Areas of Conservation Emphasis
ACE-II
California Department of Fish and Game

Frequently Asked Questions

1. What is ACE-II?

The purpose of ACE-II was to compile and analyze the best available, statewide spatial information on California's biological and recreational resources and to develop a set of tools to summarize and display this information for use in conservation planning.

The ACE-II project team compiled data on biological richness, including species diversity, rarity, and sensitive habitats statewide. Information on recreational needs and opportunities, including fishing, hunting and wildlife-viewing throughout the state, was also collected. The data were summarized and analyzed at a consistent scale of 2.5 square mile hexagons. The biological richness data layers were produced by taxonomic group (amphibians, birds, fish, mammals, plants, reptiles) and sensitive habitat type (riparian, wetland, rare natural community, high value salmonid habitat). A weighted-additive model framework was then used to combine these data across taxonomic groups and sensitive habitat types into overall native species richness, rare species richness, "irreplaceability" and sensitive habitat richness layers. These four layers were further summarized into a single "biological index" layer that depicts relative biological richness within each ecoregion of the state (see the ACE-II project report for a full description). The ACE-II data layers summarize the best available biological and recreational data in California using a standardized scale and methodology, and can be used in a flexible manner to identify areas of potential biological or conservation interest throughout the state. The ACE-II data are dynamic and will be updated periodically as new data warrant.

The ACE-II maps and data can be viewed using the Department of Fish and Game's ACE-II Interactive Viewer. The viewer includes additional spatial data such as stressors (i.e., urbanization, sea level rise) and landscape considerations (i.e., land ownership, landscape features) that can be overlaid on the ACE-II data layers. The Interactive Viewer allows the user to display and contrast the arrangement and relative value of California's unique biological resources, providing a first step toward setting conservation priorities statewide. ACE-II is one building block in a long-term collaboration among western states to develop conservation Decision Support Systems across the west.

2. How should ACE-II be used?

ACE-II provides an easily-accessible and standardized way to view the best available statewide data on California's biological richness and biodiversity. These datasets have many uses ranging from ecological research and modeling to local land-use planning and conservation decision making.

The ACE-II datasets include several broad-scale measures that quantify biological richness and biodiversity statewide at a scale of 2.5 square mile hexagons, providing an overview of the distribution of biological diversity in California. The datasets can be used to view relative biological richness statewide or within a specific ecoregion. In addition, the user can view the individual components of diversity (native species, rare species, and sensitive habitats) within a specific area of interest.

The ACE-II Interactive Viewer is an on-line-interface that allows the user to view the juxtaposition of biological richness and biodiversity with stressors (i.e., urbanization, projected sea level rise) and other landscape factors (i.e., land ownership, geopolitical boundaries). Together, these data can be used in a flexible manner to identify areas of biological or conservation interest based on project-specific goals.

The ACE-II Interactive Viewer also allows the user to create a customized biological index output that is tailored to specific questions or project goals by manually adjusting the weights of the biological richness layers in a weighted additive model. Further information on the weighted additive model can be found in the ACE-II User Guide and Project Report.

Examples of specific uses of ACE-II include:

- Using the ACE-II viewer to obtain an overview of the distribution of biodiversity and relative richness statewide or within a specific ecoregion.
- Identifying hotspots of native species diversity or rarity throughout the state.
- Identifying areas (hexagons) that have multiple biological richness attributes (i.e., high native diversity, presence of rare species and sensitive habitats, etc.).
- Identifying areas of the state with limited survey data that may represent data gaps in our understanding of biodiversity in California. This information may help in prioritizing future surveys to fill these data gaps.
- Identifying the number of rare amphibian, bird, fish, mammal, plant, or reptile species with documented occurrences within a hexagon.
- Obtaining a list of native species, rare species, and sensitive habitat types found within a given hexagon.
- Comparing richness values between hexagons as a measure of relative biological richness across an area of interest.
- Using the weighted-additive model interface to create customized biological index maps that are tailored to a specific question or project goal.
- Integrating ACE-II base data layers into conservation prioritization projects and other ecological analyses.

Some limitations of use: ACE-II is a coarse-scale analysis that shows broad patterns of biological diversity across the state. It does not replace the need for site-specific surveys. At the local planning level, the ACE-II data are meant to be used in conjunction with local information and project-specific surveys and analysis.

Appropriate use of ACE-II will consider data assumptions and limitations outlined in the ACE-II project report. ACE-II should not be used as a stand-alone map of conservation priorities.

3. How often is ACE-II updated?

ACE-II is updated as new data becomes available. The data were last updated in 2015, with additional updates expected in 2017.

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

The ACE-II Project Report contains a full description of the ACE-II data and model development process, as well as the uses and limitations of the datasets.

5. Are the data layers available for download?

For most users, viewing and manipulating the data within the ACE-II viewer is the most appropriate way to use the data for its intended purposes. For advanced users with a thorough understanding of the data limitations, the ACE-II GIS layers are available for download. Users must consider the data limitations as well as common GIS pitfalls such as scale, currency, and error-propagation.

6. Where can I find metadata?

- In the ACE-II viewer, metadata can be viewed by clicking on the "*i*" button to the right of the layer name in the layers list on the left hand side of the page.
- A full description of the datasets and data development process is available in the ACE-II Project Report.

7. What is the difference between the statewide and ecoregional maps? Which should I use?

In the statewide analysis, all biological richness values were assessed relative to values within the entire state. These maps show a broad overview of the distribution of biodiversity within the state of California and can be used to compare richness between any two areas of the state. However, the statewide data do not account for the large ecological differences across different regions of the state, and have limited use for regional or local planning.

In the ecoregional analysis, all biological richness values were assessed relative to other values within that ecoregion. The biological index was built on ecoregionally normalized values. This analysis allows the identification of the areas of greatest richness and rarity within an ecoregion, accounting for ecological differences across different regions of the state. The ecoregional maps and analysis results would be more appropriate for use during regional planning. However, because the analysis was done separately by ecoregion, ecoregional analysis results are not directly comparable between ecoregions.

8. Why are some hexagons outlined in black?

Hexagons outlined in black are "Limited Data Hexagons". This layer is by default always turned on. Limited data hexagons are hexagons for which there were no rare species data available for any taxonomic group. These hexagons often represent areas that are poorly surveyed, although they may also represent areas where rare species are not present. There is a high likelihood that biological richness values in poorly surveyed hexagons are artificially low and are not representative of the true biological resources present. It is important to note that some hexagons not included in the "limited data hexagons" layer may also be poorly surveyed.

Note also that not all hexagons with rare species counts of zero are included in the limited data hexagon layer. Hexagons with rare species counts of zero that do not appear in the limited data hexagon layer once had documented rare species occurrences that are now considered extirpated. Because the absence of rare species in these locations is due to extirpation rather than lack of data, these hexagons are not considered limited data areas.

9. Can I generate a list of the species or sensitive habitat types known from each hexagon?

The ACE-II data available in the viewer include counts of native species, rare species, and sensitive habitat types associated with each hexagon. A list of the species and habitat types used to generate these counts for a given hexagon is not available within the viewer.

10. Why is the viewer only displaying one ecoregion? I want to see more than one.

When viewing the Ecoregional Analysis Data, only one ecoregion will display at a time. Because each ecoregion was analyzed separately, ecoregional analysis results are not directly comparable between ecoregions. To prevent inadvertent comparisons between areas that are not directly comparable, the display limits the view to sets of hexagons with values that are directly comparable. Statewide layers are comparable across the state and can be viewed on a statewide basis.

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

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, whereas in reality there just aren't any available data for what species are present in those areas.

A data layer showing those areas for which we have no survey information is available to overlay on ACE-II (see question 7 above). This gives an indication of areas where it is likely that low biodiversity scores may be due to lack of data. However, level of survey effort may affect biodiversity scores in other areas of the state as well. Using the ACE-II ecoregional models may remove some level of bias. Ecoregional models compare biodiversity scores only within a single ecoregion, and level of survey effort may be more consistent within a single ecoregion than across the entire state.

Use of range maps to quantify biodiversity can remove some level of survey effort bias to biodiversity measures. Future work on ACE-II will include development of range models to address the bias caused by use of occurrence data.

12. The biological index score of a hexagon does not match my expectations based on my knowledge of that area. Why?

The biological index surface is meant to show broad-scale patterns and needs to be viewed with consideration of its uses and limitations. The value of any single hexagon must be interpreted with caution. Hexagon values may be influenced by the level of survey data in an area. Lands with little or no survey data may show low biological index scores even if they have high biological richness. Submitting survey data to CNDDB or BIOS can help ensure that this information will be incorporated into future ACE analyses.

13. Why can I find hexagons with high biological index scores within urbanized areas with little or no natural habitat?

Urbanization and other stressors were not incorporated into the biological index model; thus, the biological index score has not been adjusted based on level of urbanization or disturbance in an area. The ACE-II biological index model was based on analyses of species range data, rare species occurrence data, and habitat data. Lands near urban areas tend to be well-surveyed. This can result in larger numbers of documented rare species and sensitive habitat occurrences near urban areas. Furthermore isolated populations of rare species with ever restricted distributions in urbanized areas can drive up the rarity-weighted richness scores in those locations. These phenomena can in turn lead to high biological index scores in urban areas. An urbanization layer is available as an overlay within the ACE-II viewer, so the ACE-II biological layers and urbanization can be viewed together.

The ACE-II technical team considered reducing the biological index score in urban areas, but chose not to do so because it would have resulted in a loss of information due to issues of scale. Current statewide urbanization layers for California are coarse-scale. There are some important habitat fragments within currently mapped urbanized areas that would not be given an appropriate score if the biological index was determined by whether or not a hexagon is within an urban boundary. Furthermore, many hexagons are partially covered by urbanized areas making it difficult to classify them as urbanized or not.

Other conservation prioritization efforts have manually refined current urbanization layers within their project area using aerial photographs, but this was not possible to do statewide within the scope of the ACE-II project. The Essential Habitat Connectivity Project identified small Natural Landscape Blocks (<2000 acres), some of which are within urban or semi-urban areas. The small Natural Landscape Blocks are available as an overlay in the ACE-II viewer, and can be used to view some intact habitat fragments that fall within urban boundaries. The ACE-II biological index and other biological richness measures should be viewed with the consideration that these scores were not adjusted for level of urbanization.

14. Why does a hexagon with a known occurrence of a rare species have a lower biological index value than a nearby hexagon where this species does not occur?

The biological index surface is a compilation of values for all taxonomic groups combined. Therefore, an area that is important for a single species or taxonomic group may not receive a high overall biological index score. The individual data layers by taxonomic group would be more appropriate to use for identifying key areas for specific taxonomic groups, such as botanical hotspots. *The ACE-II biological index model does not address species-specific conservation needs.*

15. The Essential Habitat Connectivity Data in the ACE-II Viewer is not described in the ACE-II project report. Where can I find more information about these datasets?

The California Essential Habitat Connectivity Project has its own website and project report, where further information can be found.

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

We would like to hear from you. How are you using ACE-II? What could be added to make it more useful? Send comments or questions by clicking on the envelope symbol on the bottom left of the viewer page, or send an email to the Conservation Analysis Unit Coordinator.