mission/).

GAP data are used to assess the status of biodiversity in the U.S. by mapping where species' habitats exist and to evaluate the likelihood of persistence of those habitats. The most common analysis is to perform a "gap analysis" or to evaluate where the system of protected areas in the U.S. provides inadequate habitat coverage for a species or group of species. Vertebrate diversity has been the ongoing focus of analysis for GAP, with the assumption that, although lacking sufficient

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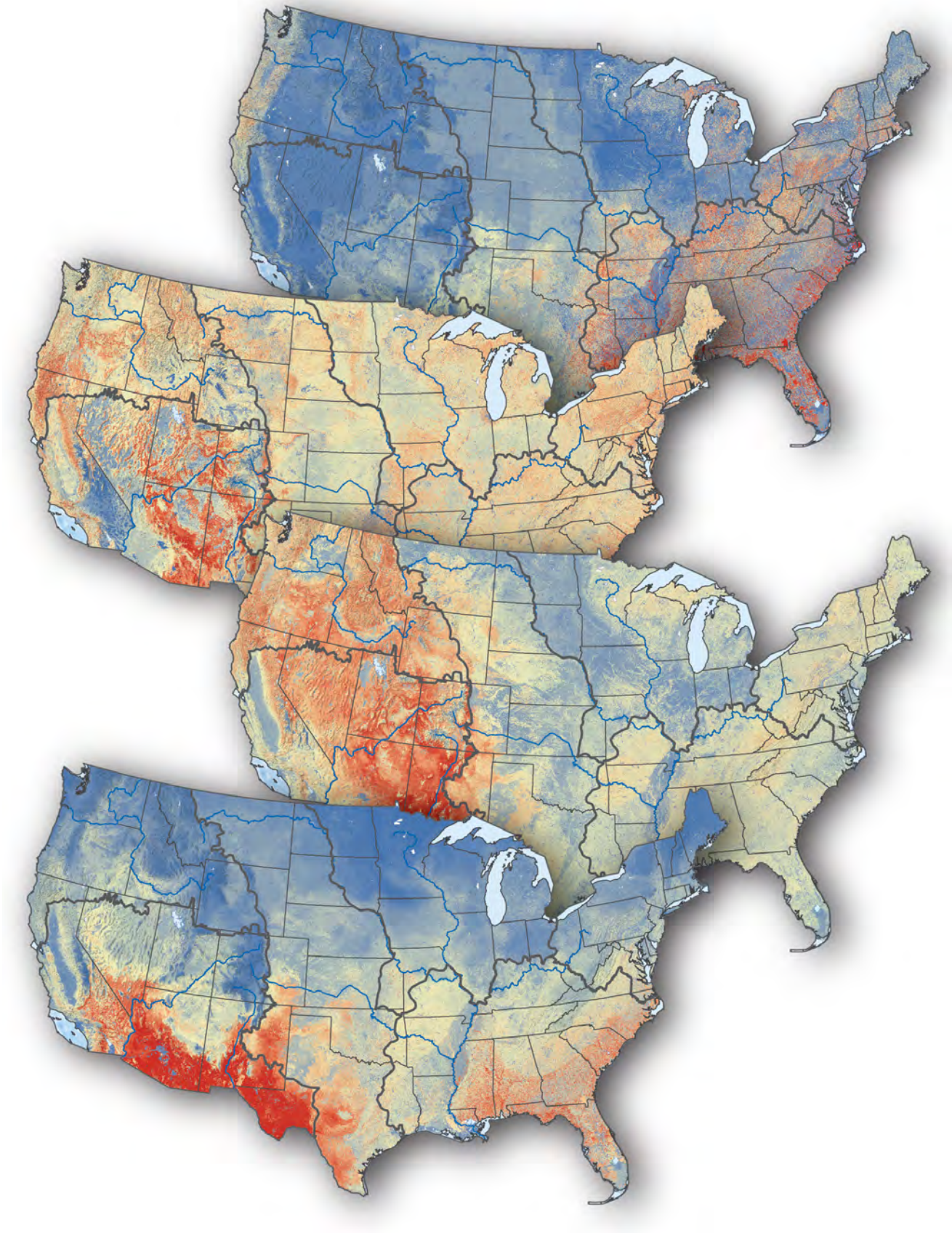
data, vertebrates and their associated habitats are a reasonable measure of biodiversity because these species are responding to landscape level variation in vegetation and environmental conditions at a resolution that is meaningful for management and can serve as a coarse-filter for conservation planning (Noss and Cooperrider, 1994; Csuti and Kiester, 1996).

A goal of the USGS, in accordance with the GAP mission statement, is to create an objective biodiversity metric based on standardized data for the entire U.S. In support of that goal we have created habitat models for 1,590 species (appendix 1, table 1.1) and an additional 129 subspecies (appendix 2, table 2.1). In the richness maps presented here, the 1,590 species level models were used (without adding the 129 subspecies) as they include the modeled habitat for the subspecies. Consistent modeling methods across space and for all species being considered are desirable for an objective metric to be comparable across various scales of ecological organization, from small patches to vast landscapes. (Rahbek, 2005; Hurlbert and Jetz, 2007). Given differential data availability for many species over large extents we relied on deductive habitat suitability modeling methodology for this effort. This approach achieves a quantitative metric for biodiversity and forms the basis for analysis and understanding thatn can be expanded with time.

Mapped data on species' ranges are often used to inform patterns of biodiversity and aid in planning for conservation delivery. (Jenkins and others, 2015). Range data are available for most species across the U.S. but often have limitations including lack of precision, incompleteness and lack of robust statistical validation (Di Marco and others, 2017; Rondinini and others, 2011). Analyses based on a species' range can additionally be limited by using ranges that are inclusive of areas not considered potential habitat (Hurlbert and White, 2005). For example, including agricultural lands within the range for a forest dwelling species. Species distribution modeling applications use spatial information on habitat variables to predict potential habitat distributions (Ficetola and others, 2015; Buchanan and others, 2011; Rondinini and others, 2011), rather than to predict spatial occupancy of species based on known occurrence points. The species and the quality and quantity of available data will dictate the best modelling approach. Deductive modeling of potential habitat can be the most practical and management- relevant approach when data are limited (Aycrigg and others; 2015, Rondinini and others, 2011) or insufficient for statistical occurrence models (Van Horne, 2002). Modelling patterns of biodiversity over very large regions (for example, landscapes to continents) and for a large number of species will undoubtedly include sparse and inconsistent data which makes deductive models the most pragmatic approach (Rondinini, 2011).

Here we explain the process used by the USGS to create the species richness maps for four major classes in the phylum Chordata: mammals, birds, reptiles, and amphibians for the conterminous U.S. This work was accomplished by a team of biologists from the USGS and partner institutions (Boise State University, North Carolina State University, and New Mexico State University). These richness maps (figs. 2–5) were created using deductive species' habitat distribution modeling methods described below. Those models were formally released in July 2018 and are described and made available through the USGS's data repository ScienceBase (https://doi.org/10.5066/F7V122T2).

Photograph of a *Tamias minimus* (Least Chipmunk) on a log in Grand Teton National Park, Wyoming, by John J. Mosesso, January 28, 2014. Accessed Oct. 4, 2018, at https://commons.wikimedia.org/wiki/File:Least_Chipmunk_(12188508453).jpg.



Mosaic of figures 2–5, amphibian, bird, mammal, and reptile species richness maps derived from species' habitat distribution models of the conterminous United States.

Methods

Species Habitat Distribution Modeling

To create species richness maps based on GAP habitat maps, we initially created individual species' ranges and habitat distribution models for each of the terrestrial vertebrate species found in the conterminous U.S. during summer, winter, or year-round (both summer and winter). We did not attempt to model stopover habitats (areas visited briefly for rest or foraging) for migratory species. The habitat distribution modeling process involves seven steps detailed below.

1. Species List

We started with a species list for each of the four terrestrial vertebrate classes of interest (that is, mammals, amphibians, reptiles, birds). The final combined list was compiled from three standard checklists including:

Banks, R.C., Chesser, R.T., Cicero, C., Dunn, J.L., Kratter, A.W., Lovette, I.J., Rasmussen, P.C., Remsen, J.V., Jr., Rising, J.D., Stotz, D.F., and Winker, K., 2008, Forty-ninth supplement to the American Ornithologists Union checklist of North American birds: The Auk, v. 125, issue 3, p. 758–768. [Also available at https://doi.org/10.1525/auk.2008.9708.]

Crother, B.I., committee chair, 2008, Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding (6th ed.): Society for the Study of Amphibians and Reptiles, Herpetological Circular no. 37, 94 p.

Wilson, D.E., and Reeder, D.M., eds., 2005, Mammal species of the world—A taxonomic and geographic reference (3d ed.): Baltimore, Johns Hopkins University Press, 2,000 p.

2. Review of the Literature

For each species and subspecies, common references (listed below) were consulted to obtain taxonomy, range extent, characteristics of habitats used by the species, and life history information. For taxa less represented in these common references, a refined literature search was used to provide complete information. For species with sufficient information related to subspecies' ranges, a determination was made as to whether subspecies level range and model development was necessary. Specifically, we asked: "Were the ranges between subspecies spatially distinct and were there unique habitat relationships that warranted a separate subspecies model?"

Given that species information was created over time and was inclusive of more than 1,700 species and subspecies, it is possible that more recent publications have not yet been added to a reference list. The compendium of species literature was developed for the primary purpose of documenting the species' range and their habitat preferences, therefore, omission of more recent references is unlikely to significantly change the results of this project. The literature provided is not offered as a definitive list of references for the species, but in most cases, is fairly complete. For each species modeled, we included the Integrated Taxonomic Information System Taxonomic Serial Number and NatureServe's Global Element Identifier that reflects the most precise taxonomic concept match. See table 3.1 (appendix 3) for notes on species where the name or taxonomic concepts were not a direct match.

List of common references consulted:

- American Society of Mammalogists' species accounts, accessed 10 12, 2016, at http://www.mammalsociety.org,
- California wildlife habitat relationships database accessed 10 12, 2016, at https://www.wildlife.ca.gov/Data/CWHR,
- Lanoo, M., ed., 2005, Amphibian declines—The conservation status of United States species: Berkeley and Los Angeles, University of California Press, 1,115 p.
- NatureServe Explorer, accessed 10 12, 2016 at http://explorer.natureserve.org/,
- The Cornell Lab of Ornithology, Birds of North America: Ithaca, N.Y., Cornell University, accessed 10,12,2016, at https://birdsna.org/Species-Account/bna/home.

3. Compile a National Range Map

GAP species range data are coarse representations of the geographic limits within which a species can be found (Morrison and Hall, 2002). Range maps provide the geographic extent that the USGS GAP uses to delineate areas of suitable habitat for terrestrial vertebrate species to produce habitat maps. The range maps are created by attributing a vector file derived from the 12-digit Hydrologic Unit Dataset (USGS and U.S. Department of Agriculture [USDA], Natural Resources Conservation Service, 2009]). Modifications to that dataset are described in the ScienceBase item https://doi.org/10.5066/F7DZ0754 (USGS, 2011). Attribution of the season range for each species was based on the literature and online sources (See McKerrow and others, 2018, their appendix 2 (see supporting information at https://doi.org/10.1111/ddi.12779). In addition to published ranges, online species occurrence databases were also consulted (for example, Global Biodiversity Information Facility [GBIF]). Range delineations can best be described as a synthesis of data. They were derived from existing range information, not from a primary analysis of occurrence points. Our synthesis was aimed at defining a

range based on existing data sources and standardizing the data at a resolution that made analysis with other data sets possible. Actual recorded occurrences were used to develop the ranges when those occurrence points provided additional or confirmatory information.

Attribution for each hydrologic unit within the range included values for origin (native, introduced, reintroduced, or vagrant), occurrence (extant, possibly present, potentially present, or extirpated), reproductive use (breeding, non-breeding, or both) and season (year-round, summer, winter, migratory, or vagrant). These species' range data provide the biological context within which to build our species' distribution models.

4. Enter Habitat Relationships into a Relational Database.

GAP habitat maps were created by applying a deductive habitat model, the Wildlife Habitat Relations Model (WHRM), to remotely-sensed data layers within a species' range. The deductive habitat models were built by compiling information on species' habitat associations and entering it into a relational database. Information was compiled from the best available characterizations of species' habitat at the time the modeling information was collected. As noted above, the list of sources was not intended to be a complete reference list. Sources included species' accounts in books, databases, and peer-reviewed literature. The literature references for each species are included in the "Species Habitat Model Report" and "Machine Readable Habitat Database Parameters" files attached to each habitat map item in ScienceBase (see the "Data Access" section of this report for details). For all species, the compiled habitat information is used by a scientist to determine which of the ecological systems and land use classes represented in the National GAP Land Cover Map ver. 1.0 (https://doi.org/10.5066/F7959GF5) is associated with that species.

USGS GAP land cover data used in the habitat modeling for this report were a seamless 30-meter (m) resolution, thematically detailed (>580 classes) land cover map with a specific focus on vegetation and land use types relevant to terrestrial species habitats. The USGS GAP Land Cover Map used vegetation classes based on NatureServe's Ecological Systems Classification (Comer and others, 2003) and land cover classes described in the National Land Cover Dataset (Homer and others, 2007). These data described vegetation communities at a level of thematic detail useful for ascribing habitat types for species because it was based on dominant vegetation and was discernible from remotely- sensed data or from plot-based modeling. Prior to the development of this dataset this level of detail had not been available for a map of the U.S. The detailed land cover data reflect regional variation and provide an ecological context related to plant species composition and structure, as well as climatic regimes; all these are important for describing habitats of different species. For example, in the southeastern U.S., map units such as "East Gulf Coastal Plain Interior Upland Pine Woodland" and "Southern Coastal Plain Blackwater River Floodplain Forests" provide meaningful context. Similarly, in the northwest U.S., detailed descriptions for the map classes such as "Northern Rocky Mountain Mesic Montane Mixed Conifer Forest" and "Northern Rocky Mountain Montane-Foothill Deciduous Shrubland" indicate important plant habitat composition and structure that inform what animal species are likely to be present.

For many species, factors other than land cover were used to define a suitable environment o were included in the database. These factors included elevation (that is minimum, maximum), proximity to water features, proximity to wetlands, level of human development, forest ecotone width, and forest edge. Each factor corresponded to a data layer that was used during map production. For a list of the ancillary datasets and descriptions of the parameters used see table 4.1 in appendix 4. The specific parameters used in the modeling and mapping process are documented in the "Species Habitat Model Report" and "Machine Readable Habitat Database Parameters" files and included with the final models in the ScienceBase repository (see the "Data Access" section of this report).

The final habitat maps are generated using a Python script that queries the model parameters in the database; reclassifies the GAP Land Cover ver 1.0 and ancillary data layers within the species' range and combines the reclassified layers to produce the final 30-m resolution habitat map. These habitat maps reflect ecological systems, and all other constraints applied within habitat models that are represented by the ancillary data layers. Six regions were used to simplify habitat modeling within the conterminous U.S.: Northwest, Southwest, Great Plains, Upper Midwest, Southeast, and Northeast (see U.S. Geological Survey, 2011). These regions allowed for efficient processing of the species distribution models on smaller, ecologically homogenous extents.

Habitat affinities were assigned based on the literature accounts for each species to indicate whether a species would occupy (or not) a particular map class in a given season. The three values used and their associated definitions for the National Gap Analysis Project's Habitat Maps are:

Value 1 = Known or probable occurrence, summer;

Value 2 = Known or probable occurrence, winter;

Value 3 = Known or probable occurrence, year-round (both winter and summer).

5. Run ArcGIS Model

After the database was populated, a spatial model was designed using a Python script to access information within the database, select map units (land cover classes or ecological systems) and ancillary criteria, and ultimately apply selection to spatial datasets limited to the species' range. A raster data set in GeoTIFF file format was the output for each modeling region, and region outputs were mosaicked to create the national extent raster for each species.

6. Internal Review of Model Output

The habitat distribution map for each species was reviewed first by the scientist that developed the model, and then by a second biologist before being finalized. Edits based on the reviews were incorporated into the database and the script was rerun to generate the final map. The name of the biologist who carried out the literature review and assembled the modeling parameters is shown as the "editor" type contact for each habitat map item in the ScienceBase repository (USGS, 2018a).

7. Publish the Model

The final model and range map were then published and made available online through ScienceBase at https://doi.org/10.5066/F7V122T2 (USGS, 2018a). Publication involved generating a species-specific metadata report, the attributed vector file for the species range, and the final habitat distribution map (that is, a 30 m resolution raster with a value between 1 and 3 representing suitable habitat) (fig. 1).

An agricultural field in the Great Plains region of Montana, by Terry Sohl, U.S. Geological Survey, September 2015. Accessed Oct. 5, 2018, at https://www.usgs.gov/media/images/agricultural-field-great-plains-region-montana.

Coastal and near shore environments. A salt marsh near Homosassa Springs, Florida. Photograph by Randolf Femmer, U.S. Geological Survey, May 1996. Accessed on Oct. 5, 2018 at https://www.usgs.gov/media/images/salt-marsh-near-homosassa-springs.

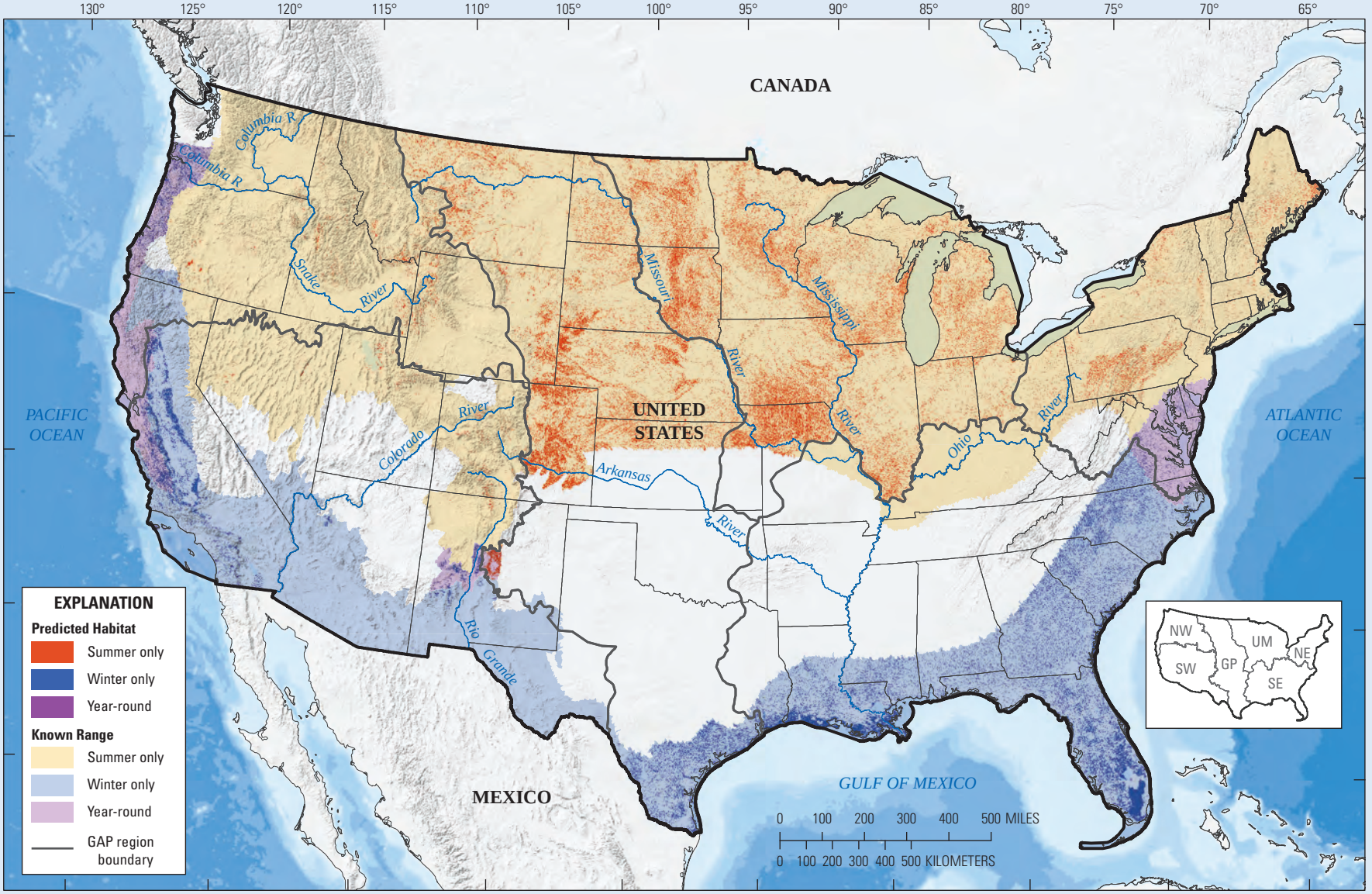
An example of coniferous forests and riparian habitat by the Rio Brazos near Tierra Amarilla, New Mexico, by Lindsay Hastings, Oct. 17, 2016. Accessed Oct 5, 2018, at https://www.usgs.gov/media/images/rio-brazos-near-tierra-amarilla-nm.

An example of eastern deciduous forests with fall foliage in North Carolina, as viewed from Waterrock Knob with the Blue Ridge Parkway winding below, by Tanya Schoenhoff, U.S. Geological Survey, Oct. 11, 2008. Accessed Oct. 4, 2018 at https://www.usgs.gov/media/images/blue-ridge-parkway-fall-foliage-0.

GAP Wildlife Habitat Relations Models (WHRMs) and Their Associated Habitat Maps Can be Useful in the Following Applications

- Conservation planning and spatial conservation prioritization at regional and national extents (that is, complementarity, redundancy, representation; Scott and others, 1993), including climate adaptation (Groves and others, 2012).
- Mapping alpha, beta, and gamma species diversity, and evaluating the spatial coincidence of biodiversity hotspots among taxa and groups of species (Scott and others, 1993).
- Assessing multi-species habitat conservation (Scott and others, 1993, Probst and Gustafson 2009).
- Removing areas of unsuitable land cover from predictive species occurrence maps created with external data-driven species distribution models that make predictions based upon climatic and geophysical variables (Scott and others, 1993).
- Using biogeography to guide and provide context for inquiries into species at risk or benefit from mappable land cover changes with regions of interest (for example, urbanization and climate refugia, respectively).
- Translating historic or projected changes in landscapes into changes in mesoscale habitat availability (for example, fire, urbanization, and clearcutting).
- Linking coarse and fine resolution species habitat data to design wildlife surveys in support of species-specific landscape analyses (Probst and Gustafson, 2009).
- Characterizing landscapes around points or small areas to create landscape variables for multi-scale, spatially-explicit population and species distribution models.
- Filtering multi-scale, multi-species wildlife data at a broad scale for conservation assessments and planning (Probst and Gustafson, 2009). Identifying places of interest for wildlife observation and study, and stratifying effort in wildlife surveys (Scott and others, 1993).
- Testing the performance of indicator species in representing multiple species in habitat protection assessments (Scott and others, 1993).

Photograph of a *Botaurus lentiginosus* (American Bittern) in Kenilworth Marsh, Washington, D.C., by J. Read, National Park Service. Accessed Oct. 4, 2018, at https://www.nps.gov/keaq/planyourvisit/birding.htm.



Base from U.S. Geological Survey digital data, The National Map, accessed December 2018, at https://viewer.nationalmap.gov/basic
Albers Equal-Area Conic projection, North American Datum of 1983

Figure 1. Map of known range and predicted habitat distribution of *Botaurus lentiginosus* (American Bittern). In the foreground the predicted habitat for the species is shown. The lighter colors in the background show the range used to constrain the predicted habitiat distribution model. Gap Analysis Project (GAP) region boundaries used in the modeling effort: NW, northwest; SW, southwest; GP, Great Plains; UM, Upper Midwest; SE, southeast; NE, northeast.

The Species Habitat Distribution Maps

GAP habitat maps are representations of the spatial distributions of suitable environmental and land cover conditions for individual species within the U.S. Specifically, these maps show places within a species' range where the environment is predicted to be suitable for the species to occur, while areas not included in the map are those predicted to be unsuitable for the species to occur. Multiple maps may exist for species that migrate within the conterminous U.S. during the year and species with habitat associations that vary with season, or reproductive period.

GAP habitat maps are created by intersecting coarse resolution range maps with maps created with moderate-resolution wildlife habitat relationship models (WHRMs). The resulting maps have significantly more detail than range maps, but less detail than microhabitat models that would incorporate information on features within broad classes of floral composition (for example, cavity trees, rock outcrops, and small ponds) that are not currently mapped at large extents. The maps are appropriate for application at a 1:100,000- scale (Morrison and others, 2006). The 2001 National Land Cover dataset (NCLD, 2001; Homer and others, 2007), which underlies most of our species' models and defines their ecological scale, has a minimum mapping unit of 1 acre, but habitat definitions within the WHRMs are often further refined with data layers, such as elevation or hydrography layers, that may identify 900 square meter (m^2) patches of mesoscale habitat.

GAP habitat maps do not explicitly predict occurrence of each species at any given time, because species' actual (fine-scale) distributions can vary due to intra- and interspecific interactions and population dynamics that can leave suitable habitat unoccupied (Pulliam, 2000). Fine-scale habitat characteristics that are not well represented by the WHRMs can further restrict the distribution of individuals among locations. Conversely, habitat maps do predict species absence at this scale (Johnson and others, 2009); that is, if habitat is well understood and parametrized well in a model. These maps are valuable for several reasons: (1) the detail and resolution of the maps match the perspective often used for conservation implementation and land-use planning, and corresponds to changes in land cover (Scott and others, 1993; Ferrier and others, 2004; Flather and others, 2009, Johnson and others, 2009); (2), these maps provide a relatively quick and inexpensive assessment of the distribution of vegetation and associated species (Scott and others, 1993). By leveraging remotely-sensed data, WHRMs avoid depending upon expensive and inefficient data collection in the field. By excluding unsuitable areas, WHRMs produce maps that can be used for broad-scale applications compared to range maps alone; and (3), these maps provide a medium resolution characterization of the extent of habitat of a species. Similarly, the maps can suggest unsurveyed areas where species may occur now or after range shifts. Finally, the completeness of the GAP WHRM dataset enables analyses and assessments of all species or customized groups of species as well as analyses at national, regional, and landscape scales. The range-wide extents of these models allow ecoregion- scale assessments, which are more biologically appropriate than analyses at smaller extents defined by political boundaries, such as within states or counties (Scott and others, 1993).

Other Literature Related to GAP Species Habitat Distribution Models

Boykin, K.G., Drost, C., and Wynne, J.J., 2007, A gap analysis of terrestrial vertebrate species on the Colorado Plateau—Assessment from the Southwest Regional Gap Analysis Project, *in* van Riper, C., III, and Sogge, M.K., eds., The Colorado Plateau III—Integrating research and resources management for effective conservation: Tucson, University of Arizona Press, p. 77–107.

Csuti, B., Polasky, S., Williams, P.H., Pressey, R.L., Camm, J.D., Kershaw, M., Kiester, A.R., Downs, B., Hamilton, R., Huso, M., and Sahr, K., 1997, A comparison of reserve selection algorithms using data on terrestrial vertebrates in Oregon: Biological Conservation, v. 80, issue 1, p 83–97.

Homer, C., Dewitz, J., Fry, J., Coan, M., Hossain, N., Larson, C., Herold, N., McKerrow, A., VanDriel, J.N., and Wickham, J., 2007, Completion of the 2001 National Land Cover Database for the Conterminous United States: Photogrammetric Engineering and Remote Sensing, v. 73, no. 4, p. 337–341, accessed July 30, 2018, at https://www.researchgate.net/profile/Collin_Homer/publication/237239863_Completion_of_the_2001_National_Land_Cover_Database_for_the_Conterminous_United_States/links/0046352ab204d93a3e000000.pdf.

Iglecia, M.N., Collazo, J.A., and McKerrow, A.J., 2012, Use of occupancy models to evaluate expert knowledge-based species-habitat relationships: Avian Conservation and Ecology, v. 7, no. 2, article 5, accessed on July 15, 2018, at http://dx.doi.org/10.5751/ACE-00551-070205.

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Data Access

Each of the species ranges and models are available to the public through the USGS ScienceBase Repository. There are two collections, one for the species ranges available at https://doi.org/10.5066/F7Q81B3R (USGS, 2018b) and one for the species habitat distribution models available at https://doi.org/10.5066/F7V122T2 (USGS, 2018a).

Individual ScienceBase items for each species are available within each collection. The items represent a useful collection of information and data related to the ranges and models. For example, the literature references used in in the species habitat models are included in the "Species Habitat Model Report" and "Machine Readable Habitat Database Parameters" files attached to each habitat map item.

In addition, the produced data and detailed metadata with linkages to ancillary datasets used in the model are included in the ScienceBase items. Individual datasets used in the modeling process with these habitat model parameters are also made available in the ScienceBase Repository (https://www.sciencebase.gov/catalog/item/5644f3c1e4b0aafbcd0188f1 (USGS, 2018a). (For a general description of the ancillary datasets see table 4.1.) The "Machine Readable Habitat Database Parameters" Java script object notation (JSON) file attached to each species habitat map item has an "input_layers" object that contains the specific parameter names and references (via Digital Object Identifier) to the input data used with that parameter.

The individual species models used to generate the richness for this report are available at https://gapanalysis.usgs.gov/apps/species-data-download/ and through the science base repository (https://doi.org/10.5066/F7V122T2).

A description of the USGS Science Analytics and Synthesis (SAS) Program which houses the GAP Project is available at https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis.

Naming Conventions and Codes

A composite version code is employed to allow the user to track the spatial extent, the date of the ground conditions, and the iteration of the data set for that extent/date. For example, CONUS_2001v1 represents the spatial extent of the CONUS, the ground condition year of 2001, and the first iteration (v1) for that extent/date. The GAP species code is used in conjunction with the version code to identify specific data sets or files (that is, Cooper's Hawk Habitat Map is named bCOHAx_CONUS_2001v1_HabMap).

Creating the Richness Maps

For each of the four vertebrate classes, we created richness maps based on summing binary (habitat/non-habitat) versions of the individual species habitat distribution models. Only species level models were included in calculating richness maps. Note the species level models represent the modeled habitat for all of the related subspecies and therefore for this species level analysis we used only the 1,590 species-level habitat distribution maps. As mentioned above, GAP habitat maps are coded with values 1–3 depending on the season (for example, summer, winter or year-round), so we needed to first reclass each habitat map to a binary map of 1s and 0s, where 1 indicated that a cell was suitable habitat during any season, and 0 indicated that a cell was unsuitable during all seasons. Year round indicates suitable habitat in both summer and the winter seasons.

Results

Species richness across the conterminous U.S. based on summing habitat distribution models for each of the four classes (amphibians, birds, mammals, and reptiles) are presented in figures 2–5. The highest richness for amphibians was 42 species. Amphibian-rich areas occurred throughout riparian and wetland habitats of the Southeast, Coastal Pacific, and the Upper Midwest regions (fig. 2). Large areas of the west and Midwest had relatively low amphibian richness. Maximum bird richness was 163 with concentrations of high richness in the Intermountain West, Pacific and Gulf Coast regions, and scattered patches throughout the East and Midwest (fig. 3). Maximum mammal richness reached 72 species with highest richness concentrated in the Desert Southwest and southern portions of the Intermountain Region. Areas of high mammal richness were mapped throughout the west, with a few isolated areas of low richness corresponding to Intermountain Basins (fig. 4). In general, mammal richness was higher in the West than either the eastern or Midwestern U.S. Maximum richness of 54 species of reptiles was highly concentrated in the Desert Southwest and scattered throughout the southeast (fig. 5).

Discussion

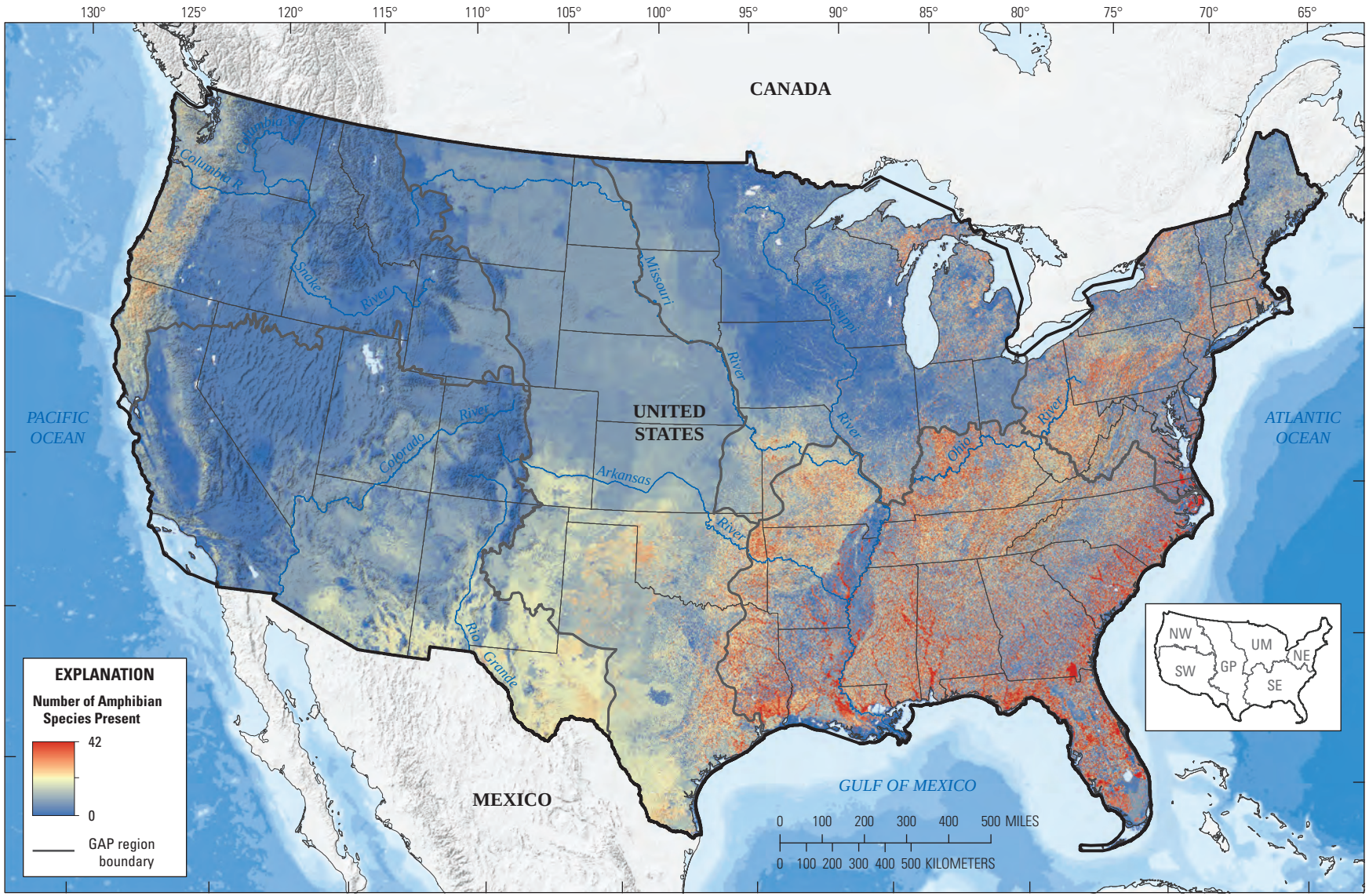
The maps developed for this project are the first to show patterns of species richness based on suitable habitat for the terrestrial vertebrates of CONUS. The patterns of species richness represent the combination of the biogeographic evolution of the taxa (that is, species ranges) and suitable landscape context (that is, habitat as represented by Ecological Systems and other mapped environmental variables). The approach presented in this paper can increase the value and utility of the resultant maps. For example, as McKerrow and others (2018) showed that excluding unsuitable areas by using individual species models changed spatial patterns of species richness and richness hotspots as compared to spatial patterns derived using species range data or coarser resolution habitat distribution data.

The species habitat distributions and the derived species richness maps provide a nationally consistent metric for the status of terrestrial vertebrate biodiversity. The species distribution models, used in conjunction with the Protected Areas Database for the U.S. (https://gapanalysis.usgs.gov/padus/), more accurately characterize the current protection status for each species habitat in the National Biogeographic Map (https://maps.usgs.gov/biogeography/) and facilitate scale-specific analyses. For example, if an ecoregional planning team is interested in understanding the patterns of species richness within their region, they can carry out an analysis that only includes the species specific to the region with the richness areas evaluated based on that ecoregion's maximum richness.

While we have focused here on species richness patterns for CONUS, these data support analyses beyond evaluating protection and potential threats to species habitats. Individual species of interest, groups of species with common requirements, or specific habitat types can also be evaluated at various extents. If additional spatial data sets representing risks to these species are available, such as changes in hydrologic regime, deforestation or invasive-driven changes to plant communities, the elements of terrestrial vertebrate biodiversity most at risk can be discerned in any given system.

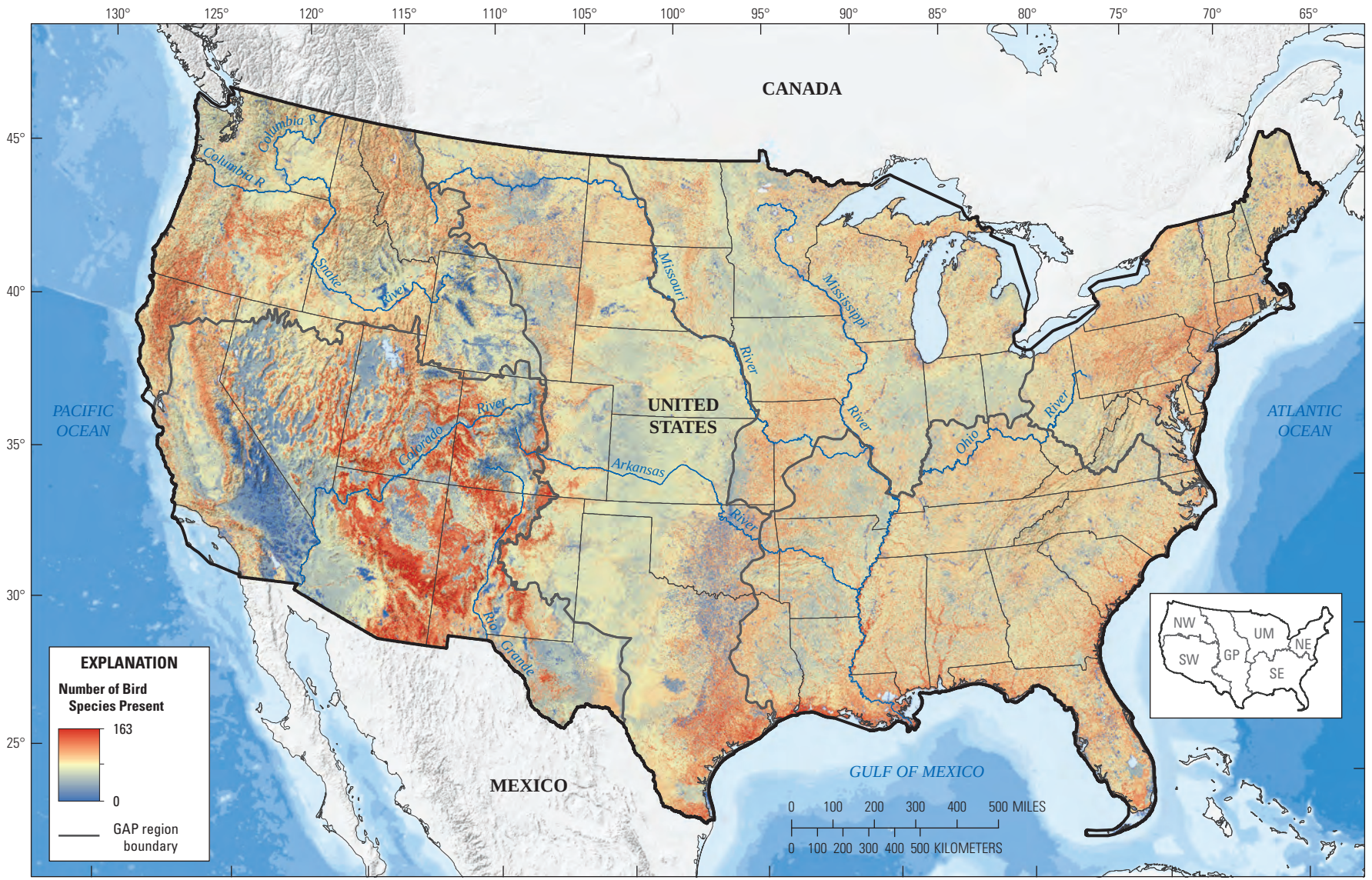
The suitable habitat distribution models described here and used to produce the Terrestrial Vertebrate Species Richness Maps for the CONUS can be useful in addressing additional questions directly relevant to land managers and conservation planners. The approach and resultant model outputs can be especially relevant to the Department of Interior agencies in managing wildlife populations and their habitats across the nation. Species habitat maps have already been used to identify the species likely to be affected by various land use scenarios (Martinuzzi and others, 2015) and to model the potential impact on individual species (Tarr and others, 2016). In addition, similar data have served as a basis for quantifying ecosystem services related to biological diversity (Boykin and others, 2013) and to inform wind and solar energy facility siting (Thomas and others, 2018).

Photograph of a *Pseudacris regilla* (Pacific Chorus Frog) in a meadow located in Yosemite National Park, California, by Devin Edmonds, U.S. Geological Survey, July 1, 2012. Accessed Oct. 4, 2018, at https://www.usgs.gov/media/images/pacific-chorus-frog-1.



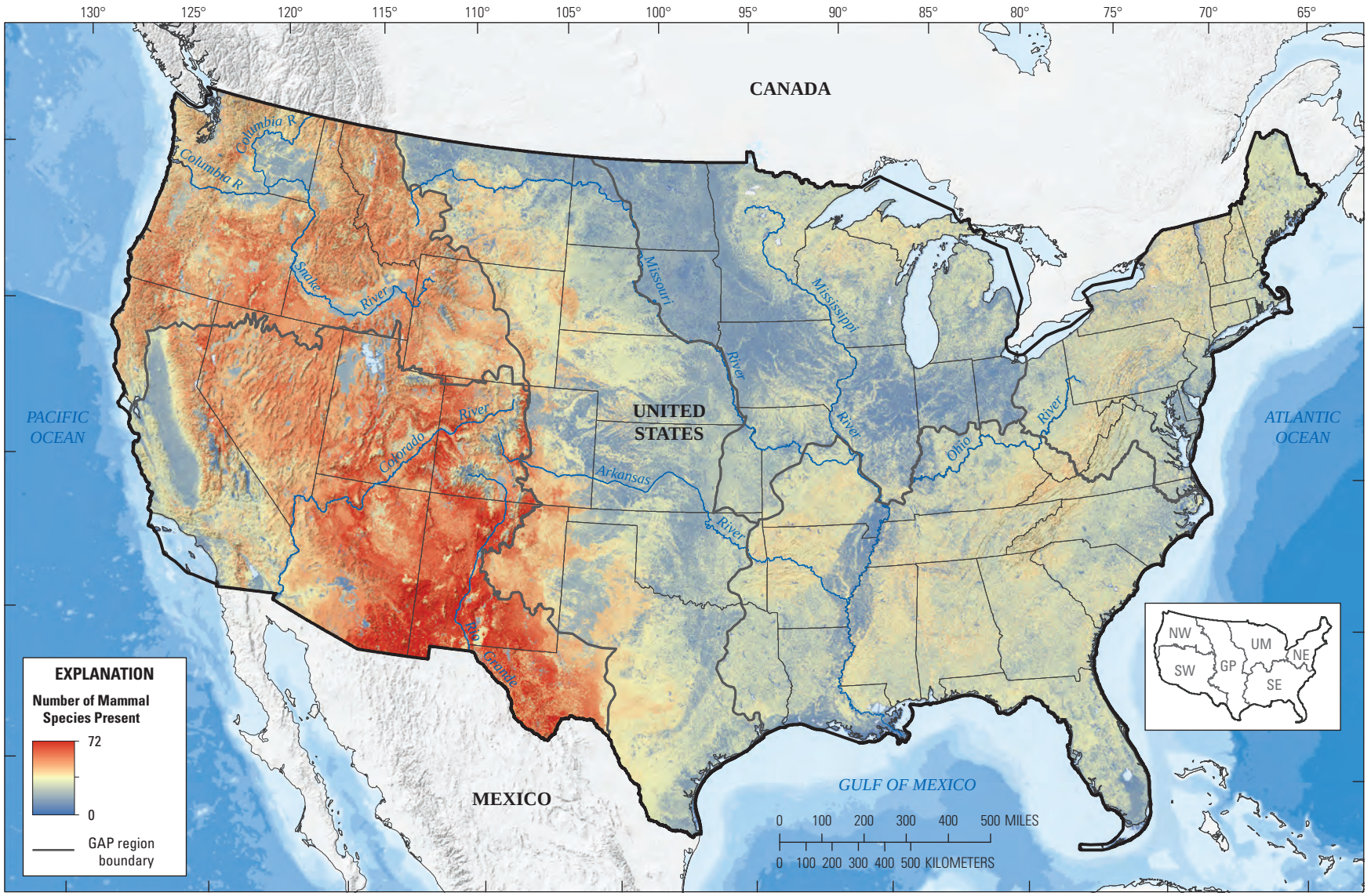
Base from U.S. Geological Survey digital data, The National Map, accessed December 2018, at https://viewer.nationalmap.gov/basic
Albers Equal-Area Conic projection, North American Datum of 1983

Figure 2. Map of amphibian species richness derived from species habitat distribution models for the conterminous U.S. The habitat distribution map for each of the 282 amphibian species were added together to determine amphibian richness for each 30 m cell. The maximum richness indicates there are areas where potential habitat for up to 42 amphibian species exists. Gap Analysis Project (GAP) region boundaries: NW, northwest; SW, southwest; GP, Great Plains; UM, upper Midwest; SE, southeast; NE, northeast.



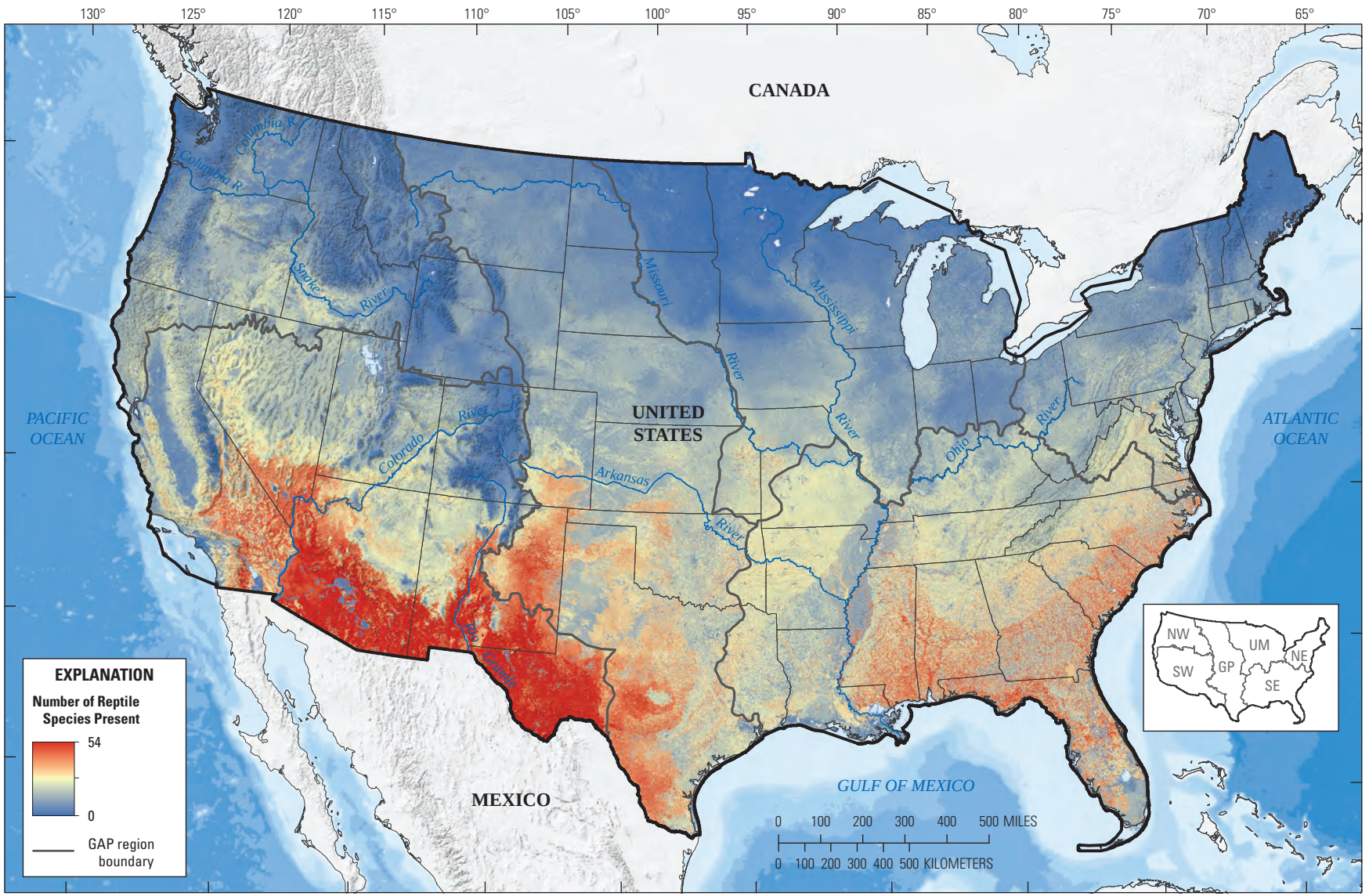
Base from U.S. Geological Survey digital data, The National Map, accessed December 2018, at https://viewer.nationalmap.gov/basic
Albers Equal-Area Conic projection, North American Datum of 1983

Figure 3. Map of bird species richness derived from species habitat distribution models for the conterminous U.S. The habitat distribution map for each of the 621 bird species were added together to determine bird richness for each 30 m cell. The maximum richness indicates there are areas where potential habitat for up to 163 bird species exists. Gap Analysis Project (GAP) region boundaries: NW, northwest; SW, southwest; GP, Great Plains; UM, upper Midwest; SE, southeast; NE, northeast.



Base from U.S. Geological Survey digital data, The National Map, accessed December 2018, at https://viewer.nationalmap.gov/basic
Albers Equal-Area Conic projection, North American Datum of 1983

Figure 4. Map of mammal species richness derived from species habitat distribution models for the conterminous U.S. The habitat distribution map for each of the 365 mammal species were added together to determine mammal richness for each 30 m cell. The maximum richness indicates there are areas where potential habitat for up to 72 mammal species exists. Gap Analysis Project (GAP) region boundaries: NW, northwest; SW, southwest; GP, Great Plains; UM, upper Midwest; SE, southeast; NE, northeast.



Base from U.S. Geological Survey digital data, The National Map, accessed December 2018, at https://viewer.nationalmap.gov/basic
Albers Equal-Area Conic projection, North American Datum of 1983

Figure 5. Map of reptile species richness derived from species habitat distribution models for the conterminous U.S. The habitat distribution map for each of the 322 reptile species were added together to determine amphibian richness for each 30 m cell. The maximum richness indicates there are areas where potential habitat for up to 54 reptile species exists. Gap Analysis Project (GAP) region boundaries: NW, northwest; SW, southwest; GP, Great Plains; UM, upper Midwest; SE, southeast; NE, northeast.

Programmatic Considerations

Modeling Approach

If point occurrence data become more accessible for a larger number of species and statistical methods can be expanded for using those data to model species distributions, inductive models can be increasingly used to map species distributions. The authors see the value in the use of inductive models for statistical prediction based on occurrence when data are sufficient because of the increased strength of the quantitative comparisons and validation. That said, sufficient data are not available for all species for a nation-wide biodiversity evaluation. Given the goal of creating nationally consistent models for all terrestrial vertebrates, it is inevitable that some species will be data rich and others, data poor. We put the species habitat distribution models in this report forward as a reasonable and consistent modeling approach at a moderate resolution (30 m) across both a wide geographic extent and for a wide range of species. GAP has directly tested inductive approaches in two regional projects (Aycrigg and others, 2015) with the program's objectives specifically in mind. In both cases, deductive models were typically found to be the best final model after expert review and an evaluation of the extent of modeled habitat relative to the range of the species. While more limited in quantitative evaluation, validity of deductive models is reliant on expert review and intuitive modeling parameters.

Core datasets selected for the models represent the best known, moderate resolution data with documented influence on species habitat selection. Certainly, there are some species requirements that cannot be mapped using remotely sensed data, so our models represent a coarse filter for species habitat. If a species uses pine snags, and we have pine communities well mapped, they may make a good proxy for the true habitat feature. If we only had maps of conical crowned forests, that would be a lesser habitat proxy and may be inappropriate. Accordingly, we chose to use a deductive modelling approach because it is currently the most feasible method for achieving the goal of assessing the status of terrestrial vertebrate species diversity. Future efforts should evaluate how well the variables represent true habitat features and the range in variability for the models overall.

While we are constrained by which datasets can be used at a national extent, there are opportunities to review additional data with respect to improving species habitat distribution models at smaller extents or for a short list of species. For example, Martinuzzi and others (2009) have shown the potential for improving species habitat models with the use of LiDAR data. Similarly, Glisson and others (2017) were able to refine predictions of species occupancy for the Yuma Rail based on the specific landscape-context variables.

Model Review and Assessment

Over the course of the GAP, expert reviews of models have been carried out via regional workshops in the Southwest (Boykin and others, 2007), Northwest (Aycrigg and others, 2015) and Alaska (Gotthardt and others, 2014). Reviews and comments were also solicited from biologists involved with incorporating GAP models into the Western Governors' Association Crucial Habitat Assessment Tool. In that effort the Species of Concern workgroup developed a process for agency review on a common suite species distribution maps. External review played an important role in the refinement and vetting of the GAP models, but notable challenges were encountered. For example, eliciting species model reviews was time consuming and the review process didn't always result in a consensus on a species habitat model or in an actionable item, and inherent biases resulted from uneven geographic representation of, or participation by, the attendees. Further, few experts have knowledge across the entire range of a species and where overlap in their knowledge does exist across a broad extent, experts often disagree (Drescher and others, 2013).

While individual species models have been assessed at the state and regional extents (Aycrigg and others, 2015; McKerrow and others, 2006; Peterson and others, 2001), we have not carried out a CONUS-wide accuracy assessment of any species model. GAP efforts in the Pacific Northwest and Alaska compared inductive and deductive model approaches using occurrence records to assess "model accuracy" or the percent of occurrence records that fell in modeled habitat (Aycrigg and others, 2015). That same study chose to reject models where less than 75 percent of the mapped range included modeled habitat or where the expert review suggested a model should be rejected. Importantly, Aycrigg and others (2015) showed that careful screening of data precision in spatial representation can provide a reasonable assessment of the omission error relative to the modeled habitat. In some cases, those errors can be used to identify geographies not well represented in the occurrence record datasets, indicating a need for additional surveys. Similarly, omission in the deductive models could indicate habitat affinities that were missed during model development.

Assessing commission errors in which a species is modeled to occur but does not, is far more challenging than it is for omission errors. Without standard repeated surveys across the range of a species, it is impossible to say that a species will not use a specific habitat. Because our species habitat distribution models remove unsuitable areas within the range of the species we assume they have fewer commission errors than the next closest complete dataset for the nation (McKerrow and others, 2018). The challenge is to refine the species distribution models by reducing commission, without adding or increasing omission error.

Given that habitat distributions represent areas that are described by model parameters to be habitat for a species, another approach for assessment is to test for the presence of the landscape factors used in the models.

Boykin and others (2010) did this type of assessment for the southwest regional project. Not surprisingly, they found that variables that are directly measured (for example, slope, soil composition, and rock outcrop) had higher concordance with modeled habitat than descriptive variables (for example, ecological system, and landform).

Finally, as with non-statistical modeling approaches where it is impossible to measure uncertainty, sensitivity analyses are used to identify the effect of uncertainty or error on the final result. Given the range of data quality and quantity across the species included here, we suggest four topics for improving our understanding of model quality.

1. Detailed expert review where possible to refine the species habitat associations, model parameters, and (or) identify recent changes in the range of the species.

2. Assess omission where presence-only data are available across the range of a species.

3. Rank levels of certainty (for example, range, abundance of literature, appropriateness of available modeling parameters, and final model) as a method for determining when revisions can be made.

4. Conduct sensitivity analysis specific to a question being addressed with the species habitat or richness maps.

Comparing Models

We acknowledge that the data used in our analysis may not represent the best source of predictive distribution data for individual species in a given geographical extent where extensive field work can support a more intensive modeling approach; but we do put our analysis of these data forward as a reasonable and consistent modeling approach at a moderate resolution (30 m) across both a wide geographic extent and for a wide range of species.

In evaluating and applying the species ranges and habitat distribution models it is important to understand the temporal resolution of the data being presented. The Gap Analysis Project evolved programmatically from individual state to regional projects and then to the national effort. While much was learned during the development of regional datasets, the work on the national extent models started in earnest in 2008, therefore the species list, literature review, and creation of the national ancillary datasets reflect work since then. In other words, the models reflect the understanding gleaned from the literature between 2008 and 2017. We report the date of the model completion (End Date) in the metadata for each species to give the end-user an understanding of the timeframe for the information used in the model. The heavy reliance of the habitat distribution models on the 2001 land cover means that the maps reflect the understanding of the species habitat requirements from the literature at the time the habitat association literature review was completed and the ground conditions of the 2001 landscape.

Future Directions

With the models completed, our primary focus is now on the use of the models for national and regional conservation assessments. We have considered a full list of species, and consistency among individual species data allows for the ability to make meaningful subsets of the full species list to address specific questions related to better understanding biogeography of terrestrial vertebrates, as well as to identify species vulnerable to specific threats. In addition, we would like to leverage the growing access to occurrence records to enhance the information related to species ranges. For future revisions, we would like to include enhanced documentation of linkages between model parameter selection and literature sources used to make model parameter decisions. Ancillary datasets used in the modeling process would be examined and updated as needed, and software methods could be adopted that will run the process fully with code that can be made publicly available. Finally, we plan to incorporate research related to assessing error in the models and the sensitivity of the analytical outcomes.

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Appendix 1. Ancillary Datasets and Model Parameter Used in Species' Habitat Modeling

Land Cover and Derivatives

Land Cover

The ecological systems mapped in the Gap Analysis Project (GAP) National Land Cover Data ver. 1.0 (2001) (U.S. Geological Survey [USGS], 2018b) were used as 'map units' to describe habitat types preferred by species. Map units are designated as either primary or secondary. Primary maps units are defined as those ecological systems critical for a species' reproduction and survival. Secondary map units are those ecological systems generally not critical for reproduction and survival, but typically are used in conjunction with primary map units for foraging, roosting, and (or) sub-optimal nesting locations. Secondary map units are selected only when located within a specified distance from primary map units.

Patch Size

The type and size of clusters of habitat was assessed with spatial modeling. We used patch size to indicate minimum amounts of contiguous habitat needed for a species. This variable required the calculation of cluster sizes in the modeling code during post processing. In other words, these model variables are not independent ancillary data layers.

Contiguous Patch—Minimum size (hectare [ha])—This parameter is set using the most conservation values explicitly stated in the specie literature.

Forest and Ecotone Habitats

The ecotone (that is, edge) between forested and non-forested environments can be a critical aspect of habitat. We grouped map units into forested, non-forested, and shrubland/woodland land cover types to create unique data layers. These data layers were then buffered at specified distances to identify species habitats. Aggregated map units can be compared and contrasted to identify areas of transition between these broad categories. They can also be used to identify core areas or contiguous blocks of similar type (that is, interior) through buffering.

Forested map units included deciduous forest, evergreen forest, mixed forest, palustrine forested wetland, and estuarine forested wetland.

Non-forested map units were defined as water, pasture/hay, agricultural areas, urban/developed, marshes, beaches, and so forth.

Woodland/shrubland map units were defined as those ecological systems and land uses containing a majority of short, scrubby, woody vegetation or sparsely canopied treed vegetation.

Ecotone Type and Width

Ecotone Type

Forest/Open Ecotone Only—This data layer represents the transitional areas between forest and open, non-forested habitats.

Forest/Open Ecotone+Woodlands/Shrublands—The forest/open only ecotone does not consider environments with sparse canopies or scrubby vegetation, therefore this data layer includes woodland and shrubland map units that would otherwise be ignored. This dataset uses two data layers in tandem. The forest/open ecotone and the woodlands/shrublands (that is, wlsl) are calculated individually and then combined to depict a landscape that includes both ecotones.

Ecotone Width

This distance represents a symmetrically buffered edge (that is, 0; 30; 60; 120; 250; 500; and 1,000 meters [m]). For example, an ecotone width of 500 m includes 250 m into forest and 250 m into open.

Buffer distances:

- Distances into ecotone (for example, forest edge): 0; 30; 60; 120; 250; 500; 1,000; 2,000; 4,000, and >4,000 m
- Distances away ecotone (for example, forest edge: >4,000; 4,000; 2,000; 1,000; 500; 250; 120; 60; 30; and 0 m

Forest Interior and Width

This data layer is comprised of unique aggregations of forest and non-forest map units taken from the Gap Analysis Project (GAP) land cover data. See above under Forest and Ecotone Habitats for descriptions of the forest and non-forest map units.

For a species that requires interior forest (for example, uses):

- Distances into forest from forest edge: 0; 30; 60; 120; 250; 500; 1,000; 2,000; 4,000; and >4,000 m

For a species that avoids interior forest (for example, avoids):

- Distances away from forest from forest edge: >4,000; 4,000; 2,000; 1,000; 500; 250; 120; 60; 30; and 0 m

Human Impact Avoidance

Environments dominated by human disturbance such as roads, cities, and the constructed materials that support human habitation have profound effects on species. For most species, this data layer was used to exclude species from a portion of the landscape. However, some species respond favorably to human habitats, therefore this data layer was used in an inclusionary manner. A species' model could have used the model variable for human impact avoidance at one of three avoidance levels described below:

- *High*—For species that are *very intolerant* of human disturbance. *All* portions of the landscape identified as being directly influenced by human disturbance are *eliminated* from the predicted distribution.
- *Medium*—For species that are *moderately intolerant* of human disturbance. Only portions of the landscape identified as being *highly or moderately* influenced by human disturbance are *eliminated* from the predicted distribution.
- *Low*—For species that are *partially intolerant* of human disturbance. Only portions of the landscape identified as being *highly* influenced by human disturbance are from the predicted distribution.

Elevation

Some species respond to environments directly related to altitudinal variation. Elevation (for example, a digital elevation model [DEM]) is easily implemented in spatial modeling by limiting the model to the minimum and maximum values explicitly stated in the literature. DEMs are utilized directly and are measured in meters above mean sea level.

Hydrography

Water and its location on the landscape is a very important aspect of species habitats. The source for hydrographic data was the USGS National Hydrography Dataset (NHD).

Water Type

- *Flowing Water*—Flowing water represents hydrographic features such as streams, rivers, springs, seeps, ditches with moving water, and so forth.
- *Standing Water*—Standing water represents hydrographic features such as lakes, ponds, reservoirs, bays, inlets, estuaries, ocean, ditches with non-flowing water, and so forth.
- *Wet Vegetation*—Wet vegetation represents hydrographic features such as swamps, marshes, Carolina bays, and so forth. This includes a collection of map units representing seasonally or tidally inundated woody and non-woody plants.

Salinity

Water salinity is a major factor when considering habitat conditions for many species. However, the dynamic and complex nature of water systems makes the development of a highly refined and reliable data layer challenging. Therefore, we developed three general categories to include in species habitat models for species requiring water:

- *Freshwater Only*
- *Brackish/Saltwater Only*
- *All Water* (that is, both brackish/saltwater and freshwater)

Stream Velocity

For some aquatic species, this is an important aspect of their habitat, such as oxygenation levels, presence of invertebrate prey, and amount of sediment within the water column and on streambed substrates. Stream velocity (that is, stream gradient) was derived from a combination of streams and slopes calculated from a DEM, which created three categories for stream gradient:

- *Slow Only* – For species that require slow moving or almost stagnant sections of streams or rivers. Typically, these are areas where the underlying topography is flat (0 percent gradient).
- *Fast Only* – For species that require high velocity sections of streams or rivers. Typically, these are areas where the underlying topography is steep. A threshold of >5 percent gradient was used.
- *All Types* – For species that can utilize either fast or slow sections of streams or rivers.

Distance into and from type of water:

- Distances from a type of water were: >4,000; 4,000; 2,000; 1,000; 500; 250; 120; 60; 30; and 0 m
- Distances into a type of water were: 0; 30; 60; 120; 250; 500; 1,000; 2,000; 4,000; and >4,000 m

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
ancfrx	Northern Cricket Frog	*Acris crepitans*	Amphibian	173520
ascfrx	Southern Cricket Frog	*Acris gryllus*	Amphibian	173518
arisax	Ringed Salamander	*Ambystoma annulatum*	Amphibian	173594
astrsx	Streamside Salamander	*Ambystoma barbouri*	Amphibian	208204
arfsax	Reticulated Flatwoods Salamander	*Ambystoma bishopi*	Amphibian	775866
actgsx	California Tiger Salamander	*Ambystoma californiense*	Amphibian	173595
affsax	Frosted Flatwoods Salamander	*Ambystoma cingulatum*	Amphibian	173596
anosax	Northwestern Salamander	*Ambystoma gracile*	Amphibian	173597
ajesax	Jefferson Salamander	*Ambystoma jeffersonianum*	Amphibian	173598
abupsx	Blue-spotted Salamander	*Ambystoma laterale*	Amphibian	173599
ambsax	Mabee's Salamander	*Ambystoma mabeei*	Amphibian	173600
altopx	Long-toed Salamander	*Ambystoma macrodactylum*	Amphibian	173601
asposx	Spotted Salamander	*Ambystoma maculatum*	Amphibian	173590
abtisx	Barred Tiger Salamander	*Ambystoma mavortium*	Amphibian	668193
amasax	Marbled Salamander	*Ambystoma opacum*	Amphibian	173591
amosax	Mole Salamander	*Ambystoma talpoideum*	Amphibian	173604
asmmsx	Small-mouthed Salamander	*Ambystoma texanum*	Amphibian	173605
aetsax	Eastern Tiger Salamander	*Ambystoma tigrinum*	Amphibian	173592
atwamx	Two-toed Amphiuma	*Amphiuma means*	Amphibian	173609
aotamx	One-toed Amphiuma	*Amphiuma pholeter*	Amphibian	173611
athamx	Three-toed Amphiuma	*Amphiuma tridactylum*	Amphibian	173612
aamtox	American Toad	*Anaxyrus americanus*	Amphibian	773511
awytox	Wyoming Toad	*Anaxyrus baxteri*	Amphibian	773512
abotox	Western Toad	*Anaxyrus boreas*	Amphibian	773513
aartox	Arroyo Toad	*Anaxyrus californicus*	Amphibian	773514
ayotox	Yosemite Toad	*Anaxyrus canorus*	Amphibian	773515
agptox	Great Plains Toad	*Anaxyrus cognatus*	Amphibian	773516
agrtox	Green Toad	*Anaxyrus debilis*	Amphibian	773518
abltox	Black Toad	*Anaxyrus exsul*	Amphibian	773519
afotox	Fowler's Toad	*Anaxyrus fowleri*	Amphibian	773520
acatox	Canadian Toad	*Anaxyrus hemiophrys*	Amphibian	773521
ahotox	Houston Toad	*Anaxyrus houstonensis*	Amphibian	773522
aaztox	Arizona Toad	*Anaxyrus microscaphus*	Amphibian	773525
aagtox	Amargosa Toad	*Anaxyrus nelsoni*	Amphibian	773526
arstox	Red-spotted Toad	*Anaxyrus punctatus*	Amphibian	773527
aoatox	Oak Toad	*Anaxyrus quercicus*	Amphibian	773528
asgtox	Sonoran Green Toad	*Anaxyrus retiformis*	Amphibian	773529
atetox	Texas Toad	*Anaxyrus speciosus*	Amphibian	773530
asotox	Southern Toad	*Anaxyrus terrestris*	Amphibian	773531
awotox	Woodhouse's Toad	*Anaxyrus woodhousii*	Amphibian	773532

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
agrsax	Green Salamander	*Aneides aeneus*	Amphibian	173699
aclsax	Clouded Salamander	*Aneides ferreus*	Amphibian	173700
ablasx	Black Salamander	*Aneides flavipunctatus*	Amphibian	173701
asmtsx	Sacramento Mountains Salamander	*Aneides hardii*	Amphibian	173702
aarsax	Arboreal Salamander	*Aneides lugubris*	Amphibian	173703
awasax	Wandering Salamander	*Aneides vagrans*	Amphibian	668242
arotfx	Rocky Mountain Tailed Frog	*Ascaphus montanus*	Amphibian	661593
actfrx	Coastal Tailed Frog	*Ascaphus truei*	Amphibian	173546
acslsx	California Slender Salamander	*Batrachoseps attenuatus*	Amphibian	173706
ainsax	Inyo Mountains Salamander	*Batrachoseps campi*	Amphibian	173707
ahhssx	Hell Hollow Slender Salamander	*Batrachoseps diabolicus*	Amphibian	573575
asgssx	San Gabriel Mountains Slender Salamander	*Batrachoseps gabrieli*	Amphibian	550545
agmssx	Gabilan Mountains Slender Salamander	*Batrachoseps gavilanensis*	Amphibian	668243
aggsax	Gregarious Salamander	*Batrachoseps gregarius*	Amphibian	573576
assssx	San Simeon Slender Salamander	*Batrachoseps incognitus*	Amphibian	668244
asslsx	Sequoia Slender Salamander	*Batrachoseps kawia*	Amphibian	573577
asmssx	Santa Lucia Mountains Slender Salamander	*Batrachoseps luciae*	Amphibian	668245
agssax	Garden Slender Salamander	*Batrachoseps major*	Amphibian	208343
alssax	Lesser Slender Salamander	*Batrachoseps minor*	Amphibian	668246
abbssx	Black-bellied Slender Salamander	*Batrachoseps nigriventris*	Amphibian	173708
acissx	Channel Islands Slender Salamander	*Batrachoseps pacificus*	Amphibian	173709
akrssx	Kings River Slender Salamander	*Batrachoseps regius*	Amphibian	573578
arssax	Relictual Slender Salamander	*Batrachoseps relictus*	Amphibian	208344
akpsax	Kern Plateau Salamander	*Batrachoseps robustus*	Amphibian	668247
akcssx	Kern Canyon Slender Salamander	*Batrachoseps simatus*	Amphibian	173710
atssax	Tehachapi Slender Salamander	*Batrachoseps stebbinsi*	Amphibian	173711
aossax	Oregon Slender Salamander	*Batrachoseps wrightorum*	Amphibian	573579
abafrx	Barking Frog	*Craugastor augusti*	Amphibian	773869
ahellx	Hellbender	*Cryptobranchus alleganiensis*	Amphibian	173587
acudsx	Cumberland Dusky Salamander	*Desmognathus abditus*	Amphibian	668239
aseesx	Seepage Salamander	*Desmognathus aeneus*	Amphibian	173636
aadsax	Apalachicola Dusky Salamander	*Desmognathus apalachicolae*	Amphibian	208266
asodsx	Southern Dusky Salamander	*Desmognathus auriculatus*	Amphibian	173637
aodsax	Ouachita Dusky Salamander	*Desmognathus brimleyorum*	Amphibian	173638
acmdsx	Carolina Mountain Dusky Salamander	*Desmognathus carolinensis*	Amphibian	550253
aspdsx	Spotted Dusky Salamander	*Desmognathus conanti*	Amphibian	668240
adbbsx	Dwarf Black-bellied Salamander	*Desmognathus folkertsi*	Amphibian	668241
andsax	Northern Dusky Salamander	*Desmognathus fuscus*	Amphibian	173633
aimsax	Imitator Salamander	*Desmognathus imitator*	Amphibian	173639
asnsax	Shovel-nosed Salamander	*Desmognathus marmoratus*	Amphibian	550398

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
aseasx	Seal Salamander	*Desmognathus monticola*	Amphibian	173640
aamdsx	Allegheny Mountain Dusky Salamander	*Desmognathus ochrophaeus*	Amphibian	173641
aocsax	Ocoee Salamander	*Desmognathus ocoee*	Amphibian	550243
abrdsx	Blue Ridge Dusky Salamander	*Desmognathus orestes*	Amphibian	550245
abesax	Black-bellied Salamander	*Desmognathus quadramaculatus*	Amphibian	173642
asadsx	Santeetlah Dusky Salamander	*Desmognathus santeetlah*	Amphibian	173643
abmsax	Black Mountain Salamander	*Desmognathus welteri*	Amphibian	173644
apysax	Pygmy Salamander	*Desmognathus wrighti*	Amphibian	173645
aigsax	Idaho Giant Salamander	*Dicamptodon aterrimus*	Amphibian	173741
acgsax	Cope's Giant Salamander	*Dicamptodon copei*	Amphibian	173742
acasax	Calfifornia Giant Salamander	*Dicamptodon ensatus*	Amphibian	173743
acogsx	Coastal Giant Salamander	*Dicamptodon tenebrosus*	Amphibian	550242
argcfx	Rio Grande Chirping Frog	*Eleutherodactylus cystignathoides*	Amphibian	550238
aspcfx	Spotted Chirping Frog	*Eleutherodactylus guttilatus*	Amphibian	
accfrx	Cliff Chirping Frog	*Eleutherodactylus marnockii*	Amphibian	550240
aghfrx	Greenhouse Frog	*Eleutherodactylus planirostris*	Amphibian	173568
aensax	Ensatina	*Ensatina eschscholtzii*	Amphibian	173732
adasax	Dark-sided Salamander	*Eurycea aquatica*	Amphibian	173689
antlsx	Northern Two-lined Salamander	*Eurycea bislineata*	Amphibian	173685
achdsx	Chamberlain's Dwarf Salamander	*Eurycea chamberlaini*	Amphibian	668289
asasax	Salado Salamander	*Eurycea chisholmensis*	Amphibian	668290
astlsx	Southern Two-lined Salamander	*Eurycea cirrigera*	Amphibian	550246
atlsax	Three-lined Salamander	*Eurycea guttolineata*	Amphibian	586362
ajusax	Junaluska Salamander	*Eurycea junaluska*	Amphibian	173690
accsax	Cascade Caverns Salamander	*Eurycea latitans*	Amphibian	208320
altasx	Long-tailed Salamander	*Eurycea longicauda*	Amphibian	173687
acvsax	Cave Salamander	*Eurycea lucifuga*	Amphibian	173691
amrsax	Many-ribbed Salamander	*Eurycea multiplicata*	Amphibian	173692
asmsax	San Marcos Salamander	*Eurycea nana*	Amphibian	173693
agesax	Georgetown Salamander	*Eurycea naufragia*	Amphibian	668291
atxsax	Texas Salamander	*Eurycea neotenes*	Amphibian	173694
afbsax	Fern Bank Salamander	*Eurycea pterophila*	Amphibian	208322
adwsax	Dwarf Salamander	*Eurycea quadridigitata*	Amphibian	173695
atbsax	Texas Blind Salamander	*Eurycea rathbuni*	Amphibian	586343
ablsax	Blanco Blind Salamander	*Eurycea robusta*	Amphibian	586344
abspsx	Barton Springs Salamander	*Eurycea sosorum*	Amphibian	550247
agsalx	Grotto Salamander	*Eurycea spelaea*	Amphibian	668292
ajpsax	Jollyville Plateau Salamander	*Eurycea tonkawae*	Amphibian	668293
acbsax	Comal Blind Salamander	*Eurycea tridentifera*	Amphibian	173696
avfsax	Valdina Farms Salamander	*Eurycea troglodytes*	Amphibian	208323

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
aoksax	Oklahoma Salamander	*Eurycea tynerensis*	Amphibian	173697
aabsax	Austin Blind Salamander	*Eurycea waterlooensis*	Amphibian	668294
abrtsx	Blue Ridge Two-lined Salamander	*Eurycea wilderae*	Amphibian	550248
aenmtx	Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*	Amphibian	173467
awnmtx	Western Narrow-mouthed Toad	*Gastrophryne olivacea*	Amphibian	173468
abcsax	Berry Cave Salamander	*Gyrinophilus gulolineatus*	Amphibian	550249
atcsax	Tennessee Cave Salamander	*Gyrinophilus palleucus*	Amphibian	173714
asprsx	Spring Salamander	*Gyrinophilus porphyriticus*	Amphibian	173715
awvssx	West Virginia Spring Salamander	*Gyrinophilus subterraneus*	Amphibian	208350
agbsax	Georgia Blind Salamander	*Haideotriton wallacei*	Amphibian	173717
aftsax	Four-toed Salamander	*Hemidactylium scutatum*	Amphibian	173678
alisax	Limestone Salamander	*Hydromantes brunus*	Amphibian	173719
amlysx	Mount Lyell Salamander	*Hydromantes platycephalus*	Amphibian	173720
ashsax	Shasta Salamander	*Hydromantes shastae*	Amphibian	173721
apbtrx	Pine Barrens Treefrog	*Hyla andersonii*	Amphibian	173509
acytrx	Canyon Treefrog	*Hyla arenicolor*	Amphibian	173510
abvtrx	Bird-voiced Treefrog	*Hyla avivoca*	Amphibian	173511
acgtrx	Cope's Gray Treefrog	*Hyla chrysoscelis*	Amphibian	173502
agrtrx	Green Treefrog	*Hyla cinerea*	Amphibian	173505
apwtrx	Pine Woods Treefrog	*Hyla femoralis*	Amphibian	173499
abatrx	Barking Treefrog	*Hyla gratiosa*	Amphibian	173508
asqtrx	Squirrel Treefrog	*Hyla squirella*	Amphibian	173504
agytrx	Gray Treefrog	*Hyla versicolor*	Amphibian	173503
aaztrx	Arizona Treefrog	*Hyla wrightorum*	Amphibian	207283
ashfrx	Sheep Frog	*Hypopachus variolosus*	Amphibian	173470
amwlfx	Mexican White-lipped Frog	*Leptodactylus fragilis*	Amphibian	173578
acwfrx	Crawfish Frog	*Lithobates areolatus*	Amphibian	775078
arglfx	Rio Grande Leopard Frog	*Lithobates berlandieri*	Amphibian	775079
aplfrx	Plains Leopard Frog	*Lithobates blairi*	Amphibian	775080
agofrx	Gopher Frog	*Lithobates capito*	Amphibian	775083
aambux	American Bullfrog	*Lithobates catesbeianus*	Amphibian	775084
aclfrx	Chiricahua Leopard Frog	*Lithobates chiricahuensis*	Amphibian	775086
agrfrx	Green Frog	*Lithobates clamitans*	Amphibian	775087
apigfx	Pig Frog	*Lithobates grylio*	Amphibian	775091
arifrx	River Frog	*Lithobates heckscheri*	Amphibian	775092
afbfrx	Florida Bog Frog	*Lithobates okaloosae*	Amphibian	775103
arlfrx	Relict Leopard Frog	*Lithobates onca*	Amphibian	775105
apifrx	Pickerel Frog	*Lithobates palustris*	Amphibian	775107
anlfrx	Northern Leopard Frog	*Lithobates pipiens*	Amphibian	775108
amifrx	Mink Frog	*Lithobates septentrionalis*	Amphibian	775112

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
adgfrx	Dusky Gopher Frog	*Lithobates sevosus*	Amphibian	775113
aslfrx	Southern Leopard Frog	*Lithobates sphenocephalus*	Amphibian	775116
acrfrx	Carpenter Frog	*Lithobates virgatipes*	Amphibian	775123
allfrx	Lowland Leopard Frog	*Lithobates yavapaiensis*	Amphibian	775125
abwrwx	Black Warrior River Waterdog	*Necturus alabamensis*	Amphibian	173628
aguwax	Gulf Coast Waterdog	*Necturus beyeri*	Amphibian	173629
anrwax	Neuse River Waterdog	*Necturus lewisi*	Amphibian	173627
amudpx	Mudpuppy	*Necturus maculosus*	Amphibian	173630
adwwax	Dwarf Waterdog	*Necturus punctatus*	Amphibian	173625
absnex	Black-spotted Newt	*Notophthalmus meridionalis*	Amphibian	173617
astnex	Striped Newt	*Notophthalmus perstriatus*	Amphibian	173618
aeanex	Eastern Newt	*Notophthalmus viridescens*	Amphibian	173615
asntox	Sonoran Desert Toad	*Ollotis alvaria*	Amphibian	775976
agctox	Gulf Coast Toad	*Ollotis nebulifer*	Amphibian	775988
acutrx	Cuban Treefrog	*Osteopilus septentrionalis*	Amphibian	173538
arhsax	Red Hills Salamander	*Phaeognathus hubrichti*	Amphibian	173725
awssax	Western Slimy Salamander	*Plethodon albagula*	Amphibian	208278
abgcsx	Blue Ridge Gray-cheeked Salamander	*Plethodon amplus*	Amphibian	668316
aozsax	Ozark Zigzag Salamander	*Plethodon angusticlavius*	Amphibian	668317
ascsax	Scott Bar Salamander	*Plethodon asupak*	Amphibian	685566
atesax	Tellico Salamander	*Plethodon aureolus*	Amphibian	208280
acmsax	Caddo Mountain Salamander	*Plethodon caddoensis*	Amphibian	173652
acsmsx	Chattahoochee Slimy Salamander	*Plethodon chattahoochee*	Amphibian	208281
achsax	Cheoah Bald Salamander	*Plethodon cheoah*	Amphibian	668318
aacssx	Atlantic Coast Slimy Salamander	*Plethodon chlorobryonis*	Amphibian	208282
aerbsx	Eastern Red-backed Salamander	*Plethodon cinereus*	Amphibian	173649
awsssx	White-spotted Slimy Salamander	*Plethodon cylindraceus*	Amphibian	208283
anzsax	Northern Zigzag Salamander	*Plethodon dorsalis*	Amphibian	173653
adusax	Dunn’s Salamander	*Plethodon dunni*	Amphibian	173654
anrsax	Northern Ravine Salamander	*Plethodon electromorphus*	Amphibian	668319
adnsax	Del Norte Salamander	*Plethodon elongatus*	Amphibian	173655
afmsax	Fourch Mountain Salamander	*Plethodon fourchensis*	Amphibian	173656
anssax	Northern Slimy Salamander	*Plethodon glutinosus*	Amphibian	173650
assmsx	Southeastern Slimy Salamander	*Plethodon grobmani*	Amphibian	208285
avrsax	Valley And Ridge Salamander	*Plethodon hoffmani*	Amphibian	173657
aposax	Peaks Of Otter Salamander	*Plethodon hubrichti*	Amphibian	173658
acosax	Coeur D’alene Salamander	*Plethodon idahoensis*	Amphibian	173659
arcsax	Red-cheeked Salamander	*Plethodon jordani*	Amphibian	173660
acpsax	Cumberland Plateau Salamander	*Plethodon kentucki*	Amphibian	173661
akssax	Kiamichi Slimy Salamander	*Plethodon kiamichi*	Amphibian	208287

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
alasax	Louisiana Slimy Salamander	*Plethodon kisatchie*	Amphibian	208288
almsax	Larch Mountain Salamander	*Plethodon larselli*	Amphibian	173662
asmgsx	South Mountain Gray-cheeked Salamander	*Plethodon meridianus*	Amphibian	668320
asgcsx	Southern Gray-cheeked Salamander	*Plethodon metcalfi*	Amphibian	668321
amssax	Mississippi Slimy Salamander	*Plethodon mississippi*	Amphibian	208289
angcsx	Northern Gray-cheeked Salamander	*Plethodon montanus*	Amphibian	668322
ajmsax	Jemez Mountains Salamander	*Plethodon neomexicanus*	Amphibian	173663
acmtsx	Cheat Mountain Salamander	*Plethodon nettingi*	Amphibian	173664
aocssx	Ocmulgee Slimy Salamander	*Plethodon ocmulgee*	Amphibian	208290
armsax	Rich Mountain Salamander	*Plethodon ouachitae*	Amphibian	173665
apmsax	Pigeon Mountain Salamander	*Plethodon petraeus*	Amphibian	208291
acksax	Cow Knob Salamander	*Plethodon punctatus*	Amphibian	173666
asrsax	Southern Ravine Salamander	*Plethodon richmondi*	Amphibian	173667
assysx	Savannah Slimy Salamander	*Plethodon savannah*	Amphibian	208292
asqsax	Sequoyah Slimy Salamander	*Plethodon sequoyah*	Amphibian	208293
asrbsx	Southern Red-backed Salamander	*Plethodon serratus*	Amphibian	173668
asdsax	Shenandoah Salamander	*Plethodon shenandoah*	Amphibian	173669
abgsax	Big Levels Salamander	*Plethodon sherando*	Amphibian	775911
arlsax	Red-legged Salamander	*Plethodon shermani*	Amphibian	668323
asysax	Siskiyou Mountains Salamander	*Plethodon stormi*	Amphibian	173670
asoasx	Southern Appalachian Salamander	*Plethodon teyahalee*	Amphibian	208294
avdsax	Van Dyke's Salamander	*Plethodon vandykei*	Amphibian	173671
ascssx	South Carolina Slimy Salamander	*Plethodon variolatus*	Amphibian	208295
awrbsx	Western Red-backed Salamander	*Plethodon vehiculum*	Amphibian	173672
aszsax	Southern Zigzag Salamander	*Plethodon ventralis*	Amphibian	668324
ashmsx	Shenandoah Mountain Salamander	*Plethodon virginia*	Amphibian	668325
awbsax	Webster's Salamander	*Plethodon websteri*	Amphibian	173673
awhsax	Wehrle's Salamander	*Plethodon wehrlei*	Amphibian	173674
awlsax	Weller's Salamander	*Plethodon welleri*	Amphibian	173675
ayosax	Yonahlossee Salamander	*Plethodon yonahlossee*	Amphibian	173676
amcfrx	Mountain Chorus Frog	*Pseudacris brachyphona*	Amphibian	173528
abrfrx	Brimley's Chorus Frog	*Pseudacris brimleyi*	Amphibian	173524
acatrx	California Treefrog	*Pseudacris cadaverina*	Amphibian	550237
aspfrx	Spotted Chorus Frog	*Pseudacris clarkii*	Amphibian	173529
asppex	Spring Peeper	*Pseudacris crucifer*	Amphibian	207303
aucfrx	Upland Chorus Frog	*Pseudacris feriarum*	Amphibian	207307
abctrx	Baja California Treefrog	*Pseudacris hypochondriaca*	Amphibian	774546
ailgrx	Illinois Chorus Frog	*Pseudacris illinoensis*	Amphibian	662726
anjfrx	New Jersey Chorus Frog	*Pseudacris kalmi*	Amphibian	774547
abofrx	Boreal Chorus Frog	*Pseudacris maculata*	Amphibian	207312

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
asofrx	Southern Chorus Frog	*Pseudacris nigrita*	Amphibian	173530
algfrx	Little Grass Frog	*Pseudacris ocularis*	Amphibian	207286
aocfrx	Ornate Chorus Frog	*Pseudacris ornata*	Amphibian	173531
anptrx	Northern Pacific Treefrog	*Pseudacris regilla*	Amphibian	207313
asitrx	Sierran Treefrog	*Pseudacris sierra*	Amphibian	774548
astfrx	Strecker's Chorus Frog	*Pseudacris streckeri*	Amphibian	173532
awcfrx	Western Chorus Frog	*Pseudacris triseriata*	Amphibian	173525
asdsix	Southern Dwarf Siren	*Pseudobranchus axanthus*	Amphibian	550244
andsix	Northern Dwarf Siren	*Pseudobranchus striatus*	Amphibian	173738
amusax	Mud Salamander	*Pseudotriton montanus*	Amphibian	173682
aresax	Red Salamander	*Pseudotriton ruber*	Amphibian	173680
anrlfx	Northern Red-legged Frog	*Rana aurora*	Amphibian	173446
afylfx	Foothill Yellow-legged Frog	*Rana boylii*	Amphibian	173449
acsfrx	Cascades Frog	*Rana cascadae*	Amphibian	173450
acrlfx	California Red-legged Frog	*Rana draytonii*	Amphibian	207009
acofrx	Columbia Spotted Frog	*Rana luteiventris*	Amphibian	550546
asmfrx	Southern Mountain Yellow-legged Frog	*Rana muscosa*	Amphibian	173454
aorfrx	Oregon Spotted Frog	*Rana pretiosa*	Amphibian	173458
asylfx	Sierra Nevada Yellow-legged Frog	*Rana sierrae*	Amphibian	775211
awofrx	Wood Frog	*Rana sylvatica*	Amphibian	775117
acanex	Cane Toad	*Rhinella marinus*	Amphibian	776032
abutox	Burrowing Toad	*Rhinophrynus dorsalis*	Amphibian	173552
actrsx	Cascade Torrent Salamander	*Rhyacotriton cascadae*	Amphibian	550250
actosx	Columbia Torrent Salamander	*Rhyacotriton kezeri*	Amphibian	550251
aotsax	Olympic Torrent Salamander	*Rhyacotriton olympicus*	Amphibian	173745
astosx	Southern Torrent Salamander	*Rhyacotriton variegatus*	Amphibian	550252
acospx	Couch's Spadefoot	*Scaphiopus couchii*	Amphibian	173429
aeaspx	Eastern Spadefoot	*Scaphiopus holbrookii*	Amphibian	173426
ahuspx	Hurter's Spadefoot	*Scaphiopus hurterii*	Amphibian	206987
alesix	Lesser Siren	*Siren intermedia*	Amphibian	173736
agrsix	Greater Siren	*Siren lacertina*	Amphibian	775942
amxtrx	Mexican Treefrog	*Smilisca baudinii*	Amphibian	173536
albtrx	Lowland Burrowing Treefrog	*Smilisca fodiens*	Amphibian	774570
aplspx	Plains Spadefoot	*Spea bombifrons*	Amphibian	206989
awespx	Western Spadefoot	*Spea hammondii*	Amphibian	206990
agbspx	Great Basin Spadefoot	*Spea intermontana*	Amphibian	206991
amxspx	Mexican Spadefoot	*Spea multiplicata*	Amphibian	206993
amlsax	Many-lined Salamander	*Stereochilus marginatus*	Amphibian	173647
arsnex	Rough-skinned Newt	*Taricha granulosa*	Amphibian	173620
arbnex	Red-bellied Newt	*Taricha rivularis*	Amphibian	173621

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
asenex	Sierra Newt	*Taricha sierrea*	Amphibian	
acfnex	California Newt	*Taricha torosa*	Amphibian	173622
bcohax	Cooper's Hawk	*Accipiter cooperii*	Bird	175309
bnogox	Northern Goshawk	*Accipiter gentilis*	Bird	175300
bsshax	Sharp-shinned Hawk	*Accipiter striatus*	Bird	175304
bcomyx	Common Myna	*Acridotheres tristis*	Bird	554025
bspsax	Spotted Sandpiper	*Actitis macularius*	Bird	726049
bclgrx	Clark's Grebe	*Aechmophorus clarkii*	Bird	554027
bwegrx	Western Grebe	*Aechmophorus occidentalis*	Bird	174503
bnswox	Northern Saw-whet Owl	*Aegolius acadicus*	Bird	177942
bboowx	Boreal Owl	*Aegolius funereus*	Bird	177938
bwtswx	White-throated Swift	*Aeronautes saxatalis*	Bird	178014
brwblx	Red-winged Blackbird	*Agelaius phoeniceus*	Bird	179045
btrblx	Tricolored Blackbird	*Agelaius tricolor*	Bird	179060
bbacsx	Bachman's Sparrow	*Aimophila aestivalis*	Bird	179386
bbospx	Botteri's Sparrow	*Aimophila botterii*	Bird	179390
brwspx	Rufous-winged Sparrow	*Aimophila carpalis*	Bird	179375
bcaspx	Cassin's Sparrow	*Aimophila cassinii*	Bird	179393
bfsspx	Five-striped Sparrow	*Aimophila quinquestriata*	Bird	554030
brcspx	Rufous-crowned Sparrow	*Aimophila ruficeps*	Bird	179377
bwodux	Wood Duck	*Aix sponsa*	Bird	175122
brazox	Razorbill	*Alca torda*	Bird	176971
bchukx	Chukar	*Alectoris chukar*	Bird	175908
bdovex	Dovekie	*Alle alle*	Bird	176982
bvchux	Violet-crowned Hummingbird	*Amazilia violiceps*	Bird	178066
bbbehx	Buff-bellied Hummingbird	*Amazilia yucatanensis*	Bird	178060
brcpax	Red-crowned Parrot	*Amazona viridigenalis*	Bird	177806
bbaisx	Baird's Sparrow	*Ammodramus bairdii*	Bird	179339
bsstsx	Saltmarsh Sharp-tailed Sparrow	*Ammodramus caudacutus*	Bird	179344
bhespx	Henslow's Sparrow	*Ammodramus henslowii*	Bird	179340
blcspx	Le Conte's Sparrow	*Ammodramus leconteii*	Bird	179345
bsespx	Seaside Sparrow	*Ammodramus maritimus*	Bird	179346
bnstsx	Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	Bird	554031
bgrspx	Grasshopper Sparrow	*Ammodramus savannarum*	Bird	179333
bsagsx	Sage Sparrow	*Amphispiza belli*	Bird	179402
bbtspx	Black-throated Sparrow	*Amphispiza bilineata*	Bird	179395
bnopix	Northern Pintail	*Anas acuta*	Bird	175074
bamwix	American Wigeon	*Anas americana*	Bird	175094
bnshox	Northern Shoveler	*Anas clypeata*	Bird	175096
bgwtex	Green-winged Teal	*Anas crecca*	Bird	175081

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bcitex	Cinnamon Teal	*Anas cyanoptera*	Bird	175089
bbwtex	Blue-winged Teal	*Anas discors*	Bird	175086
bmodux	Mottled Duck	*Anas fulvigula*	Bird	175070
beuwix	Eurasian Wigeon	*Anas penelope*	Bird	175092
bmallx	Mallard	*Anas platyrhynchos*	Bird	175063
babdux	American Black Duck	*Anas rubripes*	Bird	175068
bgadwx	Gadwall	*Anas strepera*	Bird	175073
banhix	Anhinga	*Anhinga anhinga*	Bird	174755
bbrnox	Brown Noddy	*Anous stolidus*	Bird	176941
bgwfgx	Greater White-fronted Goose	*Anser albifrons*	Bird	175020
bampix	American Pipit	*Anthus rubescens*	Bird	554127
bsppix	Sprague's Pipit	*Anthus spragueii*	Bird	178499
bwesjx	Western Scrub-jay	*Aphelocoma californica*	Bird	554128
bflsjx	Florida Scrub-jay	*Aphelocoma coerulescens*	Bird	179693
bissjx	Island Scrub-jay	*Aphelocoma insularis*	Bird	554129
bmejax	Mexican Jay	*Aphelocoma ultramarina*	Bird	179707
bsurfx	Surfbird	*Aphriza virgata*	Bird	176673
bgoeax	Golden Eagle	*Aquila chrysaetos*	Bird	175407
blimpx	Limpkin	*Aramus guarauna*	Bird	176197
bgrepx	Green Parakeet	*Aratinga holochlora*	Bird	177683
bmipax	Mitred Parakeet	*Aratinga mitrata*	Bird	177686
bbchux	Black-chinned Hummingbird	*Archilochus alexandri*	Bird	178033
brthux	Ruby-throated Hummingbird	*Archilochus colubris*	Bird	178032
bgregx	Great Egret	*Ardea alba*	Bird	554135
bgbhex	Great Blue Heron	*Ardea herodias*	Bird	174773
brutux	Ruddy Turnstone	*Arenaria interpres*	Bird	176571
bbltux	Black Turnstone	*Arenaria melanocephala*	Bird	176574
bolspx	Olive Sparrow	*Arremonops rufivirgatus*	Bird	179271
bseowx	Short-eared Owl	*Asio flammeus*	Bird	177935
bleowx	Long-eared Owl	*Asio otus*	Bird	177932
bbuowx	Burrowing Owl	*Athene cunicularia*	Bird	177946
bverdx	Verdin	*Auriparus flaviceps*	Bird	178759
blescx	Lesser Scaup	*Aythya affinis*	Bird	175134
bredhx	Redhead	*Aythya americana*	Bird	175125
brndux	Ring-necked Duck	*Aythya collaris*	Bird	175128
bgrscx	Greater Scaup	*Aythya marila*	Bird	175130
bcanvx	Canvasback	*Aythya valisineria*	Bird	175129
bbctix	Black-crested Titmouse	*Baeolophus atricristatus*	Bird	558842
btutix	Tufted Titmouse	*Baeolophus bicolor*	Bird	554138
boatix	Oak Titmouse	*Baeolophus inornatus*	Bird	554140

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bjutix	Juniper Titmouse	*Baeolophus ridgwayi*	Bird	650445
bbrtix	Bridled Titmouse	*Baeolophus wollweberi*	Bird	554141
bupsax	Upland Sandpiper	*Bartramia longicauda*	Bird	176610
bcedwx	Cedar Waxwing	*Bombycilla cedrorum*	Bird	178532
bbowax	Bohemian Waxwing	*Bombycilla garrulus*	Bird	178529
brugrx	Ruffed Grouse	*Bonasa umbellus*	Bird	175790
bambix	American Bittern	*Botaurus lentiginosus*	Bird	174856
bmamux	Marbled Murrelet	*Brachyramphus marmoratus*	Bird	176996
batbrx	Brant	*Branta bernicla*	Bird	175011
bcangx	Canada Goose	*Branta canadensis*	Bird	174999
bcacgx	Cackling Goose	*Branta hutchinsii*	Bird	714068
bsnowx	Snowy Owl	*Bubo scandiacus*	Bird	686683
bghowx	Great Horned Owl	*Bubo virginianus*	Bird	177884
bcaegx	Cattle Egret	*Bubulcus ibis*	Bird	174803
bbuffx	Bufflehead	*Bucephala albeola*	Bird	175145
bcogox	Common Goldeneye	*Bucephala clangula*	Bird	175141
bbagox	Barrow's Goldeneye	*Bucephala islandica*	Bird	175144
bwthax	White-tailed Hawk	*Buteo albicaudatus*	Bird	175369
bzthax	Zone-tailed Hawk	*Buteo albonotatus*	Bird	175368
bsthax	Short-tailed Hawk	*Buteo brachyurus*	Bird	175372
brthax	Red-tailed Hawk	*Buteo jamaicensis*	Bird	175350
brlhax	Rough-legged Hawk	*Buteo lagopus*	Bird	175373
brshax	Red-shouldered Hawk	*Buteo lineatus*	Bird	175359
bgrhax	Gray Hawk	*Buteo nitidus*	Bird	175378
bbwhax	Broad-winged Hawk	*Buteo platypterus*	Bird	175365
bfehax	Ferruginous Hawk	*Buteo regalis*	Bird	175377
bswhax	Swainson's Hawk	*Buteo swainsoni*	Bird	175367
bcobhx	Common Black-hawk	*Buteogallus anthracinus*	Bird	175402
bgrhex	Green Heron	*Butorides virescens*	Bird	174793
bmudux	Muscovy Duck	*Cairina moschata*	Bird	175246
blarbx	Lark Bunting	*Calamospiza melanocorys*	Bird	179312
blalox	Lapland Longspur	*Calcarius lapponicus*	Bird	179526
bmclox	Mccown's Longspur	*Calcarius mccownii*	Bird	179525
bcclox	Chestnut-collared Longspur	*Calcarius ornatus*	Bird	179530
bsmlox	Smith's Longspur	*Calcarius pictus*	Bird	179529
bsandx	Sanderling	*Calidris alba*	Bird	176669
bdunlx	Dunlin	*Calidris alpina*	Bird	176661
breknx	Red Knot	*Calidris canutus*	Bird	176642
bstsax	Stilt Sandpiper	*Calidris himantopus*	Bird	554145
bpusax	Purple Sandpiper	*Calidris maritima*	Bird	176646

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bwesax	Western Sandpiper	*Calidris mauri*	Bird	176668
blesax	Least Sandpiper	*Calidris minutilla*	Bird	176656
brosax	Rock Sandpiper	*Calidris ptilocnemis*	Bird	176647
bcaqux	California Quail	*Callipepla californica*	Bird	175876
bgaqux	Gambel's Quail	*Callipepla gambelii*	Bird	175877
bscqux	Scaled Quail	*Callipepla squamata*	Bird	175872
bluhux	Lucifer Hummingbird	*Calothorax lucifer*	Bird	178030
banhux	Anna's Hummingbird	*Calypte anna*	Bird	178036
bcohux	Costa's Hummingbird	*Calypte costae*	Bird	178035
bnobtx	Northern Beardless-tyrannulet	*Camptostoma imberbe*	Bird	178376
bcacwx	Cactus Wren	*Campylorhynchus brunneicapillus*	Bird	178587
bcwwix	Chuck-will's-widow	*Caprimulgus carolinensis*	Bird	177960
bbcnix	Buff-collared Nightjar	*Caprimulgus ridgwayi*	Bird	177966
bwpwix	Whip-poor-will	*Caprimulgus vociferus*	Bird	177961
bcrcax	Crested Caracara	*Caracara cheriway*	Bird	175595
brfwax	Red-faced Warbler	*Cardellina rubrifrons*	Bird	178970
bnocax	Northern Cardinal	*Cardinalis cardinalis*	Bird	179124
bpyrrx	Pyrrhuloxia	*Cardinalis sinuatus*	Bird	179132
bcorex	Common Redpoll	*Carduelis flammea*	Bird	179230
bhorex	Hoary Redpoll	*Carduelis hornemanni*	Bird	179231
blagox	Lawrence's Goldfinch	*Carduelis lawrencei*	Bird	179232
bpisix	Pine Siskin	*Carduelis pinus*	Bird	179233
blegox	Lesser Goldfinch	*Carduelis psaltria*	Bird	179234
bamgox	American Goldfinch	*Carduelis tristis*	Bird	179236
bcafix	Cassin's Finch	*Carpodacus cassinii*	Bird	179190
bhofix	House Finch	*Carpodacus mexicanus*	Bird	179191
bpufix	Purple Finch	*Carpodacus purpureus*	Bird	179186
btuvux	Turkey Vulture	*Cathartes aura*	Bird	175265
bbithx	Bicknell's Thrush	*Catharus bicknelli*	Bird	554148
bveerx	Veery	*Catharus fuscescens*	Bird	179796
bhethx	Hermit Thrush	*Catharus guttatus*	Bird	179779
bswthx	Swainson's Thrush	*Catharus ustulatus*	Bird	179788
bcanwx	Canyon Wren	*Catherpes mexicanus*	Bird	178610
bgusgx	Gunnison Sage-grouse	*Centrocercus minimus*	Bird	677540
bgrsgx	Greater Sage-grouse	*Centrocercus urophasianus*	Bird	175855
bpigux	Pigeon Guillemot	*Cepphus columba*	Bird	176991
bblgux	Black Guillemot	*Cepphus grylle*	Bird	176985
brhaux	Rhinoceros Auklet	*Cerorhinca monocerata*	Bird	177023
bbrcrx	Brown Creeper	*Certhia americana*	Bird	178803
bbekix	Belted Kingfisher	*Ceryle alcyon*	Bird	178106

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bchswx	Chimney Swift	*Chaetura pelagica*	Bird	178001
bvaswx	Vaux's Swift	*Chaetura vauxi*	Bird	178002
bwrenx	Wrentit	*Chamaea fasciata*	Bird	178826
bsnplx	Snowy Plover	*Charadrius alexandrinus*	Bird	176510
bpiplx	Piping Plover	*Charadrius melodus*	Bird	176507
bmoplx	Mountain Plover	*Charadrius montanus*	Bird	176522
bseplx	Semipalmated Plover	*Charadrius semipalmatus*	Bird	176506
bkillx	Killdeer	*Charadrius vociferus*	Bird	176520
bwiplx	Wilson's Plover	*Charadrius wilsonia*	Bird	176517
bsngox	Snow Goose	*Chen caerulescens*	Bird	175038
brogox	Ross's Goose	*Chen rossii*	Bird	175041
bbltex	Black Tern	*Chlidonias niger*	Bird	176959
bgkinx	Green Kingfisher	*Chloroceryle americana*	Bird	178112
blaspx	Lark Sparrow	*Chondestes grammacus*	Bird	179371
bhbkix	Hook-billed Kite	*Chondrohierax uncinatus*	Bird	175449
blenix	Lesser Nighthawk	*Chordeiles acutipennis*	Bird	177988
bannix	Antillean Nighthawk	*Chordeiles gundlachii*	Bird	177992
bconix	Common Nighthawk	*Chordeiles minor*	Bird	177979
bamdix	American Dipper	*Cinclus mexicanus*	Bird	178536
bnohax	Northern Harrier	*Circus cyaneus*	Bird	175430
bmawrx	Marsh Wren	*Cistothorus palustris*	Bird	178608
bsewrx	Sedge Wren	*Cistothorus platensis*	Bird	178605
bltdux	Long-tailed Duck	*Clangula hyemalis*	Bird	175147
bevgrx	Evening Grosbeak	*Coccothraustes vespertinus*	Bird	179173
bybcux	Yellow-billed Cuckoo	*Coccyzus americanus*	Bird	177831
bbbcux	Black-billed Cuckoo	*Coccyzus erythropthalmus*	Bird	177834
bmacux	Mangrove Cuckoo	*Coccyzus minor*	Bird	177828
bnoflx	Northern Flicker	*Colaptes auratus*	Bird	178154
bgiflx	Gilded Flicker	*Colaptes chrysoides*	Bird	554081
bnobox	Northern Bobwhite	*Colinus virginianus*	Bird	175863
bbtpix	Band-tailed Pigeon	*Columba fasciata*	Bird	676899
bropix	Rock Pigeon	*Columba livia*	Bird	177071
bindox	Inca Dove	*Columbina inca*	Bird	177162
bcogdx	Common Ground-dove	*Columbina passerina*	Bird	177152
bosflx	Olive-sided Flycatcher	*Contopus cooperi*	Bird	554221
bgrpex	Greater Pewee	*Contopus pertinax*	Bird	178356
bwewpx	Western Wood-pewee	*Contopus sordidulus*	Bird	178360
beawpx	Eastern Wood-pewee	*Contopus virens*	Bird	178359
bblvux	Black Vulture	*Coragyps atratus*	Bird	175272
bamcrx	American Crow	*Corvus brachyrhynchos*	Bird	179731

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bnocrx	Northwestern Crow	*Corvus caurinus*	Bird	179736
bcorax	Common Raven	*Corvus corax*	Bird	179725
bchrax	Chihuahuan Raven	*Corvus cryptoleucus*	Bird	179730
btacrx	Tamaulipas Crow	*Corvus imparatus*	Bird	179743
bficrx	Fish Crow	*Corvus ossifragus*	Bird	179737
byerax	Yellow Rail	*Coturnicops noveboracensis*	Bird	176259
bgbanx	Groove-billed Ani	*Crotophaga sulcirostris*	Bird	177839
bbljax	Blue Jay	*Cyanocitta cristata*	Bird	179680
bstjax	Steller's Jay	*Cyanocitta stelleri*	Bird	179685
bbrjax	Brown Jay	*Cyanocorax morio*	Bird	179715
bgrejx	Green Jay	*Cyanocorax yncas*	Bird	179712
btrusx	Trumpeter Swan	*Cygnus buccinator*	Bird	174992
bwhswx	Tundra Swan	*Cygnus columbianus*	Bird	174987
bmuswx	Mute Swan	*Cygnus olor*	Bird	174985
bbbihx	Broad-billed Hummingbird	*Cynanthus latirostris*	Bird	178073
bblswx	Black Swift	*Cypseloides niger*	Bird	177997
bmonqx	Montezuma Quail	*Cyrtonyx montezumae*	Bird	175900
bsogrx	Sooty Grouse	*Dendragapus fuliginosus*	Bird	175776
bdugrx	Dusky Grouse	*Dendragapus obscurus*	Bird	175860
bbbwdx	Black-bellied Whistling-Duck	*Dendrocygna autumnalis*	Bird	175044
bfuwdx	Fulvous Whistling-duck	*Dendrocygna bicolor*	Bird	175046
bbtbwx	Black-throated Blue Warbler	*Dendroica caerulescens*	Bird	178888
bbbwax	Bay-breasted Warbler	*Dendroica castanea*	Bird	178912
bcerwx	Cerulean Warbler	*Dendroica cerulea*	Bird	178903
bgcwax	Golden-cheeked Warbler	*Dendroica chrysoparia*	Bird	178901
byrwax	Yellow-rumped Warbler	*Dendroica coronata*	Bird	178891
bprawx	Prairie Warbler	*Dendroica discolor*	Bird	178918
bytwax	Yellow-throated Warbler	*Dendroica dominica*	Bird	178905
bblbwx	Blackburnian Warbler	*Dendroica fusca*	Bird	178904
bgrwax	Grace's Warbler	*Dendroica graciae*	Bird	178909
bkiwax	Kirtland's Warbler	*Dendroica kirtlandii*	Bird	178917
bmawax	Magnolia Warbler	*Dendroica magnolia*	Bird	178886
bbtywx	Black-throated Gray Warbler	*Dendroica nigrescens*	Bird	178896
bhewax	Hermit Warbler	*Dendroica occidentalis*	Bird	178902
bpawax	Palm Warbler	*Dendroica palmarum*	Bird	178921
bcswax	Chestnut-sided Warbler	*Dendroica pensylvanica*	Bird	178911
bywarx	Yellow Warbler	*Dendroica petechia*	Bird	178878
bpiwax	Pine Warbler	*Dendroica pinus*	Bird	178914
bblpwx	Blackpoll Warbler	*Dendroica striata*	Bird	178913
bcmwax	Cape May Warbler	*Dendroica tigrina*	Bird	178887

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
btowax	Townsend's Warbler	*Dendroica townsendi*	Bird	178897
bbtnwx	Black-throated Green Warbler	*Dendroica virens*	Bird	178898
bbobox	Bobolink	*Dolichonyx oryzivorus*	Bird	179032
bpiwox	Pileated Woodpecker	*Dryocopus pileatus*	Bird	178166
bgrcax	Gray Catbird	*Dumetella carolinensis*	Bird	178625
blbhex	Little Blue Heron	*Egretta caerulea*	Bird	174827
breegx	Reddish Egret	*Egretta rufescens*	Bird	174824
bsnegx	Snowy Egret	*Egretta thula*	Bird	174813
btrhex	Tricolored Heron	*Egretta tricolor*	Bird	174826
bstkix	Swallow-tailed Kite	*Elanoides forficatus*	Bird	175289
bwtkix	White-tailed Kite	*Elanus leucurus*	Bird	175282
balflx	Alder Flycatcher	*Empidonax alnorum*	Bird	178340
bpsflx	Pacific-slope Flycatcher	*Empidonax difficilis*	Bird	178348
bybflx	Yellow-bellied Flycatcher	*Empidonax flaviventris*	Bird	178338
bbbflx	Buff-breasted Flycatcher	*Empidonax fulvifrons*	Bird	178352
bhaflx	Hammond's Flycatcher	*Empidonax hammondii*	Bird	554254
bleflx	Least Flycatcher	*Empidonax minimus*	Bird	178344
bduflx	Dusky Flycatcher	*Empidonax oberholseri*	Bird	178346
bcoflx	Cordilleran Flycatcher	*Empidonax occidentalis*	Bird	554255
bwiflx	Willow Flycatcher	*Empidonax traillii*	Bird	178341
bacflx	Acadian Flycatcher	*Empidonax virescens*	Bird	178339
bgrflx	Gray Flycatcher	*Empidonax wrightii*	Bird	178347
bholax	Horned Lark	*Eremophila alpestris*	Bird	554256
bwhibx	White Ibis	*Eudocimus albus*	Bird	174930
bmahux	Magnificent Hummingbird	*Eugenes fulgens*	Bird	178050
brublx	Rusty Blackbird	*Euphagus carolinus*	Bird	179091
bbrblx	Brewer's Blackbird	*Euphagus cyanocephalus*	Bird	179094
bspgrx	Spruce Grouse	*Falcipennis canadensis*	Bird	553896
bmerlx	Merlin	*Falco columbarius*	Bird	175613
bapfax	Aplomado Falcon	*Falco femoralis*	Bird	175610
bprfax	Prairie Falcon	*Falco mexicanus*	Bird	175603
bpefax	Peregrine Falcon	*Falco peregrinus*	Bird	175604
bgyrfx	Gyrfalcon	*Falco rusticolus*	Bird	175599
bamkex	American Kestrel	*Falco sparverius*	Bird	175622
batpux	Atlantic Puffin	*Fratercula arctica*	Bird	177025
btupux	Tufted Puffin	*Fratercula cirrhata*	Bird	177032
bmafrx	Magnificent Frigatebird	*Fregata magnificens*	Bird	174763
bamcox	American Coot	*Fulica americana*	Bird	176292
bwisnx	Wilson's Snipe	*Gallinago delicata*	Bird	726048
bcomox	Common Moorhen	*Gallinula chloropus*	Bird	176284

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bcolox	Common Loon	*Gavia immer*	Bird	174469
bpalox	Pacific Loon	*Gavia pacifica*	Bird	174475
brtlox	Red-throated Loon	*Gavia stellata*	Bird	174474
bgbtex	Gull-billed Tern	*Gelochelidon nilotica*	Bird	176882
bgrrox	Greater Roadrunner	*Geococcyx californianus*	Bird	177836
bcoyex	Common Yellowthroat	*Geothlypis trichas*	Bird	178944
bfepox	Ferruginous Pygmy-owl	*Glaucidium brasilianum*	Bird	177908
bnopox	Northern Pygmy-owl	*Glaucidium gnoma*	Bird	177902
bwhcrx	Whooping Crane	*Grus americana*	Bird	176176
bsacrx	Sandhill Crane	*Grus canadensis*	Bird	176177
bcacox	California Condor	*Gymnogyps californianus*	Bird	175274
bpijax	Pinyon Jay	*Gymnorhinus cyanocephalus*	Bird	179748
bbloyx	Black Oystercatcher	*Haematopus bachmani*	Bird	176475
bamoyx	American Oystercatcher	*Haematopus palliatus*	Bird	176472
bbaeax	Bald Eagle	*Haliaeetus leucocephalus*	Bird	175420
bwewax	Worm-eating Warbler	*Helmitheros vermivorum*	Bird	726195
bbnstx	Black-necked Stilt	*Himantopus mexicanus*	Bird	176726
bbarsx	Barn Swallow	*Hirundo rustica*	Bird	178448
bhadux	Harlequin Duck	*Histrionicus histrionicus*	Bird	175149
bligux	Little Gull	*Hydrocoloeus minutus*	Bird	176840
bwothx	Wood Thrush	*Hylocichla mustelina*	Bird	179777
bybchx	Yellow-breasted Chat	*Icteria virens*	Bird	178964
bbuorx	Bullock's Oriole	*Icterus bullockii*	Bird	554267
bhoorx	Hooded Oriole	*Icterus cucullatus*	Bird	179070
bbaorx	Baltimore Oriole	*Icterus galbula*	Bird	179083
bauorx	Audubon's Oriole	*Icterus graduacauda*	Bird	179065
balorx	Altamira Oriole	*Icterus gularis*	Bird	179076
bscorx	Scott's Oriole	*Icterus parisorum*	Bird	179082
bsborx	Spot-breasted Oriole	*Icterus pectoralis*	Bird	179068
bsbaox	Streak-backed Oriole	*Icterus pustulatus*	Bird	179079
bororx	Orchard Oriole	*Icterus spurius*	Bird	179064
bmikix	Mississippi Kite	*Ictinia mississippiensis*	Bird	554268
blebix	Least Bittern	*Ixobrychus exilis*	Bird	174846
bvathx	Varied Thrush	*Ixoreus naevius*	Bird	179773
bdejux	Dark-eyed Junco	*Junco hyemalis*	Bird	179410
byejux	Yellow-eyed Junco	*Junco phaeonotus*	Bird	179427
bwtptx	White-Tailed Ptarmigan	*Lagopus leucurus*	Bird	677541
bbthhx	Blue-throated Hummingbird	*Lampornis clemenciae*	Bird	178054
bnshrx	Northern Shrike	*Lanius excubitor*	Bird	178511
bloshx	Loggerhead Shrike	*Lanius ludovicianus*	Bird	178515

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bhergx	Herring Gull	*Larus argentatus*	Bird	176824
bcagux	California Gull	*Larus californicus*	Bird	176829
bmegux	Mew Gull	*Larus canus*	Bird	176832
brbgux	Ring-billed Gull	*Larus delawarensis*	Bird	176830
blbbgx	Lesser Black-backed Gull	*Larus fuscus*	Bird	176821
bgwgux	Glaucous-winged Gull	*Larus glaucescens*	Bird	176814
bicgux	Iceland Gull	*Larus glaucoides*	Bird	176811
bheegx	Heermann's Gull	*Larus heermanni*	Bird	176841
bglgux	Glaucous Gull	*Larus hyperboreus*	Bird	176808
byfgux	Yellow-footed Gull	*Larus livens*	Bird	176880
bgbbgx	Great Black-backed Gull	*Larus marinus*	Bird	176815
bwegux	Western Gull	*Larus occidentalis*	Bird	176817
bbogux	Bonaparte's Gull	*Larus philadelphia*	Bird	176839
bthgux	Thayer's Gull	*Larus thayeri*	Bird	176828
bblrax	Black Rail	*Laterallus jamaicensis*	Bird	176263
bwtdox	White-tipped Dove	*Leptotila verreauxi*	Bird	177166
blagux	Laughing Gull	*Leucophaeus atricilla*	Bird	176837
bfrgux	Franklin's Gull	*Leucophaeus pipixcan*	Bird	176838
bblrfx	Black Rosy-finch	*Leucosticte atrata*	Bird	179222
bbcrfx	Brown-capped Rosy-finch	*Leucosticte australis*	Bird	179223
bgcrfx	Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*	Bird	179215
bsbdox	Short-billed Dowitcher	*Limnodromus griseus*	Bird	176675
blbdox	Long-billed Dowitcher	*Limnodromus scolopaceus*	Bird	176679
bswwax	Swainson's Warbler	*Limnothlypis swainsonii*	Bird	178848
bmagox	Marbled Godwit	*Limosa fedoa*	Bird	176686
bhomex	Hooded Merganser	*Lophodytes cucullatus*	Bird	175183
brecrx	Red Crossbill	*Loxia curvirostra*	Bird	179259
bwwcrx	White-winged Crossbill	*Loxia leucoptera*	Bird	179268
beasox	Eastern Screech-owl	*Megascops asio*	Bird	686658
bwesox	Western Screech-owl	*Megascops kennicottii*	Bird	686659
bwhsox	Whiskered Screech-owl	*Megascops trichopsis*	Bird	686662
bgfwox	Golden-fronted Woodpecker	*Melanerpes aurifrons*	Bird	178194
brbwox	Red-bellied Woodpecker	*Melanerpes carolinus*	Bird	178195
brhwox	Red-headed Woodpecker	*Melanerpes erythrocephalus*	Bird	178186
bacwox	Acorn Woodpecker	*Melanerpes formicivorus*	Bird	178189
blewox	Lewis's Woodpecker	*Melanerpes lewis*	Bird	178196
bgiwox	Gila Woodpecker	*Melanerpes uropygialis*	Bird	178198
bwwscx	White-winged Scoter	*Melanitta fusca*	Bird	175163
bblscx	Black Scoter	*Melanitta nigra*	Bird	175171
bsuscx	Surf Scoter	*Melanitta perspicillata*	Bird	175170

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bwitux	Wild Turkey	*Meleagris gallopavo*	Bird	176136
bswspx	Swamp Sparrow	*Melospiza georgiana*	Bird	179488
blispx	Lincoln's Sparrow	*Melospiza lincolnii*	Bird	179484
bsospx	Song Sparrow	*Melospiza melodia*	Bird	179492
bcomex	Common Merganser	*Mergus merganser*	Bird	175185
brbmex	Red-breasted Merganser	*Mergus serrator*	Bird	175187
belowx	Elf Owl	*Micrathene whitneyi*	Bird	177912
bnomox	Northern Mockingbird	*Mimus polyglottos*	Bird	178620
bbawwx	Black-and-White Warbler	*Mniotilta varia*	Bird	178844
bbrocx	Bronzed Cowbird	*Molothrus aeneus*	Bird	179116
bbhcox	Brown-headed Cowbird	*Molothrus ater*	Bird	179112
bshcox	Shiny Cowbird	*Molothrus bonariensis*	Bird	179117
btosox	Townsend's Solitaire	*Myadestes townsendi*	Bird	179824
bwostx	Wood Stork	*Mycteria americana*	Bird	174897
batflx	Ash-throated Flycatcher	*Myiarchus cinerascens*	Bird	178316
bgcflx	Great Crested Flycatcher	*Myiarchus crinitus*	Bird	178309
bdcflx	Dusky-capped Flycatcher	*Myiarchus tuberculifer*	Bird	178319
bbcflx	Brown-crested Flycatcher	*Myiarchus tyrannulus*	Bird	178312
bparex	Painted Redstart	*Myioborus pictus*	Bird	178986
bsbflx	Sulphur-bellied Flycatcher	*Myiodynastes luteiventris*	Bird	178305
bmopax	Monk Parakeet	*Myiopsitta monachus*	Bird	177723
bmadux	Masked Duck	*Nomonyx dominicus*	Bird	554350
bclnux	Clark's Nutcracker	*Nucifraga columbiana*	Bird	179750
blbcux	Long-billed Curlew	*Numenius americanus*	Bird	176593
bwhimx	Whimbrel	*Numenius phaeopus*	Bird	176599
bycnhx	Yellow-crowned Night-heron	*Nyctanassa violacea*	Bird	174842
bbcnhx	Black-crowned Night-heron	*Nycticorax nycticorax*	Bird	174832
bcopax	Common Pauraque	*Nyctidromus albicollis*	Bird	177975
bftspx	Fork-tailed Storm-petrel	*Oceanodroma furcata*	Bird	174625
basspx	Ashy Storm-petrel	*Oceanodroma homochroa*	Bird	174634
blespx	Leach's Storm-petrel	*Oceanodroma leucorhoa*	Bird	174628
bbrtex	Bridled Tern	*Onychoprion anaethetus*	Bird	176897
bsotex	Sooty Tern	*Onychoprion fuscatus*	Bird	176894
bconwx	Connecticut Warbler	*Oporornis agilis*	Bird	178938
bkewax	Kentucky Warbler	*Oporornis formosus*	Bird	178937
bmowax	Mourning Warbler	*Oporornis philadelphia*	Bird	178939
bmgwax	Macgillivray's Warbler	*Oporornis tolmiei*	Bird	178940
bmouqx	Mountain Quail	*Oreortyx pictus*	Bird	175893
bsathx	Sage Thrasher	*Oreoscoptes montanus*	Bird	178654
bplchx	Plain Chachalaca	*Ortalis vetula*	Bird	175716

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bflowx	Flammulated Owl	*Otus flammeolus*	Bird	177878
brudux	Ruddy Duck	*Oxyura jamaicensis*	Bird	175175
brtbex	Rose-throated Becard	*Pachyramphus aglaiae*	Bird	178384
bosprx	Osprey	*Pandion haliaetus*	Bird	175590
bhashx	Harris's Hawk	*Parabuteo unicinctus*	Bird	175397
bnopax	Northern Parula	*Parula americana*	Bird	178868
btrpax	Tropical Parula	*Parula pitiayumi*	Bird	178869
bhospx	House Sparrow	*Passer domesticus*	Bird	179628
betspx	Eurasian Tree Sparrow	*Passer montanus*	Bird	179630
bsavsx	Savannah Sparrow	*Passerculus sandwichensis*	Bird	179314
bfospx	Fox Sparrow	*Passerella iliaca*	Bird	179464
blazbx	Lazuli Bunting	*Passerina amoena*	Bird	179151
bblgrx	Blue Grosbeak	*Passerina caerulea*	Bird	726198
bpabux	Painted Bunting	*Passerina ciris*	Bird	179156
binbux	Indigo Bunting	*Passerina cyanea*	Bird	179150
bvabux	Varied Bunting	*Passerina versicolor*	Bird	179152
brbpix	Red-billed Pigeon	*Patagioenas flavirostris*	Bird	676900
bwcpix	White-crowned Pigeon	*Patagioenas leucocephala*	Bird	676903
bawpex	American White Pelican	*Pelecanus erythrorhynchos*	Bird	174684
bbrpex	Brown Pelican	*Pelecanus occidentalis*	Bird	174685
bgrapx	Gray Partridge	*Perdix perdix*	Bird	175915
bgrajx	Gray Jay	*Perisoreus canadensis*	Bird	179667
bcaswx	Cave Swallow	*Petrochelidon fulva*	Bird	178460
bclswx	Cliff Swallow	*Petrochelidon pyrrhonota*	Bird	178455
bolwax	Olive Warbler	*Peucedramus taeniatus*	Bird	178874
bphaix	Phainopepla	*Phainopepla nitens*	Bird	179877
bdccox	Double-crested Cormorant	*Phalacrocorax auritus*	Bird	174717
bnecox	Neotropic Cormorant	*Phalacrocorax brasilianus*	Bird	554375
bgrcox	Great Cormorant	*Phalacrocorax carbo*	Bird	174715
bpecox	Pelagic Cormorant	*Phalacrocorax pelagicus*	Bird	174725
bbracx	Brandt's Cormorant	*Phalacrocorax penicillatus*	Bird	174724
bcopox	Common Poorwill	*Phalaenoptilus nuttallii*	Bird	555544
brephx	Red Phalarope	*Phalaropus fulicaria*	Bird	176734
bwiphx	Wilson's Phalarope	*Phalaropus tricolor*	Bird	176736
brnepx	Ring-necked Pheasant	*Phasianus colchicus*	Bird	175905
brbgrx	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Bird	179139
bbhgrx	Black-headed Grosbeak	*Pheucticus melanocephalus*	Bird	179140
bamflx	American Flamingo	*Phoenicopterus ruber*	Bird	174976
bbbmax	Black-billed Magpie	*Pica hudsonia*	Bird	726117
bybmax	Yellow-billed Magpie	*Pica nuttalli*	Bird	179723

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bwhwox	White-headed Woodpecker	*Picoides albolarvatus*	Bird	178256
bbbwox	Black-backed Woodpecker	*Picoides arcticus*	Bird	178250
barwox	Arizona Woodpecker	*Picoides arizonae*	Bird	685724
brcwox	Red-cockaded Woodpecker	*Picoides borealis*	Bird	178257
bnuwox	Nuttall's Woodpecker	*Picoides nuttallii*	Bird	178258
bdowox	Downy Woodpecker	*Picoides pubescens*	Bird	178259
blbwox	Ladder-backed Woodpecker	*Picoides scalaris*	Bird	178260
battwx	American Three-toed Woodpecker	*Picoides tridactylus*	Bird	685725
bhawox	Hairy Woodpecker	*Picoides villosus*	Bird	178262
bpigrx	Pine Grosbeak	*Pinicola enucleator*	Bird	179205
babtox	Abert's Towhee	*Pipilo aberti*	Bird	179307
bgttox	Green-tailed Towhee	*Pipilo chlorurus*	Bird	179310
bcaltx	California Towhee	*Pipilo crissalis*	Bird	202307
beatox	Eastern Towhee	*Pipilo erythrophthalmus*	Bird	179276
bcantx	Canyon Towhee	*Pipilo fuscus*	Bird	179293
bsptox	Spotted Towhee	*Pipilo maculatus*	Bird	554380
bhetax	Hepatic Tanager	*Piranga flava*	Bird	179884
bwetax	Western Tanager	*Piranga ludoviciana*	Bird	179882
bsctax	Scarlet Tanager	*Piranga olivacea*	Bird	179883
bsutax	Summer Tanager	*Piranga rubra*	Bird	179888
bgkisx	Great Kiskadee	*Pitangus sulphuratus*	Bird	178301
brospx	Roseate Spoonbill	*Platalea ajaja*	Bird	174941
bsnbux	Snow Bunting	*Plectrophenax nivalis*	Bird	179532
bwfibx	White-faced Ibis	*Plegadis chihi*	Bird	174926
bglibx	Glossy Ibis	*Plegadis falcinellus*	Bird	174924
bpagpx	Pacific Golden-plover	*Pluvialis fulva*	Bird	554381
bbbplx	Black-bellied Plover	*Pluvialis squatarola*	Bird	176567
bhogrx	Horned Grebe	*Podiceps auritus*	Bird	174482
brngrx	Red-necked Grebe	*Podiceps grisegena*	Bird	174479
beagrx	Eared Grebe	*Podiceps nigricollis*	Bird	174485
bpbgrx	Pied-billed Grebe	*Podilymbus podiceps*	Bird	174505
bbcchx	Black-capped Chickadee	*Poecile atricapilla*	Bird	554382
bcachx	Carolina Chickadee	*Poecile carolinensis*	Bird	554383
bmochx	Mountain Chickadee	*Poecile gambeli*	Bird	554385
bbochx	Boreal Chickadee	*Poecile hudsonica*	Bird	726112
bcbchx	Chestnut-backed Chickadee	*Poecile rufescens*	Bird	554387
bmechx	Mexican Chickadee	*Poecile sclateri*	Bird	554388
bbggnx	Blue-gray Gnatcatcher	*Polioptila caerulea*	Bird	179853
bcagnx	California Gnatcatcher	*Polioptila californica*	Bird	554389
bbtgnx	Black-tailed Gnatcatcher	*Polioptila melanura*	Bird	179857

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bvespx	Vesper Sparrow	*Pooecetes gramineus*	Bird	179366
bpugax	Purple Gallinule	*Porphyrio martinica*	Bird	707815
bsorax	Sora	*Porzana carolina*	Bird	176242
bpumax	Purple Martin	*Progne subis*	Bird	178464
bprowx	Prothonotary Warbler	*Protonotaria citrea*	Bird	178846
bbushx	Bushtit	*Psaltriparus minimus*	Bird	178764
bcaaux	Cassin's Auklet	*Ptychoramphus aleuticus*	Bird	177013
bmashx	Manx Shearwater	*Puffinus puffinus*	Bird	174555
bveflx	Vermilion Flycatcher	*Pyrocephalus rubinus*	Bird	178371
bbtgrx	Boat-tailed Grackle	*Quiscalus major*	Bird	179108
bgtgrx	Great-tailed Grackle	*Quiscalus mexicanus*	Bird	179109
bcogrx	Common Grackle	*Quiscalus quiscula*	Bird	179104
bkirax	King Rail	*Rallus elegans*	Bird	176207
bvirax	Virginia Rail	*Rallus limicola*	Bird	176221
bclrax	Clapper Rail	*Rallus longirostris*	Bird	176209
bamavx	American Avocet	*Recurvirostra americana*	Bird	176721
brckix	Ruby-crowned Kinglet	*Regulus calendula*	Bird	179870
bgckix	Golden-crowned Kinglet	*Regulus satrapa*	Bird	179865
bbansx	Bank Swallow	*Riparia riparia*	Bird	178436
bsnkix	Snail Kite	*Rostrhamus sociabilis*	Bird	175295
bblskx	Black Skimmer	*Rynchops niger*	Bird	554447
browrx	Rock Wren	*Salpinctes obsoletus*	Bird	178614
bblphx	Black Phoebe	*Sayornis nigricans*	Bird	178330
beaphx	Eastern Phoebe	*Sayornis phoebe*	Bird	178329
bsaphx	Say's Phoebe	*Sayornis saya*	Bird	178333
bamwox	American Woodcock	*Scolopax minor*	Bird	176580
bovenx	Ovenbird	*Seiurus aurocapilla*	Bird	726205
blowax	Louisiana Waterthrush	*Seiurus motacilla*	Bird	178935
bnowax	Northern Waterthrush	*Seiurus noveboracensis*	Bird	178931
bbtahx	Broad-tailed Hummingbird	*Selasphorus platycercus*	Bird	178038
bruhux	Rufous Hummingbird	*Selasphorus rufus*	Bird	178040
balhux	Allen's Hummingbird	*Selasphorus sasin*	Bird	178041
bamrex	American Redstart	*Setophaga ruticilla*	Bird	178979
bmoblx	Mountain Bluebird	*Sialia currucoides*	Bird	179811
bweblx	Western Bluebird	*Sialia mexicana*	Bird	179806
beablx	Eastern Bluebird	*Sialia sialis*	Bird	179801
brbnux	Red-breasted Nuthatch	*Sitta canadensis*	Bird	178784
bwbnux	White-breasted Nuthatch	*Sitta carolinensis*	Bird	178775
bbhnux	Brown-headed Nuthatch	*Sitta pusilla*	Bird	178785
bpynux	Pygmy Nuthatch	*Sitta pygmaea*	Bird	178788

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bcoeix	Common Eider	*Somateria mollissima*	Bird	175155
bkieix	King Eider	*Somateria spectabilis*	Bird	175160
brnsax	Red-naped Sapsucker	*Sphyrapicus nuchalis*	Bird	178211
brbsax	Red-breasted Sapsucker	*Sphyrapicus ruber*	Bird	178212
bwisax	Williamson's Sapsucker	*Sphyrapicus thyroideus*	Bird	178208
bybsax	Yellow-bellied Sapsucker	*Sphyrapicus varius*	Bird	178202
bdickx	Dickcissel	*Spiza americana*	Bird	179165
batspx	American Tree Sparrow	*Spizella arborea*	Bird	179432
bbcspx	Black-chinned Sparrow	*Spizella atrogularis*	Bird	179448
bbrspx	Brewer's Sparrow	*Spizella breweri*	Bird	179440
bccspx	Clay-colored Sparrow	*Spizella pallida*	Bird	179439
bchspx	Chipping Sparrow	*Spizella passerina*	Bird	179435
bfispx	Field Sparrow	*Spizella pusilla*	Bird	179443
bwcsex	White-collared Seedeater	*Sporophila torqueola*	Bird	179201
bnrwsx	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	Bird	178443
bcahux	Calliope Hummingbird	*Stellula calliope*	Bird	178048
bpajax	Parasitic Jaeger	*Stercorarius parasiticus*	Bird	176793
bcatex	Caspian Tern	*Sterna caspia*	Bird	176935
brostx	Roseate Tern	*Sterna dougallii*	Bird	176891
bfotex	Forster's Tern	*Sterna forsteri*	Bird	176887
bcotex	Common Tern	*Sterna hirundo*	Bird	176888
bartex	Arctic Tern	*Sterna paradisaea*	Bird	176890
bletex	Least Tern	*Sternula antillarum*	Bird	176923
bspdox	Spotted Dove	*Streptopelia chinensis*	Bird	177134
beucdx	Eurasian Collared-dove	*Streptopelia decaocto*	Bird	177139
bggowx	Great Gray Owl	*Strix nebulosa*	Bird	177929
bspowx	Spotted Owl	*Strix occidentalis*	Bird	177925
bbadox	Barred Owl	*Strix varia*	Bird	177921
beamex	Eastern Meadowlark	*Sturnella magna*	Bird	179034
bwemex	Western Meadowlark	*Sturnella neglecta*	Bird	179039
beustx	European Starling	*Sturnus vulgaris*	Bird	179637
bmabox	Masked Booby	*Sula dactylatra*	Bird	174699
bxamux	Xantus's Murrelet	*Synthliboramphus hypoleucus*	Bird	177011
blegrx	Least Grebe	*Tachybaptus dominicus*	Bird	174508
btresx	Tree Swallow	*Tachycineta bicolor*	Bird	178431
bvgswx	Violet-green Swallow	*Tachycineta thalassina*	Bird	178427
beltex	Elegant Tern	*Thalasseus elegans*	Bird	176931
broytx	Royal Tern	*Thalasseus maximus*	Bird	176922
bsatex	Sandwich Tern	*Thalasseus sandvicensis*	Bird	176932
bbewrx	Bewick's Wren	*Thryomanes bewickii*	Bird	178562

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bcarwx	Carolina Wren	*Thryothorus ludovicianus*	Bird	178581
bbethx	Bendire's Thrasher	*Toxostoma bendirei*	Bird	178636
bcrthx	Crissal Thrasher	*Toxostoma crissale*	Bird	178652
bcbthx	Curve-billed Thrasher	*Toxostoma curvirostre*	Bird	178637
blcthx	Le Conte's Thrasher	*Toxostoma lecontei*	Bird	178645
blbthx	Long-billed Thrasher	*Toxostoma longirostre*	Bird	178630
bcathx	California Thrasher	*Toxostoma redivivum*	Bird	178642
bbrthx	Brown Thrasher	*Toxostoma rufum*	Bird	178627
bleyex	Lesser Yellowlegs	*Tringa flavipes*	Bird	176620
bwatax	Wandering Tattler	*Tringa incana*	Bird	176630
bgryex	Greater Yellowlegs	*Tringa melanoleuca*	Bird	176619
bwillx	Willet	*Tringa semipalmata*	Bird	176638
bsosax	Solitary Sandpiper	*Tringa solitaria*	Bird	176615
bhowrx	House Wren	*Troglodytes aedon*	Bird	178541
bwiwrx	Winter Wren	*Troglodytes troglodytes*	Bird	178547
beltrx	Elegant Trogon	*Trogon elegans*	Bird	178096
bamrox	American Robin	*Turdus migratorius*	Bird	179759
bgrpcx	Greater Prairie-chicken	*Tympanuchus cupido*	Bird	175834
blepcx	Lesser Prairie-chicken	*Tympanuchus pallidicinctus*	Bird	175838
bstgrx	Sharp-tailed Grouse	*Tympanuchus phasianellus*	Bird	175841
bcokix	Couch's Kingbird	*Tyrannus couchii*	Bird	178291
btbkix	Thick-billed Kingbird	*Tyrannus crassirostris*	Bird	178292
bgrakx	Gray Kingbird	*Tyrannus dominicensis*	Bird	178280
bstflx	Scissor-tailed Flycatcher	*Tyrannus forficatus*	Bird	178293
btrkix	Tropical Kingbird	*Tyrannus melancholicus*	Bird	178282
beakix	Eastern Kingbird	*Tyrannus tyrannus*	Bird	178279
bwekix	Western Kingbird	*Tyrannus verticalis*	Bird	178287
bcakix	Cassin's Kingbird	*Tyrannus vociferans*	Bird	178288
bbanox	Barn Owl	*Tyto alba*	Bird	177851
bcomux	Common Murre	*Uria aalge*	Bird	176974
btbmux	Thick-billed Murre	*Uria lomvia*	Bird	176978
bocwax	Orange-crowned Warbler	*Vermivora celata*	Bird	178856
bgwwax	Golden-winged Warbler	*Vermivora chrysoptera*	Bird	178852
bcolwx	Colima Warbler	*Vermivora crissalis*	Bird	178865
bluwax	Lucy's Warbler	*Vermivora luciae*	Bird	178866
btewax	Tennessee Warbler	*Vermivora peregrina*	Bird	178855
bbwwax	Blue-winged Warbler	*Vermivora pinus*	Bird	178853
bnawax	Nashville Warbler	*Vermivora ruficapilla*	Bird	178861
bviwax	Virginia's Warbler	*Vermivora virginiae*	Bird	178864
bbwvix	Black-whiskered Vireo	*Vireo altiloquus*	Bird	179016

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
bbcvix	Black-capped Vireo	*Vireo atricapilla*	Bird	178990
bbevix	Bell's Vireo	*Vireo bellii*	Bird	179003
bcavix	Cassin's Vireo	*Vireo cassinii*	Bird	554456
bytvix	Yellow-throated Vireo	*Vireo flavifrons*	Bird	179009
bygvix	Yellow-green Vireo	*Vireo flavoviridis*	Bird	179019
bwavix	Warbling Vireo	*Vireo gilvus*	Bird	179023
bwevix	White-eyed Vireo	*Vireo griseus*	Bird	178991
bhuvix	Hutton's Vireo	*Vireo huttoni*	Bird	178997
brevix	Red-eyed Vireo	*Vireo olivaceus*	Bird	179021
bphvix	Philadelphia Vireo	*Vireo philadelphicus*	Bird	179022
bplvix	Plumbeous Vireo	*Vireo plumbeus*	Bird	554477
bbhvix	Blue-headed Vireo	*Vireo solitarius*	Bird	179010
bgrvix	Gray Vireo	*Vireo vicinior*	Bird	179008
bcawax	Canada Warbler	*Wilsonia canadensis*	Bird	178977
bhowax	Hooded Warbler	*Wilsonia citrina*	Bird	178972
bwiwax	Wilson's Warbler	*Wilsonia pusilla*	Bird	178973
byhblx	Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	Bird	179043
bwwdox	White-winged Dove	*Zenaida asiatica*	Bird	177121
bmodox	Mourning Dove	*Zenaida macroura*	Bird	177125
bwtspx	White-throated Sparrow	*Zonotrichia albicollis*	Bird	179462
bgcspx	Golden-crowned Sparrow	*Zonotrichia atricapilla*	Bird	179461
bewcsx	White-crowned Sparrow	*Zonotrichia leucophrys*	Bird	179455
bhaspx	Harris's Sparrow	*Zonotrichia querula*	Bird	179454
mmoosx	Moose	*Alces americanus*	Mammal	180703
mhasqx	Harris' Antelope Squirrel	*Ammospermophilus harrisii*	Mammal	180179
mtasqx	Texas Antelope Squirrel	*Ammospermophilus interpres*	Mammal	180180
mwtasx	White-tailed Antelope Squirrel	*Ammospermophilus leucurus*	Mammal	180181
mnasqx	Nelson's Antelope Squirrel	*Ammospermophilus nelsoni*	Mammal	180182
mbashx	Barbary Sheep	*Ammotragus lervia*	Mammal	180719
mpronx	Pronghorn	*Antilocapra americana*	Mammal	180717
mpabax	Pallid Bat	*Antrozous pallidus*	Mammal	180006
msewex	Sewellel	*Aplodontia rufa*	Mammal	180133
mwfvox	White-footed Vole	*Arborimus albipes*	Mammal	180352
mrtvox	Red Tree Vole	*Arborimus longicaudus*	Mammal	180353
mstvox	Sonoma Tree Vole	*Arborimus pomo*	Mammal	552505
mgfsex	Guadalupe Fur Seal	*Arctocephalus townsendi*	Mammal	180636
mjfebx	Jamaican Fruit-eating Bat	*Artibeus jamaicensis*	Mammal	180058
mchitx	Chital	*Axis axis*	Mammal	552474
mnpymx	Northern Pygmy Mouse	*Baiomys taylori*	Mammal	180368
mringx	Ringtail	*Bassariscus astutus*	Mammal	180577

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mbisox	American Bison	*Bison bison*	Mammal	180706
mnossx	Northern Short-tailed Shrew	*Blarina brevicauda*	Mammal	179967
msotsx	Southern Short-tailed Shrew	*Blarina carolinensis*	Mammal	179968
mestsx	Elliot's Short-tailed Shrew	*Blarina hylophaga*	Mammal	179969
mpyrax	Pygmy Rabbit	*Brachylagus idahoensis*	Mammal	552521
mnfsex	Northern Fur Seal	*Callorhinus ursinus*	Mammal	180627
mcoyox	Coyote	*Canis latrans*	Mammal	180599
mgrwox	Gray Wolf	*Canis lupus*	Mammal	180596
mambex	American Beaver	*Castor canadensis*	Mammal	180212
melk1x	Elk	*Cervus elaphus*	Mammal	180695
msikax	Sika	*Cervus nippon*	Mammal	180696
mbpmox	Bailey's Pocket Mouse	*Chaetodipus baileyi*	Mammal	552520
mcpmox	California Pocket Mouse	*Chaetodipus californicus*	Mammal	552491
mchpmx	Chihuahuan Pocket Mouse	*Chaetodipus eremicus*	Mammal	552489
msdpmx	San Diego Pocket Mouse	*Chaetodipus fallax*	Mammal	552510
mltpmx	Long-tailed Pocket Mouse	*Chaetodipus formosus*	Mammal	552482
mhpmox	Hispid Pocket Mouse	*Chaetodipus hispidus*	Mammal	552483
mrpmox	Rock Pocket Mouse	*Chaetodipus intermedius*	Mammal	552484
mnpmox	Nelson's Pocket Mouse	*Chaetodipus nelsoni*	Mammal	552485
mdpmox	Desert Pocket Mouse	*Chaetodipus penicillatus*	Mammal	552486
mbcpmx	Baja California Pocket Mouse	*Chaetodipus rudinoris*	Mammal	900643
mspmox	Spiny Pocket Mouse	*Chaetodipus spinatus*	Mammal	552487
mmltbx	Mexican Long-tongued Bat	*Choeronycteris mexicana*	Mammal	180062
msnmox	Star-nosed Mole	*Condylura cristata*	Mammal	179964
mahnsx	American Hog-nosed Skunk	*Conepatus leuconotus*	Mammal	180567
mrbebx	Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	Mammal	555664
mtbebx	Townsend's Big-eared Bat	*Corynorhinus townsendii*	Mammal	203452
myfpgx	Yellow-faced Pocket Gopher	*Cratogeomys castanops*	Mammal	180220
mnalsx	North American Least Shrew	*Cryptotis parva*	Mammal	179971
mgpdox	Gunnison's Prairie Dog	*Cynomys gunnisoni*	Mammal	180184
mwtpdx	White-tailed Prairie Dog	*Cynomys leucurus*	Mammal	180185
mptpdx	Black-tailed Prairie Dog	*Cynomys ludovicianus*	Mammal	180186
mupdox	Utah Prairie Dog	*Cynomys parvidens*	Mammal	180187
mfadex	Fallow Deer	*Dama dama*	Mammal	552472
mnbarx	Nine-banded Armadillo	*Dasypus novemcinctus*	Mammal	180103
mviopx	Virginia Opossum	*Didelphis virginiana*	Mammal	179921
makrax	Agile Kangaroo Rat	*Dipodomys agilis*	Mammal	180233
mckrax	California Kangaroo Rat	*Dipodomys californicus*	Mammal	180234
mgckrx	Gulf Coast Kangaroo Rat	*Dipodomys compactus*	Mammal	180235
mdkrax	Desert Kangaroo Rat	*Dipodomys deserti*	Mammal	180236

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mtkrax	Texas Kangaroo Rat	*Dipodomys elator*	Mammal	180237
mhkrax	Heermann's Kangaroo Rat	*Dipodomys heermanni*	Mammal	180239
mgkrax	Giant Kangaroo Rat	*Dipodomys ingens*	Mammal	180240
mmkrax	Merriam's Kangaroo Rat	*Dipodomys merriami*	Mammal	180241
mctkrx	Chisel-toothed Kangaroo Rat	*Dipodomys microps*	Mammal	180242
msjkrx	San Joaquin Kangaroo Rat	*Dipodomys nitratoides*	Mammal	180243
mokrax	Ord's Kangaroo Rat	*Dipodomys ordii*	Mammal	180244
mpkrax	Panamint Kangaroo Rat	*Dipodomys panamintinus*	Mammal	180245
mdzrax	Dulzura Kangaroo Rat	*Dipodomys simulans*	Mammal	555660
mbtkrx	Banner-tailed Kangaroo Rat	*Dipodomys spectabilis*	Mammal	180246
mskrax	Stephen's Kangaroo Rat	*Dipodomys stephensi*	Mammal	180247
mnfkrx	Narrow-faced Kangaroo Rat	*Dipodomys venustus*	Mammal	180248
mseotx	Sea Otter	*Enhydra lutris*	Mammal	180547
mbbbax	Big Brown Bat	*Eptesicus fuscus*	Mammal	180008
mhorsx	Horse	*Equus caballus*	Mammal	180691
mnapox	North American Porcupine	*Erethizon dorsatum*	Mammal	180393
mspbax	Spotted Bat	*Euderma maculatum*	Mammal	180010
msslix	Steller Sea Lion	*Eumetopias jubatus*	Mammal	180625
mfbbax	Florida Bonneted Bat	*Eumops floridanus*	Mammal	946276
mwbbax	Wagner's Bonneted Bat	*Eumops glaucinus*	Mammal	180079
mgbbax	Greater Bonneted Bat	*Eumops perotis*	Mammal	180080
mumbax	Underwood's Mastiff Bat	*Eumops underwoodi*	Mammal	180081
mdpgox	Desert Pocket Gopher	*Geomys arenarius*	Mammal	180215
mapgox	Attwater's Pocket Gopher	*Geomys attwateri*	Mammal	552516
mbpgox	Baird's Pocket Gopher	*Geomys breviceps*	Mammal	552517
mppgox	Plains Pocket Gopher	*Geomys bursarius*	Mammal	180216
mkjpgx	Knox Jones's Pocket Gopher	*Geomys knoxjonesi*	Mammal	552518
mtxgox	Texas Pocket Gopher	*Geomys personatus*	Mammal	180217
msegox	Southeastern Pocket Gopher	*Geomys pinetis*	Mammal	180218
mspogx	Strecker's Pocket Gopher	*Geomys streckeri*	Mammal	900166
mctpgx	Central Texas Pocket Gopher	*Geomys texensis*	Mammal	552519
mnfsqx	Northern Flying Squirrel	*Glaucomys sabrinus*	Mammal	180169
msfsqx	Southern Flying Squirrel	*Glaucomys volans*	Mammal	180170
mwolvx	Wolverine	*Gulo gulo*	Mammal	180551
mhitax	Himalayan Tahr	*Hemitragus jemlahicus*	Mammal	625146
mabebx	Allen's Big-eared Bat	*Idionycteris phyllotis*	Mammal	180012
mshbax	Silver-haired Bat	*Lasionycteris noctivagans*	Mammal	180014
mwrbax	Western Red Bat	*Lasiurus blossevillii*	Mammal	552512
merbax	Eastern Red Bat	*Lasiurus borealis*	Mammal	180016
mhobax	Hoary Bat	*Lasiurus cinereus*	Mammal	180017

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
msybax	Southern Yellow Bat	*Lasiurus ega*	Mammal	180018
mnybax	Northern Yellow Bat	*Lasiurus intermedius*	Mammal	180019
msebax	Seminole Bat	*Lasiurus seminolus*	Mammal	180020
mwybax	Western Yellow Bat	*Lasiurus xanthinus*	Mammal	552502
msavox	Sagebrush Vole	*Lemmiscus curtatus*	Mammal	552490
mocelx	Ocelot	*Leopardus pardalis*	Mammal	552470
mclobx	Curasoan Long-nosed Bat	*Leptonycteris curasoae*	Mammal	552464
mmlnbx	Mexican Long-nosed Bat	*Leptonycteris nivalis*	Mammal	180068
manjax	Antelope Jackrabbit	*Lepus alleni*	Mammal	180114
msnhax	Snowshoe Hare	*Lepus americanus*	Mammal	180112
mbtjax	Black-tailed Jackrabbit	*Lepus californicus*	Mammal	180115
mwsjax	White-sided Jackrabbit	*Lepus callotis*	Mammal	180116
mwtjax	White-tailed Jackrabbit	*Lepus townsendii*	Mammal	180118
mmspmx	Mexican Spiny Pocket Mouse	*Liomys irroratus*	Mammal	180250
mnarox	North American River Otter	*Lontra canadensis*	Mammal	180549
mcalyx	Canadian Lynx	*Lynx canadensis*	Mammal	180585
mbobcx	Bobcat	*Lynx rufus*	Mammal	180582
mclebx	Californian Leaf-nosed Bat	*Macrotus californicus*	Mammal	180071
mhomax	Hoary Marmot	*Marmota caligata*	Mammal	180139
myemax	Yellow-bellied Marmot	*Marmota flaviventris*	Mammal	180140
mwoodx	Woodchuck	*Marmota monax*	Mammal	180137
molmax	Olympic Marmot	*Marmota olympus*	Mammal	180141
mammax	American Marten	*Martes americana*	Mammal	180559
mfishx	Fisher	*Martes pennanti*	Mammal	180560
mhoskx	Hooded Skunk	*Mephitis macroura*	Mammal	180563
mstskx	Striped Skunk	*Mephitis mephitis*	Mammal	180562
mdkmox	Dark Kangaroo Mouse	*Microdipodops megacephalus*	Mammal	180252
mpkmox	Pale Kangaroo Mouse	*Microdipodops pallidus*	Mammal	180253
mcavox	California Vole	*Microtus californicus*	Mammal	180305
mgtvox	Gray-tailed Vole	*Microtus canicaudus*	Mammal	180306
mrovox	Rock Vole	*Microtus chrotorrhinus*	Mammal	180307
mltvox	Long-Tailed Vole	*Microtus longicaudus*	Mammal	180299
mmgvox	Mogollon Vole	*Microtus mogollonensis*	Mammal	552480
mmovox	Montane Vole	*Microtus montanus*	Mammal	180310
mprvox	Prairie Vole	*Microtus ochrogaster*	Mammal	180312
mcrvox	Creeping Vole	*Microtus oregoni*	Mammal	180313
mmevox	Meadow Vole	*Microtus pennsylvanicus*	Mammal	180297
mwovox	Woodland Vole	*Microtus pinetorum*	Mammal	180314
mnawvx	North American Water Vole	*Microtus richardsoni*	Mammal	180315
mtovox	Townsend's Vole	*Microtus townsendii*	Mammal	180316

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mnesex	Northern Elephant Seal	*Mirounga angustirostris*	Mammal	180672
mpmbax	Pallas's Mastiff Bat	*Molossus molossus*	Mammal	180083
mpgfbx	Peters's Ghost-faced Bat	*Mormoops megalophylla*	Mammal	180051
mhomox	House Mouse	*Mus musculus*	Mammal	180366
mermix	Ermine	*Mustela erminea*	Mammal	180555
mltwex	Long-tailed Weasel	*Mustela frenata*	Mammal	180556
mbffex	Black-footed Ferret	*Mustela nigripes*	Mammal	180557
mlewex	Least Weasel	*Mustela nivalis*	Mammal	180554
mammix	American Mink	*Mustela vison*	Mammal	726284
mcoypx	Coypu	*Myocastor coypus*	Mammal	180402
mwrbvx	Western Red-backed Vole	*Myodes californicus*	Mammal	180295
msrbvx	Southern Red-backed Vole	*Myodes gapperi*	Mammal	180294
mswmyx	Southwestern Myotis	*Myotis auriculus*	Mammal	179992
msemyx	Southeastern Myotis	*Myotis austroriparius*	Mammal	179993
mcamyx	California Myotis	*Myotis californicus*	Mammal	179991
mwsfmx	Western Small-footed Myotis	*Myotis ciliolabrum*	Mammal	179994
mlemyx	Long-eared Myotis	*Myotis evotis*	Mammal	179995
mgrmyx	Gray Myotis	*Myotis grisescens*	Mammal	179997
mkemyx	Keen's Myotis	*Myotis keenii*	Mammal	179989
mesfmx	Eastern Small-footed Myotis	*Myotis leibii*	Mammal	179999
mlbmyx	Little Brown Myotis	*Myotis lucifugus*	Mammal	179988
marmyx	Arizona Myotis	*Myotis occultus*	Mammal	946254
mnomyx	Northern Myotis	*Myotis septentrionalis*	Mammal	180000
minmyx	Indiana Myotis	*Myotis sodalis*	Mammal	180001
mfrmyx	Fringed Myotis	*Myotis thysanodes*	Mammal	180002
mcvmyx	Cave Myotis	*Myotis velifer*	Mammal	180003
mllmyx	Long-legged Myotis	*Myotis volans*	Mammal	179990
myumyx	Yuma Myotis	*Myotis yumanensis*	Mammal	180004
mwjmox	Woodland Jumping Mouse	*Napaeozapus insignis*	Mammal	180390
msacox	South American Coati	*Nasua narica*	Mammal	552462
mrtmux	Round-tailed Muskrat	*Neofiber alleni*	Mammal	180357
mwthwx	White-throated Woodrat	*Neotoma albigula*	Mammal	180370
mbtwox	Bushy-tailed Woodrat	*Neotoma cinerea*	Mammal	180371
mazwox	Arizona Woodrat	*Neotoma devia*	Mammal	552494
meawox	Eastern Woodrat	*Neotoma floridana*	Mammal	180372
mdfwox	Dusky-footed Woodrat	*Neotoma fuscipes*	Mammal	180373
mdewox	Desert Woodrat	*Neotoma lepida*	Mammal	180374
mwtwox	White-toothed Woodrat	*Neotoma leucodon*	Mammal	970628
mbewox	Big-eared Woodrat	*Neotoma macrotis*	Mammal	970629
malwox	Allegheny Woodrat	*Neotoma magister*	Mammal	555661

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mmewox	Mexican Woodrat	*Neotoma mexicana*	Mammal	180375
mspwox	Southern Plains Woodrat	*Neotoma micropus*	Mammal	180376
mstwox	Stephen's Woodrat	*Neotoma stephensi*	Mammal	180377
mshmox	Shrew-mole	*Neurotrichus gibbsii*	Mammal	179975
mcgshx	Cockrum's Gray Shrew	*Notiosorex cockrumi*	Mammal	709803
mcrgsx	Crawford's Gray Shrew	*Notiosorex crawfordi*	Mammal	179973
mevbax	Evening Bat	*Nycticeius humeralis*	Mammal	180022
mpftbx	Pocketed Free-tailed Bat	*Nyctinomops femorosaccus*	Mammal	180085
mbftbx	Big Free-tailed Bat	*Nyctinomops macrotis*	Mammal	180086
mpikax	American Pika	*Ochotona princeps*	Mammal	180109
mgomox	Golden Mouse	*Ochrotomys nuttalli*	Mammal	180379
mmudex	Mule Deer	*Odocoileus hemionus*	Mammal	180698
mwtdex	White-tailed Deer	*Odocoileus virginianus*	Mammal	180699
mcmmux	Common Muskrat	*Ondatra zibethicus*	Mammal	180318
mcgmox	Chihuahuan Grasshopper Mouse	*Onychomys arenicola*	Mammal	180381
mngmox	Northern Grasshopper Mouse	*Onychomys leucogaster*	Mammal	180382
msgmox	Southern Grasshopper Mouse	*Onychomys torridus*	Mammal	180383
mmogox	Mountain Goat	*Oreamnos americanus*	Mammal	180713
mgemsx	Gemsbok	*Oryx gazella*	Mammal	625180
mcoorx	Coues' Oryzomys	*Oryzomys couesi*	Mammal	180337
mmaorx	Marsh Oryzomys	*Oryzomys palustris*	Mammal	180336
mbishx	Bighorn Sheep	*Ovis canadensis*	Mammal	180711
mjagux	Jaguar	*Panthera onca*	Mammal	180593
mhtmox	Hairy-tailed Mole	*Parascalops breweri*	Mammal	179977
mcopex	Collared Peccary	*Pecari tajacu*	Mammal	552761
mwepmx	White-eared Pocket Mouse	*Perognathus alticolus*	Mammal	180255
mapmox	Arizona Pocket Mouse	*Perognathus amplus*	Mammal	180256
mobpmx	Olive-backed Pocket Mouse	*Perognathus fasciatus*	Mammal	180260
mppmox	Plains Pocket Mouse	*Perognathus flavescens*	Mammal	180261
mslmox	Silky Pocket Mouse	*Perognathus flavus*	Mammal	180262
msjpmx	San Joaquin Pocket Mouse	*Perognathus inornatus*	Mammal	180265
mlpmox	Little Pocket Mouse	*Perognathus longimembris*	Mammal	180267
mmpmox	Merriam's Pocket Mouse	*Perognathus merriami*	Mammal	552488
mgbpmx	Great Basin Pocket Mouse	*Perognathus parvus*	Mammal	180269
mtxdex	Texas Deermouse	*Peromyscus attwateri*	Mammal	180281
mbrdex	Brush Deermouse	*Peromyscus boylii*	Mammal	180282
mcadex	California Deermouse	*Peromyscus californicus*	Mammal	180283
mcndex	Canyon Deermouse	*Peromyscus crinitus*	Mammal	180284
mccdex	Cactus Deermouse	*Peromyscus eremicus*	Mammal	180286
mnbdex	Northern Baja Deermouse	*Peromyscus fraterculus*	Mammal	970631

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mcodex	Cotton Deermouse	*Peromyscus gossypinus*	Mammal	180279
msadex	Saxicoline Deermouse	*Peromyscus gratus*	Mammal	552495
mnodex	Northwestern Deermouse or Keen's Mouse	*Peromyscus keeni*	Mammal	552497
mwfdex	White-footed Deermouse	*Peromyscus leucopus*	Mammal	180278
mnadex	North American Deermouse	*Peromyscus maniculatus*	Mammal	180276
mbedex	Black-eared Deermouse	*Peromyscus melanotis*	Mammal	180287
mmedex	Merriam's Deermouse	*Peromyscus merriami*	Mammal	180288
mnrdex	Northern Rock Deermouse	*Peromyscus nasutus*	Mammal	552496
mwadex	White-ankled Deermouse	*Peromyscus pectoralis*	Mammal	180289
moldex	Oldfield Deermouse	*Peromyscus polionotus*	Mammal	180290
mpidex	Pinon Deermouse	*Peromyscus truei*	Mammal	180291
mwhvox	Western Heather Vole	*Phenacomys intermedius*	Mammal	180359
mehvox	Eastern Heather Vole	*Phenacomys ungava*	Mammal	552492
mhasex	Harbor Seal	*Phoca vitulina*	Mammal	180649
mwepix	Western Pipistrelle	*Pipistrellus hesperus*	Mammal	180024
meapix	Eastern Pipistrelle	*Pipistrellus subflavus*	Mammal	180025
mfldex	Florida Deermouse	*Podomys floridanus*	Mammal	180339
mraccx	Raccoon	*Procyon lotor*	Mammal	180575
mcougx	Cougar	*Puma concolor*	Mammal	552479
mjagdx	Jaguarundi	*Puma yagouaroundi*	Mammal	726257
mcarix	Caribou	*Rangifer tarandus*	Mammal	180701
mbrrtx	Brown Rat	*Rattus norvegicus*	Mammal	180363
mrorax	Roof Rat	*Rattus rattus*	Mammal	180362
mfhmox	Fulvous Harvest Mouse	*Reithrodontomys fulvescens*	Mammal	180341
mehmox	Eastern Harvest Mouse	*Reithrodontomys humulis*	Mammal	180342
mwhmox	Western Harvest Mouse	*Reithrodontomys megalotis*	Mammal	180343
mphmox	Plains Harvest Mouse	*Reithrodontomys montanus*	Mammal	180344
msmhmx	Salt-marsh Harvest Mouse	*Reithrodontomys raviventris*	Mammal	180345
msambx	Sambar	*Rusa unicolor*	Mammal	625051
meamox	Eastern Mole	*Scalopus aquaticus*	Mammal	179979
mbfmox	Broad-footed Mole	*Scapanus latimanus*	Mammal	179981
mcsmox	Coast Mole	*Scapanus orarius*	Mammal	179982
mtomox	Townsend's Mole	*Scapanus townsendii*	Mammal	179983
mabsqx	Abert's Squirrel	*Sciurus aberti*	Mammal	180173
magsqx	Arizona Gray Squirrel	*Sciurus arizonensis*	Mammal	180174
mrbsqx	Red-bellied Squirrel	*Sciurus aureogaster*	Mammal	552498
mebsqx	Eastern Gray Squirrel	*Sciurus carolinensis*	Mammal	180175
mwgsqx	Western Gray Squirrel	*Sciurus griseus*	Mammal	180176
mmfsqx	Mexican Fox Squirrel	*Sciurus nayaritensis*	Mammal	180177
mefsqx	Eastern Fox Squirrel	*Sciurus niger*	Mammal	180172

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[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
macrax	Arizona Cotton Rat	*Sigmodon arizonae*	Mammal	180347
mtbcrx	Tawny-bellied Cotton Rat	*Sigmodon fulviventer*	Mammal	180348
mhcrax	Hispid Cotton Rat	*Sigmodon hispidus*	Mammal	180349
myncrx	Yellow-nosed Cotton Rat	*Sigmodon ochrognathus*	Mammal	180350
macshx	Arctic Shrew	*Sorex arcticus*	Mammal	179935
marshx	Arizona Shrew	*Sorex arizonae*	Mammal	179939
mbdshx	Baird's Shrew	*Sorex bairdi*	Mammal	709810
mmrshx	Marsh Shrew	*Sorex bendirii*	Mammal	179940
mcishx	Cinereus (Masked) Shrew	*Sorex cinereus*	Mammal	179929
mltshx	Long-tailed Shrew	*Sorex dispar*	Mammal	179941
msmshx	Smoky Shrew	*Sorex fumeus*	Mammal	179943
mprshx	Prairie Shrew	*Sorex haydeni*	Mammal	179945
mapshx	American Pygmy Shrew	*Sorex hoyi*	Mammal	179946
mspshx	Southeastern Shrew	*Sorex longirostris*	Mammal	179936
mmlshx	Mt. Lyell Shrew	*Sorex lyelli*	Mammal	179948
mmeshx	Merriam's Shrew	*Sorex merriami*	Mammal	179949
mdushx	Dusky Shrew	*Sorex monticolus*	Mammal	179950
mdwshx	Dwarf Shrew	*Sorex nanus*	Mammal	179951
mnmshx	New Mexico Shrew	*Sorex neomexicanus*	Mammal	555657
morshx	Ornate Shrew	*Sorex ornatus*	Mammal	179952
mpashx	Pacific Shrew	*Sorex pacificus*	Mammal	179953
mawshx	American Water Shrew	*Sorex palustris*	Mammal	179933
mpbshx	Preble's Shrew	*Sorex preblei*	Mammal	179954
mfoshx	Fog Shrew	*Sorex sonomae*	Mammal	552508
minshx	Inyo Shrew	*Sorex tenellus*	Mammal	179955
mtrshx	Trowbridge's Shrew	*Sorex trowbridgii*	Mammal	179956
mvashx	Vagrant Shrew	*Sorex vagrans*	Mammal	179932
mugsqx	Uinta Ground Squirrel	*Spermophilus armatus*	Mammal	180147
mcasqx	California Ground Squirrel	*Spermophilus beecheyi*	Mammal	180148
mbgsqx	Belding's Ground Squirrel	*Spermophilus beldingi*	Mammal	180149
migsqx	Idaho Ground Squirrel	*Spermophilus brunneus*	Mammal	180150
mmgsqx	Merriam's Ground Squirrel	*Spermophilus canus*	Mammal	552499
mcosqx	Columbian Ground Squirrel	*Spermophilus columbianus*	Mammal	180151
mwysqx	Wyoming Ground Squirrel	*Spermophilus elegans*	Mammal	180152
mfgsqx	Franklin's Ground Squirrel	*Spermophilus franklinii*	Mammal	180153
mgmgsx	Golden-mantled Ground Squirrel	*Spermophilus lateralis*	Mammal	180154
mmesqx	Mexican Ground Squirrel	*Spermophilus mexicanus*	Mammal	180155
mmosqx	Mohave Ground Squirrel	*Spermophilus mohavensis*	Mammal	180156
mpgsqx	Piute Ground Squirrel	*Spermophilus mollis*	Mammal	552504
mrgsqx	Richardson's Ground Squirrel	*Spermophilus richardsonii*	Mammal	180157

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
mcggsx	Cascade Golden-mantled Ground Squirrel	*Spermophilus saturatus*	Mammal	180158
msgsqx	Spotted Ground Squirrel	*Spermophilus spilosoma*	Mammal	180159
mrtgsx	Round-tailed Ground Squirrel	*Spermophilus tereticaudus*	Mammal	180160
mtgsqx	Townsend's Ground Squirrel	*Spermophilus townsendii*	Mammal	180161
mtlgsx	Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	Mammal	180162
mrosqx	Rock Squirrel	*Spermophilus variegatus*	Mammal	180163
mwasqx	Washington Ground Squirrel	*Spermophilus washingtoni*	Mammal	180164
mwsskx	Western Spotted Skunk	*Spilogale gracilis*	Mammal	552466
messkx	Eastern Spotted Skunk	*Spilogale putorius*	Mammal	180570
mwibox	Wild Boar	*Sus scrofa*	Mammal	180722
mswrax	Swamp Rabbit	*Sylvilagus aquaticus*	Mammal	180121
mdecox	Desert Cottontail	*Sylvilagus audubonii*	Mammal	180122
mbrrax	Brush Rabbit	*Sylvilagus bachmani*	Mammal	180123
meacox	Eastern Cottontail	*Sylvilagus floridanus*	Mammal	180124
mmocox	Mountain Cottontail	*Sylvilagus nuttallii*	Mammal	180126
mapcox	Appalachian Cottontail	*Sylvilagus obscurus*	Mammal	552514
mmarax	Marsh Rabbit	*Sylvilagus palustris*	Mammal	180120
mrocox	Robust Cottontail	*Sylvilagus robustus*	Mammal	555658
mngcox	New England Cottontail	*Sylvilagus transitionalis*	Mammal	180127
mnblex	Northern Bog Lemming	*Synaptomys borealis*	Mammal	180323
msblex	Southern Bog Lemming	*Synaptomys cooperi*	Mammal	180324
mmftbx	Mexican Free-tailed Bat	*Tadarida brasiliensis*	Mammal	180088
malchx	Alpine Chipmunk	*Tamias alpinus*	Mammal	180189
mypchx	Yellow-pine Chipmunk	*Tamias amoenus*	Mammal	180190
mgfchx	Gray-footed Chipmunk	*Tamias canipes*	Mammal	180191
mgcchx	Gray-collared Chipmunk	*Tamias cinereicollis*	Mammal	180192
mclchx	Cliff Chipmunk	*Tamias dorsalis*	Mammal	180193
mmmchx	Merriam's Chipmunk	*Tamias merriami*	Mammal	180194
mlechx	Least Chipmunk	*Tamias minimus*	Mammal	180195
mcfchx	California Chipmunk	*Tamias obscurus*	Mammal	180196
mycchx	Yellow-cheeked Chipmunk	*Tamias ochrogenys*	Mammal	180197
mpachx	Palmer's Chipmunk	*Tamias palmeri*	Mammal	180198
mpnchx	Panamint Chipmunk	*Tamias panamintinus*	Mammal	180199
mloecx	Long-eared Chipmunk	*Tamias quadrimaculatus*	Mammal	180200
mcochx	Colorado Chipmunk	*Tamias quadrivittatus*	Mammal	180201
mrtchx	Red-tailed Chipmunk	*Tamias ruficaudus*	Mammal	180202
mhochx	Hopi Chipmunk	*Tamias rufus*	Mammal	552503
mshchx	Shadow Chipmunk	*Tamias senex*	Mammal	180203
msichx	Siskiyou Chipmunk	*Tamias siskiyou*	Mammal	180204
msochx	Sonoma Chipmunk	*Tamias sonomae*	Mammal	180205

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

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GAP code	Common name	Scientific name	Taxon	ITIS TSN
mlochx	Lodgepole Chipmunk	*Tamias speciosus*	Mammal	180206
meachx	Eastern Chipmunk	*Tamias striatus*	Mammal	180207
mtochx	Townsend's Chipmunk	*Tamias townsendii*	Mammal	180208
muichx	Uinta Chipmunk	*Tamias umbrinus*	Mammal	180209
mdosqx	Douglas's Squirrel	*Tamiasciurus douglasii*	Mammal	180167
mresqx	Red Squirrel	*Tamiasciurus hudsonicus*	Mammal	180166
mambax	American Badger	*Taxidea taxus*	Mammal	180565
mbogox	Botta's Pocket Gopher	*Thomomys bottae*	Mammal	180222
mcpgox	Camas Pocket Gopher	*Thomomys bulbivorus*	Mammal	180223
mwygox	Wyoming Pocket Gopher	*Thomomys clusius*	Mammal	180224
mipgox	Idaho Pocket Gopher	*Thomomys idahoensis*	Mammal	180225
mwpgox	Western Pocket Gopher	*Thomomys mazama*	Mammal	180226
mmpgox	Mountain Pocket Gopher	*Thomomys monticola*	Mammal	180227
mnpgox	Northern Pocket Gopher	*Thomomys talpoides*	Mammal	180228
mtpgox	Townsend's Pocket Gopher	*Thomomys townsendii*	Mammal	180229
mspgox	Southern Pocket Gopher	*Thomomys umbrinus*	Mammal	180230
mwimax	West Indian Manatee	*Trichechus manatus*	Mammal	180684
mgrfox	Gray Fox	*Urocyon cinereoargenteus*	Mammal	180609
misfox	Island Fox	*Urocyon littoralis*	Mammal	180610
mabbex	American Black Bear	*Ursus americanus*	Mammal	180544
mbrbex	Grizzly Or Brown Bear	*Ursus arctos*	Mammal	180543
mkifox	Kit Fox	*Vulpes macrotis*	Mammal	180606
mswfox	Swift Fox	*Vulpes velox*	Mammal	180607
mrefox	Red Fox	*Vulpes vulpes*	Mammal	180604
mcasex	California Sealion	*Zalophus californianus*	Mammal	180621
mmjmox	Meadow Jumping Mouse	*Zapus hudsonius*	Mammal	180386
mwemox	Western Jumping Mouse	*Zapus princeps*	Mammal	180387
mpjmox	Pacific Jumping Mouse	*Zapus trinotatus*	Mammal	180388
rwptux	Western Pond Turtle	*Actinemys marmorata*	Reptile	668668
rcoppx	Copperhead	*Agkistrodon contortrix*	Reptile	174296
rcottx	Cottonmouth	*Agkistrodon piscivorus*	Reptile	174299
ramalx	American Alligator	*Alligator mississippiensis*	Reptile	551771
rclizx	California Legless Lizard	*Anniella pulchra*	Reptile	174095
rgranx	Green Anole	*Anolis carolinensis*	Reptile	173885
rflsox	Florida Softshell	*Apalone ferox*	Reptile	208675
rsmsox	Smooth Softshell	*Apalone mutica*	Reptile	208677
rspsox	Spiny Softshell	*Apalone spinifera*	Reptile	208680
rglsnx	Glossy Snake	*Arizona elegans*	Reptile	174202
raswhx	Arizona Striped Whiptail	*Aspidoscelis arizonae*	Reptile	208930
rcswhx	Canyon Spotted Whiptail	*Aspidoscelis burti*	Reptile	174015

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rgcwhx	Gray Checkered Whiptail	*Aspidoscelis dixoni*	Reptile	174016
rcwhix	Chihuahuan Spotted Whiptail	*Aspidoscelis exsanguis*	Reptile	174017
rglswx	Gila Spotted Whiptail	*Aspidoscelis flagellicauda*	Reptile	174018
rcspwx	Common Spotted Whiptail	*Aspidoscelis gularis*	Reptile	174019
rlwwhx	Little White Whiptail	*Aspidoscelis gypsi*	Reptile	174021
rorwhx	Orange-throated Whiptail	*Aspidoscelis hyperythra*	Reptile	174020
rliswx	Little Striped Whiptail	*Aspidoscelis inornata*	Reptile	174021
rlaswx	Laredo Striped Whiptail	*Aspidoscelis laredoensis*	Reptile	174022
rnmwhx	New Mexico Whiptail	*Aspidoscelis neomexicana*	Reptile	174024
rcchwx	Colorado Checkered Whiptail	*Aspidoscelis neotesselata*	Reptile	683028
rpaswx	Pai Striped Whiptail	*Aspidoscelis pai*	Reptile	914099
rplwhx	Plateau Spotted Whiptail	*Aspidoscelis scalaris*	Reptile	208925
rslrax	Six-lined Racerunner	*Aspidoscelis sexlineata*	Reptile	174014
rsswhx	Sonoran Spotted Whiptail	*Aspidoscelis sonorae*	Reptile	174025
rccwhx	Common Checkered Whiptail	*Aspidoscelis tesselata*	Reptile	174026
rtiwhx	Tiger Whiptail	*Aspidoscelis tigris*	Reptile	208940
rdgwhx	Desert Grassland Whiptail	*Aspidoscelis uniparens*	Reptile	208947
rplswx	Plateau Striped Whiptail	*Aspidoscelis velox*	Reptile	208948
rrbwhx	Red-backed Whiptail	*Aspidoscelis xanthonota*	Reptile	564600
rbcrax	Baja California Ratsnake	*Bogertophis rosaliae*	Reptile	209454
rtprax	Trans-pecos Ratsnake	*Bogertophis subocularis*	Reptile	209455
rztlix	Zebra-tailed Lizard	*Callisaurus draconoides*	Reptile	173906
rlogtx	Loggerhead Sea Turtle	*Caretta caretta*	Reptile	173830
rewsnx	Eastern Wormsnake	*Carphophis amoenus*	Reptile	174161
rwewox	Western Wormsnake	*Carphophis vermis*	Reptile	563908
rscarx	Scarletsnake	*Cemophora coccinea*	Reptile	174195
rnrbox	Northern Rubber Boa	*Charina bottae*	Reptile	174326
rsrbox	Southern Rubber Boa	*Charina umbratica*	Reptile	683027
rgstux	Green Sea Turtle	*Chelonia mydas*	Reptile	173833
rsntux	Snapping Turtle	*Chelydra serpentina*	Reptile	173752
rvasax	Variable Sandsnake	*Chilomeniscus stramineus*	Reptile	585779
rwsnsx	Western Shovel-nosed Snake	*Chionactis occipitalis*	Reptile	174212
rssnsx	Sonoran Shovel-nosed Snake	*Chionactis palarostris*	Reptile	174213
rsoptx	Southern Painted Turtle	*Chrysemys dorsalis*	Reptile	208623
rpatux	Painted Turtle	*Chrysemys picta*	Reptile	173783
rsptux	Spotted Turtle	*Clemmys guttata*	Reptile	173771
rkisnx	Kirtland's Snake	*Clonophis kirtlandii*	Reptile	174216
rrawhx	Rainbow Whiptail	*Cnemidophorus lemniscatus*	Reptile	174023
rtxbgx	Texas Banded Gecko	*Coleonyx brevis*	Reptile	174038
rrbgex	Reticular Banded Gecko	*Coleonyx reticulatus*	Reptile	174039

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rsbgex	Switak's Banded Gecko	*Coleonyx switaki*	Reptile	174040
rwbgex	Western Banded Gecko	*Coleonyx variegatus*	Reptile	174041
rsowhx	Sonoran Whipsnake	*Coluber bilineatus*	Reptile	174237
rnarax	North American Racer	*Coluber constrictor*	Reptile	174169
rcoacx	Coachwhip	*Coluber flagellum*	Reptile	209320
rbccox	Baja California Coachwhip	*Coluber fuliginosus*	Reptile	683039
rstrax	Striped Racer	*Coluber lateralis*	Reptile	174239
rscwhx	Schott's Whipsnake	*Coluber schotti*	Reptile	209338
rstwhx	Striped Whipsnake	*Coluber taeniatus*	Reptile	174240
rrbssx	Regal Black-striped Snake	*Coniophanes imperialis*	Reptile	174218
rspsnx	Sharp-tailed Snake	*Contia tenuis*	Reptile	174220
rgelix	Greater Earless Lizard	*Cophosaurus texanus*	Reptile	173910
rcrocx	American Crocodile	*Crocodylus acutus*	Reptile	174361
redbrx	Eastern Diamond-backed Rattlesnake	*Crotalus adamanteus*	Reptile	174309
rwdbrx	Western Diamond-backed Rattlesnake	*Crotalus atrox*	Reptile	174310
rsidex	Sidewinder	*Crotalus cerastes*	Reptile	174311
rsbrax	Arizona Black Rattlesnake	*Crotalus cerberus*	Reptile	683063
rtirax	Timber Rattlesnake	*Crotalus horridus*	Reptile	174306
rrratx	Rock Rattlesnake	*Crotalus lepidus*	Reptile	174312
rsratx	Speckled Rattlesnake	*Crotalus mitchellii*	Reptile	174313
rbtrax	Black-tailed Rattlesnake	*Crotalus molossus*	Reptile	174314
rwerax	Western Rattlesnake	*Crotalus oreganus*	Reptile	209548
rtsrax	Twin-spotted Rattlesnake	*Crotalus pricei*	Reptile	174315
rrdrax	Red Diamond Rattlesnake	*Crotalus ruber*	Reptile	174316
rmorax	Mohave Rattlesnake	*Crotalus scutulatus*	Reptile	174317
rtratx	Tiger Rattlesnake	*Crotalus tigris*	Reptile	174318
rprrax	Prairie Rattlesnake	*Crotalus viridis*	Reptile	174319
rrnrax	Ridge-nosed Rattlesnake	*Crotalus willardi*	Reptile	174320
rgbclx	Great Basin Collared Lizard	*Crotaphytus bicinctores*	Reptile	208791
reclix	Eastern Collared Lizard	*Crotaphytus collaris*	Reptile	173912
rsclix	Sonoran Collared Lizard	*Crotaphytus nebrius*	Reptile	564568
rrclix	Reticulate Collared Lizard	*Crotaphytus reticulatus*	Reptile	173914
rbcclx	Baja California Collared Lizard	*Crotaphytus vestigium*	Reptile	564569
rchtux	Chicken Turtle	*Deirochelys reticularia*	Reptile	173786
rleatx	Leatherback Sea Turtle	*Dermochelys coriacea*	Reptile	173843
rrnsnx	Ring-necked Snake	*Diadophis punctatus*	Reptile	174158
rdeigx	Desert Iguana	*Dipsosaurus dorsalis*	Reptile	173921
reisnx	Eastern Indigo Snake	*Drymarchon couperi*	Reptile	683031
rcaisx	Central American Indigo Snake	*Drymarchon melanurus*	Reptile	683032
rsprax	Speckled Racer	*Drymobius margaritiferus*	Reptile	174226

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rnalix	Northern Alligator Lizard	*Elgaria coerulea*	Reptile	209008
rmalix	Madrean Alligator Lizard	*Elgaria kingii*	Reptile	209017
rsoalx	Southern Alligator Lizard	*Elgaria multicarinata*	Reptile	209020
rpalix	Panamint Alligator Lizard	*Elgaria panamintina*	Reptile	209029
rbturx	Blanding's Turtle	*Emydoidea blandingii*	Reptile	173789
rhstux	Hawksbill Sea Turtle	*Eretmochelys imbricata*	Reptile	173836
rrbmux	Red-bellied Mudsnake	*Farancia abacura*	Reptile	174164
rrasnx	Rainbow Snake	*Farancia erytrogramma*	Reptile	174166
rthnsx	Tamaulipan Hook-nosed Snake	*Ficimia streckeri*	Reptile	174228
rcllix	Cope's Leopard Lizard	*Gambelia copeii*	Reptile	564591
rbnllx	Blunt-nosed Leopard Lizard	*Gambelia sila*	Reptile	564570
rlnllx	Long-nosed Leopard Lizard	*Gambelia wislizenii*	Reptile	173924
rtalix	Texas Alligator Lizard	*Gerrhonotus infernalis*	Reptile	564557
rwotux	Wood Turtle	*Glyptemys insculpta*	Reptile	668669
rbotux	Bog Turtle	*Glyptemys muhlenbergii*	Reptile	668670
ryhgex	Yellow-headed Gecko	*Gonatodes albogularis*	Reptile	174053
rdetox	Desert Tortoise	*Gopherus agassizii*	Reptile	173856
rtxtox	Texas Tortoise	*Gopherus berlandieri*	Reptile	173857
rgotox	Gopher Tortoise	*Gopherus polyphemus*	Reptile	173858
rbmtux	Barbour's Map Turtle	*Graptemys barbouri*	Reptile	173791
rcmtux	Cagle's Map Turtle	*Graptemys caglei*	Reptile	173792
remtux	Escambia Map Turtle	*Graptemys ernsti*	Reptile	551768
rybmtx	Yellow-blotched Map Turtle	*Graptemys flavimaculata*	Reptile	173793
rnmtux	Northern Map Turtle	*Graptemys geographica*	Reptile	173794
rpmtux	Pascagoula Map Turtle	*Graptemys gibbonsi*	Reptile	551767
rbkmtx	Black-knobbed Map Turtle	*Graptemys nigrinoda*	Reptile	173797
rrmtux	Ringed Map Turtle	*Graptemys oculifera*	Reptile	173798
romtux	Ouachita Map Turtle	*Graptemys ouachitensis*	Reptile	173799
rfmtux	False Map Turtle	*Graptemys pseudogeographica*	Reptile	173800
raltux	Alabama Map Turtle	*Graptemys pulchra*	Reptile	173801
rtmtux	Texas Map Turtle	*Graptemys versa*	Reptile	173802
rchnsx	Chihuahuan Hook-nosed Snake	*Gyalopion canum*	Reptile	174230
rtssnx	Thornscrub Hook-nosed Snake	*Gyalopion quadrangulare*	Reptile	563909
rgimox	Gila Monster	*Heloderma suspectum*	Reptile	174113
rwoslx	Wood Slave	*Hemidactylus mabouia*	Reptile	174058
rdhnsx	Dusty Hog-nosed Snake	*Heterodon gloydi*	Reptile	
rmhnsx	Mexican Hog-nosed Snake	*Heterodon kennerlyi*	Reptile	
rphnsx	Plains Hog-nosed Snake	*Heterodon nasicus*	Reptile	174155
rehnsx	Eastern Hog-nosed Snake	*Heterodon platirhinos*	Reptile	563935
rshnsx	Southern Hog-nosed Snake	*Heterodon simus*	Reptile	174156

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GAP code	Common name	Scientific name	Taxon	ITIS TSN
reelix	Elegant Earless Lizard	*Holbrookia elegans*	Reptile	683056
rstelx	Spot-tailed Earless Lizard	*Holbrookia lacerata*	Reptile	173926
rclelx	Common Lesser Earless Lizard	*Holbrookia maculata*	Reptile	173927
rkelix	Keeled Earless Lizard	*Holbrookia propinqua*	Reptile	173928
rdenix	Desert Nightsnake	*Hypsiglena chlorophaea*	Reptile	174232
rchnix	Chihuahuan Nightsnake	*Hypsiglena jani*	Reptile	174232
rcnigx	Coast Nightsnake	*Hypsiglena ochrorhyncha*	Reptile	209311
raztux	Arizona Mud Turtle	*Kinosternon arizonense*	Reptile	668672
rstmtx	Striped Mud Turtle	*Kinosternon baurii*	Reptile	173765
rymtux	Yellow Mud Turtle	*Kinosternon flavescens*	Reptile	173766
rrfmtx	Rough-footed Mud Turtle	*Kinosternon hirtipes*	Reptile	173767
rsomtx	Sonoran Mud Turtle	*Kinosternon sonoriense*	Reptile	173768
remdtx	Eastern Mud Turtle	*Kinosternon subrubrum*	Reptile	173763
rgbkix	Gray-banded Kingsnake	*Lampropeltis alterna*	Reptile	209266
rybkix	Yellow-bellied Kingsnake	*Lampropeltis calligaster*	Reptile	174185
rstsnx	Short-tailed Snake	*Lampropeltis extenuata*	Reptile	174277
rckinx	Common Kingsnake	*Lampropeltis getula*	Reptile	209247
rsmkix	Sonoran Mountain Kingsnake	*Lampropeltis pyromelana*	Reptile	174192
rmilkx	Milksnake	*Lampropeltis triangulum*	Reptile	174187
rcmkix	California Mountain Kingsnake	*Lampropeltis zonata*	Reptile	174193
rkrstx	Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Reptile	551770
rorstx	Olive Ridley Sea Turtle	*Lepidochelys olivacea*	Reptile	173840
rcesnx	Cat-eyed Snake	*Leptodeira septentrionalis*	Reptile	174235
rnmthx	New Mexico Threadsnake	*Leptotyphlops dissectus*	Reptile	914108
rtxthx	Texas Threadsnake	*Leptotyphlops dulcis*	Reptile	174336
rwethx	Western Threadsnake	*Leptotyphlops humilis*	Reptile	174337
rrobox	Rosy Boa	*Lichanura trivirgata*	Reptile	174331
rastux	Alligator Snapping Turtle	*Macrochelys temminckii*	Reptile	668671
rdbtex	Diamond-backed Terrapin	*Malaclemys terrapin*	Reptile	173780
rsocox	Sonoran Coralsnake	*Micruroides euryxanthus*	Reptile	174352
rhacox	Harlequin Coralsnake	*Micrurus fulvius*	Reptile	174354
rtxcsx	Texas Coralsnake	*Micrurus tener*	Reptile	683040
rsawax	Saltmarsh Watersnake	*Nerodia clarkii*	Reptile	209370
rmswax	Mississippi Green Watersnake	*Nerodia cyclopion*	Reptile	174243
rpbwax	Plain-bellied Watersnake	*Nerodia erythrogaster*	Reptile	174244
rsowax	Southern Watersnake	*Nerodia fasciata*	Reptile	174248
rfgwax	Florida Green Watersnake	*Nerodia floridana*	Reptile	209382
rbrvwx	Brazos River Watersnake	*Nerodia harteri*	Reptile	174249
rcowax	Concho Watersnake	*Nerodia paucimaculata*	Reptile	209384
rdbwax	Diamond-backed Watersnake	*Nerodia rhombifer*	Reptile	563904

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GAP code	Common name	Scientific name	Taxon	ITIS TSN
rnwatx	Northern Watersnake	*Nerodia sipedon*	Reptile	174251
rbrwax	Brown Watersnake	*Nerodia taxispilota*	Reptile	174255
rrogrx	Rough Greensnake	*Opheodrys aestivus*	Reptile	174172
rsmgrx	Smooth Greensnake	*Opheodrys vernalis*	Reptile	174173
rsglix	Slender Glass Lizard	*Ophisaurus attenuatus*	Reptile	174106
riglix	Island Glass Lizard	*Ophisaurus compressus*	Reptile	174109
rmglix	Mimic Glass Lizard	*Ophisaurus mimicus*	Reptile	209006
reglix	Eastern Glass Lizard	*Ophisaurus ventralis*	Reptile	174110
rbrvix	Brown Vinesnake	*Oxybelis aeneus*	Reptile	174258
rearax	Eastern Ratsnake	*Pantherophis alleghaniensis*	Reptile	683033
rbarax	Baird's Ratsnake	*Pantherophis bairdi*	Reptile	174179
rgprax	Great Plains Ratsnake	*Pantherophis emoryi*	Reptile	209205
reafox	Eastern Foxsnake	*Pantherophis gloydi*	Reptile	683034
rrecox	Red Cornsnake	*Pantherophis guttatus*	Reptile	174176
rterax	Texas Ratsnake	*Pantherophis obsoletus*	Reptile	174177
rslcox	Slowinski's Cornsnake	*Pantherophis slowinskii*	Reptile	683035
rgrrax	Gray Ratsnake	*Pantherophis spiloides*	Reptile	209215
rwefox	Western Foxsnake	*Pantherophis vulpina*	Reptile	174183
rbrlix	Banded Rock Lizard	*Petrosaurus mearnsi*	Reptile	173936
rbhlix	Blainville's Horned Lizard	*Phrynosoma blainvillii*	Reptile	208819
rthlix	Texas Horned Lizard	*Phrynosoma cornutum*	Reptile	173938
rpshlx	Pygmy Short-horned Lizard	*Phrynosoma douglasii*	Reptile	564567
rghlix	Goode's Horned Lizard	*Phrynosoma goodei*	Reptile	173937
rgshlx	Greater Short-horned Lizard	*Phrynosoma hernandesi*	Reptile	564594
rfthlx	Flat-tailed Horned Lizard	*Phrynosoma mcallii*	Reptile	173941
rrthlx	Round-tailed Horned Lizard	*Phrynosoma modestum*	Reptile	173942
rdhlix	Desert Horned Lizard	*Phrynosoma platyrhinos*	Reptile	173943
rrhlix	Regal Horned Lizard	*Phrynosoma solare*	Reptile	173944
rpltgx	Peninsular Leaf-toed Gecko	*Phyllodactylus nocticolus*	Reptile	585976
rsalsx	Saddled Leaf-nosed Snake	*Phyllorhynchus browni*	Reptile	174260
rsplsx	Spotted Leaf-nosed Snake	*Phyllorhynchus decurtatus*	Reptile	174261
rgophx	Gophersnake	*Pituophis catenifer*	Reptile	209400
rpinex	Pinesnake	*Pituophis melanoleucus*	Reptile	174263
rlopix	Louisiana Pinesnake	*Pituophis ruthveni*	Reptile	563905
rcoskx	Coal Skink	*Plestiodon anthracinus*	Reptile	208882
rmtskx	Mountain Skink	*Plestiodon callicephalus*	Reptile	173964
rmoskx	Mole Skink	*Plestiodon egregius*	Reptile	208885
rcflsx	Common Five-lined Skink	*Plestiodon fasciatus*	Reptile	173959
rgiskx	Gilbert's Skink	*Plestiodon gilberti*	Reptile	173966
rsflsx	Southeastern Five-lined Skink	*Plestiodon inexpectatus*	Reptile	173960

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rbhskx	Broad-headed Skink	*Plestiodon laticeps*	Reptile	173961
rmlskx	Many-lined Skink	*Plestiodon multivirgatus*	Reptile	173967
rgpskx	Great Plains Skink	*Plestiodon obsoletus*	Reptile	173968
rfsskx	Florida Sand Skink	*Plestiodon reynoldsi*	Reptile	174005
rprskx	Prairie Skink	*Plestiodon septentrionalis*	Reptile	208900
rweskx	Western Skink	*Plestiodon skiltonianus*	Reptile	173970
rflskx	Four-lined Skink	*Plestiodon tetragrammus*	Reptile	208908
rarbcx	Alabama Red-bellied Cooter	*Pseudemys alabamensis*	Reptile	173804
rricox	River Cooter	*Pseudemys concinna*	Reptile	173805
rrgcox	Rio Grande Cooter	*Pseudemys gorzugi*	Reptile	551766
rfrbcx	Florida Red-bellied Cooter	*Pseudemys nelsoni*	Reptile	173813
rpcoox	Peninsula Cooter	*Pseudemys peninsularis*	Reptile	551765
rnrbcx	Northern Red-bellied Cooter	*Pseudemys rubriventris*	Reptile	173814
rsucox	Suwannee Cooter	*Pseudemys suwanniensis*	Reptile	668673
rtxcox	Texas Cooter	*Pseudemys texana*	Reptile	208649
rscsnx	Striped Crayfish Snake	*Regina alleni*	Reptile	174126
rgcsnx	Graham's Crayfish Snake	*Regina grahamii*	Reptile	174127
rgcrsx	Glossy Crayfish Snake	*Regina rigida*	Reptile	174123
rqueex	Queensnake	*Regina septemvittata*	Reptile	174125
rpwlix	Pine Woods Littersnake	*Rhadinaea flavilata*	Reptile	174265
rflwox	Florida Wormlizard	*Rhineura floridana*	Reptile	209635
rlnsnx	Long-nosed Snake	*Rhinocheilus lecontei*	Reptile	174267
repnsx	Eastern Patch-nosed Snake	*Salvadora grahamiae*	Reptile	174270
rwpnsx	Western Patch-nosed Snake	*Salvadora hexalepis*	Reptile	174271
rcchux	Common Chuckwalla	*Sauromalus ater*	Reptile	564596
rdsalx	Dunes Sagebrush Lizard	*Sceloporus arenicolus*	Reptile	564574
rtsslx	Twin-spotted Spiny Lizard	*Sceloporus bimaculosus*	Reptile	208748
rclslx	Clark's Spiny Lizard	*Sceloporus clarkii*	Reptile	173868
rcoslx	Common Sagebrush Lizard	*Sceloporus graciosus*	Reptile	173870
rgpslx	Graphic Spiny Lizard	*Sceloporus grammicus*	Reptile	173871
ryslix	Yarrow's Spiny Lizard	*Sceloporus jarrovii*	Reptile	173872
rdslix	Desert Spiny Lizard	*Sceloporus magister*	Reptile	173873
rcalix	Canyon Lizard	*Sceloporus merriami*	Reptile	173874
rwflix	Western Fence Lizard	*Sceloporus occidentalis*	Reptile	173875
rtslix	Texas Spiny Lizard	*Sceloporus olivaceus*	Reptile	173876
rgnslx	Granite Spiny Lizard	*Sceloporus orcutti*	Reptile	173877
rcrslx	Crevice Spiny Lizard	*Sceloporus poinsettii*	Reptile	173878
rsblix	Slevin's Bunchgrass Lizard	*Sceloporus slevini*	Reptile	564597
rpflix	Plateau Fence Lizard	*Sceloporus tristichus*	Reptile	208738
reflix	Eastern Fence Lizard	*Sceloporus undulatus*	Reptile	173865

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rybslx	Yellow-backed Spiny Lizard	*Sceloporus uniformis*	Reptile	
rrblix	Rose-bellied Lizard	*Sceloporus variabilis*	Reptile	173880
rsplix	Striped Plateau Lizard	*Sceloporus virgatus*	Reptile	173881
rfslix	Florida Scrub Lizard	*Sceloporus woodi*	Reptile	173882
rlbskx	Little Brown Skink	*Scincella lateralis*	Reptile	174008
rblssx	Black Swampsnake	*Seminatrix pygaea*	Reptile	174273
rgnrax	Green Ratsnake	*Senticolis triaspis*	Reptile	209458
rmassx	Massasauga	*Sistrurus catenatus*	Reptile	174304
rpratx	Pygmy Rattlesnake	*Sistrurus miliarius*	Reptile	174302
rwgrox	Western Groundsnake	*Sonora semiannulata*	Reptile	174275
rregex	Reef Gecko	*Sphaerodactylus notatus*	Reptile	174083
rrbmtx	Razor-backed Musk Turtle	*Sternotherus carinatus*	Reptile	173759
rflmtx	Flattened Musk Turtle	*Sternotherus depressus*	Reptile	173760
rlmtux	Loggerhead Musk Turtle	*Sternotherus minor*	Reptile	173761
remstx	Eastern Musk Turtle	*Sternotherus odoratus*	Reptile	173758
rdebrx	Dekay's Brownsnake	*Storeria dekayi*	Reptile	174129
rrbsnx	Red-bellied Snake	*Storeria occipitomaculata*	Reptile	174131
rflbrx	Florida Brownsnake	*Storeria victa*	Reptile	209080
rmbhsx	Mexican Black-headed Snake	*Tantilla atriceps*	Reptile	174279
rsesnx	Southeastern Crowned Snake	*Tantilla coronata*	Reptile	174280
rtbhsx	Trans-pecos Black-Headed Snake	*Tantilla cucullata*	Reptile	563934
rfhsnx	Flat-headed Snake	*Tantilla gracilis*	Reptile	174281
rsbhsx	Smith's Black-headed Snake	*Tantilla hobartsmithi*	Reptile	174282
rpbhsx	Plains Black-headed Snake	*Tantilla nigriceps*	Reptile	174283
rrrcsx	Rim Rock Crowned Snake	*Tantilla oolitica*	Reptile	174284
rwbhsx	Western Black-headed Snake	*Tantilla planiceps*	Reptile	174285
rfcsnx	Florida Crowned Snake	*Tantilla relicta*	Reptile	174286
rcbhsx	Chihuahuan Black-headed Snake	*Tantilla wilcoxi*	Reptile	174288
rybhsx	Yaqui Black-headed Snake	*Tantilla yaquia*	Reptile	174289
rebtux	Eastern Box Turtle	*Terrapene carolina*	Reptile	173776
robtux	Ornate Box Turtle	*Terrapene ornata*	Reptile	173778
raqgax	Aquatic Gartersnake	*Thamnophis atratus*	Reptile	209141
rshgax	Short-headed Gartersnake	*Thamnophis brachystoma*	Reptile	174138
rbugax	Butler's Gartersnake	*Thamnophis butleri*	Reptile	174139
rsigax	Sierra Gartersnake	*Thamnophis couchii*	Reptile	174140
rbngax	Black-necked Gartersnake	*Thamnophis cyrtopsis*	Reptile	174141
rtegax	Terrestrial Gartersnake	*Thamnophis elegans*	Reptile	174142
rmegax	Mexican Gartersnake	*Thamnophis eques*	Reptile	174143
rgigax	Giant Gartersnake	*Thamnophis gigas*	Reptile	209147
rtsgax	Two-striped Gartersnake	*Thamnophis hammondii*	Reptile	209149

Table 1.1. List of 1,590 species for which Gap Analysis Project (GAP) habitat distribution models were created and combined to generate maps of species richness maps by class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa and scientific name.—Continued

[ITIS, Integrated Taxonomic Information System; TSN, taxonomic serial number]

GAP code	Common name	Scientific name	Taxon	ITIS TSN
rchgax	Checkered Gartersnake	*Thamnophis marcianus*	Reptile	174144
rnwgax	Northwestern Gartersnake	*Thamnophis ordinoides*	Reptile	174145
rwerix	Western Ribbonsnake	*Thamnophis proximus*	Reptile	174146
rplgax	Plains Gartersnake	*Thamnophis radix*	Reptile	174147
rnhgax	Narrow-headed Gartersnake	*Thamnophis rufipunctatus*	Reptile	174148
rearix	Eastern Ribbonsnake	*Thamnophis sauritus*	Reptile	174134
rcogax	Common Gartersnake	*Thamnophis sirtalis*	Reptile	174136
rmpslx	Mexican Plateau Slider	*Trachemys gaigeae*	Reptile	208657
rposlx	Pond Slider	*Trachemys scripta*	Reptile	173819
rwelyx	Western Lyresnake	*Trimorphodon biscutatus*	Reptile	174291
rtxlyx	Texas Lyresnake	*Trimorphodon vilkinsonii*	Reptile	209451
rlisnx	Lined Snake	*Tropidoclonion lineatum*	Reptile	174293
rcftlx	Coachella Fringe-toed Lizard	*Uma inornata*	Reptile	173948
rcdflx	Colorado Desert Fringe-toed Lizard	*Uma notata*	Reptile	173949
ryftlx	Yuman Fringe-toed Lizard	*Uma rufopunctata*	Reptile	683046
rmftlx	Mohave Fringe-toed Lizard	*Uma scoparia*	Reptile	173950
rltblx	Long-tailed Brush Lizard	*Urosaurus graciosus*	Reptile	173952
rbcblx	Baja California Brush Lizard	*Urosaurus nigricaudus*	Reptile	586156
rotlix	Ornate Tree Lizard	*Urosaurus ornatus*	Reptile	173954
rcsblx	Common Side-blotched Lizard	*Uta stansburiana*	Reptile	173956
rroeax	Rough Earthsnake	*Virginia striatula*	Reptile	174150
rsmeax	Smooth Earthsnake	*Virginia valeriae*	Reptile	174151
ranlix	Arizona Night Lizard	*Xantusia arizonae*	Reptile	914104
rbnlix	Bezy's Night Lizard	*Xantusia bezyi*	Reptile	683048
rsanlx	Sandstone Night Lizard	*Xantusia gracilis*	Reptile	683049
rgnlix	Granite Night Lizard	*Xantusia henshawi*	Reptile	174090
rinlix	Island Night Lizard	*Xantusia riversiana*	Reptile	174091
rsinlx	Sierra Night Lizard	*Xantusia sierrae*	Reptile	208992
rdnlix	Desert Night Lizard	*Xantusia vigilis*	Reptile	174092
rwnlix	Wiggins' Night Lizard	*Xantusia wigginsi*	Reptile	174089

Appendix 2. Selected References for Information Used to Delineate Species' Ranges

These references constitute some of the most commonly used sources of species' range geography. It is not a complete list of all references used for each species. References without a specified date, especially those online, were accessed during the course of the Gap Analysis Project (GAP) which spanned approximately seven years (2011–2018).

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Table 2.1. List of 129 subspecies for which Gap Analysis Project (GAP) habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark blue) and scientific name (light blue).

Species code	Subspecies scientific name	Common name
	Amphibian	
	Cryptobranchus alleganiensis	
aHELLx		Hellbender
aHELLa	*Cryptobranchus alleganiensis alleganiensis*	Eastern Hellbender
aHELLb	*Cryptobranchus alleganiensis bishopi*	Ozark Hellbender
	Bird	
	Ammodramus savannarum	
bGRSPx		Grasshopper Sparrow
bGRSPf	*Ammodramus savannarum floridanus*	Florida Grasshopper Sparrow
	Amphispiza belli	
bSAGSx		Sage Sparrow
bSAGSb	*Amphispiza belli belli*	Bell's Sage Sparrow
bSAGSa	*Amphispiza belli canescens*	Sage Sparrow canescens
bSAGSc	*Amphispiza belli clementeae*	San Clemente Sage Sparrow
bSAGSn	*Amphispiza belli nevadensis*	Great Basin Sage Sparrow
	Anser albifrons	
bGWFGx		Greater White-fronted Goose
bGWFGe	*Anser albifrons elgasi*	Tule White-fronted Goose
	Athene cunicularia	
bBUOWx		Burrowing Owl
bBUOWf	*Athene cunicularia floridana*	Florida Burrowing Owl
bBUOWh	*Athene cunicularia hypugaea*	Western Burrowing Owl
	Charadrius alexandrinus	
bSNPLx		Snowy Plover
bSNPLn	*Charadrius alexandrinus nivosus*	Western Snowy Plover
	Glaucidium brasilianum	
bFEPOx		Ferruginous Pygmy-owl
bFEPOc	*Glaucidium brasilianum cactorum*	Cactus Ferruginous Pygmy-owl
	Glaucidium gnoma	
bNOPOx		Northern Pygmy-owl
bNOPOc	*Glaucidium gnoma californicum*	Northern Pygmy-owl
bNOPOg	*Glaucidium gnoma gnoma*	Northern Pygmy-owl
	Laterallus jamaicensis	
bBLRAx		Black Rail
bBLRAc	*Laterallus jamaicensis coturniculus*	California Black Rail
	Meleagris gallopavo	
bWITUx		Wild Turkey
bWITUm	*Meleagris gallopavo merriami*	Merriam's Turkey
bWITUi	*Meleagris gallopavo mexicana*	Mexican Turkey
	Pelecanus occidentalis	
bBRPEx		Brown Pelican

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
Bird—Continued		
Pelecanus occidentalis—Continued		
bBRPEc	*Pelecanus occidentalis californicus*	California Brown Pelican
bBRPEa	*Pelecanus occidentalis carolinensis*	Eastern Brown Pelican
Pooecetes gramineus		
bVESPx		Vesper Sparrow
bVESPa	*Pooecetes gramineus affinis*	Oregon Vesper Sparrow
Sternula antillarum		
bLETEx		Least Tern
bLETEa	*Sternula antillarum athalassos*	Interior Least Tern
bLETEb	*Sternula antillarum browni*	California Least Tern
Strix occidentalis		
bSPOWx		Spotted Owl
bSPOWc	*Strix occidentalis caurina*	Northern Spotted Owl
bSPOWl	*Strix occidentalis lucida*	Mexican Spotted Owl
bSPOWo	*Strix occidentalis occidentalis*	California Spotted Owl
Tympanuchus cupido		
bGRPCx		Greater Prairie-chicken
bGRPCa	*Tympanuchus cupido attwateri*	Attwater's Greater Prairie Chicken
bGRPCp	*Tympanuchus cupido pinnatus*	Greater Prairie Chicken
Tympanuchus phasianellus		
bSTGRx		Sharp-tailed Grouse
bSTGRa	*Tympanuchus phasianellus campestris*	Prairie Sharp-tailed Grouse
bSTGRc	*Tympanuchus phasianellus columbianus*	Columbian Sharp-tailed Grouse
bSTGRj	*Tympanuchus phasianellus jamesi*	Plains Sharp-tailed Grouse
Mammal		
Antilocapra americana		
mPRONx		Pronghorn
mPRONs	*Antilocapra americana sonoriensis*	Sonoran Pronghorn
Aplodontia rufa		
mSEWEx		Sewellel
mSEWEc	*Aplodontia rufa californica*	Sierra Nevada Mountain Beaver
mSEWEh	*Aplodontia rufa humboldtiana*	Mountain Beaver humboldtiana
mSEWEn	*Aplodontia rufa nigra*	Point Arena Mountain Beaver
mSEWEo	*Aplodontia rufa olympica*	Mountain Beaver olympica
mSEWEa	*Aplodontia rufa pacifica*	Mountain Beaver pacifica
mSEWEp	*Aplodontia rufa phaea*	Point Reyes Mountain Beaver
mSEWEr	*Aplodontia rufa rufa*	Mountain Beaver rufa
Brachylagus idahoensis		
mPYRAx		Pygmy Rabbit
mPYRAc	*Brachylagus idahoensis pop. 2*	Pygmy Rabbit (Columbia Basin Population)

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
	Mammal—Continued	
	Canis lupus	
mGRWOx		Gray Wolf
mGRWOb	*Canis lupus baileyi*	Mexican Wolf
mGRWOr	*Canis lupus rufus*	Red Wolf
	Cervus elaphus	
mELK1x		Elk
mELK1t	*Cervus elaphus nannodes*	Tule Elk
mELK1r	*Cervus elaphus roosevelti*	Roosevelt Elk
	Corynorhinus townsendii	
mTBEBx		Townsend's Big-eared Bat
mTBEBa	*Corynorhinus townsendii australis*	Townsend's Big-eared Bat australis
mTBEBi	*Corynorhinus townsendii ingens*	Ozark Big-eared Bat
mTBEBp	*Corynorhinus townsendii pallescens*	Pale Lumped-nosed Bat
mTBEBt	*Corynorhinus townsendii townsendii*	Townsend's Western Big-eared Bat
mTBEBv	*Corynorhinus townsendii virginianus*	Virginia Big-eared Bat
	Dipodomys heermanni	
mHKRAx		Heermann's Kangaroo Rat
mHKRAm	*Dipodomys heermanni morroensis*	Morro Bay Kangaroo Rat
	Dipodomys nitratoides	
mSJKRx		San Joaquin Kangaroo Rat
mSJKRe	*Dipodomys nitratoides exilis*	Fresno Kangaroo Rat
mSJKRn	*Dipodomys nitratoides nitratoides*	Tipton Kangaroo Rat
	Glaucomys sabrinus	
mNFSQx		Northern Flying Squirrel
mNFSQa	*Glaucomys sabrinus californicus*	San Bernardino Flying Squirrel
mNFSQo	*Glaucomys sabrinus coloratus*	Carolina Northern Flying Squirrel
mNFSQf	*Glaucomys sabrinus fuscus*	Virginia Northern Flying Squirrel
	Marmota flaviventris	
mYEMAx		Yellow-bellied Marmot
mYEMAn	*Marmota flaviventris notioros*	Wet Mountains Marmot
	Microdipodops megacephalus	
mDKMOx		Dark Kangaroo Mouse
mDKMOn	*Microdipodops megacephalus nasutus*	Fletcher Kangaroo Mouse
	Microtus californicus	
mCAVOx		California Vole
mCAVOc	*Microtus californicus scirpensis*	Amargosa Vole
	Microtus chrotorrhinus	
mROVOx		Rock Vole
mROVOc	*Microtus chrotorrhinus carolinensis*	Southern Rock Vole

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
Mammal—Continued		
Microtus longicaudus		
mLTVOx		Long-tailed Vole
mLTVOl	*Microtus longicaudus leucophaeus*	White-bellied Vole
Microtus montanus		
mMOVOx		Montane Vole
mMOVOa	*Microtus montanus arizonensis*	Arizona Montane Vole
mMOVOf	*Microtus montanus fucosus*	Pahranagat Valley Vole
mMOVOn	*Microtus montanus nevadensis*	Ash Meadows Montane Vole
Microtus ochrogaster		
mPRVOx		Prairie Vole
mPRVOt	*Microtus ochrogaster taylori*	Prairie Vole
Microtus pennsylvanicus		
mMEVOx		Meadow Vole
mMEVOd	*Microtus pennsylvanicus dukecampbelli*	Duke's Salt Marsh Vole
Microtus townsendii		
mTOVOx		Townsend's Vole
mTOVOp	*Microtus townsendii pugeti*	Shaw Island Vole
Myodes gapperi		
mSRBVx		Southern Red-backed Vole
mSRBVb	*Myodes gapperi brevicaudus*	Black Hills Red-backed Vole
Neotoma floridana		
mEAWOx		Eastern Woodrat
mEAWOs	*Neotoma floridana smalli*	Key Largo Woodrat
Neotoma fuscipes		
mDFWOx		Dusky-footed Woodrat
mDFWOs	*Neotoma fuscipes riparia*	San Joaquin Valley Wood Rat
Odocoileus virginianus		
mWTDEx		White-tailed Deer
mWTDEc	*Odocoileus virginianus clavium*	Key Deer
mWTDEl	*Odocoileus virginianus leucurus*	Columbian White-tailed Deer
mWTDEn	*Odocoileus virginianus nigribarbis*	Blackbeard Island Deer
Oryzomys palustris		
mMAORx		Marsh Oryzomys
mMAORn	*Oryzomys palustris natator*	Key Oryzomys
Perognathus longimembris		
mLPMOx		Little Pocket Mouse
mLPMOp	*Perognathus longimembris pacificus*	Pacific Pocket Mouse
Peromyscus polionotus		
mOLDEx		Oldfield Deermouse
mOLDEa	*Peromyscus polionotus allophrys*	Choctawhatchee Beach Deermouse

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
Mammal—Continued		
Peromyscus polionotus—Continued		
mOLDEm	*Peromyscus polionotus ammobates*	Alabama Beach Deermouse
mOLDEl	*Peromyscus polionotus leucocephalus*	Santa Rosa Beach Deermouse
mOLDEn	*Peromyscus polionotus niveiventris*	Southeast Beach Deermouse
mOLDEp	*Peromyscus polionotus peninsularis*	St. Andrews Beach Deermouse
mOLDEh	*Peromyscus polionotus phasma*	Anastasia Beach Deermouse
mOLDEt	*Peromyscus polionotus trissyllepsis*	Perdido Key Beach Deermouse
Peromyscus truei		
mPIDEx		Pinon Deermouse
mPIDEc	*Peromyscus truei comanche*	Palo Duro Deermouse
Puma concolor		
mCOUGx		Cougar
mCOUGc	*Puma concolor coryi*	Florida Panther
Puma yagouarondi		
mJAGDx		Jaguarundi
mJAGDc	*Puma yagouaroundi cacomitli*	Gulf Coast Jaguarundi
Rangifer tarandus		
mCARIx		Caribou
mCARIc	*Rangifer tarandus caribou*	Woodland Caribou
Scalopus aquaticus		
mEAMOx		Eastern Mole
mEAMOa	*Scalopus aquaticus anastasae*	Anastasia Island Mole
mEAMOt	*Scalopus aquaticus texanus*	Presidio Mole
Sciurus aberti		
mABSQx		Abert's Squirrel
mABSQk	*Sciurus aberti kaibabensis*	Kaibab Squirrel
Sciurus niger		
mEFSQx		Eastern Fox Squirrel
mEFSQa	*Sciurus niger avicennia*	Mangrove Fox Squirrel
mEFSQc	*Sciurus niger cinereus*	Delmarva Fox Squirrel
Sigmodon arizonae		
mACRAx		Arizona Cotton Rat
mACRAc	*Sigmodon arizonae cienegae*	Arizona Cotton Rat
mACRAp	*Sigmodon arizonae plenus*	Colorado River Cotton Rat
Sorex ornatus		
mORSHx		Ornate Shrew
mORSHr	*Sorex ornatus relictus*	Buena Vista Lake Shrew
mORSHs	*Sorex ornatus salarius*	Monterey Ornate Shrew
mORSHa	*Sorex ornatus salicornus*	Salt Marsh Ornate Shrew
mORSHi	*Sorex ornatus sinuosus*	Suisun Shrew
mORSHw	*Sorex ornatus willetti*	Santa Catalina Shrew

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
Mammal—Continued		
Sorex pacificus		
mPASHx		Pacific Shrew
mPASHc	*Sorex pacificus cascadensis*	Pacific Shrew cascadensis
mPASHp	*Sorex pacificus pacificus*	Pacific Shrew pacificus
Sorex vagrans		
mVASHx		Vagrant Shrew
mVASHh	*Sorex vagrans halicoetes*	Saltmarsh Wandering Shrew
mVASHp	*Sorex vagrans paludivagus*	Monterey Vagrant Shrew
Spermophilus brunneus		
mIGSQx		Idaho Ground Squirrel
mIGSQb	*Spermophilus brunneus brunneus*	Northern Idaho Ground Squirrel
mIGSQe	*Spermophilus brunneus endemicus*	Southern Idaho Ground Squirrel
Spermophilus lateralis		
mGMGSx		Golden-mantled Ground Squirrel
mGMGSb	*Spermophilus lateralis bernardinus*	San Bernardino Golden-mantled Ground Squirrel
Sylvilagus palustris		
mMARAx		Marsh Rabbit
mMARAh	*Sylvilagus palustris hefneri*	Lower Keys Rabbit
Tamias amoenus		
mYPCHx		Yellow-pine Chipmunk
mYPCHc	*Tamias amoenus celeris*	Yellow-pine Chipmunk
Tamias minimus		
mLECHx		Least Chipmunk
mLECHa	*Tamias minimus arizonensis*	White Mountains Chipmunk
mLECHt	*Tamias minimus atristriatus*	Penasco Chipmunk
mLECHc	*Tamias minimus chuskaensis*	Chuska Mountain Chipmunk
Tamias speciosus		
mLOCHx		Lodgepole Chipmunk
mLOCHc	*Tamias speciosus callipeplus*	Mt. Pinos Lodgepole Chipmunk
Tamiasciurus hudsonicus		
mRESQx		Red Squirrel
mRESQg	*Tamiasciurus hudsonicus grahamensis*	Mt. Graham Red Squirrel
Thomomys umbrinus		
mSPGOx		Southern Pocket Gopher
mSPGOe	*Thomomys umbrinus emotus*	Southern Pocket Gopher
mSPGOi	*Thomomys umbrinus intermedius*	Southern Pocket Gopher
Urocitellus elegans		
mWYSQx		Wyoming Ground Squirrel
mWYSQa	*Urocitellus elegans aureus*	Wyoming Ground Squirrel aureus
mWYSQe	*Urocitellus elegans elegans*	Wyoming Ground Squirrel elegans
mWYSQn	*Urocitellus elegans nevadensis*	Wyoming Ground Squirrel

Table 2.1. List of 129 subspecies for which GAP habitat distribution models were created class (amphibia, bird, mammal, reptile). Species listed alphabetically by taxa (dark green) and scientific name (light green).—Continued

Species code	Subspecies scientific name	Common name
	Mammal—Continued	
	Urocyon littoralis	
mISFOx		Island Fox
mISFOc	*Urocyon littoralis catalinae*	Santa Catalina Island Fox
mISFOl	*Urocyon littoralis clementae*	San Clemente Island Fox
mISFOd	*Urocyon littoralis dickeyi*	San Nicolas Island Fox
mISFOs	*Urocyon littoralis santacruzae*	Santa Cruz Island Fox
mISFOr	*Urocyon littoralis santarosae*	Santa Rosa Island Fox
	Ursus americanus	
mABBEx		American Black Bear
mABBEf	*Ursus americanus floridanus*	Florida Black Bear
mABBEl	*Ursus americanus luteolus*	Louisiana Black Bear
	Vulpes macrotis	
mKIFOx		Kit Fox
mKIFOm	*Vulpes macrotis mutica*	Kit Fox - San Joaquin Valley Population
	Vulpes vulpes	
mREFOx		Red Fox
mREFOn	*Vulpes vulpes necator*	Sierra Nevada Red Fox
	Reptile	
	Apalone mutica	
rSMSOx		Smooth Softshell
rSMSOc	*Apalone mutica calvata*	Gulf Coast Smooth Softshell
rSMSOm	*Apalone mutica mutica*	Midland Smooth Softshell
	Pituophis melanoleucus	
rPINEx		Pinesnake
rPINEl	*Pituophis melanoleucus lodingi*	Black Pinesnake
rPINEu	*Pituophis melanoleucus mugitus*	Florida Pinesnake
	Terrapene carolina	
rEBTUx		Eastern Box Turtle
rEBTUb	*Terrapene carolina bauri*	Florida Box Turtle

Appendix 3. Table of Notes on Species Taxonomy

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
bSTGRx	Sharp-tailed Grouse	*Tympanuchus phasianellus*	175841	104212	Three subspecies of *Tympanuchus phasianellus* (Sharp-tailed Grouse) occur in the United States: Plains *T. p. jamesi* (Sharp-tailed Grouse), *T. p. campestris* (Prairie Sharp-tailed Grouse), and *T. p. columbianus* (Columbian Sharp-tailed Grouse). Range distribution is based on Spaulding and others, 2006. *T. p. campestris* (Prairie Sharp-tailed Grouse) is not recognized by NatureServe. SGW 29 September 2017
bSTGRc	Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	175849	104539	Three subspecies of *Tympanuchus phasianellus* (Sharp-tailed Grouse) occur in the United States: *T. p. jamesi* (Plains Sharp-tailed Grouse), *T. p. campestris* (Prairie Sharp-tailed Grouse), and *T. p. columbianus* (Columbian Sharp-tailed Grouse). Range distribution is based on Spaulding and others, 2006. *T. p. campestris* (Prairie Sharp-tailed Grouse) is not recognized by NatureServe. SGW 29 September 2017
bSTGRj	Plains Sharp-tailed Grouse	*Tympanuchus phasianellus jamesi*	175853	100742	Three subspecies of *Tympanuchus phasianellus* (Sharp-tailed Grouse) occur in the United States: *T. p. jamesi* (Plains Sharp-tailed Grouse), *T. p. campestris* (Prairie Sharp-tailed Grouse), and *T. p. columbianus* (Columbian Sharp-tailed Grouse). Range distribution is based on Spaulding and others, 2006. *T. p. campestris* (Prairie Sharp-tailed Grouse) is not recognized by NatureServe. SGW 29 September 2017
bSTGRa	Prairie Sharp-tailed Grouse	*Tympanuchus phasianellus campestris*	175851	104212	Three subspecies of *Tympanuchus phasianellus* (Sharp-tailed Grouse) occur in the United States: *T. p. jamesi* (Plains Sharp-tailed Grouse), *T. p. campestris* (Prairie Sharp-tailed Grouse), and *T. p. columbianus* (Columbian Sharp-tailed Grouse). Range distribution is based on Spaulding and others, 2006. *T. p. campestris* (Prairie Sharp-tailed Grouse) is not recognized by NatureServe. SGW 29 September 2017
bSNPLx	Snowy Plover	*Charadrius nivosus*	824030	102013	Updated GAP scientific name to match ITIS and NatureServe which recognize Western Hemisphere *Charadrius nivosus* (Snowy Plovers) as distinct from *Charadrius alexandrinus* (Old World Snowy Plovers). SGW 29 September 2017
bSNPLn	Western Snowy Plover	*Charadrius nivosus nivosus*	824565	100393	Updated GAP scientific name to match ITIS and NatureServe which recognize Western Hemisphere *Charadrius nivosus* (Snowy Plovers) as distinct from *Charadrius alexandrinus* (Old World Snowy Plovers). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
bSAGSx	Sage Sparrow	*Amphispiza belli*	997724	104426	The *Artemisiospiza belli* (Sage Sparrow) has been the subject of much debate about its taxonomic status. As of May 2013, the species is comprised of five subspecies which occur in the U.S. (*A. b. belli*, *A. b. canescens*, *A. b. cinerea*, *A. b. clementeae*, *A. b. nevadensis*). *A. b. nevadensis* is likely to be elevated to species status. We mapped four subspecies based on distinct ranges and conservation concern. Both NatureServe and ITIS recognize this genus as *Artemisiospiza* and recognize *Amphispiza belli nevadensis* as a distinct species (*Artemisiospiza nevadensis*). Furthermore, NatureServe does not recognize *Amphispiza belli canescens* as a subspecies. SGW 29 September 2017
bSAGSb	Bell's Sage Sparrow	*Amphispiza belli belli*	998052	101203	The *Artemisiospiza belli* (Sage Sparrow) has been the subject of much debate about its taxonomic status. As of May 2013, the species is comprised of five subspecies which occur in the U.S. (*A. b. belli*, *A. b. canescens*, *A. b. cinerea*, *A. b. clementeae*, *A. b. nevadensis*). *A. b. nevadensis* is likely to be elevated to species status. We mapped four subspecies based on distinct ranges and conservation concern. Both NatureServe and ITIS recognize this genus as *Artemisiospiza* and recognize *Amphispiza belli nevadensis* as a distinct species (*Artemisiospiza nevadensis*). Furthermore, NatureServe does not recognize *Amphispiza belli canescens* as a subspecies. SGW 29 September 2017
bSAGSc	San Clemente Sage Sparrow	*Amphispiza belli clementeae*	998053	100803	The *Artemisiospiza belli* (Sage Sparrow) has been the subject of much debate about its taxonomic status. As of May 2013, the species is comprised of five subspecies which occur in the U.S. (*A. b. belli*, *A. b. canescens*, *A. b. cinerea*, *A. b. clementeae*, *A. b. nevadensis*). *A. b. nevadensis* is likely to be elevated to species status. We mapped four subspecies based on distinct ranges and conservation concern. Both NatureServe and ITIS recognize this genus as *Artemisiospiza* and recognize *Amphispiza belli nevadensis* as a distinct species (*Artemisiospiza nevadensis*). Furthermore, NatureServe does not recognize *Amphispiza belli canescens* as a subspecies. SGW 29 September 2017
bSAGSa	Saltbush Sparrow	*Amphispiza belli canescens*	998051	104426	The *Artemisiospiza belli* (Sage Sparrow) has been the subject of much debate about its taxonomic status. As of May 2013, the species is comprised of five subspecies which occur in the U.S. (*A. b. belli*, *A. b. canescens*, *A. b. cinerea*, *A. b. clementeae*, *A. b. nevadensis*). *A. b. nevadensis* is likely to be elevated to species status. We mapped four subspecies based on distinct ranges and conservation concern. Both NatureServe and ITIS recognize this genus as *Artemisiospiza* and recognize *Amphispiza belli nevadensis* as a distinct species (*Artemisiospiza nevadensis*). Furthermore, NatureServe does not recognize *Amphispiza belli canescens* as a subspecies. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
bSAGSn	Great Basin Sage Sparrow	*Amphispiza belli nevadensis*	997723	902215	The *Artemisiospiza belli* (Sage Sparrow) has been the subject of much debate about its taxonomic status. As of May 2013, the species is comprised of five subspecies which occur in the U.S. (*A. b. belli, A. b. canescens, A. b. cinerea, A. b. clementeae, A. b. nevadensis*). *A. b. nevadensis* is likely to be elevated to species status. We mapped four subspecies based on distinct ranges and conservation concern. Both NatureServe and ITIS recognize this genus as *Artemisiospiza* and recognize *Amphispiza belli nevadensis* as a distinct species (*Artemisiospiza nevadensis*). Furthermore, NatureServe does not recognize *Amphispiza belli canescens* as a subspecies. SGW 29 September 2017
mEAMOx	Eastern Mole	*Scalopus aquaticus*	179979	106146	Three subspecies of *Scalopus aquaticus* (Eastern Mole) are recognized by NatureServe and have a Rounded Global Status of T1 - Critically Imperiled (*S. a. anastasae*, *S. a. bassi*, and *S. a. texanus*). However, only *S. a. anastasae* and *S. a. texanus* have isolated ranges separate from the full species. Therefore, a range and model for *S. a. anastasae* and *S. a. texanus* were created and *S. a. bassi* was removed from the modeling list. SGW 29 September 2017
mEAMOa	Anastasia Island Mole	*Scalopus aquaticus anastasae*	709992	104966	Three subspecies of *Scalopus aquaticus* (Eastern Mole) are recognized by NatureServe and have a Rounded Global Status of T1 - Critically Imperiled (*S. a. anastasae*, *S. a. bassi*, and *S. a. texanus*). However, only *S. a. anastasae* and *S. a. texanus* have isolated ranges separate from the full species. Therefore, a range and model for *S. a. anastasae* and *S. a. texanus* were created and *S. a. bassi* was removed from the modeling list. SGW 29 September 2017
mEAMOt	Presidio Mole	*Scalopus aquaticus texanus*	710005	103457	Three subspecies of *Scalopus aquaticus* (Eastern Mole) are recognized by NatureServe and have a Rounded Global Status of T1 - Critically Imperiled (*S. a. anastasae*, *S. a. bassi*, and *S. a. texanus*). However, only *S. a. anastasae* and *S. a. texanus* have isolated ranges separate from the full species. Therefore, a range and model for *S. a. anastasae* and *S. a. texanus* were created and *S. a. bassi* was removed from the modeling list. SGW 29 September 2017
mCLOBx	Curasoan Long-nosed Bat	*Leptonycteris curasoae*	552464	106286	NatureServe recognize *Leptonycteris curasoae* as part of *Leptonycteris yerbabuenae*. SGW 29 September 2017
mTBEBx	Townsend's Big-eared Bat	*Corynorhinus townsendii*	203452	103228	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others, (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mTBEBi	Ozark Big-eared Bat	*Corynorhinus townsendii ingens*	632276	104608	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017
mTBEBv	Virginia Big-eared Bat	*Corynorhinus townsendii virginianus*	203454	100716	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017
mTBEBp	Pale Lumped-nosed Bat	*Corynorhinus townsendii pallescens*	203458	105024	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017
mTBEBt	Townsend's Western Big-eared Bat	*Corynorhinus townsendii townsendii*	203453	106329	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mTBEBa	Big-eared Bat (australis)	*Corynorhinus townsendii australis*	632279	103228	There are five subspecies of *Corynorhinus townsendii* and the eastern most ones, *C. t. virginianus* and *C. t. ingens* are listed as Endangered under the Endangered Species Act of 1979 (Piaggio and others, 2009). The eastern subspecies ranges are based on information in Conservation and Management of Eastern Big Eared Bats (Loeb and others, 2011). Western subspecies ranges were derived from Ammerman and others (2012) Smith and others (2008), Pierson and Rainey (1998), and Piaggio and Perkins (2005). *C. t. australis* is not recognized by NatureServe. SGW 29 September 2017
mWBBAx	Wagner's Bonneted Bat	*Eumops glaucinus*	180079	104958	*Eumops glaucinus* is not recognized by NatureServe as a species, but rather as part of *Eumops floridanus*. SGW 29 September 2017
mPYRAx	Pygmy Rabbit	*Brachylagus idahoensis*	552521	102656	NatureServe recognizes a distinct subpopulation of *Brachylagus idahoensis* as Population. 2 with the common name of Columbia Basin Pygmy Rabbit. ITIS does not recognize any subpopulations. SGW 29 September 2017
mPYRAc	Pygmy Rabbit (Columbia Basin Population)	*Brachylagus idahoensis population 2*	552521	637957	NatureServe recognizes a distinct subpopulation of *Brachylagus idahoensis* as Population 2 with the common name of Columbia Basin Pygmy Rabbit. ITIS does not recognize any subpopulations. SGW 29 September 2017
mSEWEx	Sewellel	*Aplodontia rufa*	180133	101780	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mSEWEn	Point Arena Mountain Beaver	*Aplodontia rufa nigra*	202351	104721	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mSEWEp	Point Reyes Mountain Beaver	*Aplodontia rufa phaea*	203477	100536	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mSEWEc	Sierra Nevada Mountain Beaver	*Aplodontia rufa californica*	203471	101050	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mSEWEr	Coastal Mountain Beaver	*Aplodontia rufa rufa*	202350	102374	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mSEWEo	Olympic Mountain Beaver	*Aplodontia rufa olympica*	180133	894467	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mSEWEa	Mountain Beaver pacifica	*Aplodontia rufa pacifica*	203475	101780	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mSEWEh	Mountain Beaver humboldtiana	*Aplodontia rufa humboldtiana*	203473	101780	The *Aplondontia rufa* (Sewellel), also called the Mountain Beaver, occurs in the Sierra Nevadas, Coastal California, and parts of the Pacific Northwest. Piaggio and others (2013) provided a revised assessment of the geography of its subspecies and delineated the ranges of seven subspecies: *A. r. pacifica*, *A. r. californica*, *A. r. humboldtiana*, *A. r. nigra*, *A. r. phaea*, *A. r. olympica*, and *A. r. rufa*. They also concluded that *A. r. pacifica* may be a unique species. ITIS does not recognize *A. r. olympica* as a subspecies. NatureServe does not recognize *A. r. humboldtiana* or *A. r. pacifica*. SGW 29 September 2017
mALCHx	Alpine Chipmunk	*Tamias alpinus*	180189	102392	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLECHx	Least Chipmunk	*Tamias minimus*	180195	103812	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLECHt	Penasco Chipmunk	*Tamias minimus atristriatus*	632531	102143	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLECHc	Chuska Mountain Chipmunk	*Tamias minimus chuskaensis*	931310	102895	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLECHa	White Mountains Chipmunk	*Tamias minimus arizonensis*	931309	103851	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mYPCHx	Yellow-pine Chipmunk	*Tamias amoenus*	180190	103853	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mYPCHc	Yellow-pine Chipmunk (celeris)	*Tamias amoenus celeris*	931137	101472	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mTOCHx	Townsend's Chipmunk	*Tamias townsendii*	180208	105861	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mYCCHx	Yellow-cheeked Chipmunk	*Tamias ochrogenys*	180197	102756	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mSHCHx	Shadow Chipmunk	*Tamias senex*	180203	102290	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mSICHx	Siskiyou Chipmunk	*Tamias siskiyou*	180204	101954	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mSOCHx	Sonoma Chipmunk	*Tamias sonomae*	180205	101465	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mMMCHx	Merriam's Chipmunk	*Tamias merriami*	180194	101063	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mCFCHx	California Chipmunk	*Tamias obscurus*	180196	101062	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mCLCHx	Cliff Chipmunk	*Tamias dorsalis*	180193	103986	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mCOCHx	Colorado Chipmunk	*Tamias quadrivittatus*	180201	103893	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mRTCHx	Red-tailed Chipmunk	*Tamias ruficaudus*	180202	105876	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mGCCHx	Gray-collared Chipmunk	*Tamias cinereicollis*	180192	102849	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mGFCHx	Gray-footed Chipmunk	*Tamias canipes*	180191	101405	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLOECx	Long-eared Chipmunk	*Tamias quadrimaculatus*	180200	100740	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mLOCHx	Lodgepole Chipmunk	*Tamias speciosus*	180206	105567	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). The southern portion of the subspecies *Tamias speciosus speciosus'* range is disjunct from the full species range in the extreme southern Sierra Nevadas, however, the northern portion in Tulare and Inyo counties appear not to be (based on Grinnell 1913 as stated in NatureServe). Additionally, this subspecies appears to be of no immediate conservation concern according to NatureServe and Williams (1986). The range of subspecies *T.s. callipeplus* (Mt. Pinos Lodgepole Chipmunk), however, is truly disjunct and restricted to the Mount Pinos area, Ventura County, California (Wilson and Ruff 1999) and the nearby Mt. Abel (about 6 km distant) and Mt. Frazier. Also, it is listed as T1-critically imperiled by NatureServe rounded global status. Therefore, *T.s. speciosus* was removed from the model list and *T.s. callipeplus* was retained. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mLOCHc	Mt. Pinos Lodgepole Chipmunk	*Tamias speciosus callipeplus*	931198	105202	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). The southern portion of the subspecies *Tamias speciosus speciosus'* range is disjunct from the full species range in the extreme southern Sierra Nevadas, however, the northern portion in Tulare and Inyo counties appear not to be (based on Grinnell 1913 as stated in NatureServe). Additionally, this subspecies appears to be of no immediate conservation concern according to NatureServe and Williams (1986). The range of subspecies *T.s. callipeplus* (Mt. Pinos Lodgepole Chipmunk), however, is truly disjunct and restricted to the Mount Pinos area, Ventura County, California (Wilson and Ruff 1999) and the nearby Mt. Abel (about 6 km distant) and Mt. Frazier. Also, it is listed as T1-critically imperiled by NatureServe rounded global status. Therefore, *T.s. speciosus* was removed from the model list and *T.s. callipeplus* was retained. SGW 29 September 2017
mPNCHx	Panamint Chipmunk	*Tamias panamintinus*	180199	100573	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mUICHx	Uinta Chipmunk	*Tamias umbrinus*	180209	104775	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mPACHx	Palmer's Chipmunk	*Tamias palmeri*	180198	104774	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mHOCHx	Hopi Chipmunk	*Tamias rufus*	552503	106127	NatureServe recognizes *Tamias* genus as *NeoTamias* (except *Tamias striatus*) based on Baker and others (2003). SGW 29 September 2017
mYEMAx	Yellow-bellied Marmot	*Marmota flaviventris*	180140	104002	The subspecies *Marmota flaviventris notioros* (Wet Mountains Marmot) was mapped individually due to its distinct non-overlapping range. SGW 29 September 2017
mYEMAn	Wet Mountains Marmot	*Marmota flaviventris notioros*	931015	101177	The subspecies *Marmota flaviventris notioros* (Wet Mountains Marmot) was mapped individually due to its distinct non-overlapping range. SGW 29 September 2017
mTGSQx	Townsend's Ground Squirrel	*Urocitellus townsendii*	930323	102480	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mWASQx	Washington Ground Squirrel	*Urocitellus washingtoni*	930325	101353	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mIGSQx	Idaho Ground Squirrel	*Urocitellus brunneus*	930316	100453	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mIGSQb	Northern Idaho Ground Squirrel	*Urocitellus brunneus brunneus*	931245	102796	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mIGSQe	Southern Idaho Ground Squirrel	*Urocitellus brunneus endemicus*	931232	104618	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mRGSQx	Richardson's Ground Squirrel	*Urocitellus richardsonii*	930322	100987	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mUGSQx	Uinta Ground Squirrel	*Urocitellus armatus*	930314	104586	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mBGSQx	Belding's Ground Squirrel	*Urocitellus beldingi*	930315	104604	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mCOSQx	Columbian Ground Squirrel	*Urocitellus columbianus*	930318	103644	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mTLGSx	Thirteen-lined Ground Squirrel	*Ictidomys tridecemlineatus*	930308	100397	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mMESQx	Mexican Ground Squirrel	*Ictidomys mexicanus*	930307	100396	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mSGSQx	Spotted Ground Squirrel	*Xerospermophilus spilosoma*	930312	100684	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mFGSQx	Franklin's Ground Squirrel	*Poliocitellus franklinii*	930309	105759	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mROSQx	Rock Squirrel	*Otospermophilus variegatus*	930302	102556	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mCASQx	California Ground Squirrel	*Otospermophilus beecheyi*	930301	103839	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mMOSQx	Mohave Ground Squirrel	*Xerospermophilus mohavensis*	930310	103905	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mRTGSx	Round-tailed Ground Squirrel	*Xerospermophilus tereticaudus*	930313	103413	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mGMGSx	Golden-mantled Ground Squirrel	*Callospermophilus lateralis*	930305	102855	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mGMGSb	San Bernardino Golden-mantled Ground Squirrel	*Callospermophilus lateralis bernardinus*	931060	807083	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mCGGSx	Cascade Golden-mantled Ground Squirrel	*Callospermophilus saturatus*	930304	102354	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mWYSQx	Wyoming Ground Squirrel	*Urocitellus elegans*	930319	102073	NatureServe does not recognize the subspecies *Urocitellus elegans aureus* or *U. E. elegans*. SGW 29 September 2017
mWYSQn	Wyoming Ground Squirrel (nevadensis)	*Urocitellus elegans nevadensis*	931054	106011	NatureServe does not recognize the subspecies *Urocitellus elegans aureus* or *U. E. elegans*. SGW 29 September 2017
mWYSQa	Wyoming Ground Squirrel (aureus)	*Urocitellus elegans aureus*	931053	102073	NatureServe does not recognize the subspecies *Urocitellus elegans aureus* or *U. E. elegans*. SGW 29 September 2017
mWYSQe	Wyoming Ground Squirrel (elegans)	*Urocitellus elegans elegans*	931052	102073	NatureServe does not recognize the subspecies *Urocitellus elegans aureus* or *U. E. elegans*. SGW 29 September 2017
mPGSQx	Piute Ground Squirrel	*Urocitellus mollis*	930320	102074	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mMGSQx	Merriam's Ground Squirrel	*Urocitellus canus*	930317	101708	ITIS and NatureServe recognize the splitting of 8 genera (*Notocitellus*, *Otospermophilus*, *Callospermophilus*, *Ictidomys*, *Poliocitellus*, *Xerospermophilus*, and *Urocitellus*) from *Spermophilus* (which is now restricted to Eurasia) based on Helgen and others (2009). SGW 29 September 2017
mMAORx	Marsh Oryzomys	*Oryzomys palustris*	180336	104423	The USFWS listed *Oryzomys palustris natator* as endangered in 1991 under the common name Rice Rat and designated critical habitat in August 1993. A 5-year review in 2008 concluded the *O. p. natator* subspecies endangered status is to remain unchanged. We added this subspecies due to conservation status and distinct range (Perry 2006, USFWS 2008). NatureServe lists this subspecies as *Oryzomys palustris* population 3 with the common name Key Oryzomys. ITIS does not currently recognize any subspecies for *O. palustris*. SGW 29 September 2017
mMAORn	Key Oryzomys	*Oryzomys palustris natator*	180336	104405	The USFWS listed *Oryzomys palustris natator* as endangered in 1991 under the common name Rice Rat and designated critical habitat in August 1993. A 5-year review in 2008 concluded the *O. p. natator* subspecies endangered status is to remain unchanged. We added this subspecies due to conservation status and distinct range (Perry 2006, USFWS 2008). NatureServe lists this subspecies as *Oryzomys palustris* population 3 with the common name Key Oryzomys. ITIS does not currently recognize any subspecies for *O. palustris*. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mOLDEx	Oldfield Deermouse	*Peromyscus polionotus*	180290	106418	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEm	Alabama Beach Deermouse	*Peromyscus polionotus ammobates*	180290	101301	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEt	Perdido Key Beach Deermouse	*Peromyscus polionotus trissyllepsis*	180290	105073	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEa	Choctawhatchee Beach Deermouse	*Peromyscus polionotus allophrys*	180290	100415	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEh	Anastasia Beach Deermouse	*Peromyscus polionotus phasma*	180290	105259	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEl	Santa Rosa Beach Deermouse	*Peromyscus polionotus leucocephalus*	180290	101599	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mOLDEn	Southeast Beach Deermouse	*Peromyscus polionotus niveiventris*	180290	102064	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mOLDEp	St. Andrews Beach Deermouse	*Peromyscus polionotus peninsularis*	180290	103306	ITIS does not recognize any subspecies for *Peromyscus polionotus*. Due to the conservation status of several subspecies recognized by NatureServe, we chose to map seven subspecies with distinct ranges (*P. p. ammobates*, *P. p. trissyllepsis*, *P. p. allophrys*, *P. p. phasma*, *P. p. leucocephalus*, *P. p. niveiventris*, *P. p. peninsularis*). SGW 29 September 2017
mPIDEx	Pinon Deermouse	*Peromyscus truei*	180291	100548	ITIS does not recognize any subspecies for *Peromyscus truei*. However, NatureServe recognizes the subpecies *P. t. comanche*. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mPIDEc	Palo Duro Deermouse	*Peromyscus truei comanche*	180291	103019	ITIS does not recognize any subspecies for *Peromyscus truei*. However, NatureServe recognizes the subpecies *P. t. comanche*. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mACRAx	Arizona Cotton Rat	*Sigmodon arizonae*	180347	106492	ITIS does not recognize any subspecies of *Sigmodon arizonae*. We chose to follow the taxonomy recognized by NatureServe due to the distinct ranges of several subspecies. SGW 29 September 2017
mACRAp	Colorado River Cotton Rat	*Sigmodon arizonae plenus*	180347	101792	ITIS does not recognize any subspecies of *Sigmodon arizonae*. We chose to follow the taxonomy recognized by NatureServe due to the distinct ranges of several subspecies. SGW 29 September 2017
mACRAc	Arizona Cotton Rat	*Sigmodon arizonae cienegae*	180347	791523	ITIS does not recognize any subspecies of *Sigmodon arizonae*. We chose to follow the taxonomy recognized by NatureServe due to the distinct ranges of several subspecies. SGW 29 September 2017
mEAWOx	Eastern Woodrat	*Neotoma floridana*	180372	100518	ITIS does not recognize any subspecies for *Neotoma floridana*. However, NatureServe recognizes several subpecies. We chose to map *N. f. smalli* (Key Largo Woodrat) due to its conservation status and distinct range. SGW 29 September 2017
mEAWOs	Key Largo Woodrat	*Neotoma floridana smalli*	180372	104984	TIS does not recognize any subspecies for *Neotoma floridana*. However, NatureServe recognizes several subpecies. We chose to map *N. f. smalli* (Key Largo Woodrat) due to its conservation status and distinct range. SGW 29 September 2017
mDFWOx	Dusky-footed Woodrat	*Neotoma fuscipes*	180373	768534	The San Joaquin Valley subspecies (*Neotoma fuscipes riparia*) of the *N. fuscipes* (dusky-footed woodrat) is known to exist only in a single location (Caswell Memorial State Park) along the Stanislaus River bordering San Joaquin and Stanislaus counties, Calif. It was listed endangered by USFWS in 1997 (common name of Riparian Woodrat). Because of the isolated range and high conservation concern, this subspecies was included as a separate range and model from the full *N. fuscipes* species model. ITIS does not recognize any subspecies of *N. fuscipes*. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mDFWOs	San Joaquin Valley Wood Rat	*Neotoma fuscipes riparia*	180373	768539	The San Joaquin Valley subspecies (*Neotoma fuscipes riparia*) of the *N. fuscipes* (dusky-footed woodrat) is known to exist only in a single location (Caswell Memorial State Park) along the Stanislaus River bordering San Joaquin and Stanislaus counties, Calif. It was listed endangered by USFWS in 1997 (common name of Riparian Woodrat). Because of the isolated range and high conservation concern, this subspecies was included as a separate range and model from the full *N. fuscipes* species model. ITIS does not recognize any subspecies of *N. fuscipes*. SGW 29 September 2017
mSRBVx	Southern Red-backed Vole	*Myodes gapperi*	970612	105153	ITIS does not recognize any subspecies for *Myodes gapperi*. However, NatureServe recognizes several subpecies. We chose to map *M. g. brevicaudus* (Black Hills Red-backed Vole) due to its conservation status and distinct range. SGW 29 September 2017
mSRBVb	Black Hills Red-backed Vole	*Myodes gapperi brevicaudus*	970612	105999	ITIS does not recognize any subspecies for *Myodes gapperi*. However, NatureServe recognizes several subpecies. We chose to map *M. g. brevicaudus* (Black Hills Red-backed Vole) due to its conservation status and distinct range. SGW 29 September 2017
mMEVOx	Meadow Vole	*Microtus pennsylvanicus*	180297	103729	ITIS does not recognize any subspecies for *Microtus pennsylvanicus*. However, NatureServe recognizes several subpecies. We chose to map *M. p. dukecampbelli* (Duke's Salt Marsh Vole) due to its conservation status and distinct range. SGW 29 September 2017
mMEVOd	Duke's Salt Marsh Vole	*Microtus pennsylvanicus dukecampbelli*	180297	106543	ITIS does not recognize any subspecies for *Microtus pennsylvanicus*. However, NatureServe recognizes several subpecies. We chose to map *M. p. dukecampbelli* (Duke's Salt Marsh Vole) due to its conservation status and distinct range. SGW 29 September 2017
mMOVOx	Montane Vole	*Microtus montanus*	180310	104293	ITIS does not recognize any subspecies for *Microtus montanus*. However, NatureServe recognizes several subpecies. We chose to map three subspecies (*M. m. arizonensis*, *M. m. fucosus*, *M. m. nevadensis*) due to their conservation status and distinct ranges. SGW 29 September 2017
mMOVOn	Ash Meadows Montane Vole	*Microtus montanus nevadensis*	180310	101726	ITIS does not recognize any subspecies for *Microtus montanus*. However, NatureServe recognizes several subpecies. We chose to map three subspecies (*M. m. arizonensis*, *M. m. fucosus*, *M. m. nevadensis*) due to their conservation status and distinct ranges. SGW 29 September 2017
mMOVOa	Arizona Montane Vole	*Microtus montanus arizonensis*	180310	102377	ITIS does not recognize any subspecies for *Microtus montanus*. However, NatureServe recognizes several subpecies. We chose to map three subspecies (*M. m. arizonensis*, *M. m. fucosus*, *M. m. nevadensis*) due to their conservation status and distinct ranges. SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mMOVOf	Pahranagat Valley Vole	*Microtus montanus fucosus*	180310	101211	ITIS does not recognize any subspecies for *Microtus montanus*. However, NatureServe recognizes several subpecies. We chose to map three subspecies (*M. m. arizonensis*, *M. m. fucosus*, *M. m. nevadensis*) due to their conservation status and distinct ranges. SGW 29 September 2017
mCAVOx	California Vole	*Microtus californicus*	180305	102779	ITIS does not recognize any subspecies for *Microtus californicus*. However, NatureServe recognizes several subpecies. We chose to map *M. c. scirpensis* (Amargosa Vole) due to its conservation status and distinct range. SGW 29 September 2017
mCAVOc	Amargosa Vole	*Microtus californicus scirpensis*	180305	101942	ITIS does not recognize any subspecies for *Microtus californicus*. However, NatureServe recognizes several subpecies. We chose to map *M. c. scirpensis* (Amargosa Vole) due to its conservation status and distinct range. SGW 29 September 2017
mLTVOx	Long-tailed Vole	*Microtus longicaudus*	180299	102513	ITIS does not recognize any subspecies for *Microtus longicaudus*. However, NatureServe recognizes several subpecies. We chose to map *M. l. leucophaeus* (White-bellied Vole) due to its conservation status and distinct range. SGW 29 September 2017
mLTVOl	White-bellied Vole	*Microtus longicaudus leucophaeus*	180299	102845	ITIS does not recognize any subspecies for *Microtus longicaudus*. However, NatureServe recognizes several subpecies. We chose to map *M. l. leucophaeus* (White-bellied Vole) due to its conservation status and distinct range. SGW 29 September 2017
mROVOx	Rock Vole	*Microtus chrotorrhinus*	180307	103836	ITIS does not recognize any subspecies for *Microtus chrotorrhinus*. However, NatureServe recognizes the subpecies *M. c. carolinensis* (Southern Rock Vole). We chose to map it due to it's conservation status and distinct range. SGW 29 September 2017
mROVOc	Southern Rock Vole	*Microtus chrotorrhinus carolinensis*	180307	105684	ITIS does not recognize any subspecies for *Microtus chrotorrhinus*. However, NatureServe recognizes the subpecies *M. c. carolinensis* (Southern Rock Vole). We chose to map it due to it's conservation status and distinct range. SGW 29 September 2017
mPRVOx	Prairie Vole	*Microtus ochrogaster*	180312	101287	ITIS does not recognize any subspecies for *Microtus ochrogaster*. However, NatureServe recognizes several subpecies. We chose to map *M. o. taylori* (Prairie Vole) due to its conservation status and distinct range. SGW 29 September 2017
mPRVOt	Prairie Vole	*Microtus ochrogaster taylori*	180312	101969	ITIS does not recognize any subspecies for *Microtus ochrogaster*. However, NatureServe recognizes several subpecies. We chose to map *M. o. taylori* (Prairie Vole) due to its conservation status and distinct range. SGW 29 September 2017

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[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
mKIFOx	Kit Fox	*Vulpes macrotis*	180606	102982	ITIS does not recognize any subspecies for *Vulpes macrotis*. However, NatureServe recognizes the subpecies *V. m. mutica* (Kit Fox—San Joaquin Valley population). We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mKIFOm	Kit Fox - San Joaquin Valley Population	*Vulpes macrotis mutica*	180606	101320	ITIS does not recognize any subspecies for *Vulpes macrotis*. However, NatureServe recognizes the subpecies *V. m. mutica* (Kit Fox—San Joaquin Valley population). We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mCOUGx	Cougar	*Puma concolor*	552479	101637	ITIS does not recognize *Puma concolor coryi* (Florida Panther) subspecies. However, NatureServe recognizes the subpecies. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mCOUGc	Florida Panther	*Puma concolor coryi*	552479	101183	ITIS does not recognize *Puma concolor coryi* (Florida Panther) subspecies. However, NatureServe recognizes the subpecies. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
mJAGDx	Jaguarundi	*Puma yagouarondi*	726257	103451	NatureServe recognizes this genus as *Herpailurus* according to Caso and others (2015). SGW 29 September 2017
mJAGDc	Gulf Coast Jaguarundi	*Puma yagouaroundi cacomitli*	726436	104968	NatureServe recognizes this genus as *Herpailurus* according to Caso and others (2015). SGW 29 September 2017
mELK1x	Elk	*Cervus elaphus*	180695	102257	*Cervus elaphus* subspecies of *C. e. nannodes* and *C. e. roosevelti* (Tule and Roosevelt elk, respectively) were included because of their definitive ranges and conservation concern from a historical perspective. ITIS does not recognize *C. e. roosevelti*. SGW 29 September 2017
mELK1t	Tule Elk	*Cervus elaphus nannodes*	898525	103199	*Cervus elaphus* subspecies of *C. e. nannodes* and *C. e. roosevelti* (Tule and Roosevelt elk, respectively) were included because of their definitive ranges and conservation concern from a historical perspective. ITIS does not recognize *C. e. roosevelti*. SGW 29 September 2017
mELK1r	Roosevelt Elk	*Cervus elaphus roosevelti*	180695	101331	*Cervus elaphus* subspecies of *C. e. nannodes* and *C. e. roosevelti* (Tule and Roosevelt elk, respectively) were included because of their definitive ranges and conservation concern from a historical perspective. ITIS does not recognize *C. e. roosevelti*. SGW 29 September 2017
rSUCOx	Suwannee Cooter	*Pseudemys suwanniensis*	668673	102277	Crother and others (2000, 2003) and Crother (2008) delineate *Pseudemys suwanniensis* (Suwannee Cooter) as a full species. Both NatureServe and ITIS currently treat P. suwanniensis as a subspecies (P. concinna suwanniensis). SGW 29 September 2017

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[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
rEBTUx	Eastern Box Turtle	*Terrapene carolina*	173776	100312	ITIS does not recognize *Terrapene carolina bauri* (Florida Box Turtle) subspecies. However, NatureServe recognizes the subpecies. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
rEBTUb	Florida Box Turtle	*Terrapene carolina bauri*	173776	105431	ITIS does not recognize *Terrapene carolina bauri* (Florida Box Turtle) subspecies. However, NatureServe recognizes the subpecies. We chose to map it due to its conservation status and distinct range. SGW 29 September 2017
rDSLIx	Desert Spiny Lizard	*Sceloporus magister*	173873	106473	NatureServe does not recognize either *Sceloporus bimaculosus* or *S. uniformis* as distinct species, but rather part of the *S. magister* complex. SGW 29 September 2017
rTSSLx	Twin-spotted Spiny Lizard	*Sceloporus bimaculosus*	1056655	106473	NatureServe does not recognize either *Sceloporus bimaculosus* or *S. uniformis* as distinct species, but rather part of the *S. magister* complex. SGW 29 September 2017
rYBSLx	Yellow-backed Spiny Lizard	*Sceloporus uniformis*	1056662	106473	NatureServe does not recognize either *Sceloporus bimaculosus* or *S. uniformis* as distinct species, but rather part of the *S. magister* complex. SGW 29 September 2017
rCSWHx	Canyon Spotted Whiptail	*Aspidoscelis burti*	174015	106385	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis burti* as *Cnemidophorus burti* (TSN 174015). SGW 29 September 2017
rRBWHx	Red-backed Whiptail	*Aspidoscelis xanthonota*	564600	101123	Reeder and others, (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis xanthonota* as *Cnemidophorus xanthonotus* (TSN 564600). SGW 29 September 2017
rGCWHx	Gray Checkered Whiptail	*Aspidoscelis dixoni*	174016	106265	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis dixoni* as *Cnemidophorus dixoni* (TSN 174016). SGW 29 September 2017
rCWHIx	Chihuahuan Spotted Whiptail	*Aspidoscelis exsanguis*	174017	103253	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis exsanguis* as *Cnemidophorus exsanguis* (TSN 174017). SGW 29 September 2017
rGLSWx	Gila Spotted Whiptail	*Aspidoscelis flagellicauda*	174018	101721	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis flagellicauda* as *Cnemidophorus flagellicaudus* (TSN 174018). SGW 29 September 2017
rCSPWx	Common Spotted Whiptail	*Aspidoscelis gularis*	174019	100575	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis gularis* as *Cnemidophorus gularis* (TSN 174019). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
rORWHx	Orange-throated Whiptail	*Aspidoscelis hyperythra*	174020	100457	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis hyperythra* as *Cnemidophorus hyperythrus* (TSN 174020). SGW 29 September 2017
rLISWx	Little Striped Whiptail	*Aspidoscelis inornata*	174021	106231	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis inornata* as *Cnemidophorus inornatus* (TSN 174021). SGW 29 September 2017
rASWHx	Arizona Striped Whiptail	*Aspidoscelis arizonae*	208930	106205	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis arizonae* as *Cnemidophorus inornatus arizonae* (TSN 208930). SGW 29 September 2017
rLWWHx	Little White Whiptail	*Aspidoscelis gypsi*	174021	106231	*Aspidoscelis gypsi* (Little White Whiptail) is recognized by Crother and others (2000) and Collins and Taggart (2002) as a distinct species. ITIS and NatureServe recognize this as part of *Aspidoscelis inornatus* or *Cnemidophorus inornatus* (TSN 174021), respectively. SGW 29 September 2017
rLASWx	Laredo Striped Whiptail	*Aspidoscelis laredoensis*	174022	104626	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis laredoensis* as *Cnemidophorus laredoensis* (TSN 174022). SGW 29 September 2017
rNMWHx	New Mexico Whiptail	*Aspidoscelis neomexicana*	174024	103871	Reederand others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis neomexicana* as *Cnemidophorus neomexicanus* (TSN 174024). SGW 29 September 2017
rSLRAx	Six-lined Racerunner	*Aspidoscelis sexlineata*	174014	102815	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis sexlineata* as *Cnemidophorus sexlineatus* (TSN 174014). SGW 29 September 2017
rSSWHx	Sonoran Spotted Whiptail	*Aspidoscelis sonorae*	174025	102752	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis sonorae* as *Cnemidophorus sonorae* (TSN 174025). SGW 29 September 2017
rCCWHx	Common Checkered Whiptail	*Aspidoscelis tesselata*	174026	100978	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis tesselata* as *Cnemidophorus tesselatus* (TSN 174026). SGW 29 September 2017
rTIWHx	Tiger Whiptail	*Aspidoscelis tigris*	208940	102095	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis tigris* as *Cnemidophorus tigris* (TSN 208940). SGW 29 September 2017
rDGWHx	Desert Grassland Whiptail	*Aspidoscelis uniparens*	208947	102521	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis uniparens* as *Cnemidophorus uniparens* (TSN 208947). SGW 29 September 2017

Table 3.1. Notes on species taxonomy related to the Integrated Taxonomic Information System and NatureServe's Global Element Identifiers for species where there was not a direct match with the taxonomic concept being modeled by Gap Analysis Project (GAP).—Continued

[ITIS, Integrated Taxonomic Information System; SGW, Steven G. Williams; USFWS, U.S. Fish and Wildlife Service; km, kilometer]

GAP species code	GAP common name	GAP scientific name	Matching ITIS code	Matching NatureServe Global Element ID	Taxa concept matching notes
rPLSWx	Plateau Striped Whiptail	*Aspidoscelis velox*	208948	101656	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis velox* as *Cnemidophorus velox* (TSN 208948). SGW 29 September 2017
rPLWHx	Plateau Spotted Whiptail	*Aspidoscelis scalaris*	208925	104230	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis scalaris* as *Cnemidophorus septemvittatus* (TSN 208925). SGW 29 September 2017
rCCHWx	Colorado Checkered Whiptail	*Aspidoscelis neotesselata*	914103	103410	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis neotesselata* as *Cnemidophorus neotesselatus* (TSN 914103). SGW 29 September 2017
rPASWx	Pai Striped Whiptail	*Aspidoscelis pai*	914099	637965	Reeder and others (2002) split North American species of the genus *Cnemidophorus* into the genus *Aspidoscelis*. ITIS recognizes *Aspidoscelis pai* as *Cnemidophorus pai* (TSN 914103). SGW 29 September 2017
rSINLx	Sierra Night Lizard	*Xantusia sierrae*	208992	102131	ITIS recognizes *Xantusia sierraeas* the subspecies *Xantusia vigilis sierrae* (TSN 208992). SGW 29 September 2017
rANLIx	Arizona Night Lizard	*Xantusia arizonae*	208991	100054	ITIS recognizes *Xantusia arizonae* as the subspecies *Xantusia vigilis arizonae* (TSN 208991). SGW 29 September 2017
rWNLIx	Wiggins' Night Lizard	*Xantusia wigginsi*	174092	830036	Based on mitochondrial and nuclear DNA data, Sinclair and others (2004) and Leavitt and others. (2007) determined that *Xantusia wigginsi* is a valid species split from the *Xantusia vigilis* complex that occurs in the northern half of Baja California and extreme south-central California. ITIS does not recognize *X. wigginsi* as a distinct species. SGW 29 September 2017
rDHNSx	Dusty Hog-nosed Snake	*Heterodon gloydi*	209163	104992	ITIS recognizes *Heterodon gloydi* the subspecies *Heterodon nasicus gloydi* (TSN 209163). SGW 29 September 2017.
rDENIx	Desert Nightsnake	*Hypsiglena chlorophaea*	174233	817007	*Hypsiglena chlorophaea* (Desert Nightsnake) is recognized by Mulcahy (2008) as a distinct species. ITIS recognizes this as part of *Hypsiglena torquata* (TSN 174233). SGW 29 September 2017
rCHNIx	Chihuahuan Nightsnake	*Hypsiglena jani*	174233	817057	*Hypsiglena jani* (Chihuahuan Nightsnake) is recognized by Mulcahy (2008) as a distinct species. ITIS recognizes this as part of *Hypsiglena torquata* (TSN 174233). SGW 29 September 2017
rCOACx	Coachwhip	*Coluber flagellum*	174238	103744	ITIS recognizes *Coluber flagellum* (Coachwhip) as *Masticophis flagellum* (TSN 174238). SGW 29 September 2017
rBCCOx	Baja California Coachwhip	*Coluber fuliginosus*	683039	857787	ITIS recognizes *Coluber fuliginosus* (Baja California Coachwhip) as *Masticophis fuliginosus* (TSN 683039). SGW 29 September 2017

Appendix 4. Table of Ancillary Datasets

Table 4.1. Ancillary data used to create species' habitat maps and URLs to access those data through U.S. Geological Survey ScienceBase.

Ancillary data	ScienceBase URL
National Gap Land Cover ver 1.0 (2001)	https://doi.org/10.5066/F7959GF5
Hydrologic Unit Codes [HUCs]	https://doi.org/10.5066/F7DZ0754
Modeling regions	https://doi.org/10.5066/F77H1HGT
Human impact avoidance	https://doi.org/10.5066/F7PC318R
Forest Edge	https://doi.org/10.5066/F7XW4HPN
Forest/open + woodland/shrubland	https://doi.org/10.5066/F7T43RZ7
Elevation	https://doi.org/10.5066/F72N515B
Aspect	https://doi.org/10.5066/F7FT8JXP
Slope	https://doi.org/10.5066/F75D8QQF
Hydrography	https://doi.org/10.5066/F7JM28J1
Canopy cover	https://doi.org/10.5066/F76D5RW8

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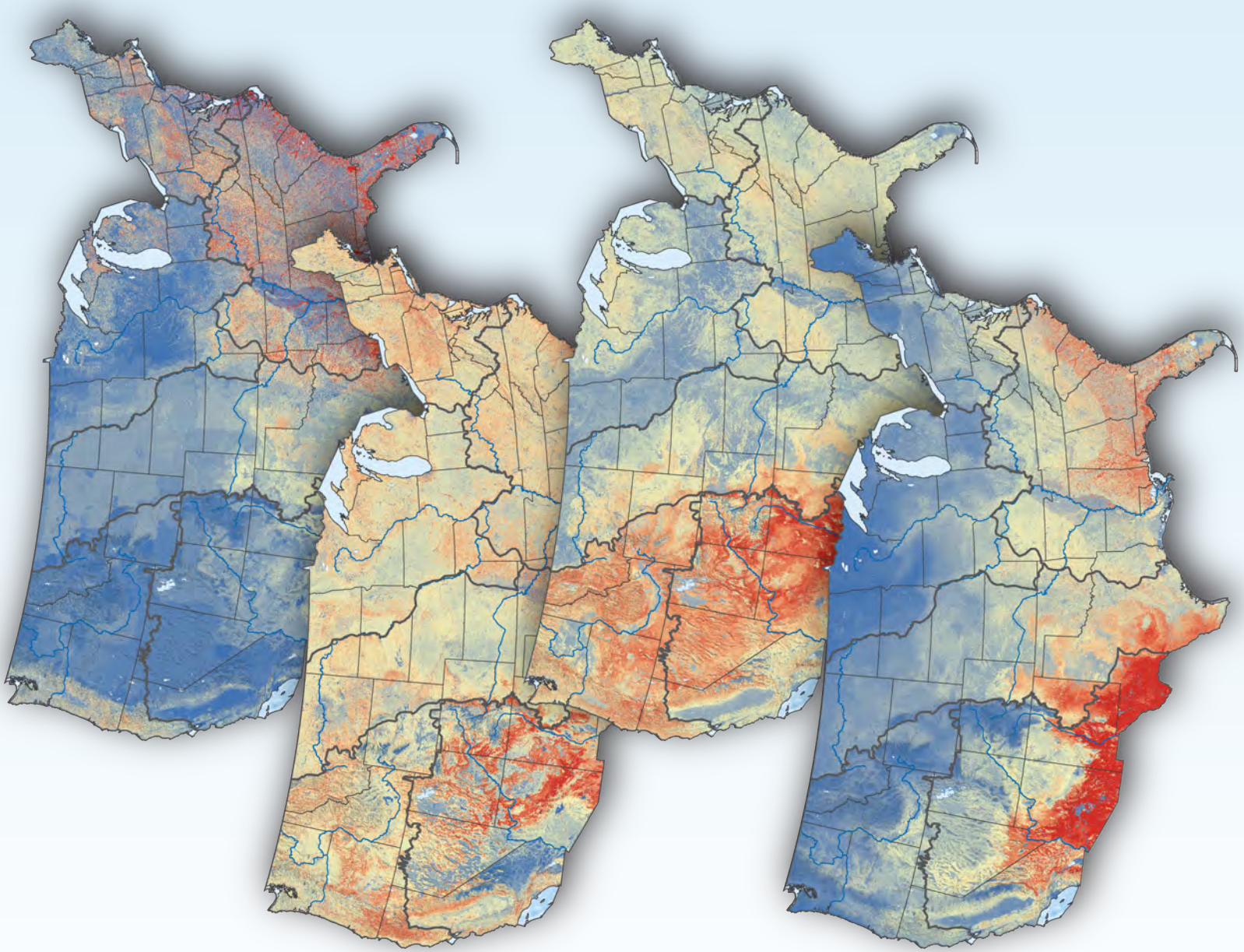

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