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Corporate Forest Ownerships of the United States, 2018: Results from the USDA Forest Service, National Woodland Owner Survey

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Abstract

The National Woodland Owner Survey (NWOS) is conducted by the U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis program, to collect information on the attitudes, behaviors, and other characteristics of America's private forest ownerships. This report provides documentation and results from the 2017 to 2018 iteration of the NWOS, which is referenced by the terminal year, 2018. The term "corporate ownerships" collectively refers to large corporate ownerships, which are companies owning 45,000+ acres of forest land, and small corporate ownerships, which include companies with between 10 and 44,999 acres of forest land and conservation organizations, partnerships, associations, and clubs. Selected results are presented and full sets of summary tables, by geography (Nation and regions) and five domains of interest, are provided in the accompanying supplemental materials. The domains of interest used in the supplemental summary tables are small corporate forest ownerships with holding sizes of 1+, 10+, 100+, and 1,000+ acres of forest land, and large corporate ownerships with holding sizes of 45,000+ acres. Each set of summary tables contains survey cooperation rates, and summaries of the responses to questions asked on the survey. The report concludes with a discussion of data interpretation, data limitations, and how to compare results with previous iterations of the NWOS.

Corporate forest ownerships with 1+ acres of forest land control 21 percent of the forest land in the United States, excluding interior Alaska. An estimated 98 percent of the small corporate forest land is in holdings of 10 or more acres of forest land, but an estimated 54 percent of the small corporate forest ownerships have holdings between 1 and 9 acres of forest land. In contrast, large corporate forest ownerships have average holdings of 312,000 acres. The results highlighted in this report are for small corporate forest ownerships with 10+ acres of forest land and large corporate forest ownerships with 45,000+ acres of forest land at the national level. This group includes an estimated 307,000 ownerships, which collectively own 145 million acres of forest land. Among small corporate ownerships, the most common reasons for owning forests are "To protect or improve wildlife habitat," "To protect water resources," and "To protect nature or biological diversity." Timber production is the single most important objective among large corporate ownerships, but protection of nature, water, and wildlife habitat are important objectives among at least 50 percent of these ownerships as well. Forest management practices are occurring on many small corporate forests, but written management plans, receiving professional advice in the previous 5 years, and participating in assistance programs are relatively uncommon. In contrast, a substantial majority of large corporate acreage is covered by management plans or enrolled in one or more green certification programs (or a combination thereof). Small corporate forest owners' most common concerns include "Trespassing or poaching," "Government regulation," and "High property taxes." Large corporate ownerships share concerns related to regulation and taxes, as well as concerns related to changes in forest product markets.

KEYWORDS: corporate forest owners, private forest owners, attitudes, behaviors, demographics, forest inventory and analysis

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Cover Art

Background photo: Ponderosa pine in South Dakota. USDA Forest Service photo by Dacia Meneguzzo. Upper Left photo: Red-tailed hawk in Pennsylvania. Courtesy photo by Greg Czarnecki, Pennsylvania Department of Conservation and Natural Resources, used with permission. Top Center photo: Bull elk in Pennsylvania. Courtesy photo by Hal Korber, Pennsylvania Game Commission, used with permission. Upper Right photo: Cypress in Illinois. USDA Forest Service photo by Susan Crocker. Lower Left photo: Youghiogheny River in southwestern Pennsylvania. Courtesy photo by Greg Czarnecki, Pennsylvania Department of Conservation and Natural Resources, used with permission. Lower Right photo: Member of a marking crew identifying a tree to be cut during a timber sale. USDA photo by Kevin Wiltsie.

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Introduction

The National Woodland Owner Survey (NWOS) is implemented by the U.S. Department of Agriculture (USDA) Forest Service's Forest Inventory and Analysis (FIA) program in order to provide information on who owns America's forests, why they own them, what they have done with them in the past, and what they plan to do with them in the future. The FIA program has three major components: the plot-based forest inventory (<https://www.fia.fs.usda.gov/>), the Timber Products Output survey (<https://www.fia.fs.usda.gov/program-features/tpo>), and the NWOS (<https://www.fia.fs.usda.gov/nwos>). Collectively, these three components provide a comprehensive view of the Nation's forests in terms of biophysical, economic, and social dimensions. The legislative authority for FIA, including the NWOS, is provided in the Forest and Rangeland Renewable Resources Research Act of 1978 and the Agricultural Research, Extension, and Education Reform Act of 1998.

The NWOS has four components currently in implementation: base (or rural), large corporate, urban, and islands. This report provides results from the base and large corporate NWOS and, in particular, results for private companies (small and large), conservation organizations, partnerships, associations, and clubs, collectively referred to as corporate forest ownerships (see [Population of Interest](#) for a fuller definition). Data collection for this iteration of the NWOS was conducted in 2017 and 2018 and is referred to by its terminal date, 2018. Summary tables are provided in appendix 1 of this report for corporate forest ownerships at the regional and national levels for ownerships with 1 or more (1+) acres, 10 or more (10+) acres, 100 or more (100+) acres, and 1,000 or more (1,000+) acres, and—for large corporate ownerships—45,000 or more (45,000+) acres of forest land. In addition to providing these tables, this report provides a brief background of the NWOS, summaries of survey implementation and estimation procedures, a presentation of selected findings, and guidance on interpreting the results. The results presented in this report focus at the national level on small corporate forest ownerships with 10+ acres of forest land at the national level and large corporate ownerships with 45,000+ acres. Additional information, including results from previous iterations of the base NWOS and other NWOS components, is available on the NWOS website: <https://www.fia.fs.usda.gov/nwos>.

This report was written as a companion to “Family Forest Ownerships of the United States, 2018” (Butler et al. 2021), which contains more in-depth information on the history, background, and methodology of the NWOS.

History of the National Woodland Owner Survey

The USDA Forest Service (hereafter, Forest Service) has been providing information on America's private forest ownerships for over 60 years. The first, national-level statistics on private forest ownerships in the United States were provided by Josephson and McGuire (1958). They reported on the distribution of forest land by ownership category and information on size of forest holdings, stand size distributions, and forest productivity with special attention given to farmers and industrial owners. The next national report was based on data collected in 1978 (Birch et al. 1982). As an adjunct to a landowner survey being conducted by the USDA Economic Research Service, the Birch et al. report provided limited information, including summaries of size of forest holdings, general

information about the ownership (e.g., legal structure, land tenure, acquisition source), and owner demographics. In 1993, the first national survey was conducted by the Forest Service's FIA program (Birch 1996c). It included information on size of forest holdings, land tenure, ownership objectives, management practices, and demographics. This was the first report to provide state-level results for the entire Nation (Birch 1996a, 1996b, 1997). Subsequent national-level surveys were completed in 2006 (Butler 2008), 2013 (Butler et al. 2016), and, as reported here, 2018. The content of the 2006, 2013, and 2018 iterations built on the content of the 1993 NWOS, but went into greater depth regarding ownership characteristics, ownership history, uses of the forest land, forest management, participation in programs and policies, recreation activities, sources of information, and demographics. The first large corporate survey was implemented as part of the 2018 iteration (Sass et al. 2021). While the 2006 and 2013 iterations of the NWOS included all private ownerships, associated reports and analysis focused primarily on family forest ownerships (Butler 2008, Butler et al. 2016). The results presented in this report come from both the base 2018 survey instrument (i.e., small corporate stratum) and the new large corporate survey instrument.

Population of Interest: Corporate Forest Ownerships

Although the NWOS covers all private forest ownerships, this report focuses on corporate forest ownerships. In total, there are an estimated 673,000 corporate forest ownerships in the United States, which collectively control 147 million acres of forest land. (Note that results in this report exclude Alaska, and, in the case of small corporate ownerships, Rhode Island and North Dakota, due to sampling limitations.) These totals correspond to approximately 35 percent of private forest land and 21 percent of total forest land in the United States (Butler et al. 2021).

The term “corporate ownership” is shorthand for two populations, “small corporate” and “large corporate” ownerships, each of which corresponds to one or more FIA ownership categories (Burrill et al. 2018, USDA Forest Service 2020). The large corporate category corresponds to corporate ownerships owning at least 45,000 acres of forest land nationwide (Caputo et al. 2017). The small corporate population includes corporate ownerships owning less than 45,000 acres, and also conservation organizations and partnerships, associations, and clubs (Table 1). Although only the first category contains for-profit corporations, nearly all (if not all) entities in the second category (nongovernmental organizations, or NGOs) are also legally incorporated entities. Despite the term “unincorporated” in the FIA definition, an increasing number of entities in the third category (e.g., recreation clubs, churches, youth camps) have also been incorporated—including many of those owning the largest acreages.

As a part of the FIA program, the NWOS adheres to the Forest Service definitions of forest land. Forest land is defined as “land that has at least 10 percent crown cover by live tally trees of any size or has had at least 10 percent canopy cover of live tally species in the past, based on the presence of stumps, snags, or other evidence. To qualify, the area must be at least 1.0 acre in size and 120.0 feet wide” (USDA Forest Service 2016).

Table 1.—Correspondence between Forest Inventory and Analysis (FIA) ownership categories (Burrill et al. 2018), National Woodland Owner Survey (NWOS) instrument, and corporate ownership populations summarized in this report

FIA ownership category	Ownership size	NWOS population	NWOS instrument
Corporate, including Native corporations in Alaska and private universities	45,000 or more acres of forest land nationwide	Large corporate	Large corporate
	Between 1 and 44,999 acres (inclusive) of forest land nationwide	Small corporate	Base
Nongovernmental conservation/natural resources organization	1 or more acres of forest land	Small corporate	Base
Unincorporated local partnership/association/club	1 or more acres of forest land	Small corporate	Base

Additional details on the forest land definition are available in the FIA glossary (USDA Forest Service 2016) and the FIA field manual (USDA Forest Service 2020). Some other reports, such as the “Forest Resources of the United States, 2017” (Oswalt et al. 2019), have adopted a forest land definition from the Food and Agriculture Organization of the United Nations (2012), and consequently, acreage values may differ. See Oswalt et al. (2019) for a discussion of specific differences.

Combining the definitions of forest land with that of the population of interest, a corporate forest ownership is a corporation, conservation organization, partnership, association, or club that owns at least 1 acre of land with tree cover of at least 10 percent, which is not used for other purposes, such as lawn, that would impede natural processes. A large corporate ownership is a corporation owning 45,000 or more acres of forest land nationwide; a small corporate ownership is one owning less than 45,000 acres.

The terms “forest land” and “woodland” are used interchangeably within the NWOS program; the specific term selected depends on the audience. The term “forest land” is used when speaking predominantly to technical experts, such as the target audience of this report. The terms “wooded land” or “woodland” is often used when talking with landowners as, based on previous research (Andrejczyk et al. 2016), these terms better correspond to most landowners’ perceptions of the technical definition of forest land. The 2018 NWOS questionnaire (appendix 2) uses the term “wooded land” and provides a lay version of the technical definition. The large corporate survey uses the term “forest land” and provides a more technical definition.

Survey Process

All components of the NWOS go through the same five steps: needs assessment, design and testing, implementation, estimation, and products and results, with the research cycle repeated for each subsequent iteration. These steps form the basic outline for this report.

Needs Assessment

The needs assessment, or scoping, for the 2018 base NWOS started with a review of the authorizing legislation and all other high-level guidance. As with the larger FIA program, the authorization and general guidance comes from the Forest and Rangeland Renewable Resources Research Act of 1978 and the Agricultural Research, Extension, and Education Reform Act of 1998. Additional guidance for the NWOS comes from periodic Blue Ribbon panels, stakeholder meetings, and other feedback from data users.

As with all Federally sponsored surveys, the NWOS is subject to the Paperwork Reduction Act of 1980. This entails providing the documentation for the justification, methods, and burden placed on the public, along with a list of the questions to be asked; review of the materials by experts; and, ultimately, review by the Office of Management Budget (OMB). In addition, the NWOS is classified as “Influential Scientific Information” and adheres to the relevant review and dissemination procedures.

The 2018 NWOS was implemented by the Family Forest Research Center (www.familyforestresearchcenter.org), a joint venture between the Forest Service’s Northern Research Station and the University of Massachusetts Amherst (UMass), Department of Environmental Conservation. This arrangement means that the NWOS is also subject to the UMass Human Subjects protocols, including review by the UMass Internal Review Board (IRB; www.umass.edu/research/compliance/human-subjects-irb). The IRB reviews the survey methods and questions being asked with a focus on ensuring that people are not being coerced to participate and there are no threats to human welfare.

The needs assessments are timed to coincide with the NWOS 5-year data collection cycles (described in the next section); thus, the needs, scope, methods, and products are thoroughly reviewed every 5 years. This process helps to ensure consistency within each cycle or iteration. In assessing the needs, one focus has been on consistency of questions asked and implementation methods across iterations to maximize comparability and facilitate analyses of changes over time.

An equivalent assessment was undertaken for the large corporate NWOS (Sass et al. 2021).

Design and Testing

The survey methods and questionnaire content were direct results of the needs assessments. The questionnaire content from previous surveys was modified to adapt to new topics (e.g., carbon markets) and adjusted to improve how data were collected. To the extent possible, the methods and questionnaire were kept consistent to maximize comparability across iterations.

Survey methods and questions were based on existing scientific literature and were thoroughly tested before implementation. Testing of questions involved two stages: pretesting and pilot testing. Pretesting involved cognitive interviews (Willis 2005) conducted with landowners to ensure the questions were understandable, there were no missing items, and the target concepts matched with the respondents’ conceptions (e.g., what it means to a landowner to own land “to enjoy beauty or scenery”). In addition,

more-detailed information on the responses (e.g., details on what was involved in specific activities) was also captured. Cognitive interviews were conducted until no new information was captured, a total of 11 interviews with randomly selected forest owners were conducted, and the instrument was deemed reliable. For the 2018 base NWOS, the cognitive interviews showed no substantial issues. The biggest issues were related to skip patterns (i.e., a respondent being asked to skip a subpart of a question given the response to a previous part of the question), and questions were adjusted accordingly.

After the questionnaire was finalized, we conducted a pilot test consisting of a full implementation involving a random sample of private forest ownerships (see Butler et al. 2021 for more information). This step allowed for verification of implementation methods and examination of how owners were responding. There was some additional indication of errors associated with skip patterns. All questions with skip patterns were further assessed, and skip patterns were removed or modified where feasible. Otherwise, the pilot testing showed the implementation methods were working as designed.

An equivalent process was later undertaken for the large corporate survey (Sass et al. 2021). Pretesting for the large corporate instrument included seven interviews that spanned ownership size, region (west, north, and south), and company type (i.e., timber investment management organizations, real estate investment trusts, and forest industry). Given the small population of large corporate ownerships, pilot testing was not conducted for this instrument.

Implementation

The NWOS implementation can be divided into the following steps: sampling, landowner contact, data entry, and logic checks, which then facilitate the generation of estimates. This section provides an overview of each step.

Sampling

The small corporate population was surveyed using the 2018 base NWOS instrument (Table 1). The first step in implementing the base instrument was to generate the sample, that is, the list of landowners who were contacted. The NWOS sample design is a derivative of the FIA sample design (Bechtold and Patterson 2005) and can be summarized as an area-based sample design with inclusion probabilities proportional to size of holdings. The initial sample is drawn from the FIA plots and the sample is subsequently augmented to reach the target sample sizes (see the next paragraph for more information on sample sizes). All sampling is done on a state-by-state basis (even though estimates of the small corporate population are later done on a *regional and national* basis only). (Note that following the precedent of the FIA forest inventory, Alaska, Oklahoma, and Texas are divided into substate areas, each of which, for sampling and estimation purposes, is treated as a separate state.) The basic FIA sampling protocol involves dividing a state into hexagons of approximately 6,000 acres; randomly locating a sample point in each hexagon; using remote sensing and previous inventory information to identify potentially forested sample points; obtaining land ownership information from

property tax records or other sources; and finally, where permission is granted, visiting the potentially forested points to determine land use and, if forested, collecting the inventory data. Nonforest points are part of the sample and are not replaced.

The NWOS augmentation largely followed these steps with two exceptions: high-resolution aerial photography was used to make the land use determination and no site visits were performed. The field-visited, base FIA points were used as training sets for the photo interpreters. Augmentation occurs by repeating the basic sampling procedure with a decreased hexagon size. These smaller hexagons were nested within the base hexagons in a fully tessellated manner. The size of the hexagons for augmentation was a function of the target sample sizes. FIA base sample points were intersected with the augmented hexagons and new, augmentation points were randomly located in “empty” hexagons. The private ownerships identified through the base FIA points and augmentation process formed the sample for the NWOS.

The target number of respondents for the 2018 base NWOS was based on *family* forest ownerships (the largest single ownership group and the primary focal population for the NWOS) and was set at 250 family forest ownerships per state. This number was based on examination of coefficients of variation for estimates of total acreage and numbers of family forest ownerships, coupled with desired error rates and logistical and financial constraints (Butler and Caputo 2021). The coefficients of variation reach the desired error rates at around 250 respondents, but they substantially stabilize once a sample size of 100 is reached, especially for estimates of family forest ownerships with 10+ acres of forest land. These results are similar to the findings of Stanovick et al. (2002).

Given that not all ownerships contacted will respond, more than 250 ownerships need to be contacted in order to reach the target number of respondents. The target number of contacts was equal to the target number of respondents divided by the expected response rate based on previous iterations of the NWOS. For example, if the response rate was 40 percent, then 625 ownerships would need to be contacted to obtain 250 respondents ($250/0.4 = 625$). These family forest ownership targets determined the *overall* sampling intensities for a state. The sample size of small corporate ownerships was consequently set indirectly as a function of the overall sampling intensity, even though we did not predetermine targets for this stratum. Instead, we retained every small corporate ownership that came up in the overall sample.

The target cycle length for the NWOS is 5 years; in other words, a full data collection cycle is completed every 5 years and associated results are published. The 2018 base NWOS was implemented over 2 years, 2017 and 2018. Subsequent iterations of the NWOS will be implemented on an annual basis with 20 percent of the sample respondents, randomly distributed across each state, asked to participate each year. To minimize burden on owners, no ownership will be asked to respond more than once per 5-year cycle for each state in which it owns forest land, regardless of the number of sample points on its land in a state in a given cycle.

The large corporate sample was derived from the same sample of base and augmented plots as the base NWOS. Even though large corporate ownerships were ultimately sent a different survey instrument, large corporate is, strictly speaking, a stratum within the base sample. Large corporate ownerships were identified among these sample points (Caputo et al. 2017) and all large corporate ownerships were included in the sample (Sass et al.

2020). Since nearly all large corporate ownerships own land in many states, we aggregated the large corporate sample across all states into a single national geography and sent each ownership a single survey for all of its forest land. Consequently, weights and estimates for this stratum are limited to the national scale (see [Weights and Estimates](#)).

Landowner Contacts

The 2018 base NWOS used the Tailored Designed Method (Dillman et al. 2014) for implementing the survey. This involved up to four waves of contacts for each potential respondent: a pre-notice postcard, a first questionnaire packet, a reminder or thank you postcard, and a second questionnaire packet. The basic timing for each wave was as follows:

- Day 1: The pre-notice postcard was mailed. This postcard let potential respondents know that a survey would soon be arriving and provided some basic background information.
- Day 7: The first questionnaire packet was mailed. This packet contained the questionnaire along with a cover letter explaining the purpose of the survey and the importance of the potential respondent's response, and a postage-paid envelope to return the completed survey.
- Day 12: The third mailing, a thank you or reminder postcard, was sent.
- Day 28: The final mailing was a replacement questionnaire packet which included a second survey, a return envelope, a modified cover letter, and an insert indicating that the survey could be completed online and a Spanish language version was available.

A toll-free phone number, postal address, email address, and the URL for the NWOS website were included in each mailing. Copies of the postcards and cover letters are provided in appendix 3 of this report.

An equivalent method was used for the large corporate surveys, except that the primary mode of contact was electronic. For the first wave of surveys, fillable digital forms were sent to ownerships for which we had email addresses and hard copies were sent to all others using priority mail. For the second round, all ownerships received hard copies.

Data Entry and Verification

Once surveys were returned, they were logged into a database. Base questionnaires were then scanned and data were extracted using optical character and mark recognition software. A person subsequently verified all data to ensure the responses were recorded correctly. The data were then uploaded to a database.

Quality control checks were performed on a randomly selected 20 percent of the base questionnaires. All responses on each selected questionnaire were compared to the database records. These checks indicated a verifier error rate of less than 0.1 percent across

all of the base NWOS, most of which were minor errors associated with the typing in of open-response answers. Where identified, the errors were corrected.

For large corporate, all surveys were entered by two individuals, and any discrepancies were manually corrected. There was an error rate of 2.8%; many of the errors were related to write-in questions.

Range and Logic Checks

For base, the next step was to run the data through a series of range and logic check procedures. First, all open-ended questions including “Other (please specify)” fields were manually inspected to identify whether responses provided additional information that allowed filling in of skipped questions or adjusting of the raw responses in nonskipped questions. For example, a respondent may not have answered a question about harvesting timber but may have provided the same information in a text or comment field, allowing us to correct the omission. This procedure resulted in changes to 0.23 percent of the questions for small corporate ownerships (i.e., base), similar to family ownerships (Butler et al. 2021).

Next, data were checked for errors associated with value ranges, skip-patterns, and between-question inconsistencies. Range errors resulted from response values being outside logical bounds and were most commonly associated with inaccurate scanning of handwriting in open-response answers. Skip-pattern errors resulted from a respondent answering questions that should have been skipped, based on the answers to root questions, or not answering questions that should have been answered. Between-question errors arose when a respondent’s answer to one question was not logically consistent with the answer to another question. Where possible, errors were fixed based on reviews of the questionnaires for potential errors associated with handwriting and consideration of responses to other questions. Errors which could not be unambiguously resolved were handled by setting the ambiguous values to null (i.e., item nonresponse). The range and logic error rate (the percentage of questions that generated one or more errors) was 3.3 percent for the small corporate (i.e., base) population, an order of magnitude greater than that for the family population (Butler et al. 2021). This difference is in large part because of a hugely increased number of skip errors associated with respondents erroneously filling out demographic questions, despite being instructed to skip these as nonfamily ownerships (67 percent of total errors). Due to the small number of surveys involved, logic and range checks for the large corporate survey were assessed manually.

Estimation

Estimating population totals and other population-level parameters associated with the 2018 NWOS involved analyzing item and unit nonresponse patterns, adjusting for unit nonresponse, imputing missing items, generating weights, and calculating the population-level estimates and associated variances. The estimates were generated in terms of acreages and ownerships. The inputs used to generate estimates are the sample data, survey data, land area per state, and FIA forest inventory-based estimates of forest area by ownership category. Data were stored in a database as described in Caputo et al. (2020b).

Item Nonresponse Assessment

Missingness is an issue that is confronted in virtually all surveys. Missingness can be analyzed at the unit level (i.e., an entity that received a survey fails to respond at all), the respondent level (i.e., the respondent completes only a subset of the questions), or the question level (i.e., the percentage of valid responses to a specific question). Depending on the reasons for nonresponse, the missingness can lead to biases in estimates. Unit nonresponse is addressed in a later section, [Unit Nonresponse Assessment](#). This section addresses respondent and question missingness, which are specific types of item missingness. The item nonresponse assessment, in addition to looking at patterns of item nonresponse, was used to set the level of completeness needed to include a response in the analysis and not be classified as unit nonresponse.

Question missingness is the percentage of the qualifying respondents who did not answer a specific question. Qualifying respondents were those that saw a specific question and were not instructed to skip it due to answers to earlier questions in the questionnaire. Respondent missingness is the percentage of qualifying questions not answered for each respondent. Qualifying questions were those that were seen by respondents and were not skipped due to answers to previous questions.

There were 22 “check group” questions on the 2018 base NWOS questionnaire where respondents were asked to “check all that apply” and the responses were recorded as separate binary variables in the database. To avoid overcounting these questions (variables) in the missingness assessment, each check bank question was collapsed to a single variable indicating whether the respondent checked one or more of the options, including “none of the above,” or failed to check any option (i.e., item nonresponse). After collapsing these variables, there were 97 questions or variables. On the large corporate survey, there were nine check group questions. There were also several regional questions which were aggregated into individual national questions or dropped from the analysis altogether. After check group questions were merged and regional variables dropped, there were 144 questions remaining on the large corporate survey.

The one question requiring a response on the 2018 base NWOS was acres of woodland owned (AC_WOOD).¹ This variable was deemed required because it was used directly in the estimation weights (see [Weights](#)) and the conservative approach of not imputing this key variable was taken. A total of 65 out of 940 returned small corporate questionnaires (7 percent) were missing this variable, were recoded as unit nonresponse, and were dropped from subsequent analyses. There were no cases of nonresponse for the equivalent variable in the large corporate survey; therefore, no surveys were dropped for this reason.

For small corporate questionnaires, response missingness ranged from 0 to 98 percent with a mean of 8 percent (median = 4 percent). In common with family ownerships (Butler et al. 2021), a missingness threshold of 25 percent was selected; records with missingness of greater than this percentage were recoded as “Nonresponse - excessive missingness” and dropped from further analyses. This resulted in the removal of 61 records (6.5 percent) due to excessive missingness, equivalent to the family survey (Butler et al. 2021).

¹ The font Source Sans Pro is used to help differentiate database variable names and other computer-related terms. Variable names are indicated in the annotated questionnaire (e.g., NWOS_6_0_ANNOTATED.pdf, included in appendix 2) and the metadata for the NWOS database (Caputo et al. 2020b).

For large corporate questionnaires, response missingness on all surveys was less than 25 percent (mean = 2.1 percent, median = 1.7 percent); no surveys were dropped.

Excluding size of forest holdings (AC_WOOD), which had no missing values because it was a required variable, question missingness on small corporate questionnaires ranged from less than 1 percent to 95 percent with an average of 6 percent (median = 3 percent). Two questions, “Concern – other” (CNC_OTH) and “Reason for owning – other” (OBJ_OTH), had missingness values of greater than 75 percent, and four additional questions had missingness values greater than 10 percent (ACQ_YEAR, OWNERS_NUMBER, TRAN_FUT_CG, NTFP_WHY_CG). This is similar to the family population (Butler et al. 2021). For the large corporate population, no questions had missingness values of greater than 10 percent (mean = 2.2 percent, median = 0 percent).

Cooperation Rate

The 2018 NWOS small corporate sample had a total sample size of 10,520 and a cooperation rate of 15 percent (Table US-1 in appendix 1, TABLES_SCORP_US_TENPLUS.html). The cooperation rates varied across the regions of the United States, ranging from 12 percent in the West (TABLES_SCORP_US_WEST_TENPLUS.html) to 22 percent in the North (TABLES_SCORP_US_NORTH_TENPLUS.html). These values are substantially lower than for family forest owners (Butler et al. 2021), making unit nonresponse bias assessment and correction more important (see [Unit Nonresponse Assessment](#)). The total sample size and cooperation rate for the 2018 NWOS large corporate sample were 200 and 44 percent, respectively—more consistent with the family population.

Item Imputation

Imputing missing values is a common technique used for many surveys and is fast becoming a standard. This technique was used for the first time for the NWOS for the 2018 iteration. Missing values were imputed using multivariate imputation by chained equations (mice), using the mice package in the R statistical environment (van Buuren and Groothuis-Oudshoorn 2011). This approach builds separate models for each variable and then uses these models to predict missing values (van Buuren 2018). The specific modeling method selected was random forests (Breiman 2001), an approach that can be used for numeric and categorical variables, has few statistical assumptions, and is a robust predictor. Five imputations were generated, a number that van Buuren (2018) and Rubin (1987) suggest is sufficient for datasets that have relatively low missingness and for which the missingness patterns do not create issues with convergence of the imputation models. These assumptions are true for the 2018 NWOS. The number of imputations also needs to be weighed against the additional data processing time.

The goodness-of-fit of the imputation results can be assessed by using “convergence” plots and comparing observed to imputed values (van Buuren 2018). Convergence plots show the means and standard deviations for the imputed values by iteration; patterns of convergence across iterations suggest problems with the imputation models. Based on the convergence plots for the 2018 NWOS small corporate sample (see appendix 4, NWOS_IMPUTATION_CONVERGENCE_PLOTS_SMALLCORP.pdf), the imputation

models behaved well. Comparing the imputed values to the observed values for a subset of numeric (NWOS_IMPUTATION_COMPARISONS_NUMERIC_SMALLCORP.pdf) and categorical variables (NWOS_IMPUTATION_COMPARISONS_CATEGORICAL_SMALLCORP.pdf), the imputation results appear to behave satisfactorily. The imputed values represent the median values and outliers reasonably well. The equivalent diagnostics for the large corporate sample show much greater variability and were consequently less useful, but this is to be expected given the small number of surveys (n=48) and low question missingness (median = 0 percent). For many variables, no more than one or two values were imputed.

The procedure for logic checking imputed values was similar to that done on the observed data described in the section [Range and Logic Checks](#), with a few key differences. The primary difference was that if an error was detected between an imputed and observed variable, the value for the observed value always took precedence and the imputed value was changed accordingly. Errors that could not be resolved unambiguously were addressed by setting values to the modal or mean value for that variable, that is, imputation to the mode or mean. The error rate for imputed values was 0.32 percent for the small corporate (i.e., base) population, similar to that for the family population (Butler et al. 2021). For the large corporate population, it was 0.06 percent.

Unit Nonresponse Assessment

Unit nonresponse was assessed using two approaches: comparing mail versus telephone respondents and comparing values for auxiliary data between respondents and nonrespondents. The ancillary data, being tied to all sample points, can be used to adjust weights; this was done as described in the next two sections.

Telephone nonresponse assessment

Telephone calls were made to nonrespondents to the base questionnaire, who were asked to answer a subset of the survey questions; 1,048 interviews were completed across both ownership types (i.e., family and small corporate populations). The telephone responses were compared to the mail responses, with imputed values being dropped. Online surveys were excluded from the comparisons due to their low sample size (n=207). There were 125 variables that were gathered in both the phone and mail surveys; this count includes each item from check bank questions as a separate item. Variables were compared using chi-squared and Mann-Whitney U tests for categorical and continuous variables, respectively. Likert-scale questions were condensed into binary variables, with the top two categories (e.g., “Very important” and “Important”) recoded as 1 and other categories (e.g., “Moderately important”, “Of little importance”, “Not important”, and “Not applicable”) recoded as 0. To control for multiple comparisons, the method proposed by Holm (1979) was used to adjust p-values, with a base (uncorrected) threshold of $\alpha = 0.05$ used as the cutoff for significance. Effect sizes were calculated using Cohen’s d (Cohen 2009).

Of the 125 variables tested, 76 (61 percent) did not significantly differ (p-value > 0.05) between the mail and telephone respondents (appendix 4, TELEPHONE_NONRESPONSE_SUMMARY.pdf). Of the 49 variables that did significantly differ, 14 differed with a negligible effect size ($|d| < 0.2$), 13 differed with a small effect size ($0.2 \leq |d| < 0.5$), 2 differed with a medium effect size ($0.5 \leq |d| < 0.8$), and no variables differed with a

large effect size ($|d| \geq 0.8$). Effect size could not be determined for two questions, owner education and ownership type, as these were categorical variables with more than two levels. The 2018 NWOS appears to capture a representative sample of landowners in most regards, with nonrespondents being slightly less active on their land and less sure of future plans.

A similar telephone nonresponse assessment was done for the large corporate survey. No significant differences were found between telephone and mail respondents across eight questions. This assessment is based on comparisons between 16 telephone responses and 48 mail respondents, which limits the statistical power of this assessment.

Unit nonresponse assessment

Propensity scoring (Brick 2013), based on random forests models (Buskirk and Kolenikov 2015), was used to predict response propensities and these values were in turn used to adjust weights. The predictor variables in the model were data origin, Census tract-level population density (U.S. Census Bureau 2010), ecoregion (Bailey 2016), and parcel size (Core Logic, Inc. 2019). All four variables were measured at the sample point and, if an ownership had more than one sample point, the values were aggregated using the mean, mode, or total (sum) for population density, ecoregion, and parcel size, respectively. Data origin was a binary variable indicating whether an ownership had at least one sample point that was part of the FIA plot-based, forest inventory or whether all associated sample points were part of the augmented sample. Since the survey weights for the small corporate stratum (i.e., base survey) were done at the state level (see the next section, Weights), the unit nonresponse adjustments to the weights were also done at the state level, with a single random forests model for each state.

The relative importance of the predictor variables and the Tjur goodness-of-fit statistic (Tjur 2009) for each model in the small corporate sample are included in appendix 4 ([UNIT_NONRESPONSE_MODEL_RESULTS_SMALLCORP.html](#)). The relative importance of variables varied by state, but in general, origin was the most important predictor variable followed by the other three variables, which were approximately equal in importance. No state-level model had a Tjur statistic less than 0.01, so adjustments were made for all states (Butler et al. 2021). For the large corporate sample, a single nonresponse model was fit at the national level. The most important variable was found to be acreage, followed by origin, ecoregion, and population. The value of the Tjur statistic for the national model was 0.2 ([UNIT_NONRESPONSE_MODEL_RESULTS_LARGE_CORP.html](#)).

The probability of each ownership responding was predicted using the relevant model, either state-level or national. The inverse of the response probabilities was calculated and normalized so that the total acreage in a stratum did not change. The normalized, inverse response probabilities (unit nonresponse adjustments) were used to adjust the weights as described in the following section.

Weights

To produce population-level estimates, the sample design needs to be incorporated into the estimators; to mitigate potential nonresponse biases, appropriate adjustments need to be applied. The 2018 NWOS estimation approach followed the weighting methodology outlined by Valliant et al. (2013).

The NWOS uses an area-based sample design which results in inclusion probabilities that are proportional to size of forest holdings; in other words, the greater the acreage owned, the greater the probability of being selected. Weights were calculated separately for each stratum and geography (state in the case of small corporate and the Nation in the case of large corporate). The inclusion probability for a corporate ownership is equal to the area of corporate land (either small or large) owned in a state divided by the sampling intensity, which is the area of corporate forest land in the state divided by the number of sample points in the stratum. The design-based weight is the inverse of the inclusion probability multiplied by the number of sample points owned. For the point estimates, the area of corporate forest land was set to the FIA forest inventory estimates to harmonize estimates across the FIA program. Both sets of estimates are valid, but the plot-based, forest inventory estimates are published more frequently and are tied to other forest resource estimates.

To account for response rates and potential nonresponse biases, the weights were adjusted by multiplying the design-based weights by the inverse of the response rate and unit nonresponse adjustments. The adjusted weights were then multiplied by the sum of the design-based weights divided by the sum of the adjusted weights so that the area totals did not change.

Estimates

Estimates were generated for totals and proportions, in terms of both acreages and ownerships, for both the small and large corporate strata. Means and medians were calculated for continuous variables in terms of ownerships (e.g., the mean size of forest holding per ownership). Total number of owners was also calculated. All estimates used the weights described in the preceding section to account for the sample design and adjust, as necessary, for nonresponse biases. Totals were the products of the weights and binary variables which indicated whether respondents were in the domain of interest (e.g., 10+ acres of forest land) and provided the relevant response to the question of interest (e.g., “Had a written forest management plan”). Other statistics, such as means, were estimated using variants of the total equations as described in Butler and Caputo (2021). In addition to the point estimates, variances need to be calculated in order to quantify the reliability of the estimates. Variance estimation followed the bootstrapping approach outlined by Efron and Tibshirani (1986) based on 1,000 replicates; details are provided in Butler and Caputo (2021). Point and variance estimates were combined across the multiple imputations using the rules outlined in van Buuren (2018) and Rubin (1987). Although the small corporate survey used the same base instrument as that used for family (Butler et al. 2021), a number of questions in that survey were either irrelevant for corporate ownerships (e.g., whether owners lived on the land) or were framed as skip-pattern questions for corporate ownerships in the questionnaire instructions (e.g., owner

demographics). Estimates were not calculated for these variables. The large corporate instrument was first piloted as part of this (2018) iteration (Sass et al. 2021) and included many regional questions (e.g., acreage owned in Alabama, prevalence of artificial regeneration in southern softwoods). These were not estimated. All other relevant questions were estimated for both populations.

Details on the methodological approaches are provided in Butler and Caputo (2021) and Butler et al. (2021), including full derivations. A package for the R statistical environment used to generate the weights and estimates is available (Butler and Caputo 2019).

Products

The core products from the 2018 NWOS (all populations) include brief summaries, a tool for custom data retrievals and data visualization (NWOS-DASH), documentation, and summary tables, all of which are available via the NWOS website: <https://www.fia.fs.usda.gov/nwos>. The core summary tables for corporate ownerships are included in appendix 1 accompanying this report. National and regional summary tables are provided for small corporate ownerships for four domains of interest: small corporate forest ownership with 1+, 10+, 100+, and 1,000+ acres of forest land. For large corporate ownerships, a single domain (45,000+ acres) is provided. Regions were based on the Renewable Resource Planning Act Assessment (RPA) regions (Oswalt et al. 2019) with the exception, due to the relative distribution of private forests, that the RPA Rocky Mountain and Pacific Coast regions are combined into one region, the West (Fig. 1). Data for Alaska are missing from all summary tables due to insufficient sample size ($n=1$). Similarly, there were no small corporate respondents from Rhode Island or North Dakota and, since weights for the small corporate stratum were done at the state level, those states are not included in the small corporate tables.

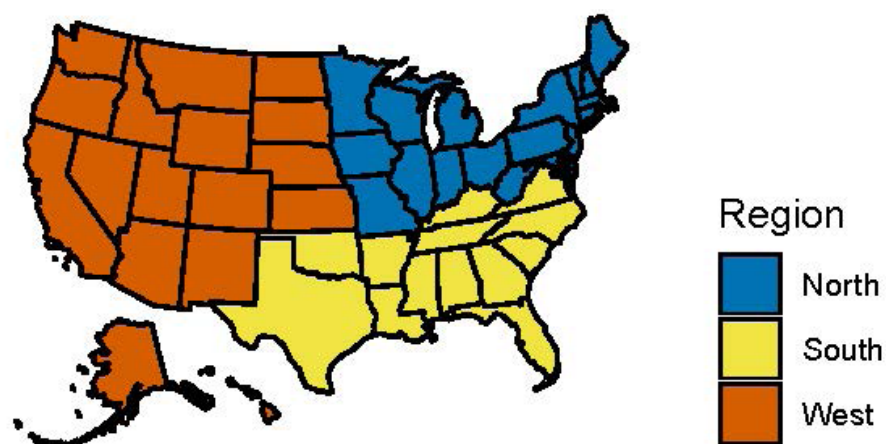


Figure 1.—Regions used for reporting for the 2018 National Woodland Owner Survey, small corporate population.

It is important to note here that, although weights were calculated at the state level for the small corporate stratum and therefore estimates could be calculated for individual states, the sample size at the state level was generally too low to result in acceptable precision at that scale. Therefore, estimates were calculated only for the regional and national geographies. In the case of the large corporate stratum, survey implementation and weighting were done at the national level, so estimation at finer scales was not possible.

The first table in each set of tables provides a summary of the 2018 NWOS cooperation rates and sample sizes for corporate ownerships in the population and geography of interest; these numbers are for all ownerships regardless of domain interest because size of forest holdings is not known for nonrespondents and hence cooperation rates can be calculated only for the full stratum. The remaining tables provide estimates of each question for the specific geography, stratum, and domain of interest; statistics in these tables are provided in terms of total acres, total ownerships, percentage of acres, and percentage of ownerships along with sample sizes (i.e., number of respondents). Accompanying each total and percentage estimate is an estimate of the associated standard error, which provides an indication of the reliability of each value. Where applicable, summaries of continuous variables (e.g., means and medians) are included in table footnotes.

Results

This section provides selected national-level results from the 2018 NWOS for small and large corporate ownerships. Unless noted otherwise, these results are for corporate forest ownerships with 10+ acres (TENPLUS) of forest land. These results are based on responses from 858 small corporate ownerships with 10+ acres of forest land in U.S. states (excluding Alaska, Rhode Island, and North Dakota) and 48 large corporate ownerships with 45,000+ acres of forest land nationwide (excluding Alaska).

Forest Ownership Distribution

One of the most basic statistics about forests is area by ownership category. Private ownerships control 60 percent of the forest land in the United States, excluding interior Alaska. Of this private acreage, there are an estimated 147 million acres of corporate forest land—about 21 percent of forest acreage across the country (Butler et al. 2021). Corporate forest land is not evenly distributed across the United States, however. While private ownerships, and in particular family forest ownerships, dominate much of the eastern United States, public forest ownerships, and in particular Federal ownerships, dominate much of the West. The area of corporate forest land is concentrated in the eastern, particularly the southeastern, and the Pacific northwestern states (Butler et al. 2021, Sass et al. 2020).

Small Corporate Forest Ownerships

Size of forest holdings

The size of small corporate forest holdings ranges from 1 acre (the minimum acreage according to the FIA definition of forest land) to many thousands of acres. The statistics, especially totals, may look very different depending on the minimum acreage used to define the domain of interest. The four minimums used in the tables accompanying this report are 1, 10, 100, and 1,000 acres of forest land. In terms of acreage, 98 percent of the small corporate forest land is part of ownerships with forest holdings of 10 or more acres of forest land (Fig. 2). In terms of ownerships, 54 percent of the family forest ownerships have holdings of between 1 and 9 acres of forest land. The result for the small corporate population is skewed more toward larger holdings than for the family population, but not substantially so (Butler et al. 2021).

For small corporate forest ownerships with 10+ acres of forest land, there are an estimated 80 million acres of forest land in the United States (Table US-2-ACRE in appendix 1, TABLES_SCORP_TENPLUS_US.html). These acres are spread across an estimated 307,000 ownerships (Table US-2-OWN in appendix 1, TABLES_SCORP_TENPLUS_US.html), but the distribution is not even; a relatively high percentage of the acres is owned by relatively few of the ownerships (Fig. 2). The mean size of holdings is 261 acres (median = 42). The number of owners (i.e., individuals) associated with a single ownership varies from 1 to over 1,000, but averages 30 (median = 3) (Tables US-5 in appendix 1, TABLES_SCORP_US_TENPLUS.html).

For small corporate forest ownerships with 10+ acres of forest land, there are an estimated 80 million acres of forest land in the United States (Table US-2-ACRE in appendix 1,

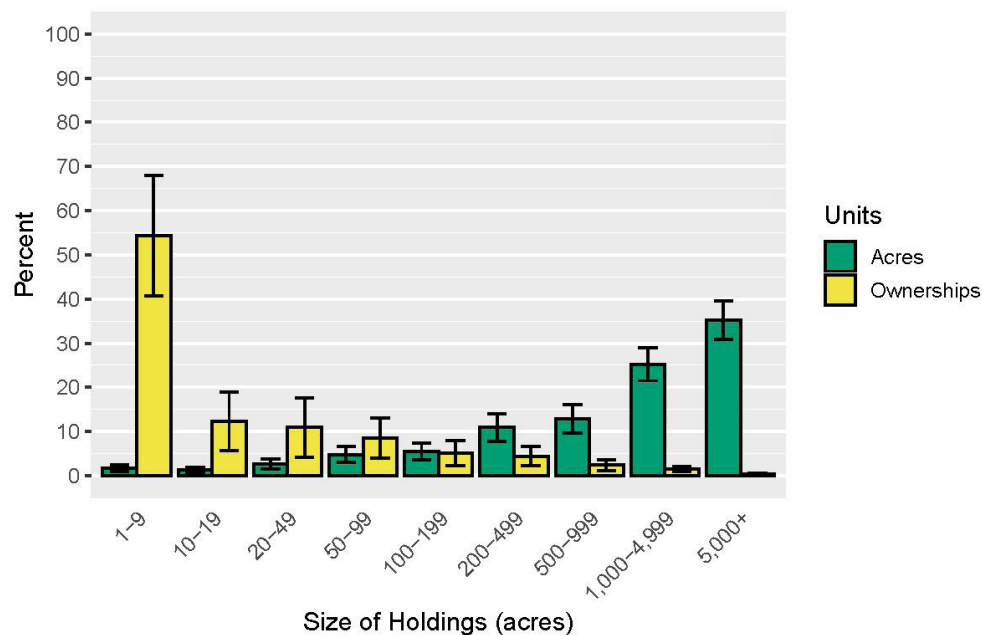


Figure 2.—Estimated percentage of small corporate forest acres and ownerships by size of forest holdings, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Reasons for owning

There are many reasons that corporations own forest land. The 2018 NWOS asked respondents to rate the importance of 13 potential reasons for owning forest land on a 5-point Likert scale that ranged from “Very Important” to “Not Important.” The vast majority of small corporate forest land is owned for multiple reasons (Tables US-7a through US-7b in appendix 1, TABLES_SCORP_US_TENPLUS.html). In terms of acreage and numbers of owners, the three most commonly cited reasons for owning forest land are “To protect or improve wildlife habitat,” “To protect water resources,” and “To protect nature or biological diversity” (Fig. 3).

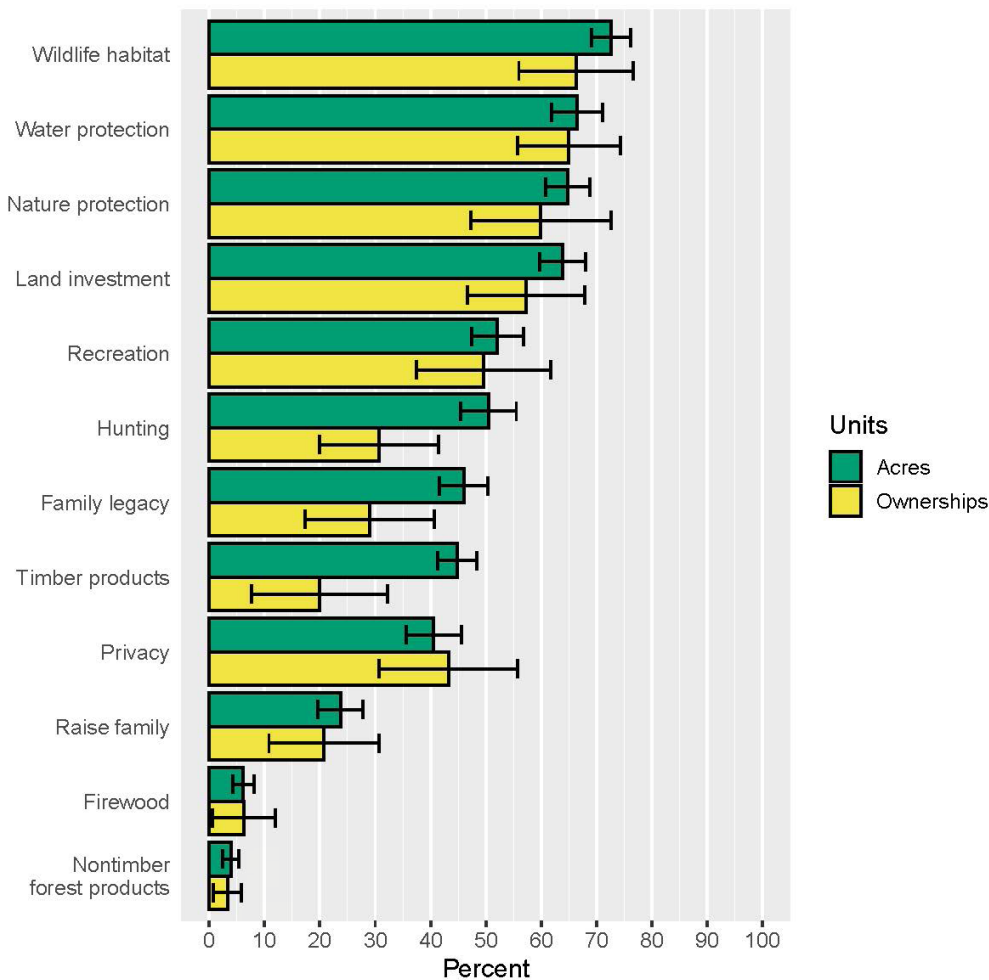


Figure 3.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by reasons for owning forest land, United States, 2018. Values include ownerships that rated reasons as important or very important on a 5-point Likert scale. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Recreation

Recreation occurs on the vast majority of small corporate forest land; an estimated 93 percent of the small corporate forest land, owned by 73 percent of small corporate ownerships, had someone using it for recreation in the previous 5 years. The most common recreationists are the owners and their close associates (Fig. 4A; Tables US-22a in appendix 1, TABLES_SCORP_US_TENPLUS.html). This finding is similar to that for family forest ownerships (Butler et al. 2021), but a substantially greater proportion of small corporate acreage is associated with recreation by the public (both for free and by fee) and beneficiaries other than owners and their friends and family. The most common forms of recreation are hunting and hiking or walking (Fig. 4B; Tables US-22b in appendix 1, TABLES_SCORP_US_TENPLUS.html).

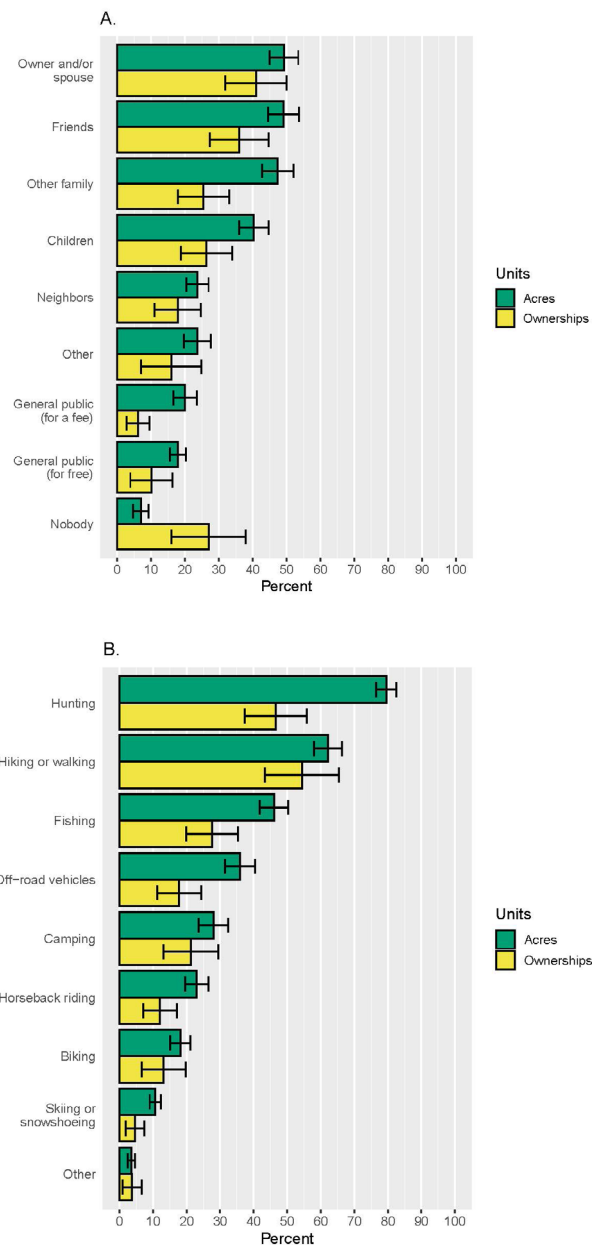


Figure 4.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by (A) who and (B) how they recreated, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Management activities

Of the management activities queried by the NWOS, the most common in the previous 5 years in terms of acreage are: “Road construction or maintenance,” “Cut and/or removed trees for sale,” “Improved wildlife habitat,” “Eliminated or removed invasive plants,” and “Trail construction or maintenance” (Fig. 5; Tables US-14 in appendix 1, TABLES_SCORP_US_TENPLUS.html). Many ownerships have participated in one or more of these activities. An estimated 9 percent of the small corporate forest land, owned by 27 percent of the ownerships, had *none* of the queried activities occurring on their forest land.

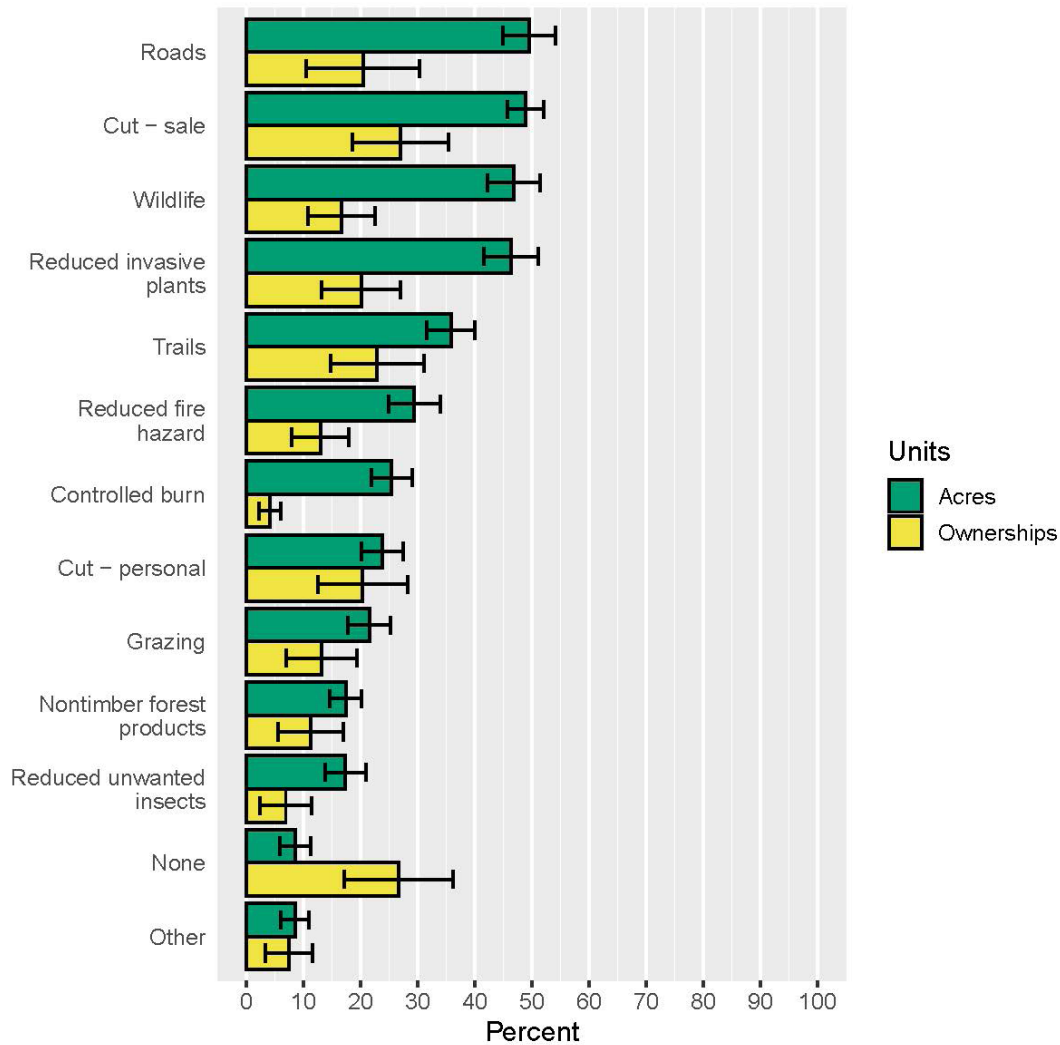


Figure 5.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by management activities in the previous 5 years, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times \text{standard error [SE]}$).

It is worth noting that many of these activities have different time horizons; for example, wildlife habitat improvements may occur more frequently than commercial timber harvests on actively managed holdings. In general, the percentages of small corporate ownerships that plan to do these activities in the next 5 years is similar to the percentages in the previous 5 years (Tables US-15 in appendix 1, TABLES_SCORP_US_TENPLUS.html). The most common future activities are the same as the past, but the order is slightly different (Fig. 6).

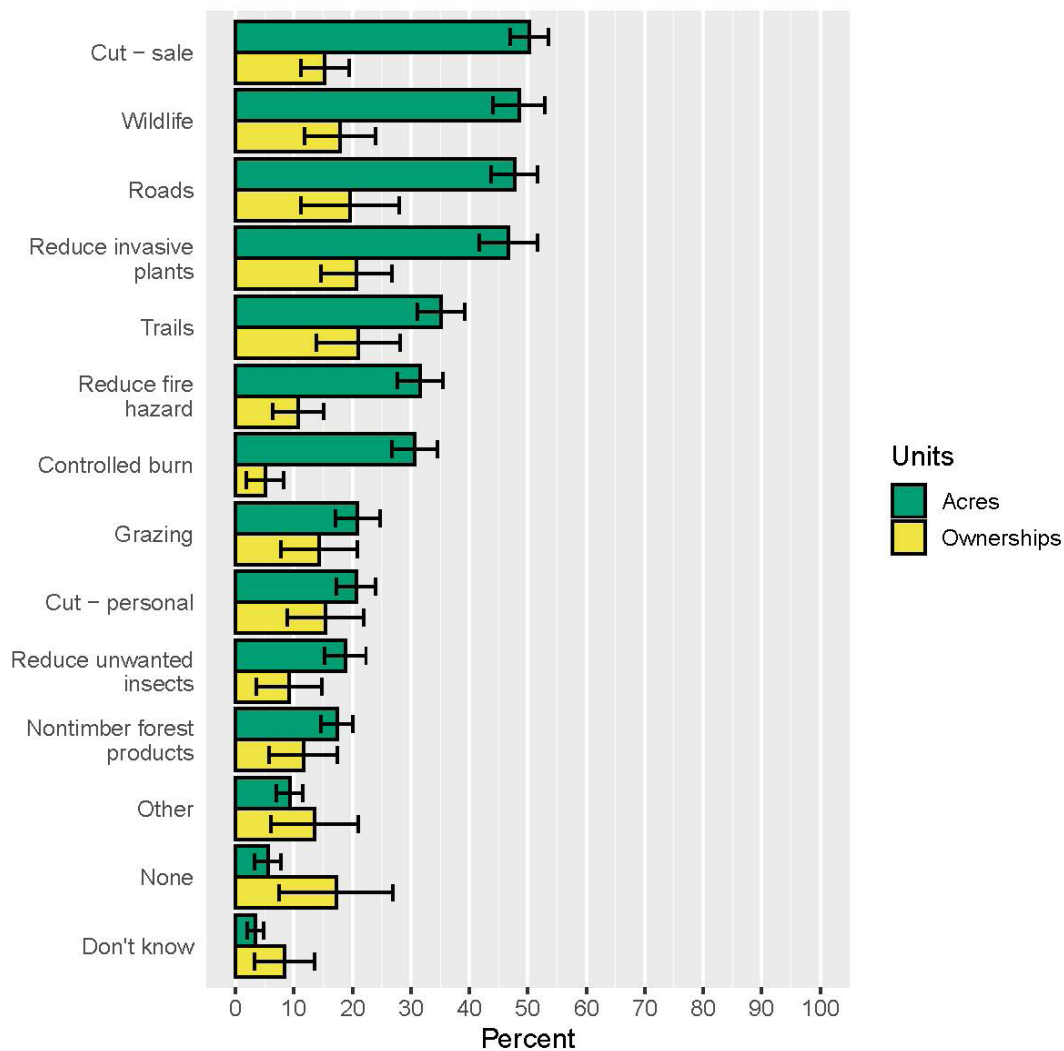


Figure 6.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by intended management activities in the next 5 years, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Management plans and advice

Multiple tools and approaches have been designed to help landowners meet their needs; two traditional ones are written forest management plans and receiving advice. An estimated 50 percent of the small corporate forest land, owned by an estimated 20 percent of the ownerships, is in the hands of people who have written forest management plans (Fig. 7; Tables US-11b in appendix 1, TABLES_SCORP_US_TENPLUS.html). This estimate is almost twice that for family ownerships (Butler et al. 2021). The percentages for those that have received advice are higher; for an estimated 23 percent of the small corporate forest land, owned by an estimated 58 percent of the small corporate forest ownerships, some type of advice has been provided in the previous 5 years (Fig. 7; Tables US-24a in appendix 1, TABLES_SCORP_US_TENPLUS.html). Compared to family ownerships, this is a smaller percentage of the ownerships covering a greater percentage of the acreage receiving advice in the past 5 years (Butler et al. 2021). The advice sources on the questionnaire include both professionals (e.g., consulting foresters) and nonprofessionals (e.g., other landowners).

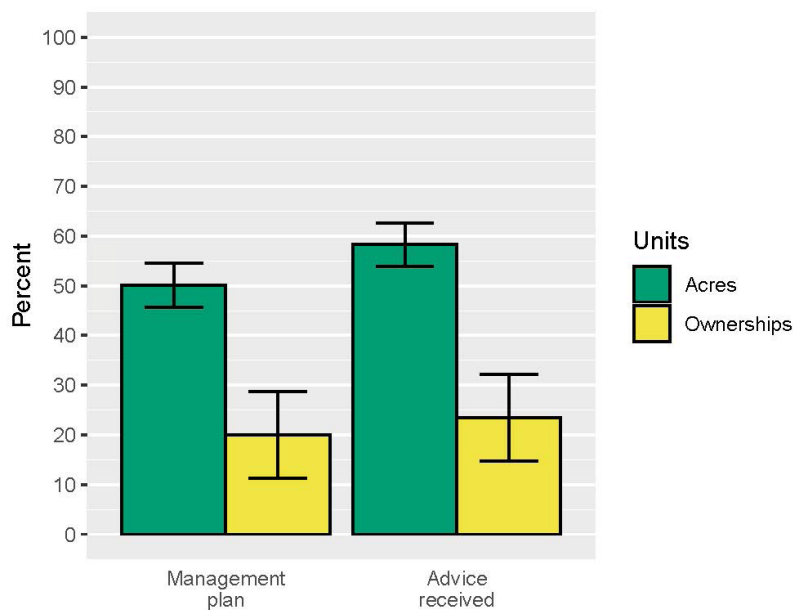


Figure 7.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) that have written management plans and have received advice, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Most small corporate forest ownerships have not received advice in the previous 5 years, but only 19 percent of the forest land, owned by 25 percent of the ownerships, is owned by people who state they do not want any information about their forest land (Fig. 8b; Tables US-25b in appendix 1, TABLES_SCORP_US_TENPLUS.html). Written materials and talking to an expert are the most commonly cited methods by which owners want to receive information. The most popular advice topics are timber management, wildlife management, invasive plants, unwanted insects or diseases, and wildfire (Fig. 8a; Tables US-25a in appendix 1, TABLES_SCORP_US_TENPLUS.html).

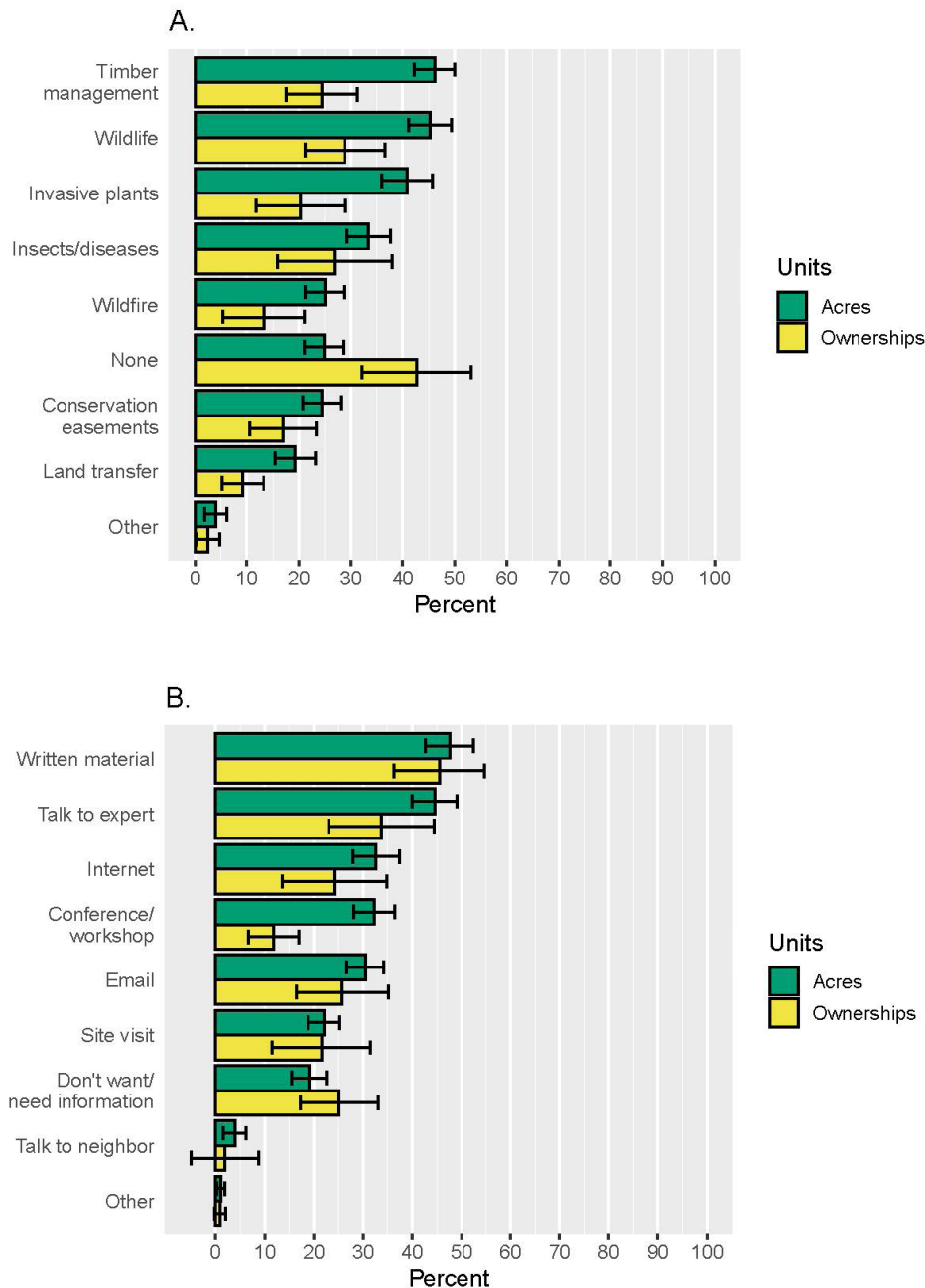


Figure 8.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by preferred advice (A) topics and (B) methods, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Programs and policies

There are many programs and policies that have been designed to help increase and ensure sustainable forest management, but most small corporate forest ownerships have low levels of familiarity with them and are not participating in them (Tables US-16 through US-20 in appendix 1, TABLES_SCORP_US_TENPLUS.html). The program with the highest participation rate is property tax programs; 35 percent of the small corporate forest land, owned by an estimated 22 percent of the ownerships, is owned by people who have participated in forest property tax programs (Fig. 9). The next three most common programs—conservation easements, cost-share, and green certification programs—have participation rates of less than 10 percent of the small corporate ownerships, although these have a disproportionately large share of the acreage (between 15 and 20 percent). Fewer than 1 percent of small corporate ownerships (owning 2 percent of the acreage) currently participate in carbon sequestration programs, and 41 percent are completely unfamiliar with these programs. Overall, participation in programs is greater than that seen with family ownerships (Butler et al. 2021).

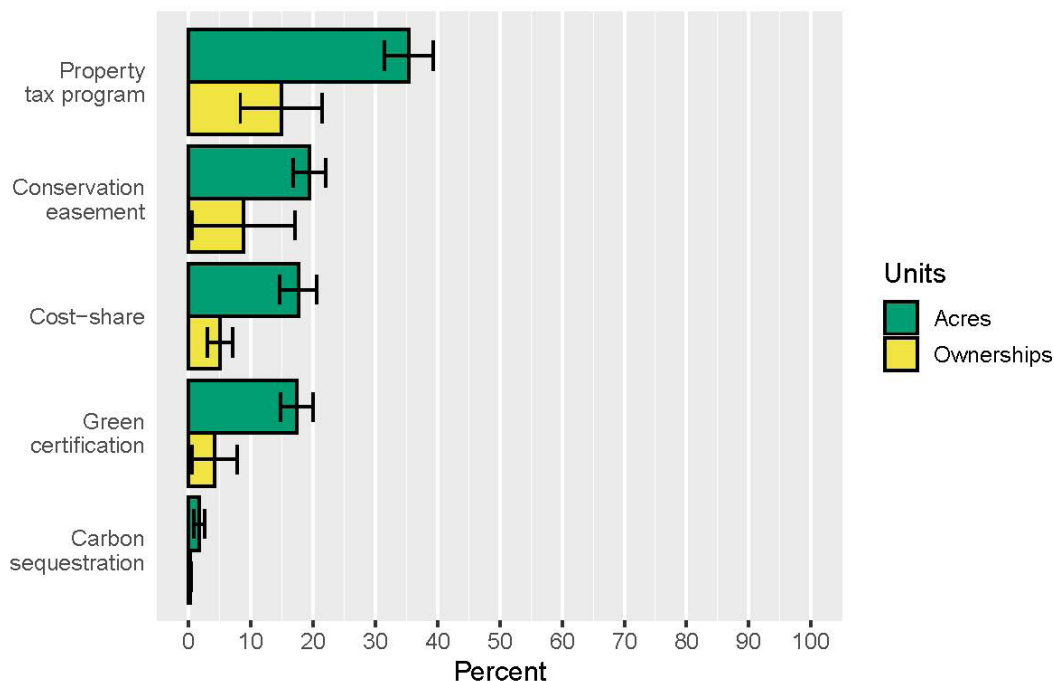


Figure 9.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by program participation, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Concerns

Many issues may be concerns for corporate forest owners. Of the 16 issues asked about in the 2018 NWOS, 79 percent or more of the small corporate forest land is owned by people who rated 1 or more of the following as concerns or great concerns: “Trespassing or poaching,” “Government regulation,” and “High property taxes” (Fig. 10; Tables US-26I, US-26G, US-26H in appendix 1, TABLES_SCORP_US_TENPLUS.html).

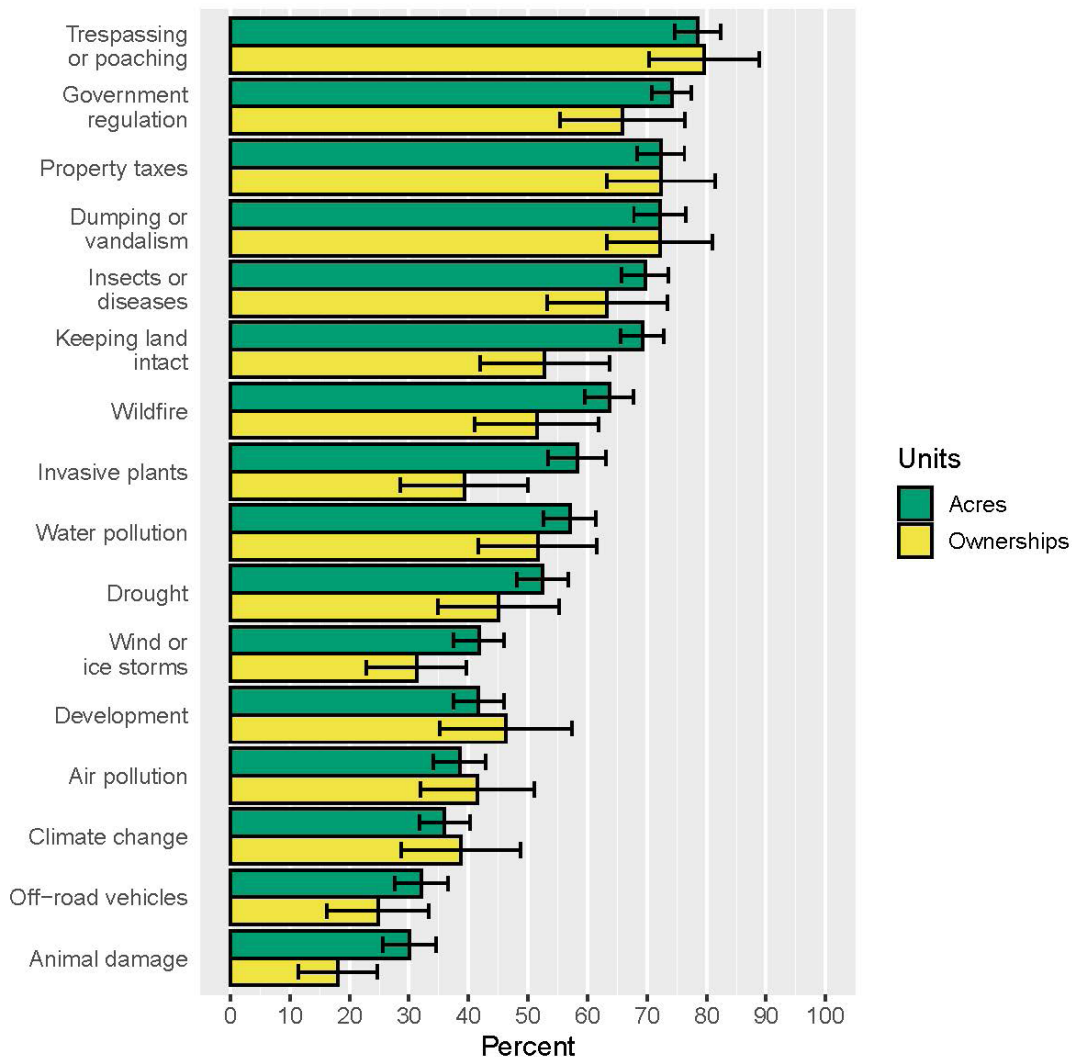


Figure 10.—Estimated percentage of small corporate forest acres and ownerships (10+ acres of forest land) by concerns, United States, 2018. Values include ownerships that rated reasons as important or very important on a 5-point Likert scale. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times \text{standard error [SE]}$).

Large Corporate Forest Ownerships

Size of forest holdings

Large corporate forest ownerships by definition own at least 45,000 acres (Caputo et al. 2017). In total, 65 million acres of large corporate forest land are owned by an estimated 209 large corporate ownerships (Tables US-2 in appendix 1, TABLES_LCORP_US_45K_PLUS.html). A majority of ownerships, 79 percent, own between 45,000 and 500,000 acres (mean = 313,000 acres, median = 129,000 acres). The remaining 21 percent, however, own the majority—71 percent—of the total acreage (Fig. 11; Tables US-3 in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

Reasons for owning

A majority of large corporate ownerships are structured as private corporations or limited liability companies (LLCs); only 10 percent are structured as publicly traded organizations (Tables US-4a in appendix 1, TABLES_LCORP_US_45K_PLUS.html). All of these companies function to some extent as producers of timber or wood products, or both. One percent of large corporate ownerships self-identify as real estate investment trusts (REITs), 24 percent as timber investment management organizations (TIMOs), and 26 percent as forest management companies that also own land (Tables US-4b through US-4d in appendix 1, TABLES_LCORP_US_45K_PLUS.html) (these categories are not mutually exclusive). One-third of large corporate owners, owning 37 percent of the acreage, own and operate one or more primary wood processing mills (Tables US-14 in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

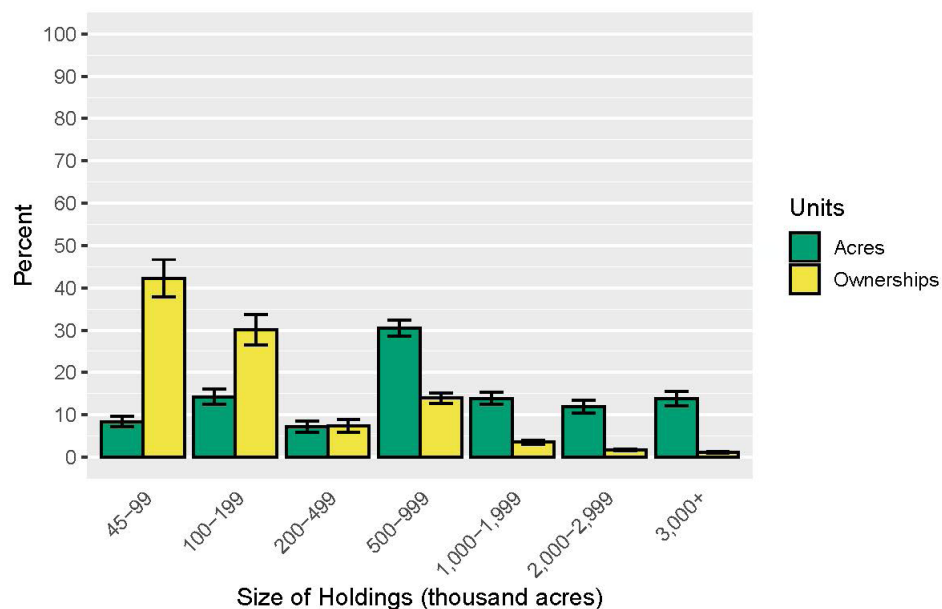


Figure 11.—Estimated percentage of large corporate forest acres and ownerships by size of forest holdings, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Additionally, 42 percent of large corporate ownerships, owning 61 percent of the acreage, have long-term fiber supply agreements in which some or all of their annual harvest is committed to primary wood processing facilities (Tables US-15a, US-15b in appendix 1, TABLES_LCORP_US_45K_PLUS.html). Overall, 52 percent of large corporate ownerships, owning 63 percent of the acreage, generate half or more of their revenue from forest land operations. Only 8 percent of ownerships generate revenue from forest land exclusively, although this 8 percent owns 32 percent of the large corporate acreage (Tables US-25 in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

This emphasis on production of timber and wood products is revealed in companies' objectives; 95 percent of large corporate ownerships consider timber production to be an important or very important objective, followed by 87 percent for land investment (Fig. 12; Tables US-5e, US-5g in appendix 1, TABLES_LCORP_US_45K_PLUS.html). However, a number of objectives related to stewardship of nature were also rated very highly. Water protection, wildlife habitat, nature protection, and aesthetics were the next four most important objectives—each considered important or very important to between 37 and 84 percent of large corporate owners (Fig. 12).

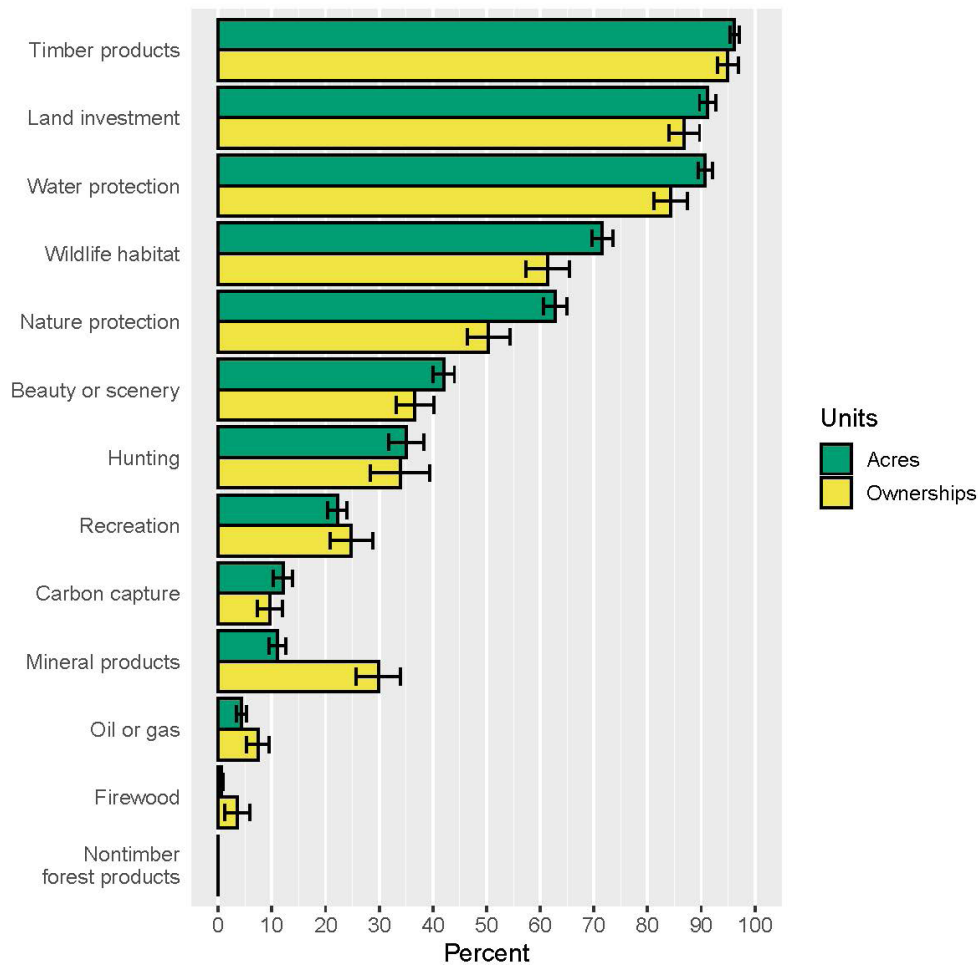


Figure 12.—Estimated percentage of large corporate forest acres and ownerships by reasons for owning forest land, United States, 2018. Values include ownerships who rated reasons as important or very important on a 5-point Likert scale. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Recreation

Recreation is an important or very important objective for less than one quarter of large corporate ownerships (Fig. 12). Nonetheless, recreation of one form or another is estimated to occur on at least some of the forest land owned by *all* large corporate ownerships. In contrast to small corporate and family ownerships, the group most commonly reported as using the land for recreation in terms of acreage are *paying* members of the public. This was reported by 85 percent of the ownerships, owning 94 percent of the forest land (Fig. 13a; Tables US-21a in appendix 1, TABLES_LCORP_US_45K_PLUS.html). A majority of ownerships also provide recreation services to company employees, neighbors, and nonpaying members of the public. The most common forms of recreation are hunting, fishing, and hiking or walking (Fig. 13b; Tables US-21b in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

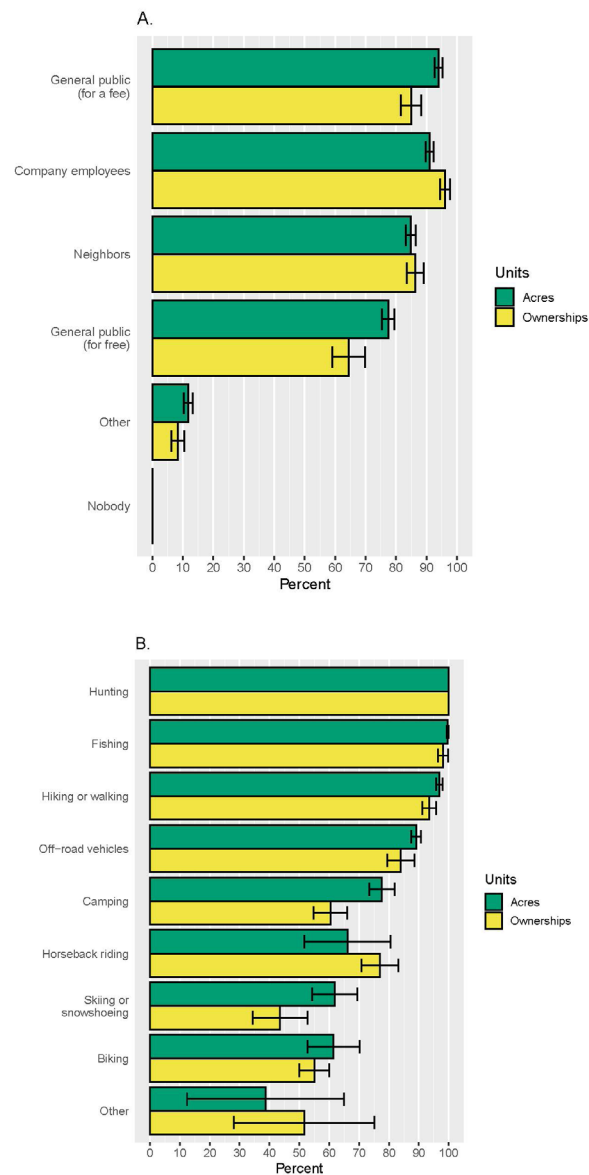


Figure 13.—Estimated percentage of large corporate forest acres and ownerships by (A) who and (B) how they recreated, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Management activities

Two management activities, cutting timber for sale and building or maintaining roads, were conducted by 100 percent of large corporate ownerships in the previous 5 years. This is not surprising, given that these two activities are necessary at a fundamental level for producing timber and wood products (Fig. 14; Tables US-17 in appendix 1, TABLES_LCORP_US_45K_PLUS.html). Improving wildlife habitat, using herbicides, and reducing invasive plants, insects and diseases, and fire hazard are the three next most common activities for large corporate ownerships.

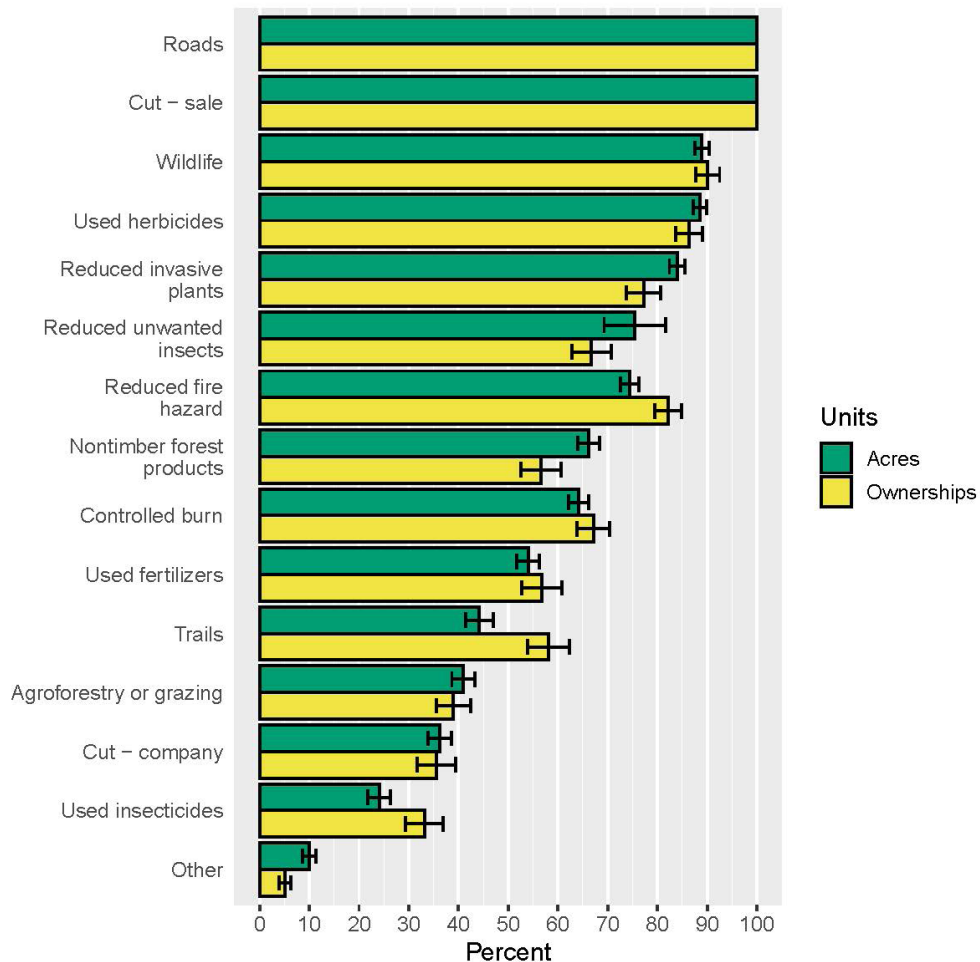


Figure 14.—Estimated percentage of large corporate forest acres and ownerships by management activities in the previous 5 years, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Additionally, the large corporate questionnaire contained several other questions providing more detail on forest management activities. The average annual acreage harvested by large corporate ownerships is 10,816 acres (median = 3,996 acres); 5 percent of ownerships harvest more than 50,000 acres annually (Fig. 15; Tables US-9 in appendix 1, TABLES_LCORP_US_45K_PLUS.html). More than 97 percent of large corporate ownerships have undertaken thinnings or plantings on their forest land in the past 5 years (Tables US-10, US-11 in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

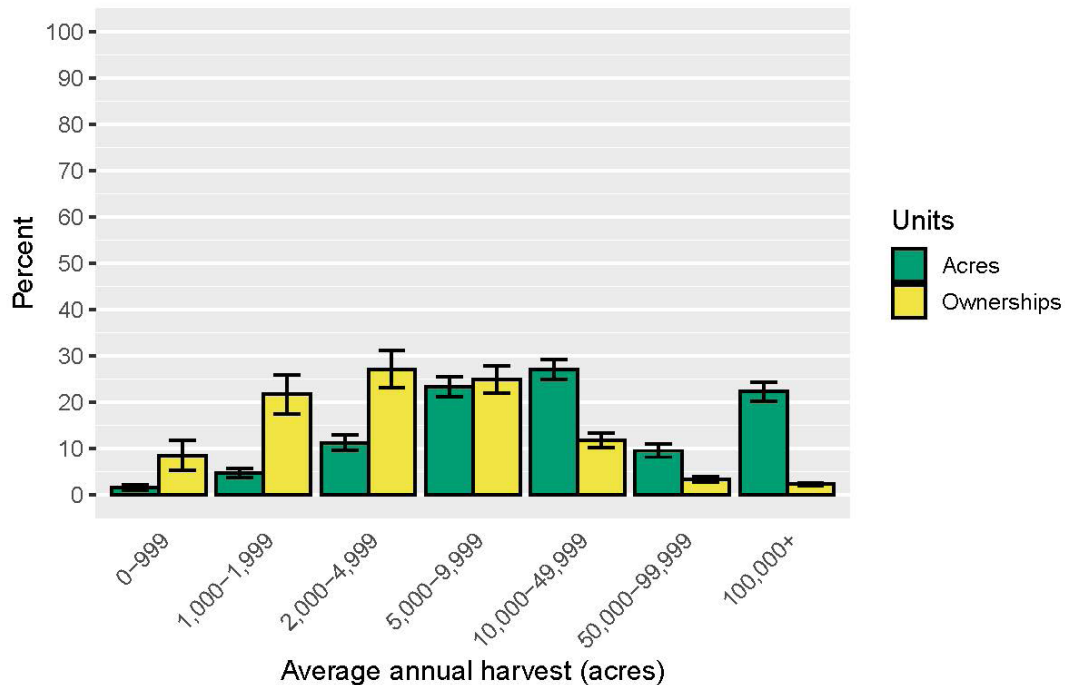


Figure 15.—Estimated percentage of large corporate forest acres and ownerships by estimated acreage harvested on an annual basis, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Management planning

The vast majority of large corporate ownerships have 95 percent or more of their land covered by a management plan (Fig. 16; Tables US-8b in appendix 1, TABLES_LCORP_US_45K_PLUS.html). However, 9 percent of large corporate ownerships, owning 11 percent of the acreage, have less than half of their land under a traditional management plan. While company employees were the most common personnel involved in day-to-day field operations and planning, 33 percent of large corporate ownerships also hired outside consultants for these functions (Tables US-8a in appendix 1, TABLES_LCORP_US_45K_PLUS.html).

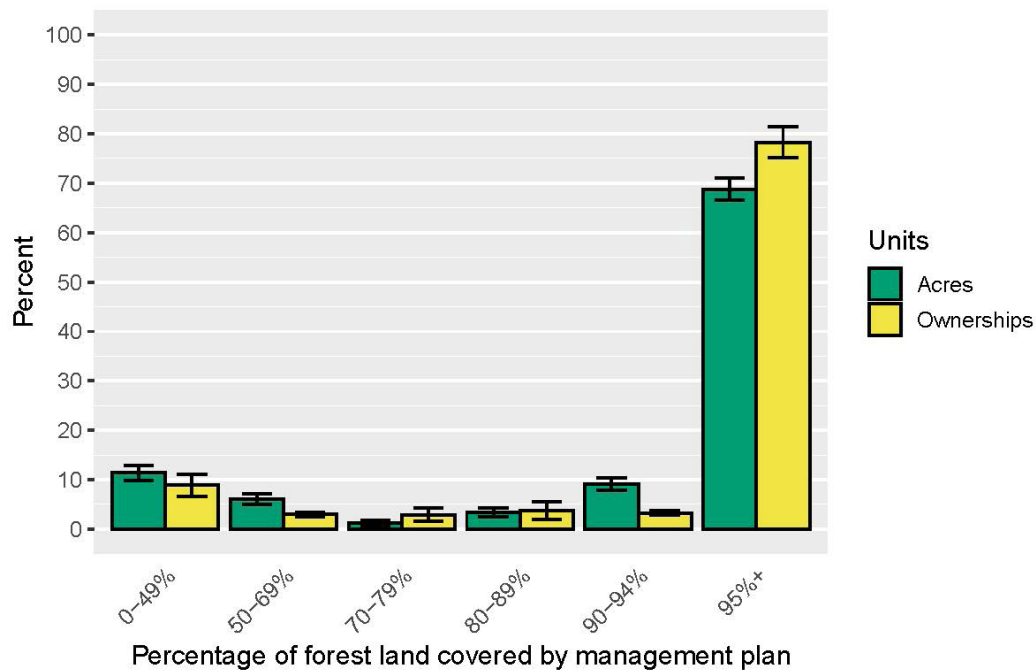


Figure 16.—Estimated percentage of large corporate forest acres and ownerships by percentage of forest land under a management plan, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Programs and planning

A substantial majority of large corporate ownerships, owning 88 percent of the forest acreage, participate in green certification programs (Tables US-18a in appendix 1, TABLES_LCORP_US_45K_PLUS.html). On average, large corporate ownerships have 66 percent of their land (median = 86 percent) enrolled; 47 percent of large corporate ownerships, owning 63 percent of the forest land, have 95 percent or more of their land enrolled (Fig. 17; Tables US-18b in appendix 1, TABLES_LCORP_US_45K_PLUS.html). The most common certification systems are the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), and American Tree Farm System (Tables US-18c in appendix 1, TABLES_LCORP_US_45K_PLUS.html). Compared to green certification, conservation easements are less common on large corporate forest lands.

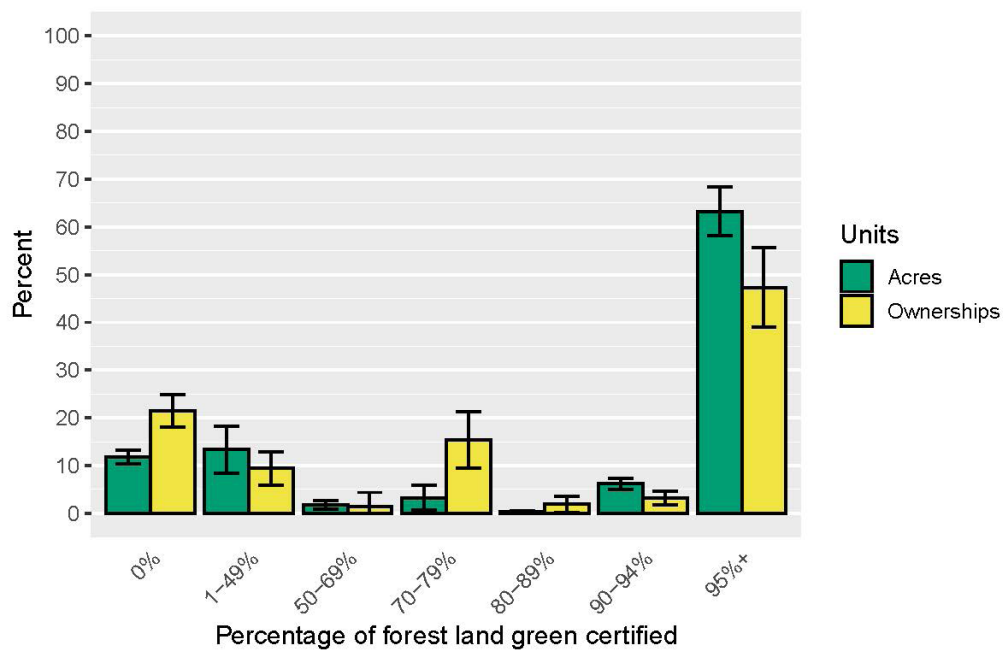


Figure 17.—Estimated percentage of large corporate forest acres and ownerships by percentage of forest land enrolled in a green certification system, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

On average, only 14 percent (median = 1 percent) of large corporate ownerships' holdings are under a conservation easement (Fig. 18; Tables US-19 in appendix 1, TABLES_LCORP_US_45K_PLUS.html). Of ownerships, 48 percent have no land in easements; only 8 percent have more than half of their land in easements. Compared to small corporate and family (Butler et al. 2021) ownerships, both green certification and conservation easements are more common among large corporate ownerships.

Concerns

Large corporate ownerships have a number of concerns for the present and future. Of the 29 issues presented in the large corporate questionnaire, 85 percent of large corporate ownerships identified one or more as being of concern or of great concern (Fig. 19; Tables US-24a through US-24ac in appendix 1, TABLES_LCORP_US_45K_PLUS.html). The most important concerns are those related to economic or business operations, including taxes and tax laws, regulations, and markets. Additionally, disturbance agents and natural disasters, including insects and diseases, wildfire, and wind and ice storms, were rated as of concern or of great concern by a majority of large corporate ownerships (Fig. 19).

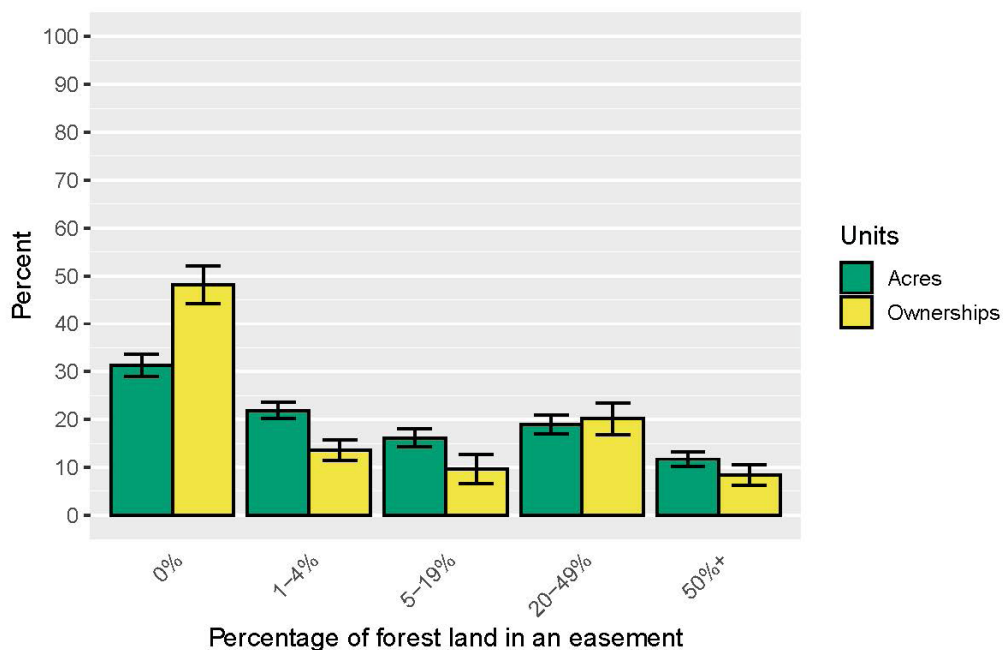


Figure 18.—Estimated percentage of large corporate forest acres and ownerships by percentage of forest land enrolled in a conservation easement, United States, 2018. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

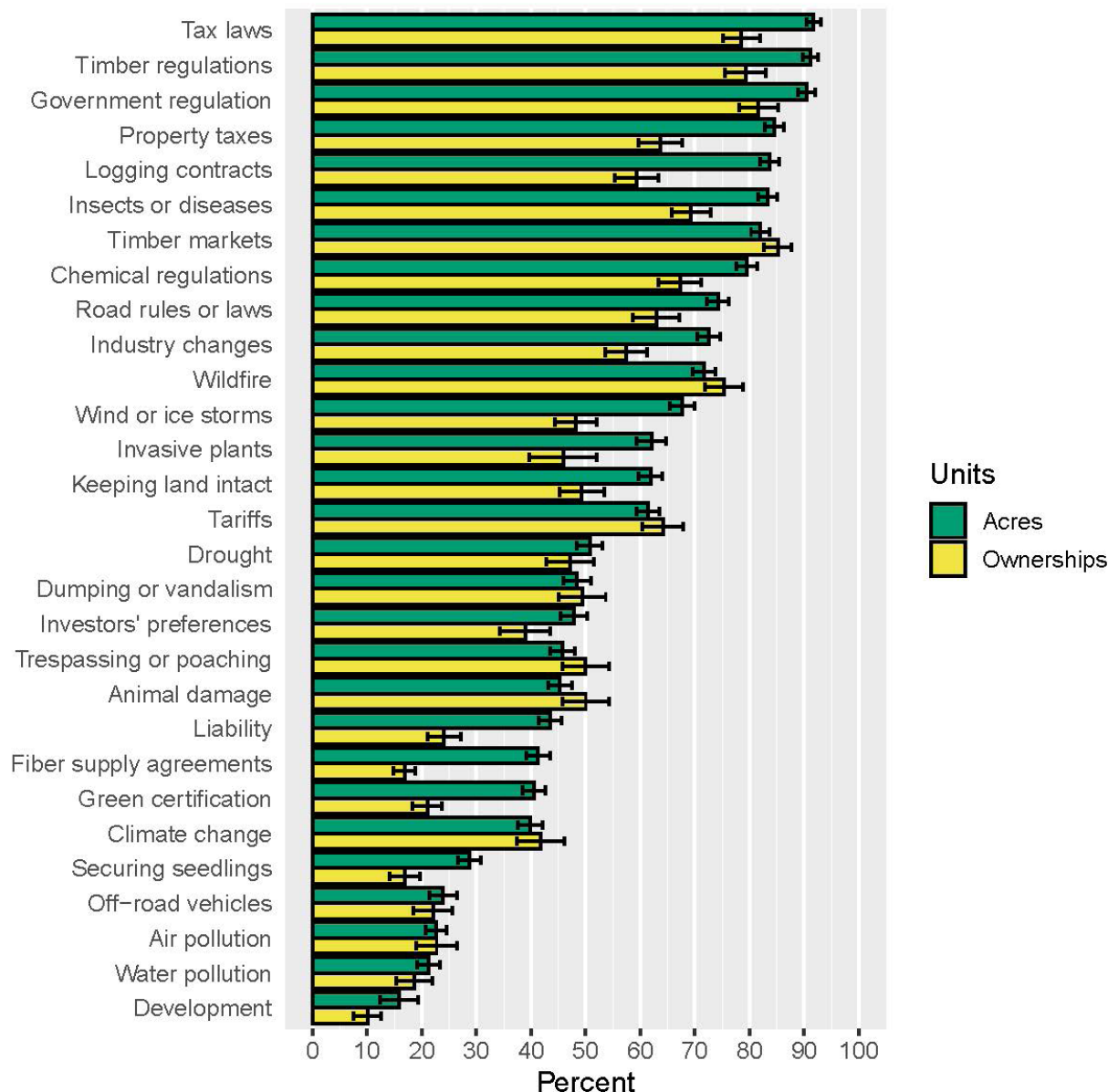


Figure 19.—Estimated percentage of large corporate forest acres and ownerships by concerns, United States, 2018. Values include ownerships who rated reasons as of concern or of great concern on a 5-point Likert scale. Error bars represent 95 percent confidence intervals (i.e., $1.96 \times$ standard error [SE]).

Conclusions

The results presented in this report are a subset of the many statistics collected as part of the 2018 National Woodland Owner Survey. Full sets of tabular summaries by geography and for different domains of interest (i.e., small corporate forest ownerships with 1+, 10+, 100+, and 1,000+ acres of forest land and large corporate ownerships with 45,000+ acres of forest land) are included in appendix 1 accompanying this report. Tools to further explore the results, such as data visualization(s), are available at: <https://www.fia.fs.usda.gov/nwos/results>.

In interpreting the results, it is important to recognize the constraints of the underlying data. Since the NWOS results are based on a sample of ownerships, one key element in interpreting the results are the standard errors (SEs) provided in the tables. These values help to quantify the reliability of the associated estimates. If a standard error for an estimate is higher than desired, it is possible that it may be reduced if the sample size is increased (e.g., looking across larger geographic areas) or by looking at expanded domains of interest. Due to the NWOS sample design with inclusion probabilities that are a function of size of holdings, the standard errors associated with ownerships of smaller holdings (e.g., 1 to 9 acres of forest land) are particularly large, so the estimates for ownerships with 10+ acres of forest land tend to have smaller standard errors.

It is also important to recognize that there are many meaningful subgroups or segments of corporate forest ownerships. This report highlights results for small corporate forest ownerships with 10+ acres of forest land and large corporate ownerships with 45,000+ acres of forest land. Depending on one's needs, there are many ways the data could be segmented, such as looking at just the active timber harvesters or creating further subsets by size. Tools are being created to facilitate these analyses and specific segments will be the focus of future research efforts.

Another important caveat in interpreting the results from the NWOS base survey is that the “intensity” of activities on an ownership's land is not captured. For example, respondents to the base survey (i.e., small corporate ownerships) are asked to indicate whether they have harvested trees, but they are not asked about the number of acres or volumes harvested. The results provide estimates of the number of acres owned by people who have harvested trees, but this does not imply that all of the acres were harvested. Ancillary data (including Forest Service Forest Inventory and Analysis plot-based forest inventory data) and additional surveys are required to answer questions regarding intensity of timber harvesting and other activities. In contrast, several questions on the large corporate survey (e.g., about harvesting, management plans, or enrolling in programs) do explicitly ask about the acreage or proportion of acreage associated with certain activities or attributes. Thus, we can make statements such as “47 percent of large corporate ownerships have 95 percent or more of their land enrolled in a green certification program” (see [Programs and planning](#) under Large Corporate Forest Ownerships). Here, however, we must be cautious in interpreting the acreage estimates. The corresponding statement in terms of acreage, “Sixty-three percent of the large corporate forest land is owned by large corporate ownerships, which have 95 percent or more of their land enrolled in a green certification system” is technically correct and potentially useful, but easy to misinterpret.

This report provides an overview of the objectives, activities, and attributes of corporate forest owners in the United States. Additional research could improve our understanding of changes in corporate forest land ownership (e.g., Caputo et al. 2020a, Sass et al. 2021), why corporate forest owners behave the way they do, and how changes in corporate forest ownership behavior and objectives may affect timber supply, biodiversity, carbon storage, and other ecosystem services and societal goals.

Acknowledgments

We want to express our sincere gratitude to the many landowners from across the United States who took the time to complete the survey—thank you! Thanks also go to the employees of the Family Forest Research Center who made this survey happen and to the Forest Inventory and Analysis staff members who helped facilitate it. We are also grateful for all the reviewers, who provided constructive feedback, and the individuals who provided input on early iterations of the survey instruments.

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List of Supplemental Materials

The following materials are available at <https://doi.org/10.2737/NRS-GTR-216>.

Appendix 1: Summary Tables

Appendix 1 is composed of five folders that segregate the tables by domain (1+, 10+, 100+, 1,000+ acres of forest land, large corporate). Within each domain folder are separate sets of 30 summary tables for the Nation, regions, subregions, and states where the number of survey responses received meets or exceeds the minimum sample size of 100. All tables are in html format.

Summary tables for the Nation and regions found in Appendix 1

- ONEPLUS: Small corporate forest ownerships with 1+ acres of forest land
 - TABLES_SCORP_US_ONEPLUS.html
 - TABLES_SCORP_US_NORTH_ONEPLUS.html
 - TABLES_SCORP_US_SOUTH_ONEPLUS.html
 - TABLES_SCORP_US_WEST_ONEPLUS.html
- TENPLUS: Small corporate forest ownerships with 10+ acres of forest land
 - TABLES_SCORP_US_TENPLUS.html
 - TABLES_SCORP_US_NORTH_TENPLUS.html
 - TABLES_SCORP_US_SOUTH_TENPLUS.html
 - TABLES_SCORP_US_WEST_TENPLUS.html
- HUNDREDPLUS: Small corporate forest ownerships with 100+ acres of forest land
 - TABLES_SCORP_US_HUNDREDPLUS.html
 - TABLES_SCORP_US_NORTH_HUNDREDPLUS.html
 - TABLES_SCORP_US_SOUTH_HUNDREDPLUS.html
 - TABLES_SCORP_US_WEST_HUNDREDPLUS.html
- THOUSANDPLUS: Small corporate forest ownerships with 1,000+ acres of forest land
 - TABLES_SCORP_US_THOUSANDPLUS.html
 - TABLES_SCORP_US_NORTH_THOUSANDPLUS.html
 - TABLES_SCORP_US_SOUTH_THOUSANDPLUS.html
 - TABLES_SCORP_US_WEST_THOUSANDPLUS.html
- 45K_PLUS: Large corporate forest ownerships with 45,000+ acres of forest land
 - TABLES_LCORP_US_45K_PLUS.html

Following are the titles of tables summarizing forest area by ownership category, sample size and cooperation rate, and responses to the 2018 National Woodland Owner Survey for small corporate ownerships. These table titles are for the entire United States, denoted by the “US” preceding the table number; analogous tables are available for other regions as listed earlier.

- Table US-1 (2018).—Sample size and cooperation rate for small corporate ownerships for the USDA Forest Service, National Woodland Owner Survey, United States, 2018, 1+ acres
- Table US-2-OWN (2018).—Estimated number of small corporate ownerships, United States, 2018, 10+ acres
- Table US-2-ACRE (2018).—Estimated small corporate acreage, United States, 2018, 10+ acres
- Table US-3a-OWN (2018).—Estimated number of small corporate ownerships by size of forest holdings, United States, 2018, 10+ acres
- Table US-3a-ACRE (2018).—Estimated small corporate acreage by size of forest holdings, United States, 2018, 10+ acres
- Table US-3b-OWN (2018).—Estimated number of small corporate ownerships by whether they own multiple forested parcels, United States, 2018, 10+ acres
- Table US-3b-ACRE (2018).—Estimated small corporate acreage by whether they own multiple forested parcels, United States, 2018, 10+ acres
- Table US-5-OWN (2018).—Estimated number of small corporate ownerships by number of owners, United States, 2018, 10+ acres
- Table US-5-ACRE (2018).—Estimated small corporate acreage by owners, United States, 2018, 10+ acres
- Table US-6-OWN (2018).—Estimated number of small corporate ownerships by whether they have a farm within 1 mile of their forest land, United States, 2018, 10+ acres
- Table US-6-ACRE (2018).—Estimated small corporate acreage by whether they have a farm within 1 mile of their forest land, United States, 2018, 10+ acres
- Table US-7a-OWN (2018).—Estimated number of small corporate ownerships by beauty or scenery as a reason for owning, United States, 2018, 10+ acres
- Table US-7a-ACRE (2018).—Estimated small corporate acreage by beauty or scenery as a reason for owning, United States, 2018, 10+ acres
- Table US-7b-OWN (2018).—Estimated number of small corporate ownerships by nature protection as a reason for owning, United States, 2018, 10+ acres
- Table US-7b-ACRE (2018).—Estimated small corporate acreage by nature protection as a reason for owning, United States, 2018, 10+ acres

- Table US-7c-OWN (2018).—Estimated number of small corporate ownerships by water protection as a reason for owning, United States, 2018, 10+ acres
- Table US-7c-ACRE (2018).—Estimated small corporate acreage by water protection as a reason for owning, United States, 2018, 10+ acres
- Table US-7d-OWN (2018).—Estimated number of small corporate ownerships by wildlife habitat as a reason for owning, United States, 2018, 10+ acres
- Table US-7d-ACRE (2018).—Estimated small corporate acreage by wildlife habitat as a reason for owning, United States, 2018, 10+ acres
- Table US-7e-OWN (2018).—Estimated number of small corporate ownerships by land investment as a reason for owning, United States, 2018, 10+ acres
- Table US-7e-ACRE (2018).—Estimated small corporate acreage by land investment as a reason for owning, United States, 2018, 10+ acres
- Table US-7f-OWN (2018).—Estimated number of small corporate ownerships by privacy as a reason for owning, United States, 2018, 10+ acres
- Table US-7f-ACRE (2018).—Estimated small corporate acreage by privacy as a reason for owning, United States, 2018, 10+ acres
- Table US-7g-OWN (2018).—Estimated number of small corporate ownerships by raise family as a reason for owning, United States, 2018, 10+ acres
- Table US-7g-ACRE (2018).—Estimated small corporate acreage by raise family as a reason for owning, United States, 2018, 10+ acres
- Table US-7h-OWN (2018).—Estimated number of small corporate ownerships by family legacy as a reason for owning, United States, 2018, 10+ acres
- Table US-7h-ACRE (2018).—Estimated small corporate acreage by family legacy as a reason for owning, United States, 2018, 10+ acres
- Table US-7i-OWN (2018).—Estimated number of small corporate ownerships by firewood as a reason for owning, United States, 2018, 10+ acres
- Table US-7i-ACRE (2018).—Estimated small corporate acreage by firewood as a reason for owning, United States, 2018, 10+ acres
- Table US-7j-OWN (2018).—Estimated number of small corporate ownerships by timber products as a reason for owning, United States, 2018, 10+ acres
- Table US-7j-ACRE (2018).—Estimated small corporate acreage by timber products as a reason for owning, United States, 2018, 10+ acres
- Table US-7k-OWN (2018).—Estimated number of small corporate ownerships by nontimber forest products as a reason for owning, United States, 2018, 10+ acres
- Table US-7k-ACRE (2018).—Estimated small corporate acreage by nontimber forest products as a reason for owning, United States, 2018, 10+ acres

- Table US-7l-OWN (2018).—Estimated number of small corporate ownerships by hunting as a reason for owning, United States, 2018, 10+ acres
- Table US-7l-ACRE (2018).—Estimated small corporate acreage by hunting as a reason for owning, United States, 2018, 10+ acres
- Table US-7m-OWN (2018).—Estimated number of small corporate ownerships by recreation as a reason for owning, United States, 2018, 10+ acres
- Table US-7m-ACRE (2018).—Estimated small corporate acreage by recreation as a reason for owning, United States, 2018, 10+ acres
- Table US-8a-OWN (2018).—Estimated number of small corporate ownerships by acquisition type, United States, 2018, 10+ acres
- Table US-8a-ACRE (2018).—Estimated small corporate acreage by acquisition type, United States, 2018, 10+ acres
- Table US-8b-OWN (2018).—Estimated number of small corporate ownerships by acquisition source, United States, 2018, 10+ acres
- Table US-8b-ACRE (2018).—Estimated small corporate acreage by acquisition source, United States, 2018, 10+ acres
- Table US-8c-OWN (2018).—Estimated number of small corporate ownerships by length of ownership, United States, 2018, 10+ acres
- Table US-8c-ACRE (2018).—Estimated small corporate acreage by length of ownership, United States, 2018, 10+ acres
- Table US-9a-OWN (2018).—Estimated number of small corporate ownerships by whether land was sold or given away, United States, 2018, 10+ acres
- Table US-9a-ACRE (2018).—Estimated small corporate acreage by whether land was sold or given away, United States, 2018, 10+ acres
- Table US-9b-OWN (2018).—Estimated number of small corporate ownerships by whether land was subdivided, United States, 2018, 10+ acres
- Table US-9b-ACRE (2018).—Estimated small corporate acreage by whether land was subdivided, United States, 2018, 10+ acres
- Table US-9c-OWN (2018).—Estimated number of small corporate ownerships by to whom land was sold or given to, United States, 2018, 10+ acres
- Table US-9c-ACRE (2018).—Estimated small corporate acreage by to whom land was sold or given to, United States, 2018, 10+ acres
- Table US-9d-OWN (2018).—Estimated number of small corporate ownerships by whether land was sold or given away in the previous 5 years, United States, 2018, 10+ acres
- Table US-9d-ACRE (2018).—Estimated small corporate acreage by whether land was sold or given away in the previous 5 years, United States, 2018, 10+ acres

- Table US-10-OWN (2018).—Estimated number of small corporate ownerships by forest management decision-maker, United States, 2018, 10+ acres
- Table US-10-ACRE (2018).—Estimated small corporate acreage by forest management decision-maker, United States, 2018, 10+ acres.
- Table US-11a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with written management plan, United States, 2018, 10+ acres
- Table US-11a-ACRE (2018).—Estimated small corporate acreage by familiarity with written management plan, United States, 2018, 10+ acres
- Table US-11b-OWN (2018).—Estimated number of small corporate ownerships by written management plan status, United States, 2018, 10+ acres
- Table US-11b-ACRE (2018).—Estimated small corporate acreage by written management plan status, United States, 2018, 10+ acres
- Table US-11c-OWN (2018).—Estimated number of small corporate ownerships by who has written the landowner's management plan, United States, 2018, 10+ acres
- Table US-11c-ACRE (2018).—Estimated small corporate acreage by who has written the landowner's management plan, United States, 2018, 10+ acres
- Table US-11d-OWN (2018).—Estimated number of small corporate ownerships by whether management plan has been implemented, United States, 2018, 10+ acres
- Table US-11d-ACRE (2018).—Estimated small corporate acreage by whether management plan has been implemented, United States, 2018, 10+ acres
- Table US-12a-OWN (2018).—Estimated number of small corporate ownerships by whether trees have been harvested, United States, 2018, 10+ acres
- Table US-12a-ACRE (2018).—Estimated small corporate acreage by whether trees have been harvested, United States, 2018, 10+ acres
- Table US-12b-OWN (2018).—Estimated number of small corporate ownerships by types of timber products cut and/or removed, United States, 2018, 10+ acres
- Table US-12b-ACRE (2018).—Estimated small corporate acreage by types of timber products cut and/or removed, United States, 2018, 10+ acres
- Table US-12c-OWN (2018).—Estimated number of small corporate ownerships by reasons for harvesting timber products, United States, 2018, 10+ acres
- Table US-12c-ACRE (2018).—Estimated small corporate acreage by reasons for harvesting timber products, United States, 2018, 10+ acres
- Table US-12d-OWN (2018).—Estimated number of small corporate ownerships by whether a forester was used to oversee or prepare timber harvests, United States, 2018, 10+ acres
- Table US-12d-ACRE (2018).—Estimated small corporate acreage by whether a forester was used to oversee or prepare timber harvests, United States, 2018, 10+ acres

- Table US-13a-OWN (2018).—Estimated number of small corporate ownerships by types of nontimber forest products harvested, United States, 2018, 10+ acres
- Table US-13a-ACRE (2018).—Estimated small corporate acreage by types of nontimber forest products harvested, United States, 2018, 10+ acres
- Table US-13b-OWN (2018).—Estimated number of small corporate ownerships by reasons for harvesting nontimber forest products, United States, 2018, 10+ acres
- Table US-13b-ACRE (2018).—Estimated small corporate acreage by reasons for harvesting nontimber forest products, United States, 2018, 10+ acres
- Table US-14-OWN (2018).—Estimated number of small corporate ownerships by past (previous 5 years) management activities, United States, 2018, 10+ acres
- Table US-14-ACRE (2018).—Estimated small corporate acreage by past (previous 5 years) management activities, United States, 2018, 10+ acres.
- Table US-15-OWN (2018).—Estimated number of small corporate ownerships by future (next 5 years) management activities, United States, 2018, 10+ acres
- Table US-15-ACRE (2018).—Estimated small corporate acreage by future (next 5 years) management activities, United States, 2018, 10+ acres
- Table US-16a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with green certification programs, United States, 2018, 10+ acres
- Table US-16a-ACRE (2018).—Estimated small corporate acreage by familiarity with green certification programs, United States, 2018, 10+ acres
- Table US-16b-OWN (2018).—Estimated number of small corporate ownerships by participation in green certification programs, United States, 2018, 10+ acres
- Table US-16b-ACRE (2018).—Estimated small corporate acreage by participation in green certification programs, United States, 2018, 10+ acres
- Table US-17a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with property tax programs, United States, 2018, 10+ acres
- Table US-17a-ACRE (2018).—Estimated small corporate acreage by familiarity with property tax programs, United States, 2018, 10+ acres
- Table US-17b-OWN (2018).—Estimated number of small corporate ownerships by participation in property tax programs, United States, 2018, 10+ acres
- Table US-17b-ACRE (2018).—Estimated small corporate acreage by participation in property tax programs, United States, 2018, 10+ acres
- Table US-18a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with conservation easements, United States, 2018, 10+ acres.
- Table US-18a-ACRE (2018).—Estimated small corporate acreage by familiarity with conservation easements, United States, 2018, 10+ acres

- Table US-18b-OWN (2018).—Estimated number of small corporate ownerships by current participation in conservation easements, United States, 2018, 10+ acres
- Table US-18b-ACRE (2018).—Estimated small corporate acreage by current participation in conservation easements, United States, 2018, 10+ acres
- Table US-18c-OWN (2018).—Estimated number of small corporate ownerships by expected future participation in conservation easements (next 5 years), United States, 2018, 10+ acres
- Table US-18c-ACRE (2018).—Estimated small corporate acreage by expected future participation in conservation easements (next 5 years), United States, 2018, 10+ acres
- Table US-19a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with cost-share programs, United States, 2018, 10+ acres
- Table US-19a-ACRE (2018).—Estimated small corporate acreage by familiarity with cost-share programs, United States, 2018, 10+ acres
- Table US-19c-OWN (2018).—Estimated number of small corporate ownerships by participation in cost-share programs in the last 5 years, United States, 2018, 10+ acres
- Table US-19c-ACRE (2018).—Estimated small corporate acreage by participation in cost-share programs in the last 5 years, United States, 2018, 10+ acres
- Table US-20a-OWN (2018).—Estimated number of small corporate ownerships by familiarity with carbon sequestration programs, United States, 2018, 10+ acres
- Table US-20a-ACRE (2018).—Estimated small corporate acreage by familiarity with carbon sequestration programs, United States, 2018, 10+ acres
- Table US-20b-OWN (2018).—Estimated number of small corporate ownerships by participation in carbon sequestration programs, United States, 2018, 10+ acres
- Table US-20b-ACRE (2018).—Estimated small corporate acreage by participation in carbon sequestration programs, United States, 2018, 10+ acres
- Table US-21a-OWN (2018).—Estimated number of small corporate ownerships by whether landowner has leased forest land (other than for logging), United States, 2018, 10+ acres
- Table US-21a-ACRE (2018).—Estimated small corporate acreage by whether landowners' have leased forestland land (other than for logging), United States, 2018, 10+ acres
- Table US-21b-OWN (2018).—Estimated number of small corporate ownerships by leasing activities, United States, 2018, 10+ acres
- Table US-21b-ACRE (2018).—Estimated small corporate acreage by leasing activities, United States, 2018, 10+ acres
- Table US-21c-OWN (2018).—Estimated number of small corporate ownerships by whether landowners' have leased forestland in the past 5 years, United States, 2018, 10+ acres.

- Table US-21c-ACRE (2018).—Estimated small corporate acreage by whether landowners' have leased forestland in the past 5 years, United States, 2018, 10+ acres.
- Table US-22a-OWN (2018).—Estimated number of small corporate ownerships by who has recreated on forestland in the previous 5 years, United States, 2018, 10+ acres.
- Table US-22a-ACRE (2018).—Estimated small corporate acreage by who has recreated on forestland in the previous 5 years, United States, 2018, 10+ acres.
- Table US-22b-OWN (2018).—Estimated number of small corporate ownerships by types of recreation activities conducted on landowners' forestland in previous 5 years, United States, 2018, 10+ acres.
- Table US-22b-ACRE (2018).—Estimated small corporate acreage by types of recreation activities conducted on landowners' forestland in previous 5 years, United States, 2018, 10+ acres
- Table US-23a-OWN (2018).—Estimated number of small corporate ownerships by whether certain activities have been restricted by posting, United States, 2018, 10+ acres
- Table US-23a-ACRE (2018).—Estimated small corporate acreage by whether certain activities have been restricted by posting, United States, 2018, 10+ acres
- Table US-23b-OWN (2018).—Estimated number of small corporate ownerships by which activities have been restricted by posting, United States, 2018, 10+ acres
- Table US-23b-ACRE (2018).—Estimated small corporate acreage by which activities have been restricted by posting, United States, 2018, 10+ acres
- Table US-24a-OWN (2018).—Estimated number of small corporate ownerships by whether advice was received in the previous 5 years, United States, 2018, 10+ acres
- Table US-24a-ACRE (2018).—Estimated small corporate acreage by whether advice was received in the previous 5 years, United States, 2018, 10+ acres
- Table US-24b-OWN (2018).—Estimated number of small corporate ownerships by topics of advice in the previous 5 years, United States, 2018, 10+ acres.
- Table US-24b-ACRE (2018).—Estimated small corporate acreage by topics of advice in the previous 5 years, United States, 2018, 10+ acres
- Table US-24c-OWN (2018).—Estimated number of small corporate ownerships by methods by which advice was received in the previous 5 years, United States, 2018, 10+ acres
- Table US-24c-ACRE (2018).—Estimated small corporate acreage by methods by which advice was received in the previous 5 years, United States, 2018, 10+ acres
- Table US-24d-OWN (2018).—Estimated number of small corporate ownerships by sources of advice received in the previous 5 years, United States, 2018, 10+ acres

- Table US-24d-ACRE (2018).—Estimated small corporate acreage by sources of advice received in the previous 5 years, United States, 2018, 10+ acres
- Table US-25a-OWN (2018).—Estimated number of small corporate ownerships by preferred topics of information and assistance, United States, 2018, 10+ acres
- Table US-25a-ACRE (2018).—Estimated small corporate acreage by preferred topics of information and assistance, United States, 2018, 10+ acres
- Table US-25b-OWN (2018).—Estimated number of small corporate ownerships by preferred methods of receiving information and assistance, United States, 2018, 10+ acres
- Table US-25b-ACRE (2018).—Estimated small corporate acreage by preferred methods of receiving information and assistance, United States, 2018, 10+ acres
- Table US-25c-OWN (2018).—Estimated number of small corporate ownerships by preferred or valued programs and policies, United States, 2018, 10+ acres
- Table US-25c-ACRE (2018).—Estimated small corporate acreage by preferred or valued programs and policies, United States, 2018, 10+ acres
- Table US-26a-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding air pollution, United States, 2018, 10+ acres
- Table US-26a-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding air pollution, United States, 2018, 10+ acres
- Table US-26b-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding climate change, United States, 2018, 10+ acres
- Table US-26b-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding climate change, United States, 2018, 10+ acres
- Table US-26c-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding animal damage, United States, 2018, 10+ acres
- Table US-26c-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding animal damage, United States, 2018, 10+ acres
- Table US-26d-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding development, United States, 2018, 10+ acres
- Table US-26d-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding development, United States, 2018, 10+ acres
- Table US-26e-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding drought, United States, 2018, 10+ acres
- Table US-26e-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding drought, United States, 2018, 10+ acres
- Table US-26f-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding off-road vehicles, United States, 2018, 10+ acres

- Table US-26f-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding off-road vehicles, United States, 2018, 10+ acres
- Table US-26g-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding government regulation, United States, 2018, 10+ acres
- Table US-26g-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding government regulation, United States, 2018, 10+ acres
- Table US-26h-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding property taxes, United States, 2018, 10+ acres
- Table US-26h-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding property taxes, United States, 2018, 10+ acres
- Table US-26i-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding invasive plants, United States, 2018, 10+ acres
- Table US-26i-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding invasive plants, United States, 2018, 10+ acres
- Table US-26j-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding keeping land intact, United States, 2018, 10+ acres
- Table US-26j-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding keeping land intact, United States, 2018, 10+ acres
- Table US-26k-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding dumping or vandalism, United States, 2018, 10+ acres
- Table US-26k-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding dumping or vandalism, United States, 2018, 10+ acres
- Table US-26l-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding trespassing or poaching, United States, 2018, 10+ acres
- Table US-26l-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding trespassing or poaching, United States, 2018, 10+ acres
- Table US-26m-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding insects or diseases, United States, 2018, 10+ acres
- Table US-26m-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding insects or diseases, United States, 2018, 10+ acres
- Table US-26n-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding water pollution, United States, 2018, 10+ acres
- Table US-26n-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding water pollution, United States, 2018, 10+ acres
- Table US-26o-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding wildfire, United States, 2018, 10+ acres

- Table US-26o-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding wildfire, United States, 2018, 10+ acres
- Table US-26p-OWN (2018).—Estimated number of small corporate ownerships by landowner concerns regarding wind or ice storms, United States, 2018, 10+ acres
- Table US-26p-ACRE (2018).—Estimated small corporate acreage by landowner concerns regarding wind or ice storms, United States, 2018, 10+ acres
- Table US-27a-OWN (2018).—Estimated number of small corporate ownerships by likelihood of land sale or transfer in the next 5 years, United States, 2018, 10+ acres
- Table US-27a-ACRE (2018).—Estimated small corporate acreage by likelihood of land sale or transfer in the next 5 years, United States, 2018, 10+ acres
- Table US-27b-OWN (2018).—Estimated number of small corporate ownerships by likely recipient of transferred land in the next 5 years, United States, 2018, 10+ acres
- Table US-27b-ACRE (2018).—Estimated small corporate acreage by likely recipient of transferred land in the next 5 years, United States, 2018, 10+ acres
- Table US-28a-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about keeping wooded land wooded, United States, 2018, 10+ acres.
- Table US-28a-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about keeping wooded land wooded, United States, 2018, 10+ acres
- Table US-28b-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about selling land, United States, 2018, 10+ acres
- Table US-28b-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about selling land, United States, 2018, 10+ acres
- Table US-28c-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about how well they know their forestland, United States, 2018, 10+ acres
- Table US-28c-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about how well they know their forestland, United States, 2018, 10+ acres
- Table US-28d-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about wanting to learn more about their forestland, United States, 2018, 10+ acres
- Table US-28d-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about wanting to learn more about their forestland, United States, 2018, 10+ acres
- Table US-28e-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about their level of emotional attachment to their forestland, United States, 2018, 10+ acres

- Table US-28e-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about their level of emotional attachment to their forestland, United States, 2018, 10+ acres
- Table US-28f-OWN (2018).—Estimated number of small corporate ownerships by landowner attitudes about the extent to which their forestland provides community benefits, United States, 2018, 10+ acres
- Table US-28f-ACRE (2018).—Estimated small corporate acreage by landowner attitudes about the extent to which their forestland provides community benefits, United States, 2018, 10+ acres

Following are the titles of tables summarizing forest area by ownership category, sample size and cooperation rate, and responses to the 2018 National Woodland Owner Survey for large corporate ownerships.

- Table US-1 (2018).—Sample size and cooperation rate for large corporate ownerships for the USDA Forest Service, National Woodland Owner Survey, United States, 2018, 45k+ acres
- Table US-2-OWN (2018).—Estimated number of large corporate ownerships, United States, 2018, 45k+ acres
- Table US-2-ACRE (2018).—Estimated large corporate acreage, United States, 2018, 45k+ acres
- Table US-3-OWN (2018).—Estimated number of large corporate ownerships by size of forest holdings in acres, United States, 2018, 45k+ acres
- Table US-3-ACRE (2018).—Estimated large corporate acreage by size of forest holdings in acres, United States, 2018, 45k+ acres
- Table US-4a-OWN (2018).—Estimated number of large corporate ownerships by company structure, United States, 2018, 45k+ acres
- Table US-4a-ACRE (2018).—Estimated large corporate acreage by company structure, United States, 2018, 45k+ acres
- Table US-4b-OWN (2018).—Estimated number of large corporate ownerships by whether companies are incorporated as Real Estate Investment Trusts (REITs), United States, 2018, 45k+ acres
- Table US-4b-ACRE (2018).—Estimated large corporate acreage by whether companies are incorporated as Real Estate Investment Trusts (REITs), United States, 2018, 45k+ acres
- Table US-4c-OWN (2018).—Estimated number of large corporate ownerships by whether companies are structured as Timberland Investment Management Organizations (TIMOs), United States, 2018, 45k+ acres

- Table US-4c-ACRE (2018).—Estimated large corporate acreage by whether companies are structured as Timberland Investment Management Organizations (TIMOs), United States, 2018, 45k+ acres
- Table US-4d-OWN (2018).—Estimated number of large corporate ownerships by whether companies operate as forest management companies (FMCs) managing lands for other clients, United States, 2018, 45k+ acres
- Table US-4d-ACRE (2018).—Estimated large corporate acreage by whether companies operate as forest management companies (FMCs) managing lands for other clients, United States, 2018, 45k+ acres
- Table US-5a-OWN (2018).—Estimated number of large corporate ownerships by beauty or scenery as a reason for owning, United States, 2018, 45k+ acres
- Table US-5a-ACRE (2018).—Estimated large corporate acreage by beauty or scenery as a reason for owning, United States, 2018, 45k+ acres
- Table US-5b-OWN (2018).—Estimated number of large corporate ownerships by nature protection as a reason for owning, United States, 2018, 45k+ acres
- Table US-5b-ACRE (2018).—Estimated large corporate acreage by nature protection as a reason for owning, United States, 2018, 45k+ acres
- Table US-5c-OWN (2018).—Estimated number of large corporate ownerships by water protection as a reason for owning, United States, 2018, 45k+ acres
- Table US-5c-ACRE (2018).—Estimated large corporate acreage by water protection as a reason for owning, United States, 2018, 45k+ acres
- Table US-5d-OWN (2018).—Estimated number of large corporate ownerships by wildlife habitat as a reason for owning, United States, 2018, 45k+ acres
- Table US-5d-ACRE (2018).—Estimated large corporate acreage by wildlife habitat as a reason for owning, United States, 2018, 45k+ acres
- Table US-5e-OWN (2018).—Estimated number of large corporate ownerships by land investment as a reason for owning, United States, 2018, 45k+ acres
- Table US-5e-ACRE (2018).—Estimated large corporate acreage by land investment as a reason for owning, United States, 2018, 45k+ acres
- Table US-5f-OWN (2018).—Estimated number of large corporate ownerships by firewood as a reason for owning, United States, 2018, 45k+ acres
- Table US-5f-ACRE (2018).—Estimated large corporate acreage by firewood as a reason for owning, United States, 2018, 45k+ acres
- Table US-5g-OWN (2018).—Estimated number of large corporate ownerships by timber products as a reason for owning, United States, 2018, 45k+ acres
- Table US-5g-ACRE (2018).—Estimated large corporate acreage by timber products as a reason for owning, United States, 2018, 45k+ acres

- Table US-5h-OWN (2018).—Estimated number of large corporate ownerships by nontimber forest products as a reason for owning, United States, 2018, 45k+ acres
- Table US-5h-ACRE (2018).—Estimated large corporate acreage by nontimber forest products as a reason for owning, United States, 2018, 45k+ acres
- Table US-5i-OWN (2018).—Estimated number of large corporate ownerships by hunting as a reason for owning, United States, 2018, 45k+ acres
- Table US-5i-ACRE (2018).—Estimated large corporate acreage by hunting as a reason for owning, United States, 2018, 45k+ acres
- Table US-5j-OWN (2018).—Estimated number of large corporate ownerships by recreation as a reason for owning, United States, 2018, 45k+ acres
- Table US-5j-ACRE (2018).—Estimated large corporate acreage by recreation as a reason for owning, United States, 2018, 45k+ acres
- Table US-5k-OWN (2018).—Estimated number of large corporate ownerships by carbon capture or sequestration as a reason for owning, United States, 2018, 45k+ acres
- Table US-5k-ACRE (2018).—Estimated large corporate acreage by carbon capture or sequestration as a reason for owning, United States, 2018, 45k+ acres
- Table US-5l-OWN (2018).—Estimated number of large corporate ownerships by mineral products, such as sand or gravel, as a reason for owning, United States, 2018, 45k+ acres
- Table US-5l-ACRE (2018).—Estimated large corporate acreage by mineral products, such as sand or gravel, as a reason for owning, United States, 2018, 45k+ acres
- Table US-5m-OWN (2018).—Estimated number of large corporate ownerships by oil and/or gas extraction as a reason for owning, United States, 2018, 45k+ acres
- Table US-5m-ACRE (2018).—Estimated large corporate acreage by oil and/or gas extraction as a reason for owning, United States, 2018, 45k+ acres
- Table US-6-OWN (2018).—Estimated number of large corporate ownerships by the approximate acreage acquired by companies in the past 5 years, United States, 2018, 45k+ acres
- Table US-6-ACRE (2018).—Estimated large corporate acreage by the approximate acreage acquired by companies in the past 5 years, United States, 2018, 45k+ acres
- Table US-7-OWN (2018).—Estimated number of large corporate ownerships by the approximate acreage sold by companies in the past 5 years, United States, 2018, 45k+ acres
- Table US-7-ACRE (2018).—Estimated large corporate acreage by the approximate acreage sold by companies in the past 5 years, United States, 2018, 45k+ acres

- Table US-8a-OWN (2018).—Estimated number of large corporate ownerships by who handles day-to-day field operations on the companies' forestland, United States, 2018, 45k+ acres
- Table US-8a-ACRE (2018).—Estimated large corporate acreage by who handles day-to-day field operations on the companies' forestland, United States, 2018, 45k+ acres
- Table US-8b-OWN (2018).—Estimated number of large corporate ownerships by the percentage of companies' land that is currently covered by a written management plan, United States, 2018, 45k+ acres
- Table US-8b-ACRE (2018).—Estimated large corporate acreage by the percentage of companies' land that is currently covered by a written management plan, United States, 2018, 45k+ acres
- Table US-9-OWN (2018).—Estimated number of large corporate ownerships by the average number of acres companies harvest annually, United States, 2018, 45k+ acres
- Table US-9-ACRE (2018).—Estimated large corporate acreage by the average acres companies harvest annually, United States, 2018, 45k+ acres
- Table US-10-OWN (2018).—Estimated number of large corporate ownerships by whether companies thinned any of their forestland in the past 5 years, United States, 2018, 45k+ acres
- Table US-10-ACRE (2018).—Estimated large corporate acreage by whether companies thinned any of their forestland in the past 5 years, United States, 2018, 45k+ acres
- Table US-11-OWN (2018).—Estimated number of large corporate ownerships by whether companies planted seedlings on their forestland in the past 5 years, United States, 2018, 45k+ acres
- Table US-11-ACRE (2018).—Estimated large corporate acreage by whether companies planted seedlings on their forestland in the past 5 years, United States, 2018, 45k+ acres
- Table US-12-OWN (2018).—Estimated number of large corporate ownerships by whether companies have even age stands on their forestland, United States, 2018, 45k+ acres
- Table US-12-ACRE (2018).—Estimated large corporate acreage by whether companies have even age stands on their forestland, United States, 2018, 45k+ acres
- Table US-13-OWN (2018).—Estimated number of large corporate ownerships by companies' use of silvicultural practices, United States, 2018, 45k+ acres
- Table US-13-ACRE (2018).—Estimated large corporate acreage by companies' use of silvicultural practices, United States, 2018, 45k+ acres
- Table US-14-OWN (2018).—Estimated number of large corporate ownerships by whether companies own and operate one or more primary wood processing mills in the U.S., United States, 2018, 45k+ acres

- Table US-14-ACRE (2018).—Estimated large corporate acreage by whether companies own and operate one or more primary wood processing mills in the U.S., United States, 2018, 45k+ acres
- Table US-15a-OWN (2018).—Estimated number of large corporate ownerships by whether companies have long-term timber/fiber supply agreements with mills or other primary processors, United States, 2018, 45k+ acres
- Table US-15a-ACRE (2018).—Estimated large corporate acreage by whether companies have long-term timber/fiber supply agreements with mills or other primary processors, United States, 2018, 45k+ acres
- Table US-15b-OWN (2018).—Estimated number of large corporate ownerships by the percentage of companies' annual harvest going to fulfill long-term supply agreements in the past 5 years, United States, 2018, 45k+ acres
- Table US-15b-ACRE (2018).—Estimated large corporate acreage by the percentage of companies' annual harvest going to fulfill long-term supply agreements in the past 5 years, United States, 2018, 45k+ acres
- Table US-16-OWN (2018).—Estimated number of large corporate ownerships by other activities for which companies have collected usage fees, United States, 2018, 45k+ acres
- Table US-16-ACRE (2018).—Estimated large corporate acreage by other activities for which companies have collected usage fees, United States, 2018, 45k+ acres
- Table US-17-OWN (2018).—Estimated number of large corporate ownerships by past (past 5 years) management activities, United States, 2018, 45k+ acres
- Table US-17-ACRE (2018).—Estimated large corporate acreage by past (past 5 years) management activities, United States, 2018, 45k+ acres
- Table US-18a-OWN (2018).—Estimated number of large corporate ownerships by participation in green certification programs, United States, 2018, 45k+ acres
- Table US-18a-ACRE (2018).—Estimated large corporate acreage by participation in green certification programs, United States, 2018, 45k+ acres
- Table US-18b-OWN (2018).—Estimated number of large corporate ownerships by percentage of acreage enrolled in green certification programs, United States, 2018, 45k+ acres
- Table US-18b-ACRE (2018).—Estimated large corporate acreage by percentage of acreage enrolled in green certification programs, United States, 2018, 45k+ acres
- Table US-18c-OWN (2018).—Estimated number of large corporate ownerships by participation in specific green certification programs, United States, 2018, 45k+ acres.
- Table US-18c-ACRE (2018).—Estimated large corporate acreage by participation in specific green certification programs, United States, 2018, 45k+ acres

- Table US-19-OWN (2018).—Estimated number of large corporate ownerships by percentage of companies' acreage enrolled in a conservation easement, United States, 2018, 45k+ acres
- Table US-19-ACRE (2018).—Estimated large corporate acreage by percentage of companies' acreage enrolled in a conservation easement, United States, 2018, 45k+ acres
- Table US-20-OWN (2018).—Estimated number of large corporate ownerships by whether companies own dedicated wildfire suppression equipment in the U.S., United States, 2018, 45k+ acres
- Table US-20-ACRE (2018).—Estimated large corporate acreage by whether companies own dedicated wildfire suppression equipment in the U.S., United States, 2018, 45k+ acres
- Table US-21a-OWN (2018).—Estimated number of large corporate ownerships by who has recreated on companies' land in the past 5 years, United States, 2018, 45k+ acres
- Table US-21a-ACRE (2018).—Estimated large corporate acreage by who has recreated on companies' land in the past 5 years, United States, 2018, 45k+ acres
- Table US-21b-OWN (2018).—Estimated number of large corporate ownerships by what types of recreational activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-21b-ACRE (2018).—Estimated large corporate acreage by what types of recreational activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-22-OWN (2018).—Estimated number of large corporate ownerships by what types of research activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-22-ACRE (2018).—Estimated large corporate acreage by what types of research activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-23-OWN (2018).—Estimated number of large corporate ownerships by what types of community assistance activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-23-ACRE (2018).—Estimated large corporate acreage by what types of community assistance activities have been conducted in the past 5 years, United States, 2018, 45k+ acres
- Table US-24a-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about air pollution, United States, 2018, 45k+ acres
- Table US-24a-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about air pollution, United States, 2018, 45k+ acres

- Table US-24b-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about climate change, United States, 2018, 45k+ acres
- Table US-24b-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about climate change, United States, 2018, 45k+ acres
- Table US-24c-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about damage from animals, United States, 2018, 45k+ acres
- Table US-24c-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about damage from animals, United States, 2018, 45k+ acres
- Table US-24d-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about development of nearby lands, United States, 2018, 45k+ acres
- Table US-24d-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about development of nearby lands, United States, 2018, 45k+ acres
- Table US-24e-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about drought or lack of water, United States, 2018, 45k+ acres
- Table US-24e-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about drought or lack of water, United States, 2018, 45k+ acres
- Table US-24f-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about damage or noise from offroad vehicles, United States, 2018, 45k+ acres
- Table US-24f-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about damage or noise from offroad vehicles, United States, 2018, 45k+ acres
- Table US-24g-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about government regulation, United States, 2018, 45k+ acres
- Table US-24g-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about government regulation, United States, 2018, 45k+ acres
- Table US-24h-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about high property taxes, United States, 2018, 45k+ acres
- Table US-24h-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about high property taxes, United States, 2018, 45k+ acres
- Table US-24i-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about invasive plants, United States, 2018, 45k+ acres
- Table US-24i-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about invasive plants, United States, 2018, 45k+ acres

- Table US-24j-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about keeping land intact for future generations, United States, 2018, 45k+ acres
- Table US-24j-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about keeping land intact for future generations, United States, 2018, 45k+ acres
- Table US-24k-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about misuse of wooded land, such as vandalism or dumping, United States, 2018, 45k+ acres
- Table US-24k-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about misuse of wooded land, such as vandalism or dumping, United States, 2018, 45k+ acres
- Table US-24l-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about trespassing or poaching, United States, 2018, 45k+ acres
- Table US-24l-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about trespassing or poaching, United States, 2018, 45k+ acres
- Table US-24m-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about unwanted insects or diseases, United States, 2018, 45k+ acres
- Table US-24m-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about unwanted insects or diseases, United States, 2018, 45k+ acres
- Table US-24n-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about water pollution, United States, 2018, 45k+ acres
- Table US-24n-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about water pollution, United States, 2018, 45k+ acres
- Table US-24o-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about wildfire, United States, 2018, 45k+ acres
- Table US-24o-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about wildfire, United States, 2018, 45k+ acres
- Table US-24p-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about wind or ice storms, United States, 2018, 45k+ acres
- Table US-24p-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about wind or ice storms, United States, 2018, 45k+ acres
- Table US-24q-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about maintaining green certification status, United States, 2018, 45k+ acres

- Table US-24q-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about maintaining green certification status, United States, 2018, 45k+ acres
- Table US-24r-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about regulated chemical inputs, United States, 2018, 45k+ acres
- Table US-24r-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about regulated chemical inputs, United States, 2018, 45k+ acres
- Table US-24s-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about securing logging contracts, United States, 2018, 45k+ acres
- Table US-24s-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about securing logging contracts, United States, 2018, 45k+ acres
- Table US-24t-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about long-term fiber supply agreements, United States, 2018, 45k+ acres
- Table US-24t-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about long-term fiber supply agreements, United States, 2018, 45k+ acres
- Table US-24u-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about changes in the forest products industry, United States, 2018, 45k+ acres
- Table US-24u-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about changes in the forest products industry, United States, 2018, 45k+ acres
- Table US-24v-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about changes in investors' preferences, United States, 2018, 45k+ acres
- Table US-24v-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about changes in investors' preferences, United States, 2018, 45k+ acres
- Table US-24w-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about liability issues with hunting and recreational leases, United States, 2018, 45k+ acres
- Table US-24w-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about liability issues with hunting and recreational leases, United States, 2018, 45k+ acres
- Table US-24x-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about state and local ordinances on road use and/or weight limits, United States, 2018, 45k+ acres

- Table US-24x-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about state and local ordinances on road use and/or weight limits, United States, 2018, 45k+ acres
- Table US-24y-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about securing seedling planting stock, United States, 2018, 45k+ acres
- Table US-24y-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about securing seedling planting stock, United States, 2018, 45k+ acres
- Table US-24z-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about international tariffs, United States, 2018, 45k+ acres
- Table US-24z-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about international tariffs, United States, 2018, 45k+ acres
- Table US-24aa-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about changes in state or national tax laws or structures, United States, 2018, 45k+ acres
- Table US-24aa-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about changes in state or national tax laws or structures, United States, 2018, 45k+ acres
- Table US-24ab-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about changes in timber markets, United States, 2018, 45k+ acres
- Table US-24ab-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about changes in timber markets, United States, 2018, 45k+ acres
- Table US-24ac-OWN (2018).—Estimated number of large corporate ownerships by companies' level of concern about changes in state or local ordinances in land use or timber management regulations, United States, 2018, 45k+ acres
- Table US-24ac-ACRE (2018).—Estimated large corporate acreage by companies' level of concern about changes in state or local ordinances in land use or timber management regulations, United States, 2018, 45k+ acres
- Table US-25-OWN (2018).—Estimated number of large corporate ownerships by percentage of companies' total revenue from forestland operations, United States, 2018, 45k+ acres
- Table US-25-ACRE (2018).—Estimated large corporate acreage by percentage of companies' total revenue from forestland operations, United States, 2018, 45k+ acres

Appendix 2: Survey Instruments

- NWOS_6_0_ANNOTATED.pdf: An annotated version of the survey instrument used for the 2018 National Woodland Owner Survey (base). Annotations correspond to the values in the National Woodland Owner Survey database (Caputo et al. 2020) and are referenced in various sections of this report. While this version is for Alabama, the version used for other states is nearly identical, with the exceptions of changes to the state names, area of forest land in a state, region-specific examples of nontimber forest products, and the state-specific tax program listed. Copies of all state survey instruments are available at: <https://www.fia.fs.usda.gov/nwos/quest>.
- NWOS_2018_LARGE_CORP_ANNOTATED.pdf: An annotated version of the 2018 large corporate survey instrument.

Literature Cited

Caputo, J.; Butler, B.J.; Sass, E.M. 2020. **The USDA Forest Service, National Woodland Owner Survey: database description and user's guide (version 1.0)**. Madison, WI: U.S. Department of Agriculture, Forest Service. 54 p.

Appendix 3: Mailing Materials

- NWOS 2018 Postcard 1.pdf: Pre-notice postcard (base/small corporate).
- NWOS 2018 Cover Letter 1.pdf: Cover letter accompanying first questionnaire packet (base/small corporate).
- NWOS 2018 Postcard 2.pdf: Thank you/reminder postcard (base/small corporate).
- NWOS 2018 Cover Letter 2.pdf: Cover letter accompanying second questionnaire packet (base/small corporate).
- NWOS 2018 Postcard 1 LARGECP.pdf: Pre-notice postcard (large corporate).
- NWOS 2018 Cover Letter 1 LARGECP.pdf: Cover letter accompanying first questionnaire packet (large corporate).
- NWOS 2018 Cover Letter 1 Email LARGECP.pdf: Email version of the cover letter accompanying the digital version of the first questionnaire (large corporate).
- NWOS 2018 Postcard 2 LARGECP.pdf: Thank you/reminder postcard (large corporate).
- NWOS 2018 Cover Letter 2 LARGECP.pdf: Cover letter accompanying second questionnaire packet (large corporate).

Appendix 4: Nonresponse Assessment Results

- [NWOS_IMPUTATION_COMPARISONS_CATEGORICAL_SMALLCORP.pdf](#): Comparisons of observed versus imputed categorical variables used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (small corporate population).
- [NWOS_IMPUTATION_COMPARISONS_CATEGORICAL_LARGECP.pdf](#): Comparisons of observed versus imputed categorical variables used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (large corporate population).
- [NWOS_IMPUTATION_COMPARISONS_NUMERIC_SMALLCORP.pdf](#): Comparisons of observed versus imputed numeric variables used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (small corporate population).
- [NWOS_IMPUTATION_COMPARISONS_NUMERIC_LARGECP.pdf](#): Comparisons of observed versus imputed numeric variables used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (large corporate population).
- [NWOS_IMPUTATION_CONVERGENCE_PLOTS_SMALLCORP.pdf](#): Convergence plots used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (small corporate population).
- [NWOS_IMPUTATION_CONVERGENCE_PLOTS_LARGECP.pdf](#): Convergence plots used as model diagnostics for item imputation for the 2018 National Woodland Owner Survey (large corporate population).
- [TELEPHONE_NONRESPONSE_SUMMARY.pdf](#): Comparisons between phone and mail respondents for all variables tested for the 2018 National Woodland Owner Survey (base).
- [UNIT_NONRESPONSE_MODEL_RESULTS_SMALLCORP.html](#): Coefficients and goodness-of-fit statistics for state-level, unit nonresponse models for the 2018 National Woodland Owner Survey (small corporate population).
- [UNIT_NONRESPONSE_MODEL_RESULTS_LARGECP.html](#): Coefficients and goodness-of-fit statistics for state-level, unit nonresponse models for the 2018 National Woodland Owner Survey (large corporate population).

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