

# Costs and Benefits in Conservation Choices

Geospatial analysts build maps and applications using data collected from the field. They are able to use these tools to model where species are likely to live and make decisions based on those models. In this activity, students will interact with a digital application created by a WCS scientist in order to address the problem of habitat fragmentation for jaguars. Students will weigh the costs and benefits of newly proposed protected land.

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## Objectives:

Students will be able to

- Describe the impact of habitat fragmentation on wildlife populations
- Propose a reserve to protect species, taking into account the costs and benefits

## Materials:

- [Habitat Fragmentation video](#)
- [Habitat Fragmentation notes](#)
- [Jaguar Data website](#)
- Laptops for students to display jaguar data (if available)

## Process:

- 1) Review student takeaways from activity 2 (It is possible to model species distribution using real-world data, and humans severely impact habitat suitability for many species).
- 2) Explain to students that one way humans impact animal habitats is by dividing one large area into many small areas due to the construction of roads or buildings. Remind students that they saw this play out with the road that they added to their model at the end of activity 2.
- 3) Distribute the Habitat Fragmentation notes page and direct students to write an initial definition of habitat fragmentation. Direct students to read the rest of the worksheet, but wait to fill out questions until after the video is played.
- 4) Watch the Habitat Fragmentation video. Once you have watched the video all the way through once, allow students time to answer the remaining questions on the notes page. Discuss student answers to the questions to ensure a full class understanding of the causes and potential solutions to habitat fragmentation.
  - a) **Optional:** After the video is played once, poll the class on whether they would like to watch the video a second time to collect additional information.

- 5) Following class discussion, transition students back to the subject of jaguars in North and Central America. Remind students that one of the challenges that jaguars face is habitat fragmentation from human development.
- 6) Direct students to form groups of 3-4, and distribute one laptop per group, if possible. Direct students to [jaguardata.info](http://jaguardata.info).
- 7) Explain that [jaguardata.info](http://jaguardata.info) is a digital application designed by WCS scientists to map instances of humans observing jaguars in northern Mexico and the southern United States. The goal of this app is both to collect information about jaguar sightings from the public, and for the public to get a sense of the history of jaguars in that area.
- 8) Once they arrive at the website, they should click “Begin Exploring” and then minimize the data window so they can view only the map.
- 9) Display the [jaguardata.info](http://jaguardata.info) on the board while students are exploring the application. Demonstrate the different functions of the application:
  - a) Students can zoom in and out, and the key in the lower right hand side changes with zoom
  - b) Clicking on pins or highlighted areas shows more information about each piece of data entered in the portal, including the time of the observation and the type of observation.
    - i) Both jaguar spot geo-tags, and yellow highlighted areas are observations.
  - c) Green parts of the map represent national parks.
  - d) Tabs in the top right toggle between different views of the same area.
- 10) Encourage students to zoom in on New Mexico and Arizona, and explore the data in those areas. Once students have had some time to explore, ask the whole class about their findings so far.
  - a) Is there more or less evidence of jaguars in the US than they expected?
  - b) When do most of the observations seem to have occurred?
  - c) Do they see any patterns in the kinds of places jaguars have been seen?
- 11) After students have explored the data, give them a task to make a conservation decision to improve the jaguar habitats in the United States.
  - a) “You are now going to act as a conservationist and propose a conservation solution for jaguars in the United States. Jaguars have been in the United States historically, but are not native to the US now. One reason for that is a lack of large continuous areas for jaguars to roam and hunt. You should now look at the jaguar data and propose a new protected area for wildlife. Your solution should be a piece of land that incorporates at least three jaguar observations, or connects one highlighted area to another. Your protected area cannot be within an already created parkland.”
  - b) Demonstrate one example of a potential area to protect using the app displayed on the board. Ask students to consider how they think their proposal will affect human development as well.

- 12) Give students time to decide as a group what areas they should protect using the jaguar data app. Circulate to ask students about their decisions. Encourage students to toggle between the views (terrain, road map, and satellite).
- 13) Once all groups have chosen an area they would like to protect, direct groups to pair up. Each group should then present their proposed protected area to their partner group. As they present, they should answer the following questions:
  - a) Why did you choose this area?
  - b) What benefit do you think protecting this area would have for wildlife?
  - c) What challenges do you see in trying to make this a protected area?
  - d) What kinds of human development or behavior might your protected area disrupt?
  - e) Do you think the benefits of your protected area outweigh the costs to humans?
- 14) Once all groups have presented, debrief the activity as a full class. Did students find it easy or hard to choose a new protected area? How do they think a new wildlife refuge would affect humans? As the human population grows, what does that mean for wildlife conservation?
- 15) Explain that, while wildlife conservation is challenging, WCS and other conservation organizations are working year-round to protect wildlife and wild places, and that students can contribute with their own conservation choices.

### **Modification:**

If technology is a challenge in your classroom, this activity could be done as a full class with one computer projecting the [jaguardata.info](http://jaguardata.info) app. Students could propose a new protected area as a whole class. Google Earth can be used as a companion website to zoom in on roads or other developed areas that would be affected by a proposed wildlife refuge.