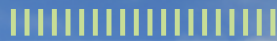


CondorExplorers



Research Journal

Observe, Record, Analyze, Protect.
« A Virtual Reality Learning Experience »



Presented by the U.S. Fish and Wildlife Service's
Urban Wildlife Refuge Conservation Program in
partnership with the Santa Barbara Zoo and a special
thanks to the Friends of California Condors Wild and Free.



**NATIONAL
WILDLIFE
REFUGE SYSTEM**



*Friends of California
Condors
Wild and Free*



**urban
wildlife
refuge**
PARTNERSHIP

CondorExplorers Research Journal

Your exploration begins 15,000 years ago, when condors survived on mammoth and other extinct large animals, and mile thick ice sheets melted away. Watch the Eons video by PBS to get started.



« The Giant Bird That Got Lost in Time by PBS Eons »

You are embarking on a virtual research expedition, investigating the relationships between endangered California condors, their environment, and people over time. You have four missions to complete in order to achieve your unique US Fish and Wildlife Service Lifelong CondorExplorer Conservationist e-badge and help save the species.



Mission 1:

CondorExplorer Environmental Warrior: Make a difference — save the species.



Mission 2:

CondorExplorer Modeling Technician: Show California condor ecosystems through time.



Mission 3:

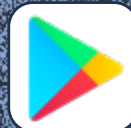
CondorExplorer TimeLooper VR Ranger: Interpret data, California condors, and nature.



Mission 4:

CondorExplorer Condor Tracker: Adopt and track a wild California condor using GPS data.

You will use the TimeLooper Xplore app and Google Earth to complete your missions over the next few weeks, in virtual reality and with real California condor GPS data. Make sure you have them both downloaded!



Click to see the [California Condor Photo Book](#) and enter the information for your condor below.

« California Condor Photo Book »

Studbook ID:

Sex:

Female

Male

Date of Hatch:

Hatch Location (if available):

Age:

Juvenile

Sub-adult

Adult

Your Name:

School:

Teacher:

Start Date:

End Date:

Add a photo of your condor here

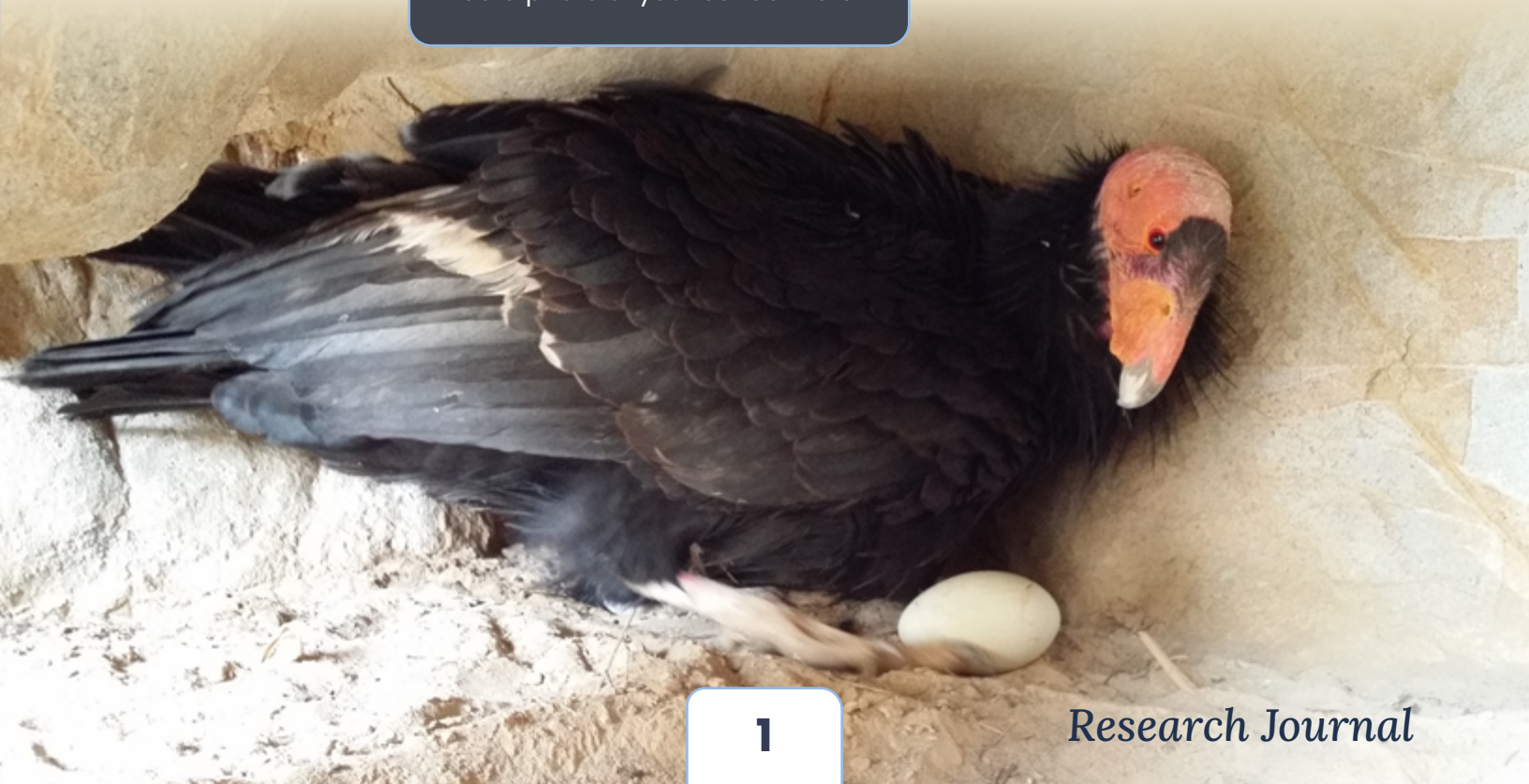


Table of Contents

Intro	a
My California Condor I	
Table of Contents	2
How We Do Science	3
Modeling Nature Near You	4
Starting Scientific	5
Modeling the Condor's Past: The Pleistocene epoch	6
Modeling Today	7
Condor Tracker: Tutorial	8
Condor Tracker: Honing in on habitat.....	9
VR Ranger: Roaming range	10
VR Ranger: Nest check.....	11
Condor Community.....	12
Hopper Mountain Food Chains	13
Hopper Mountain Food Webs	14
Whose line is it anyway?	15
Circle of Viewpoints: Thinking like an organism.....	16
VR Ranger: Non-living life.....	17
Condor Tracker: More than alive	18
Gnarly Nutrients.....	19
Do the Math!.....	20
VR Ranger: Condor culture	21
VR Ranger: Beyond the brink	22
Comparing Conservation.....	23
VR Ranger: Hunting for recovery	24
Condor Tracker: Perceiving people	25
Defending Data	26
Condor Careers.....	27
VR Ranger: Lifecycle of the endangered and famous.....	28
Nest Cam Bingo	29
Microtrash Madness!	30
Condor Tracker: Citizen science	31
Condor Tracker: Reading range	32
Modeling the Future: California condors wild and free	33
VR Ranger: Sharing success	34
Save the Species!	35
EXPEDITION COMPLETE.....	36



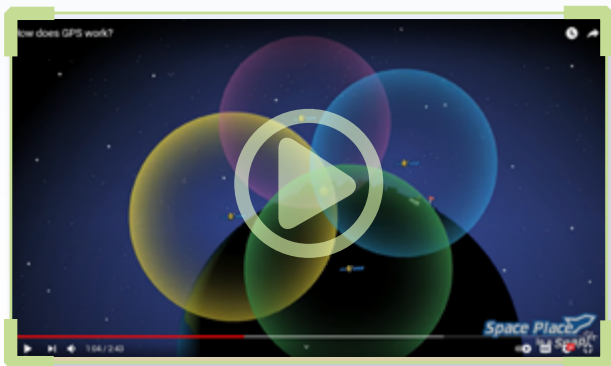
So, how will you **DO SCIENCE** to learn about the condor's role in the environment?

Using the TimeLooper app, you will work in the field at Hopper Mountain and Bitter Creek National Wildlife Refuges to track condors with radio technology, observe a blood draw and release of a wild condor, go inside a condor's nest, and more. This Research Journal will guide you and help you record your findings.

You will also learn and use an important research tool that uses maps to gather and share data. This tool is called a Geographic Information System or GIS for short. Google maps and Google Earth are two GIS's you might be familiar with already. You will also use Google Earth to monitor real GPS data from wing tags attached to the wild condors you are tracking. These are some of the same activities that the US Fish and Wildlife Service and Santa Barbara Zoo biologists use in the field to research and protect California condors.

Click the images below to watch a video from NASA exploring how GPS works and see a California condor biologist at work using radio telemetry.

NASA GPS video



« NASA GPS video »

Condor Biologist video



« Radio Telemetry video »

What do you hope to learn in this Journal?





Modeling Nature Near You

Before we explore the world of the California condor, let's connect with nature where you live. Think about the space and places around where you live. Draw a map showing where you live and different places nearby where you have connected with some part of nature. Draw what part of nature you connected with at the different locations – you can use symbols or words too.



You were just modeling your connection to nature near you. Scientists from condor biology to astrophysics and everywhere in between use modeling to help make predictions and solve problems all the time. You will use modeling too.

To complete your first mission and achieve your CondorExplorer Modeling Expert badge, you will need to use scientific modeling, like you just did and in other ways, to show how the California condor interacts with the environment and people. You will need to finish modeling the past ecosystem, research the current habitat and relationships condors have in the ecosystem today, and finally predict a future ecosystem modeling a fully recovered species.

Modeling helps scientists answer questions too. Answer these questions and revise them as your modeling effort gives you more information.

What role does the California condor play in the California ecosystem? How do changes in the ecosystem impact condors over time?



What role do you, and other humans, have with condors in the California ecosystem?





Starting Scientific

Simple observations are often the first step in scientific exploration. They can lead us to questions or hypothesis to explore. Click the image to observe a California condor in 360°



See

Write down what you see.
For example: colors, shapes,
patterns, texture



Think

What do you think is
happening? What does it
remind you of?



Wonder

What questions do you have?

You probably observed a lot of the condor's adaptations, like large feathers or a bald head. These adaptations evolved long before humans saw a condor. All adaptations are beneficial for a species, but human interaction with the environment has changed the world, leaving some species at a disadvantage to the new ecosystem.



Modeling the California condor's past: The Pleistocene epoch

Rewatch the Eons video by PBS and fill in the blanks on the modelling diagram of condors in California 15,000 years ago. We will be using many types of modeling in our research, which are tools scientists and problem solvers use.

Fossil and archeological remains show condor's historic range. Today, condors are only found in different states and Mexico.



Around _____ years ago, mile thick ice sheets melted and humans migrated to the continent. This helped cause the extinction of most of the condor's inland food source.



Lewis and Clark recorded observations of California condors in _____. They were likely the first people to bring lead bullets to their environment.



Condors fed on _____ on the coast when inland megafauna died off..



The _____ Tribes in southern CA, and many tribes up the coast, regarded the condor as a sacred creature.





Modeling Today

Start by showing what you already know--or think you know--about condors. There are no wrong answers at this stage. You will upgrade, update, and add to your modeling of the California condor and the Southern California ecosystem.



Use words, drawings, arrows, and different colors to show how condors interact with the environment.



Condor Tracker: Tutorial

Use the GIS Tutorial data provided by your teacher. This won't be the same condor you adopted.

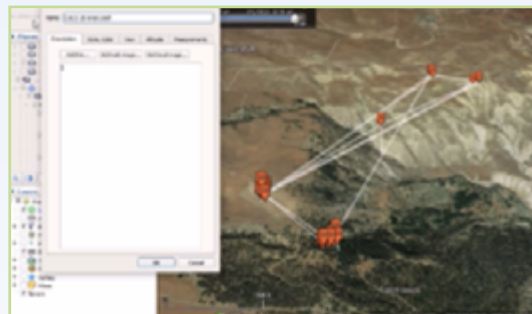
Follow the link to watch the tutorials and record your

data below: condorkids.org/gistutorial

All passwords: Gymnogyps

Studbook ID: Sex: F M

Hatch Date: Age:



Google Earth Data Collection Tutorial

Expand the data folders and turn on one day's data at a time. Follow these steps for each day's data:

1. Adjust the time scale sliders to view the entire dataset
2. Use the "Flight Path" data to determine Flight Miles.
3. Use the polygon tool to measure the area of the range being used:

Total area used: miles²

Date	Flight Miles	Area Used (miles ²)
------	--------------	---------------------------------

Tutorial

Average:

$(\text{Total area used} \div \text{Total Range}^*) \times 100 = \text{Percent}$

*Total Range = 12,000 mi²

Insert an image of your condors total area used here.





Condor Tracker: Honing in on habitat

As you begin completing your second mission, focus on the habitat that your California condor is using, and how it uses different habitat types. Remember to update your [Modeling Today](#) page with screenshots, text, or data to complete your Modeling Expert Mission.

Write or
draw how
you would
describe the
California
condor's
environment,
or habitat.

Google Earth Data Collection: Week 1

Studbook ID: _____ Sex: F M Hatch Date: _____ Age: _____

Expand the data folders and turn on one day's data at a time. Follow these steps for each day's data:

1. Adjust the time scale sliders to view the entire dataset
2. Use the "Flight Path" data to determine Flight Miles.
3. Use the polygon tool to measure the area of the range being used:

Week 1

Total area used: _____ miles²

Date	Flight Miles	Area Used (miles ²)
------	--------------	---------------------------------

Average:

$(\text{Total area used} \div \text{Total Range}^*) \times 100 = \text{Percent}$:

*Total Range = 12,000 mi²

Insert an
image
of your
condors
total area
used here.



VR Ranger: Roaming range

Go to the Virtual Research Station in the TimeLooper App and look for the map on the wall and explore the range of the California condor in Southern California.

What kind of environment or habitat do you notice in the condor's range? How does it compare to what you saw from your condor in the Google Earth?



Why do you think condors don't use some places?

Why was their range so much larger in the past? What else do you want to know about the condor's habitat?



VR Ranger: Nest check

**Go to the TimeLooper app and join some biologists for a nest entry.
Focus on the nesting habitat.**



Draw or describe a condor nest and surrounding habitat:

What do condor parents do when they leave the nest?

How could you use GPS to locate California condor nests? Are there any patterns you might notice?

Include the different condor habitats on your [Modeling Today](#) page.



Condor Community

A certain kind of animal or plant—like a condor, a dog, or California poppy—is called a species. In biology, a group of the different species interacting in the same ecosystem is called a community.

All California condors are the same species. Check out some of the other species in the condor's community. Go online to research the animals' diet and eating behaviors. Label each species as an herbivore (only eats plants), carnivore (only eats meat), or an omnivore (eats plants and meat), then list the species that it feeds on.

Use these websites for research: <https://www.nationalgeographic.com/search>

<https://explorer.natureserve.org/Search>

MOUNTAIN
LION



MULE DEER



COMMON
RAVEN



BOBCAT



GRAY FOX



JACK-
RABBIT



COYOTE



BLACK
BEAR



How do condors get food? Do they hunt and kill other animals like a predator? Explain your thoughts.

Are people predators? Why or why not?



Hopper Mountain Food Chains

For California condors to survive, they need a healthy diet, heart, digestion, and more to maintain their physiological systems. They also need a healthy habitat with clean air and water, plants, and animals that all work together to maintain the environment, or ecosystem. Most plants produce their own food with energy from the sun through photosynthesis*, and almost all animals, whether carnivores or herbivores, consume their food from other organisms. Label each species in the food chain as a producer or consumer.



Vegetation

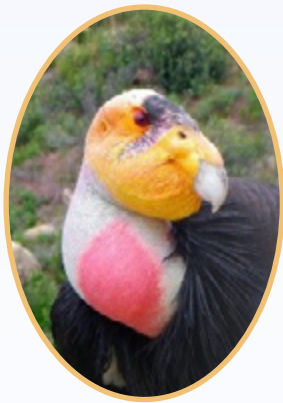


Jackrabbit



Bobcat

Pick 3 new species from Hopper Mountain that make up another food chain.



How would a California condor fit into these two food chains?

*Ask your teachers to learn more about how plants use the sun to make their own food inside their cells through a process called photosynthesis.



Hopper Mountain Food Webs

« Watch the video by California Academy of Sciences »



There are a lot more than two food chains in the Hopper Mountain ecosystem. Using your research, connect each species to the prey or food it consumes. Putting together all these food chains will create a food web.

Modeling food webs can help us see connections and make predictions about how an ecosystem would react to different impacts.

Draw lines connecting each species to all the other species it consumes.



MOUNTAIN LION



MULE DEER



CALIFORNIA
CONDOR



COMMON RAVEN



BOBCAT



GRAY FOX



JACKRABBIT



VEGETATION



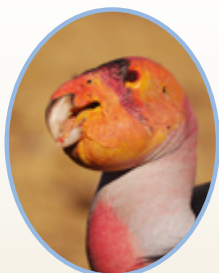
COYOTE



BLACK BEAR

What would happen if a fire took away all the vegetation?

How would predators be impacted if humans ate only wild animals, such as rabbit or deer, instead of chicken and beef?



Add the Hopper Mountain food web, and condor diet information to your [Modeling Today](#) page.



Whose line is it anyway?

Draw lines connecting the different diet and behavior types with their best description and add an image of a species that matches the term.

	Predator	Eats plants and animals
	Prey	Gets eaten by other species
	Consumer	Makes its own food for energy
	Producer	Sometimes eats dead things
	Carnivore	Only eats plants
	Omnivore	Hunter
	Herbivore	Only eats dead things
	Scavenger	Eats to get energy
	Obligate Scavenger	Only eats meat



Circle of Viewpoints*: Thinking like an organism

Time to use some imagination and put yourself in the shoes (well, feet) of one species in the Hopper Mountain food web.

Have you ever imagined you were a bird or some kind of animal? What about a plant? Write or record a video story as if you are one of the living organisms we learned about. Focus on how you would get your food and energy, and what potential threats or predators you may have to be cautious of. Really use your body to act out the behavior, and how you would be using your 5 senses.

I am thinking of how I get my food and energy from the viewpoint of (choose an animal species).

I think...

One question I might have from this viewpoint is...

Do you ever wonder how different it would be if you were a plant? Try it, and remember to think about threats, too.

I am thinking of how I get my food and energy from the viewpoint of (choose a plant species).

I think...

*The Circle of Viewpoints thinking routine was developed by Project Zero, a research center at the Harvard Graduate School of Education.



VR Ranger: Non-living life

Condors, like all organisms, depend on healthy ecosystems. We learned about some of the living parts of the ecosystem, the biotic factors, and now we need to check in on the non-living parts, the abiotic factors.

An abiotic factor is a non-living part of an ecosystem that shapes its environment. Abiotic and biotic factors work together to create a unique ecosystem. In biology, abiotic factors can include water, light, radiation, temperature, humidity, atmosphere, acidity, and soil. What abiotic factors do you notice in the photo below?:

Label the abiotic factors you notice in the photo below.



Go to the TimeLooper app and find the Telemetry locker to join a wildlife biologist at Hopper Mountain National Wildlife Refuge to monitor California condors with very high frequency, or VHF, radio technology.

Studbook ID	Observation Location	Direction of Signal
<i>Example:</i> #001	CROP	North west

Week 2

What do you think are important abiotic factors for California condors? How do they interact with these non-living parts of their ecosystem?

How do you think abiotic factors affect how biologists track and monitor condors?



Condor Tracker: More than alive

While you complete your Tracking Mission, think about how you are seeing your condor interact with abiotic factors. Describe any evidence you notice showing that condors could interact with man-made abiotic factors?

Studbook ID:

Sex: F

M

Hatch Date:

Age:

Expand the data folders and turn on one day's data at a time. Follow these steps for each day's data:

1. Adjust the time scale sliders to view the entire dataset
2. Use the "Flight Path" data to determine Flight Miles.
3. Use the polygon tool to measure the area of the range being used:

Area: _____ miles² $(\text{Area} \div \text{Total Range}^*) \times 100 = \text{Percent}$:

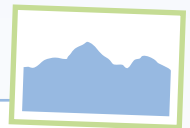
*Total Range = 12,000 mi²

Date	Flight Miles	Area Used (miles ²)
------	--------------	---------------------------------

Week 3

Average:

Paste an image of your condor's area used here.





Gnarly Nutrients

There is another important piece of the Southern California ecosystem that condors are connected too, that you are connected to as well. Living organisms—many microscopic—like bacteria, fungus, and invertebrates like worms and bugs that help recycle nutrients from dead plants and animals. These insects and tiny living things are called decomposers. Condors help decomposers in a big way by scavenging on dead carcasses, removing large amounts of meat that would take decomposers a long time. Click the image of the bacteria to watch a time lapse of decomposition of a deer carcass and click the condor image to watch condors feed on carrion. **Warning: Graphic Content**

Condors Feeding video



« Condors Feeding »

Decomposers Feeding video



« Decomposers Feeding »

Read the article from National Geographic about decomposers and try an experiment where you live and check out some of your local decomposers.

« National Geographic Decomposers Article »

This test for worms involves a little kitchen chemistry. Add a spoonful of liquid mustard to a gallon of water and pour it on the ground where there is dirt or soil. This doesn't harm plants, and worms – of all species – will come to the surface within a few minutes. Compare the number of worms in different places and see if you can make observations to make an educated guess, or hypothesis, about the worm species you find. Make sure it's okay with the people you live with before you try the experiment.

What would happen near where you live if nutrients from dead animals only got recycled by decomposers with no help from scavengers? Imagine with each of your five senses: smell, feel, taste, sight, and sound.

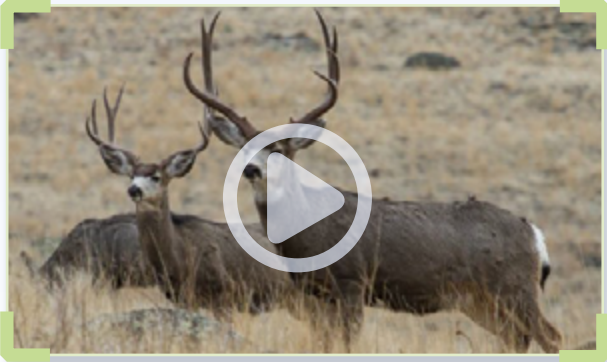




Do the Math!

Go to the TimeLooper App and find the feeding frenzy photo to get up close and personal with condors feeding on carrion. Warning: Graphic Content.

Mule deer are a common sight in Ventura County's wild spaces. They are an important part of a food web that includes vegetation like trees and shrubs, consumers like rabbits, and secondary consumers—or predators—like foxes, snakes, and mountain lions. Creatures like California condors and ravens, as well as the many microscopic fungi, and bacteria make up the scavengers and decomposers in the food web.



« Watch The Non-lead Hunter for more »»

Important Facts:

- Adult mule deers weigh 170 lbs on average.
- Carrying capacity is 40 deer per square mile
- Ventura County is 2208 square miles.



lbs/deer x deer/mile² x mile² in Ventura County = lbs of deer in Ventura County

1. How many pounds of mule deer exist in our county?
2. If half of that population dies in any given year (hunting, natural causes), how many pounds of mule deer carcass would exist?
3. If half of the carcass is taken/eaten by the primary predator (human, mountain lion, etc.), then how many pounds of carcass remains in the environment for scavengers (like California condors) and decomposers?
4. Hunters shot over 16,000 deer in 2019 in Ventura County. When hunters kill deer, they usually cut out and leave behind parts of the animal that they don't intend to eat. This is called a gut pile. If they are using non-lead ammunition and leave behind the gut pile, about 50lbs of carrion, how much meat did they provide for condors and other scavengers?
5. If scavengers and decomposers did not exist, how could humans dispose of carcasses throughout the environment?

According to the data at the Feeding Frenzy, what are the top three main food sources for California condors?

What species is the main predator for condors' top food sources?



VR Ranger: Condor culture

Go to the TimeLooper app and find the door to the Virtual Museum.

Take a screenshot of three images from the Virtual Museum that show evidence to explain condor population decline or recovery, that connect to an experience that you have had, that relates to something you know a lot about, and/or leaves you with questions. Crop the image to just show the part that you think is most important.

Use the tables to explore your evidence.

Cropped Image

Where

When

What

How is this evidence?

Questions

Cropped Image

Where

When

What

How is this evidence?

Questions

Cropped Image

Where

When

What

How is this evidence?

Questions

Use these images to update your [Modeling Today](#) page.



VR Ranger: Beyond the brink

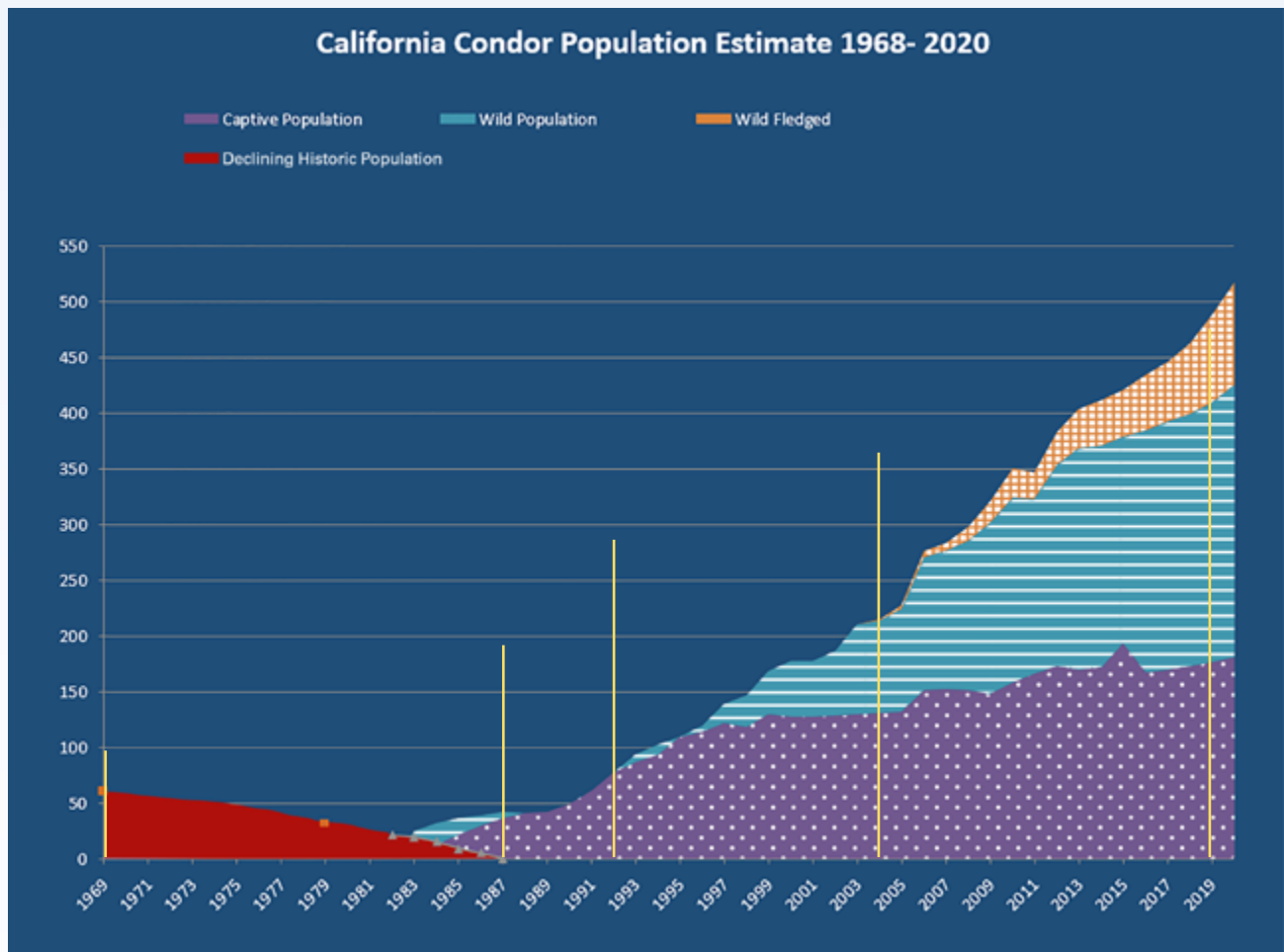
Now that we've studied the healthy condor ecosystem, let's explore why the U.S. Fish and Wildlife Service and their partners need to protect habitat like the Hopper Mountain and Bitter Creek National Wildlife Refuges and conserve California condors.

Go to the TimeLooper app and find the grainy photo of biologists capturing the last wild condor to establish the captive breeding flock in the zoos.

Write the important milestones the condor recovery efforts reached in the years below.

1969	1987	1992	2004	2019
Condor decline causes studied by the USFWS				

Write in how many condors were in the population at each milestone on the graph below.





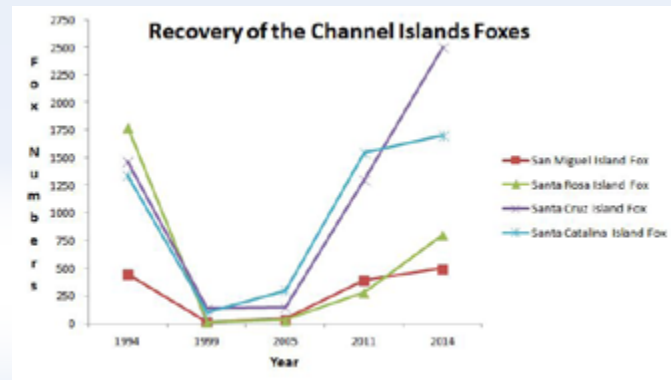
Comparing Conservation

Click the photo of the Channel Islands fox and explore there conservation story that led to their full recovery no longer endangered with extinction.

Island Fox video



« Island Fox video »



What is your best estimate for total number of Island foxes in 2014?

Why do you think the recovery of the island fox was so much more rapid than the California condors?

Animals and plants that are near extinction are officially listed as endangered by the U.S. Fish and Wildlife Service. When a species' population is in trouble but not as close to extinction, it may be listed as threatened. The Channel Islands Fox was downlisted from endangered to threatened in 2016.

Describe the California condor population and their ecosystem after they are recovered and removed from the endangered species list. What year do you think this will happen?



VR Ranger: Hunting for recovery

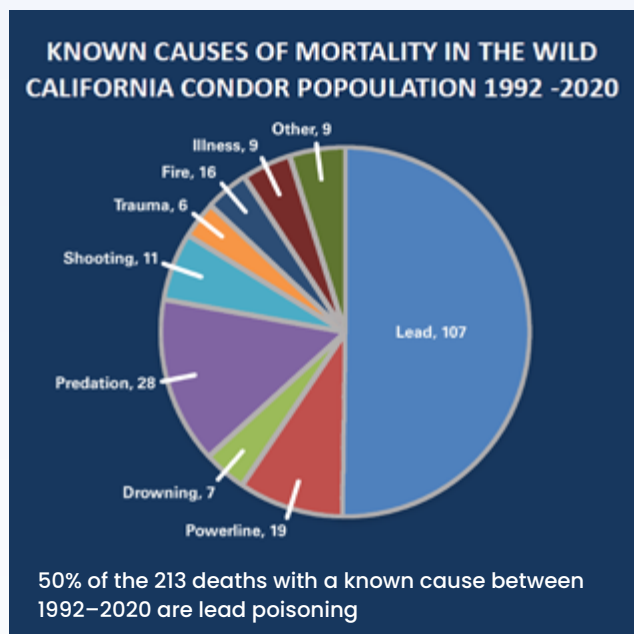
Go to the TimeLooper app and find the hunting with non-lead poster to check out the characteristics of lead and non-lead ammunition, and how lead bullets can impact scavengers, like the California condor and Bald eagle.

Use the data in the app to complete the table and bar graph to identify the main threats to condors.

Cause of Death	Number Confirmed	Percent of Total Confirmed
Total Confirmed		

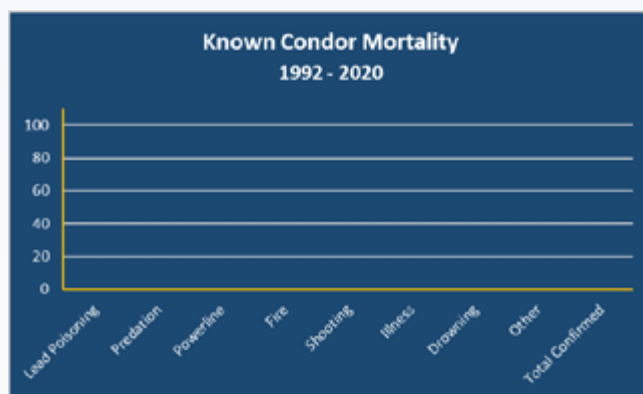
California condor adult known mortality 1980–2020

Add the Condor Mortality pie chart when you find it in the TimeLooper app later.



Insert rectangle shapes for each cause of death to show your data.

Label each bar on the graph with the percent of total known deaths in the wild.



Hunting with non-lead ammunition is one of the best ways to help save condors. The money you pay for your hunting license goes to many conservation efforts, and using non-lead ammunition may provide clean food for condors. Check out www.huntingwithnonlead.org to learn more!



Condor Tracker: Perceiving people

While you track your condor's flights and area this week, think about where your bird might interact with humans, and what those interactions might look like.

Write or draw your ideas.

Google Earth Data Collection: Week 4

Studbook ID:

Sex: F

M

Hatch Date:

Age:

Expand the data folders and turn on one day's data at a time. Follow these steps for each day's data:

1. Adjust the time scale sliders to view the entire dataset
2. Use the "Flight Path" data to determine Flight Miles.
3. Use the polygon tool to measure the area of the range being used:

Area: miles² (Area ÷ Total Range*) x 100 = Percent:

*Total Range = 12,000 mi²

Week 4

Date	Flight Miles	Area Used (miles ²)
Average:		

Insert an image of your condor's area used here.



Defending Data: Claim — Evidence – Reasoning

Choose one claim to defend:

1. The last wild California condors had to be removed from the wild to save the species because...
2. The last wild California condors did not need to be removed from the wild to save them because...

Using the data you've collected, write your claim, show evidence, then share your reasoning for why you chose that evidence.

Claim: What do you believe?

Example Claim: Beyonce is the best musician today.

Evidence: Observations from graphs, primary sources, and modeling.

Example: She won 24 Grammy awards in her career.

Reasoning: Explains how the evidence supports your claim.

Example: The Grammys are the top award ceremony for music.

When we began this exploration of condors, you had some initial ideas about these birds and what they are all about. Take a minute to think back and then write or draw your response.

I used to think..."

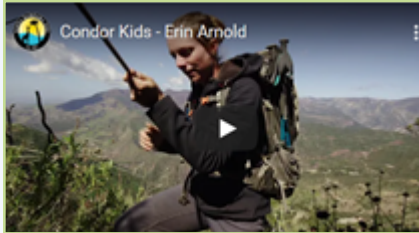
Now write or draw a reflection starting with "Now I think..."





Condor Careers

Watch these videos from our partners at the Santa Barbara Zoo to see a just few different condor careers that you could have one day. Which job would you want?



« Erin Arnold video »



« Stephanie Herrera video »



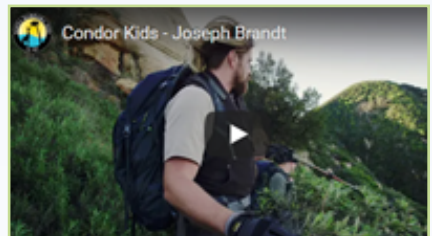
« Janet Hamber video »



« Carol Hunsperger video »



« Julie Barnes video »



« Joseph Brandt video »



Go to the TimeLooper app and find the Santa Barbara Zoo logo to learn more about how Zoo's help conservation in more ways than you might think.

Imagine it is 20 years in the future, and you have a successful career in condor conservation. Write a journal entry, with images, describing your day at work and how you helped save condors. Be sure to include your job title and what organization you work for.



VR Ranger: Lifecycle of the endangered and famous

Watch the video from the Oregon Zoo's captive breeding program, and then check out the condor nest observations in the TimeLooper app.



« Oregon Zoo video »

Write in the correct stage of life at each time frame and find or draw an image showing a condor at that age





Nest Cam Bingo

Click the images to view live condor nest cams* and play Nest Cam Bingo!

Condor biologists monitor these cameras to better understand condor behavior and to monitor for any emergency that might require them to help the parents or chick.



« Central CA Flock video »



« SoCal Flock video »

Chose the condor, the tracks, or the chick, copy it and drag it onto your bingo card.



Live stream cams may experience technical difficulties.

Both parents at the nest	Mother feeds chick	Father feeds chick	Chick wing begs	Chick wakes up
Chick plays with feathers	Chick plays with sticks	Parent stretches out their wings	Chick wiggles toes	Chick stretches wings out
Chick does "yoga" (stretches legs)	Watched for 10 minutes	FREE SPACE 	Chick mandibulates (practices using its beak)	No parents at the nest
Camera freezes or goes down	See a species other than condors	Completed nest monitoring data sheet	View other species live cam	You see microtrash in the nest
Chick is sleeping	Chick makes you laugh	Shared the live cam with someone	Chick goes to the "bathroom" (defecates)	Watched for 2 minutes

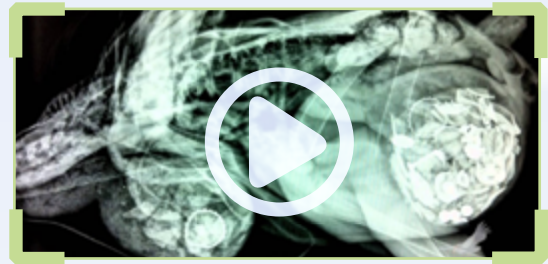
Instead of using the tokens, you can make tally marks each time you observe a square and use the bingo card like a data sheet. What questions could these observations help you answer?



Microtrash Madness!

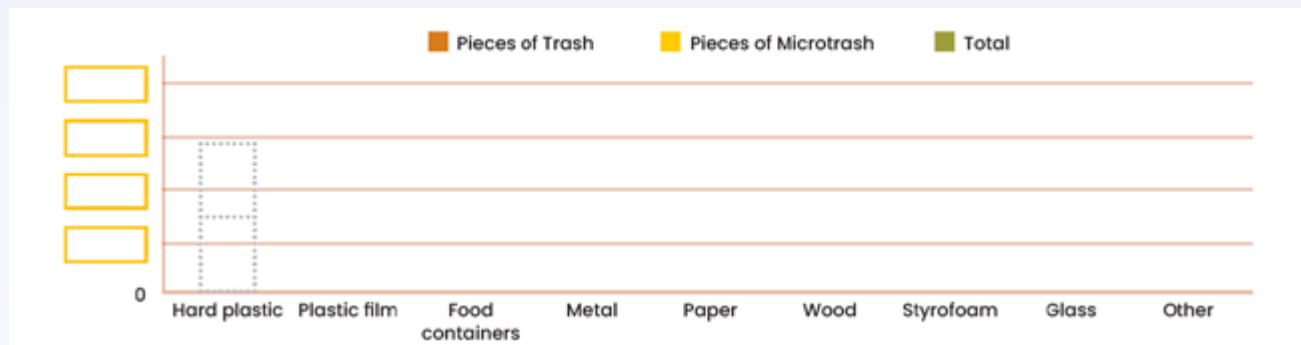
Click the x-ray of the condor chick and explore the main threat nestling condors have to overcome in there first six months - microtrash. Then, explore your own environment, practice science, and find evidence to help reduce this threat, and save the species.

Tally the different types of trash you create each day. Then, with parent permission, go outside each day and pick up trash for 10 minutes and record those findings as well. Remember that not all trash is microtrash, only items small enough for the adult to swallow and feed to a chick that are hard or sharp like bits of bone or shells.



« Microtrash video »

Material Type	Hard plastic	Plastic film	Food container	Metal	Paper	Wood	Styro-foam	Glass	Other	Total
My Trash										
Trash Outside										



What was the most common type of trash you threw away? What was the most common trash you found outside?

What was the most common microtrash?

What is one way a person could help condors consume less microtrash? How could a company or an organization help?



Condor Tracker: Citizen science

Go back through your GPS tracking data sheets and enter the weekly averages in the table to improve the accuracy and precision of your averages' analysis.

Week #	01JAN2021	Average Flight Miles	Average Area Used (miles ²)
Week 1			
Week 2			
Week 3			
Week 4			
Overall Average:			

Share the overall average data with your classmates to find the population average for flight miles and area used. This is how scientists come up with facts about what and where the birds go within their range. Your research will help inform real condor biologists about how condors use and move around the environment.

	Condor Studbook ID	Average Flight Miles	Average Area Used (miles ²)
Your condor			
Classmate 1			
Classmate 2			
Classmate 3			
Classmate 4			
Classmate 5			
Classmate 6			
Classmate 7			
Classmate 8			
Population Average:			

According to my data, California condors fly an average of _____ miles per day, _____ miles per week, and use an average are of _____ miles² per day, and _____ miles² per week. How do you think your findings impact conservation management for condors?

« Click here to enter your data for the U.S. Fish and Wildlife Service »»



Condor Tracker: Reading range

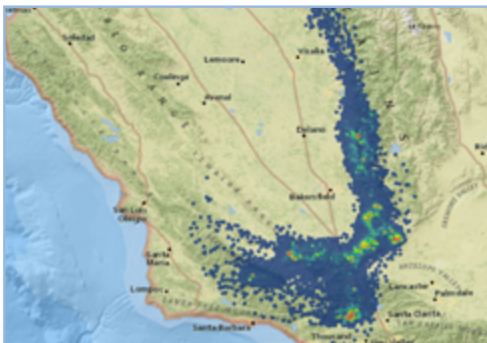
Paste and image of your condor's range used in week one. Describe how the range shown matches or doesn't match what you were expecting to see.



Paste and image of your condor's total range used in all four weeks. Mark the area of your condors range that you think was used most often, a hotspot, then describe what you think the bird was doing there.

Share data with your classmates and show the total CondorExplorers' population range used in all four weeks. Do you think that studying one condor is good enough to make claims about all condors?

How does your data compare to the overall Southern California flock's range shown here?



Mission 4: CondorExplorer Condor Tracker COMPLETE



Modeling the Future: California condors wild and free

Your exploration of the California condor is almost complete.

We have been modeling the condor ecosystem with diagrams, graphs, drawings, and thoughtful reflections. Using all your research, create a diagram, like we did for the Pleistocene era and current status, to show what you think the ecosystem of condors in California will look like in 50 years. Be sure to include the role and state of conservation and show the status of current condor threats or maybe even new ones. Show where new release sites could be located. Where do you think condors will not live and why? Will there be condors outside of California?



Use words, drawings, arrows, and different colors to show how condors interact with the environment.

Mission 2: CondorExplorer Modeling Technician **COMPLETE**



VR Ranger: Sharing success

Go to the TimeLooper app and give a tour to someone you live with. Write or draw some notes about their questions or reactions on your tour then describe your favorite part of the app. This will complete your CondorExplorer TimeLooper VR Ranger badge.



What was your favorite part of TimeLooper and why?

Mission 3: CondorExplorer TimeLooper VR Ranger

COMPLETE



Save the Species!

Make and defend a claim to the following questions: What role does the California condor play in the ecosystem?

How many condors would be needed in Southern California to remove them from the endangered species list? (Research the Andean condor for a good comparison)

Example,

Claim: Michael Jordan is the best basketball player ever.,

Evidence: He has won 6 championships. ,

Reasoning: Winning championships is the best indicator of being a great player.

Claim 1

Evidence

Reasoning

Claim 2

Evidence

Reasoning

Make a difference.

Based on your claims, evidence, and reasoning, develop a Public Service Announcement to share with people in your community how they can help save California condors and their ecosystem. There are a lot of ways to communicate, so do what you feel is best. Some ideas could be a T-shirt, billboard, essay, video, presentation, poster, or speech.

Continue to the next page to submit your Research Journal and become an official U.S. Fish and Wildlife Service CondorExplorers Lifelong Conservationist.

Mission 1: CondorExplorer Environmental Warrior
COMPLETE



EXPEDITION COMPLETE

Submit your Journal and final projects to hoppermountain@fws.gov for a chance to have your assignment posted online, and receive your unique CondorExplorer e-badges!

Additional links and resources

« The Condor's Shadow – Good Eye Films »

Password: Pitahsi

« Links and Videos »

All Site Passwords: Gymnogyps

« Discovery Channel – Nature in Focus: California condors »

« Hopper Mountain National Wildlife Refuge »

« Bitter Creek National Wildlife Refuge »

« The Santa Barbara Zoo »

« Friends of California Condors Wild and Free »

« California Condor Recovery Program »

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