

Middle School Activity: Habitat Fragmentation

You can take action for California wildlife and make a difference in the threats they face.

(NGSS Disciplinary Core Ideas MS.LS2: Ecosystems: Interactions, Energy, and Dynamics)

Pre-Activity Questions

- How does animal habitat become fragmented?
- What are the main reasons that animals lose habitat?
- Where are habitat fragmentation and habitat loss happening? Is there anything you can do to help?

Activity

- Habitat loss is a huge issue and something we hear about a lot, but what makes it so devastating is not just the number of square feet, but WHERE we are losing those square feet of wildlands. This is true around the world, but let's look specifically at California.
 - **HABITAT FRAGMENTATION** is not just the loss of habitat, but the isolation of habitats and populations due to human development.
 - As of 2011, western natural areas were disappearing at a rate of 1 football field every 2.5 minutes. The average distance to human development in western natural areas was ONLY 3.5 miles.
 - The Bay Area is one of the hotspots for this catastrophic loss of habitat and the primary cause is urban sprawl and transportation. See the change over time on this [map](#).
- So what? People need houses and we need transportation. We do, but we also need a healthy habitat to survive. Humans rely on a balanced local and global ecosystem just as much as animals do.
 - We need predictable weather patterns and rain to grow our crops and fill our reservoirs. We need insects to pollinate our fruits and birds to keep pests under control. We need natural places to exercise our bodies and support our mental well-being. We need trees to convert carbon dioxide into oxygen and a diverse array of plants for medical advancements. The list goes on and on. What do healthy ecosystems mean to you?
- The Conservation Society of California, Oakland Zoo is working to help animals impacted by habitat fragmentation and other threats. You can help too!

Take a Virtual Tour

1. Take a virtual tour of the Zoo and explore [our animals](#) on our website.
2. Read about our [conservation partners](#) and see some of the ways we're taking action for wildlife [at the Zoo](#) and in the wild.
3. Pay particularly close attention to our animals at California Trail and our more local conservation partners. An overview of each animal and some of the threats they face are listed below.
4. Check our social media for videos like these.
 - a. VIDEO - [California Condor Treated for Lead Poisoning](#)
 - b. VIDEO - [Jaguars: Panama or Bust](#)
 - c. VIDEO - [Mountain Lions: Fury Friends](#)
 - d. VIDEO - [Oakland Zoo is Wild About Wolves](#)
 - e. VIDEO - [New Bison Males Join Our Herd](#)
5. **Pick a California native animal** (currently or historically) you would like to help. It can be one we have at the Zoo or not. Anything from a bumble bee to a bison.

Do a Little Research

6. Research the threats that your chosen animal faces in the wild. Make sure you use reliable sources like BBC Earth, National Geographic, nps.org. Start with the information for California trail animals provided below.
7. Create an animal cheat sheet. Make sure you include:
 - a. Animal Name (common and scientific)
 - b. Average Lifespan in the wild
 - c. Diet
 - d. Activity Time Frame (e.g. diurnal)
 - e. Social Structure
 - f. Native Range in California (historic and current)
 - g. Habitat
 - h. Ecological Role
 - i. IUCN Status
 - j. Threats (current and/or potential)
8. Once you are familiar with your animal, brainstorm what YOU can do to help this animal in the wild. Discuss your ideas with a classmate (video chat) or another person in your household.
 - a. Hint: if the animal's population is stable, there are still potential threats that you can help mitigate.
 - b. [Ask an Oakland Zoo education staff member](#) for help and guidance.

TAKE ACTION!

9. Document your action with photos and video; you may choose to create a slide deck or a written presentation as your report.
10. Send to [Oakland Zoo](#) and you may be featured on our website



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CALIFORNIA
TAKING ACTION FOR WILDLIFE

OAKLAND ZOO

Post-Activity Questions and Resources

- What worked about your action? What would you do differently next time?
- How can we inspire more people to take action for wildlife?
- Join our [Pollinator Pioneers](#) or a local conservation group of your choice.

California Trail - Impacts of Habitat Fragmentation

Visit our website to learn about our animals and what we are doing to help wild ones.

American Bison

- American Bison once roamed across the grasslands in North America in large herds. With westward expansion, agriculture fragmented the rangeland, and hunting and the introduction of domestic cattle diseases (disease doesn't know property lines) reduced their population from 30-60 million to around 1000 in 1906.
 - [The Linnii Initiative](#) is a collaboration between the Blackfeet Nation, Oakland Zoo, and the Wildlife Conservation Society to increase genetic diversity in the small herd of bison that still lives in their historic range. With our expertise in captive breeding as part of [SAFE](#), we are perfectly positioned to bring two genetic groups of bison together (males genetically from Yellowstone; females from Canada).

Black Bears

- There are regular conflicts between humans and bears throughout California. Naturally, these bears are not fond of people and will avoid conflict, but we have taught generations of black bears that humans have easy to access food. For example, in the early days of Yosemite National Park, it was an attraction to watch bears feed on trash piles ("bear pits") and even directly from visitors' hands. As bears became more confident around people and started to rely on these food sources, they became aggressive and many were killed in the name of public safety.
 - [B.E.A.R. League](#) works to mitigate human wildlife conflict in Tahoe. Over generations, many bears have lost their natural fear of humans because people have intentionally or unintentionally fed them. This has created huge problems in human populated bear country.

Brown Bears

- Brown Bears are now extinct in California. There was a specific subspecies native to California called the California Grizzly, but it was hunted to extinction in the early 1920s (last sighting in 1924 – little over 10 years after it officially appeared on our state flag, 1911). Although Brown Bears as a whole are of least concern, North American Grizzlies are threatened and declining due to habitat fragmentation and introduction of invasive species which have displaced their large prey (i.e. elk, moose, caribou) and native grasses, nuts, berries, and tubers.
 - It's too late to prevent the extinction of brown bears in California, but we can learn from our past mistakes and save animals that are still here. The Zoo partners with [People and Carnivores](#) to protect large carnivores in the Rockies and Great Plains.

Mountain Lions

- Mountain Lions range throughout California and are one of the few apex predators left in our wildlands. The primary cause of death for mountain Lions in CA is traffic collisions (rodenticide and depredation permits are also high on the list). The large cats historically roamed many different habitats in California that are now crossed by roads. In an attempt to find food and as part of their normal movement patterns, mountain lions are often hit on roadways.
 - [BACAT](#) is an alliance between Oakland Zoo, the Mountain Lion Foundation, Bay Area Puma Project, and CA Fish & Wildlife working together to help human-mountain lion conflict. We do this through legislation and rehabilitation/placement of orphaned mountain lions.
 - California is building the largest wildlife crossing in the world across the 101 in LA. This will connect two isolated populations in the Santa Ana and Santa Monica Mountains. The Santa Monica population currently only has one breeding male - the other was shot earlier this year. This means if another depredation permit is issued, and the last male is shot before the wildlife crossing is complete, Santa Monica Mountain Lions will be functionally extinct.

Jaguars

- Jaguars used to range into the southern United states, but due to significant habitat fragmentation they are now limited mostly to Central and South America. These are VERY solitary cats and males have ranges 20-30 square miles with no overlap. Females will overlap with male territories, but with human development segmenting land, a chance meeting of a male and a female at the right time to mate is very slim. Collaboration between many landowners and stakeholders is key when creating large enough territories for jaguars to survive. The US-Mexico border wall threatens to block jaguars from their natural migration route potentially eliminating these large cats from the US all together.
 - We support [Kaminando](#), a non-profit working in Tropical Montane Cloud Forest in Central America - the rarest ecosystem with only about .14% of the entire land surface on the planet. Jaguars love this habitat, but can also live in other areas as long as they have plenty of space. They also work with local communities to raise awareness of jaguars and reduce poaching.

Gray Wolves

- Gray Wolves get a very bad wrap from years of the media portraying them as dangerous predators that prey on cold lonely humans lost in the woods at night, but in reality they are skittish. Unfortunately, their poor reputation and human development caused them to be functionally extinct in California in the 1920s. Over time, due to conservation efforts of the packs in surrounding states, gray wolves have begun to make their way back into the state. OR-7 was the first known wolf to return to the state from Oregon in 2011, but left California in 2013. Some of his offspring have since ventured back into California and the

first signs of a contemporary pack in California started in 2014 with the second pack spotted in 2015.

- [The California Wolf Center](#) has a lot of experience with gray wolves and helped us with our mated pair who are successfully raising 4 pups at the Zoo. The Center also works to dispel misconceptions of wild wolves as monsters and works with ranchers to solve wolf-livestock conflict.

California Condors

- California Condor populations are on the rise, but we aren't out of the weeds yet. Populations dropped dramatically in the 70s with the use of DDT. In 1982 the population was at its all-time low of 22 individuals and by 1987, the only California Condors in the world were 27 captive individuals at San Diego Wild Animal Park and LA Zoo. Through the 90s and today, Zoos worked tirelessly on captive breeding and reintroduction. Now there are an estimated 312 wild condors with 173 in captivity. These wild condors are still under threat due to habitat fragmentation, lead poisoning, and micro-trash.
 - [Vantana Wildlife Society](#) began releasing captive-bred condors in 1997 and since then has managed the central California flock with the National Park Service. We also work with Pinnacles National Park to treat birds with lead poisoning in our animal hospital.

Bald Eagles

- Bald Eagles had a dramatic decrease that mimicked condors, but not as severe. Their lowest was 417 pairs in 1963, but are now off the endangered species list and of least concern. The loss of these birds had huge impacts on California ecosystems like the Channel Islands off the coast of Southern California. Bald Eagles are opportunistic birds - they eat whatever they can find - and when they do hunt, prey primarily on fish. This meant that the Channel Island Fox which is endemic to the islands, had no natural predators. When Bald Eagles died off on the islands because of DDT, Golden Eagles moved in. Golden Eagles hunt primarily on land. The introduction of this predator with the destruction of most shrubland by introduced wild boars, left Channel Island Foxes incredibly vulnerable and their population plummeted. Fortunately, due to conservation efforts, Golden Eagles and boars have been removed from the islands and Bald Eagles have been reintroduced. The ecosystem is slowly rebalancing and native plants and animals are rebounding.
 - [Vantana Wildlife Society](#) is part of the successful release and breeding of Bald Eagles in the central coast region.