

Map Reading and Interpretation Guide for *California: A Changing State*

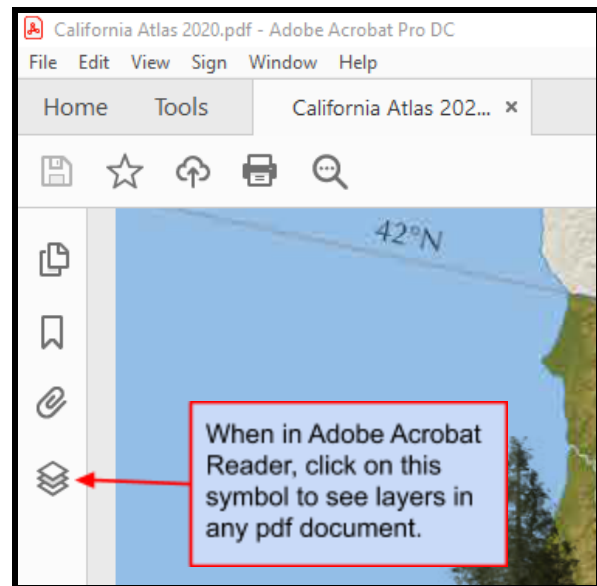
GENERAL INFORMATION

Viewing the atlas electronically The entire contents of the atlas can be viewed in a web browser by visiting the [CGA website](#). Individual pages or the entire atlas can also be downloaded so you can maintain a copy on your own computer or in a content management system that students can access easily. One advantage of downloading the pdf files and viewing them in [Adobe Acrobat Reader](#) is that you can turn on and off an additional layer on each map that adds the county boundaries and names. This can help students to have a common frame of reference as they compare different maps.

Standards alignment for 4th grade The content and organization of this atlas is carefully designed to align with fourth grade social studies standards in the state. This allows teachers to integrate use of the atlas into existing lessons and easily build new plans around it. We hope the atlas will also be a useful resource for students at many other grade levels.

Map scale and generalization A map takes a very large place like California and shrinks it down to make it fit on a single sheet of paper. The scale of most of the maps in this atlas is approximately 1 to 3,600,000. This means the maps are over three million times smaller than the state and there is limited room to represent all of the features of the state. Remember to think about how the scale of the map affects what is and is not shown on each map. Many details must be left out, but the purpose of reducing and generalizing (or simplifying) information is to make the maps more understandable and helpful to you, the reader.

Data and symbols Many types of information, or data, is shown on the maps included in the atlas. In reality, any map is a data visualization built around locational data. Color shading, line symbols, and point symbols such as dots and stars may all be used to represent that data. Readers should be careful to identify what data is being shown on a map, what the source of that information is, and how symbols are being used to represent the data. Users of the atlas should be sure to read and understand the introductory section that provides additional guidance on how to read and understand maps.



GUIDANCE FOR ATLAS PAGES

9 Earthquakes and Fault Zones This map uses point symbols to mark the epicenters of earthquakes that have occurred since 1900. The circles are proportional symbols, which means the larger the symbol the higher the magnitude of the earthquake. A special symbol is used for earthquakes that caused significant damage or loss of life. The red line on the map corresponds to the San Andreas Fault, which is a boundary between two different tectonic plates. Santa Barbara, Los Angeles, and San Diego sit on the Pacific Plate, which is grinding northward along the edge of the North American plate. The plates get locked together and then break free with sudden force, causing our earthquakes.

10 Physical Geography This map helps you get a sense of the shape of the land surface. The colors of the map correspond to elevations above sea level (area symbols). The green areas are the lowest lying, with higher elevations shown in shades of tan and brown and the highest mountains shown in white. The colors may sometimes correlate to natural colors (such as using white for the highest mountains where snow falls in the winter), but note how Death Valley is colored green because it is very low in elevation. That area is a very dry desert that would appear brown if seen from above.

11 Land Cover This map shows what is immediately on top of the land surface. Different colors are used to indicate different types of land cover, including forests, grasslands, farms (agriculture), and cities (developed/urban). Comparing this with the prior map reveals the relationship between land cover and elevation.

12 North American Watersheds The main map shows the major watersheds on the continent of North America. All surface water in California flows into the Pacific Ocean except for that part of the state which is east of the Sierra Nevada and Coast Ranges. Each of the large continental watersheds can be subdivided into smaller units based on drainage features, as shown in the inset map.

13 Physiographic Regions This map shows the approximate boundaries of California's different physiographic regions. Each of these regions has different characteristics in terms of the shape of the land and prevailing weather conditions. This creates a huge variety of habitats for plants and animals.

14 Minimum January Temperatures January is often the coldest month of the year, and this map shows how cold it gets in different parts of the state. Colder winter temperatures are found at higher elevations. Distance from the relatively warm (compared to winter air) waters of the Pacific also makes a difference.



15 Maximum July Temperatures July is often the warmest month of the year, and this map shows how warm it gets in different parts of the state. Warmer summer temperatures are found in the lower elevation valleys. Distance from the relatively cool (compared to summer air) waters of the Pacific also makes a difference.

16 Climographs and Elevation Profiles 1) The climographs show how both precipitation (rain and snow) and temperature vary across the year in one specific place. Compare the temperatures from San Francisco and Eureka to those in Death Valley to see the influence of the ocean on temperature. You can also see from the climographs that precipitation is more plentiful in the winter everywhere in the state. 2) A small map gives an indication of where extreme weather can occur in California. 3) Two elevation profiles help illustrate differences in elevation across the state by changing to the horizontal perspective. Note, however, that the profiles use vertical exaggeration (a different vertical scale than the horizontal scale) to make the variations in the ground's surface easier to see.

17 Annual Precipitation Like temperature, precipitation is heavily affected by the shape and elevation of the land. The differences between precipitation in the mountains and valleys is significant. Most of the state receives less than 20 inches of precipitation per year, so the rain and snow that falls in the mountains is important for everyone.

18 Native Americans of 1770 This map shows the approximate territories of California's Native Americans in 1770 because this represents the time just before Europeans arrived and established permanent settlements. It is very likely that territories were not as clearly defined as they are in this map, and there was no legal process used to establish and defend territorial boundaries, so the map shows approximations based on research.

21 Native American Lands Today Native Californians were displaced and dispossessed by Europeans on a grand scale, but this map shows lands that are still held in trust for government recognized Native American tribes. These lands are important to the survival of indigenous cultures in California, but they represent only a tiny fraction of the lands once occupied by Native Americans.

20-21 Spanish Missions & California Missions These two maps together show the results of cooperation between the Spanish government and the Catholic church to set up a system of missions in North America. These missions were spread across present day Mexico and Arizona as well as California. While many missions were built close to the coast, they were connected by a path/road that enabled new people to make the trip from central Mexico north to these frontier outposts. The purpose of the missions was both to solidify Spain's claims to New World territories and to convert Native Americans to the religion of Christianity.



22 Exploration & Early Settlement On the western edge of the continent, California resisted thorough exploration for quite some time. Early Spanish explorers arrived by boat and learned little about the region. Portola, Anza, Fremont, and others led expeditions over land to identify important routes for emigrants.

23 Spanish and Mexican Land Grants After gaining its independence from Spain, Mexico continued to grant large landholdings to individuals in order to encourage productive use of land that was on the frontier for that new country. This map shows original Spanish pueblo lands as well as the lands granted by the government of Mexico before California came under control of the United States.

24 Gold Rush Routes Once gold was discovered, the race was on for many hopeful prospectors to get to California and find their fortune. Miners came from all over the world and not just the eastern U.S. This map shows the different paths miners could take: whether on land, on sea, or a combination of the two.

25 The Gold Rush This map shows the parts of the state in which gold can be found (areas shaded in tones of gold and brown) as well as the location of some of the largest and most historically significant mining operations. The Mother Lode and the gold belts to the east and west of it are areas with the highest concentrations of gold and were the focus of the California Gold Rush of 1848-49. Different symbols are used to indicate where hydraulic mining and lode mining techniques were used. The inset map compares the value of the gold produced in each county of the state between 1848 and 1965. The large majority of counties did produce some gold.

26 Territorial Evolution of California The name and borders of California have changed since the time when California was claimed as colonial territory by Spain. Each map shows how the borders were drawn at specific times in history and indicates the name used for the territory..

27 California Counties This map shows the names, boundaries, and population (in 2018) of California's 58 counties. As with the state, the county boundaries have changed over time, and there weren't always 58 separate counties. Some have split. You can learn more about the creation of each county and see historic maps of the county boundaries [here](#).

28 Railroad Development Railroads have been very important to the growth of California's population and economy since the transcontinental railroad connected the east and west coasts of the United States in 1868. This unique map shows how the railroad network first grew and then shrank in size. Any lines that are grey, green, or orange but do not have a black line running down the center were no longer used by 2013.



29 Federal Lands About 40% of the land in California is under the direct control of the federal government. The government manages natural and historical resources and makes land available for recreation, conservation, and commercial activities. The government also uses land for military purposes, as reflected in the white portion of the pie chart on this page (but not colored on the map). The map shows seven different types of land managed by the federal government, and each type of designation serves a different purpose.

30 Native American Trade Routes While Native American tribes had their own territories, many also conducted trade with people outside of their tribes, and this sometimes involved traveling long distances on foot to conduct that trade. The map shows the location of known trade routes used by Native Americans, though there are certainly more routes than are shown. Colors on the map also indicate the location of specific types of ecosystems that may have been important.

31 Major Highways Modes of transportation have changed drastically over California's history, and most people now move around in cars and buses on a daily basis. The system of highways that have been built in the state help people cover longer distances more quickly. You can see that federal interstate highways are the largest roads, and they often connect large cities. In some areas of the state where fewer people live, there are large spaces between highways. Compare this map with the map on page 30.

32 Hydrology Before Human Settlement Humans have made major changes to the landscape of California, especially in the time since Europeans arrived and displaced Native populations. This map looks back in time to help you understand what California looked like before those changes. Rivers and streams have been controlled by dams and diverted for human uses, and as a result some lakes and large areas of marshland have disappeared. Near the coastline, people have also filled in marshes to create more stable ground for building.

33 Water Storage & Transport The large population of the state of California demands a lot of water for use in homes and workplaces. California also has many farms and factories that depend on water to be productive. This is why the state and its residents have invested in building structures to allow them to store and move water. The map indicates the location of dams that hold back and store water (red dots) as well as aqueducts (dashed orange lines) that allow large amounts of water to be moved to places where it is needed. The availability of surface water in streams and rivers and the distribution of the state's population are two factors that influence where dams are built.

34 Water Resources This map shows the current configuration of the state's larger surface water features. Many of the rivers shown are part of one large network that includes many streams that flow out of the Sierra Nevada Mountains that connect into larger rivers that flow along the lowlands of the Central Valley and then drain into the San Francisco Bay through an area known as the



California Delta. You can get a sense of the unique delta environment [here](#). Many of the small lakes visible on the map are actually reservoirs created by dams, though in some cases the streams feeding them are too small to even be shown on the map. The southern portion of the state has fewer water features, and some that are dry for part of the year.

35 Urban Water Transfer & Irrigated Lands Cities create very high demand for water in certain parts of the state, which are the urban areas colored orange on the map. The colored lines on the map are aqueducts, which are a combination of open ditches, covered ditches, and pipes. The aqueducts move huge amounts of water from the mountains and the northern part of the state to the coastline and southern portions of the state where water is needed. The two maps on the bottom page show how much farmland was receiving water from an irrigation system in 1912 and 2016.

36 Urban & Agricultural Lands In this map, agricultural land and urban land are shown together. This helps show the geographic relationship, and competition for space, between these two land uses. This map shows more detail about where the demand for water occurs, so compare to the previous three pages to better understand where all of the water that is collected and transported around the state is then used by people.

37 Agricultural Products Agriculture has always been an important part of California's economy, and a lot of different types of products can be produced in the state because of our diverse climate and landscapes. This page has a series of choropleth maps, where areas (in this case counties) are filled in with shades of one color. The lighter colors correspond to lower values, and the darker colors correspond to higher values of a particular measurement. In this case, the measurement is the value of the agricultural product. Each map shows only the top five counties for each product, but that does not mean that other counties could not be producing smaller amounts of this item.

38 Agricultural Exports California grows much more food than we need for ourselves. Many farmers grow products to sell to people in other countries. This is a flow map that shows the relative value of exports to the fifteen countries that receive the largest amount of agricultural exports from California. The wider the line on a flow map, the greater the value. A pie chart for each of the fifteen countries provides information about what types of agricultural products go to that country.

39 California & the World: Leading Export Markets 2017 California exports minerals and manufactured goods as well as agricultural products. Together, these things are called commodities. On this flow map, all types of exports are included, and the fifteen countries receiving the largest amount of commodities from California are slightly different than those on the previous page. The graph near the center of the map shows the value of the state's top ten categories of commodities.



40 Immigration Other than California Native Americans, all of California's population was established through the process of immigration. The top map is a choropleth map showing the number of immigrants into each county during a particular period of time. The bottom map is a flow map showing the country of birth for immigrants arriving in California in 2017. The arrows reflect the number of immigrants coming from each world region. The twelve countries of origin for more than 1000,000 immigrants in 2017 are also shaded in slightly darker colors than the other countries in their region.

41 Population Diversity Population diversity is a term describing the variety of different races and ethnicities within a population, and California's population is certainly diverse. This series of choropleth maps shows the percentage (or proportion) of people in each county who identify themselves in the race and ethnicity categories used by the United States Census.

42-43 Population Density & Population Change Since 1860 Population density is a term describing the distribution of the population in an area. When many people live close together, as in a city, population density is high. When people are spread out over distances, as in a farming region, population density is low. This choropleth map allows you to see where high and low density areas of California are located. By using small geographic units (Block Groups created by the US Census), the map shows the variations in density within each county. Compare this map to the map on page 36.

44-45 California Cities & Towns California has a few large cities and many more medium and small size cities. Each circle on the map represents a separate city or town, with the size of the circle proportional to the size of its population. You will notice that each of the largest cities is surrounded by a cluster of smaller cities and towns. These smaller cities are sometimes called suburbs.

46-47 Animal Migrations & Sources Just as trade and the migration of people connect California to other parts of the world, animal migrations also remind us that California is a part of a much larger planet. This map highlights just a few of the species that spend part of their year in California and part of their year in another part of the world. On the bottom half of Page 47 is a list of all of the data sources used to create the maps in this atlas.

48 Public Colleges & Universities This map shows the locations of college and university campuses that are part of the three public systems in the state. These campuses provide opportunities for Californians to continue their education after graduating from high schools. You can use these links to access information about the [University of California](#) system, The [California State University](#) system, or [California Community Colleges](#).

