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1. What is ACE?

Areas of Conservation Emphasis (ACE) is a California Department of Fish and Wildlife project to develop a series of maps that analyze and summarize the best available, statewide conservation-relevant information on California’s biological and recreational resources. Terrestrial data is summarized by 2.5 square mile (1600 acre) hexagons across the state, and aquatic data is summarized by HUC12 watershed. The ACE datasets are available in an [online map viewer](#) or for download.

2. Where do I find more information on how the data were developed and how to interpret the datasets?

ACE Model

The [ACE](#) website contains descriptions and summaries of the ACE data and model development process. Detailed information about each dataset can be found in the ACE Fact Sheets, which are also linked to from the website. There is a recording of an ACE [Conservation Lecture Series presentation](#) available online that provides an overview of the ACE data and viewer.

ACE GIS Data

Each ACE GIS dataset includes metadata. To view metadata in the ACE viewer, click on the metadata icon to the right of the layer name in the viewer Table of Contents (panel on left hand side).



ACE Viewer

There is an [ACE Viewer Guide](#) that provides information on using the ACE Viewer. The ACE Viewer is based on the BIOS platform, and there are [online tutorials and training videos](#) available describing how to use the BIOS viewer platform. We will be adding more ACE tutorials over time, so check back.

3. What are the limitations to using ACE?

The ACE datasets are publicly available in the ACE viewer and for download. Users should appropriately cite ACE, including the specific ACE layer name and version date, when using the data. If you would like to re-post ACE online within your own viewer, please contact the [Conservation Analysis Unit Coordinator](#) for permission. Note that ACE is updated regularly and changes over time. If using the product in an analysis, please check to make sure you are using the most recent version.

The ACE data is subject to certain assumptions and limitations that must be considered in any use or application of the data. All ACE data layers are limited by the accuracy and scale of the input data. ACE is a compilation of the best available scientific information; however, many of these datasets are not comprehensive across the landscape, may change over time, and should be revised and improved as new data become available.

The user accepts sole responsibility for the correct interpretation and use of these data, and agrees not to misrepresent these data. CDFW makes no warranty of any kind regarding these data, express or implied. By downloading the ACE datasets, the user understands that the data are in draft condition and subject to change at any time as new information becomes available. The user will not seek to hold the State or the Department liable under any circumstances for any damages with respect to any claim by the user or any third party on account of or arising from the use of data or maps. CDFW reserves the right to modify or replace these datasets without notification.

The ACE maps display biological and recreational values based on available data and constrained by the limitations of the data. The values may be influenced by level of survey effort in a given area. The ACE data represent broad-scale patterns across the landscape, and the value of any single hexagon should be interpreted with caution. ACE is a decision-support tool to be used in conjunction with species-specific information and local-scale conservation prioritization analyses.

The ACE maps do not replace the need for site-specific evaluation of biological resources and should not be used as the sole measure of conservation priority during planning. No statement or dataset shall by itself be considered an official response from a state agency



regarding impacts to wildlife resulting from a management action subject to the California Environmental Quality Act (CEQA).

4. How often is ACE updated?

ACE is updated approximately annually.

5. How do I submit my data to ACE?

Rare species occurrence data submitted to [CNDDDB](#) with the Online Field Survey form will be automatically incorporated into the next ACE update.

Other types of data can be submitted to [BIOS](#). Please note that you would like your information considered for inclusion in ACE when submitting datasets to BIOS.

6. Who can I contact to ask questions or provide feedback?

We would like to hear from you. How are you using ACE? What could be added to make it more useful? Send comments or questions to the [Conservation Analysis Unit Coordinator](#).

7. Can I use ACE to determine what species or habitats are on a specific property?

ACE is a coarse-scale, non-regulatory tool. It does not replace the need for field surveys, and cannot be used for parcel-level analysis.

8. What do the ACE Ranks from 1-5 mean?

The ACE ranks from 1 (low value) – 5 (high value) show the relative score for an area (hexagon or watershed). For most datasets (aquatic datasets, significant habitats, connectivity, climate resilience), the ranks show the relative value compared with all other areas across the state. For terrestrial biodiversity datasets, the ranks show the relative value compared with all other areas within the ecoregion.

Biodiversity and Significant Habitat datasets were ranked by quantile, meaning that an equal number of hexagons or watersheds were assigned to each rank. For example, a hexagon with Biodiversity Rank 5 has high biodiversity value. When compared with all other hexagons in the ecoregion, it is among the top 20% of hexagons with the highest biodiversity scores; ≥80% of the hexagons in the ecoregion have lower biodiversity scores. Hexagons with Biodiversity Rank 4 have medium-high biodiversity. When compared with all other hexagons in the ecoregion, ≥20% of the hexagons have higher biodiversity, while ≥60% have lower biodiversity. Because hexagons are equal area, this means that ≥20% of



the area of the ecoregion has higher biodiversity, and $\geq 60\%$ of the area has lower biodiversity. Watersheds are variable in area, so assumptions about area cannot be made based on the watershed ranks.

Connectivity and Climate Resilience datasets were not ranked by quantile. See the [Connectivity](#) and [Climate Resilience](#) Fact Sheets for more information on the ranking criteria used for these datasets.

Note that the ACE ranks show broad-scale patterns, and the value of any single hexagon must be interpreted with caution.

9. What is the difference between the statewide and ecoregional ranks?

Both statewide and ecoregional ranks were developed for terrestrial biodiversity. Only statewide ranks were developed for aquatic biodiversity, significant habitats, connectivity, climate resilience.

The statewide ranks assess values relative to the rest of the state. These maps show a broad overview of the distribution of biodiversity or other values within the state of California. However, the statewide data do not account for the large ecological differences across different regions of the state. Because there are large differences in the suites of terrestrial species present in different ecoregions of the state, the statewide ranks for terrestrial biodiversity are of limited use for regional or local planning. For example, the overall biodiversity on the north coast of California is higher than most other areas of the state. Therefore, the statewide ACE biodiversity ranks on the north coast tend to be highly skewed toward the highest rank (5). If all hexagons in an ecoregion are Rank 5, it is not possible to determine higher and lower areas of biodiversity *within* that ecoregion.

Because of this, ecoregional scores were developed for terrestrial biodiversity scores. Ecoregions are defined ecologically, and represent units of the state with similar topography, geology, climate, and habitats. The ecoregional scores were assessed relative to other values within that ecoregion, allowing the identification of the areas of greatest richness and rarity in each region of the state.

10. Can I generate a list of the species known from each hexagon?

Users can generate a list of species used in the counts for each hexagon by viewing the “Terrestrial Species List” (under Terrestrial Biodiversity heading) or the “Aquatic Species List” (under Aquatic Biodiversity heading) in the viewer. First, turn on the layer by clicking the radio button next to the layer name. The layer name should then be highlighted in pink.



Next, ensure that “Identify Features” is selected in the toolbars at the top of the page. Click on a hexagon on the map. The list of species for that hexagon will appear in the table at the bottom of the page. If the table is not visible, click on the green table button to expand the table.

The Species Names table indicates whether the species is modeled to occur in the hexagon, or if a verified field occurrence is known from the hexagon. For the ACE Rarity and Irreplaceability datasets, only verified field occurrences were used.

Note that all species occurrence locations are buffered by 1 mile in ACE, and some species names are suppressed from the table due to data sensitivity or contributor requirements. ACE is a non-regulatory product. The species list is not appropriate for use in regulatory processes and should not be used in place of a CNDDDB or Rarefind query.

11. The ACE score of a hexagon/watershed does not match my expectations based on my knowledge of that area. Why?

There are a number of factors that can influence the ACE score for an area:

1. *Availability of information.* ACE is based on the best-available information. Biodiversity values may be influenced by the level of survey data in an area. Lands with limited survey data may have depressed biodiversity or sensitive habitat scores. If you have data you would like to see incorporated into ACE, please submit it to CNDDDB or BIOS.
2. *Relative Value.* All ACE scores are relative values, so the scores in the rest of the ecoregion/state influence the score of each hexagon/watershed. An area may have a lower rank than expected due to higher values elsewhere in the ecoregion or state.

12. Why does a hexagon with a known occurrence of a rare species have a lower biodiversity score than a neighboring hexagon where this species does not occur?

The biodiversity score incorporates overall native richness (common and rare species), rare species richness, and irreplaceability (areas of high importance to narrowly endemic species) for all taxonomic groups. There may be other attributes in the neighboring hexagon, such as the presence of a narrowly endemic species, that adds more to the biodiversity score than the single rare species occurrence.



13. Why can I find hexagons or watersheds with high biodiversity scores within highly urbanized areas that have little natural habitat?

The biodiversity scores are based solely on species distribution and occurrence data, and were not adjusted based on the level of urbanization or disturbance present. While the Native Species Richness scores do incorporate urbanization in that a species would not be modeled to occur there if urban habitat is unsuitable for the species, there are several factors that may still lead to high biodiversity scores in urban areas:

1. *Mosaic of urban and natural lands.* Many hexagons and watersheds are partially covered with urban habitat, so they contain a mix of urban and natural habitat. Many urban areas contain pockets of natural habitat that may support native, rare, or endemic species. A hexagon or watershed that is largely urbanized likely still contains some pockets of natural habitat, and these areas may score highly for biodiversity. In this case, users can interpret the biodiversity score as applying to the remaining natural habitat found in the hexagon or watershed.
2. *Survey intensity.* Lands near urban areas tend to be well-surveyed, which can result in large numbers of documented rare species occurrences near urban areas. Furthermore, isolated populations of rare species with restricted distributions in urbanized areas can result in high irreplaceability scores in those locations. All species occurrences were buffered by one mile in the ACE model, so natural habitat areas within a mile of urban areas will contribute to the biodiversity score within the urban area.

14. How can I differentiate between areas that truly have low biodiversity and areas for which we simply don't have enough information? Likewise, how can I differentiate between areas with truly high biodiversity and areas for which we simply have abundant data?

There have not been systematic biodiversity surveys across California. The level of survey effort, and therefore density of information about species present, varies across the landscape. Uneven levels of survey data are a problem for any analysis that quantifies biodiversity in the landscape. Public lands and areas near urban centers tend to be well-surveyed because they are accessible or have high development activity. These areas often appear to have very high species richness, because a high level of survey effort in these locations has detected many species occurrences. Similarly, large tracts of private lands that have never been surveyed may appear to have very low species richness, while in reality we simply don't have any information about what species are present.



Using species distribution models to quantify biodiversity can remove some level of survey effort bias, by replacing lack of information in unsurveyed areas with predictions about whether the species might be present. The 2018 ACE 3 update began incorporating species distribution models into the ACE Native Species Richness model. Future work on ACE will continue developing and testing the use of distribution models to correct for survey effort bias.

15. Does ACE contain State Wildlife Action Plan (SWAP) information?

Maps of SWAP Terrestrial Targets and Aquatic Targets are available separately as overlays in the ACE viewer. The SWAP priorities were not incorporated into the ACE model.

16. What is the difference between the “Login” and “Use Public ACE” options when opening the ACE Viewer?

When opening the ACE viewer, two options are available: “Login” or “Use Public ACE”. All ACE datasets are public, and there is no difference in the ACE datasets available whether the login option or public ACE is used.

The “Login” option is for [CNDDDB](#) subscribers, and allows users to access CNDDDB datasets within the ACE viewer.

17. Is the ACE data available to download?

All ACE GIS datasets are available for download through a link on the main [ACE webpage](#). The GIS datasets can also be downloaded individually either through the [ACE Viewer](#) or through [BIOS](#). See the [ACE Viewer Guide](#) for instructions for download through the viewer.

18. Why am I having trouble downloading the data?

If the download seems to time out and will not complete, it is likely due to connection speed. Try using a ftp client software (freely available online). Note that you must first register to download the data (the download link will take you to the registration page).

19. Where can I find definitions for the fields in the ACE tables?

Definitions for the ACE tables are found in the metadata for each data layer as well as in the data layer Fact Sheet.

