

# How can the Santa Ana sucker be saved?

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## 1 Introduction

According to Kolbert 201X, we are in the midst of a dramatic extinction event – rivaling major catastrophic extinctions in the past. The difference with the current situation is the cause: The dominance of human beings over the Earth’s surface led to the extirpation of thousands of species, and counting.

It’s easy to second guess various scientific and policy questions with respect to endangered species, but when we begin to evaluate what is actually being done on the ground for various species, we quickly learn that we are not just in a ecological web, we are also in a policy and regulatory morass.

### 1.1 Driving Question

This project will attempt to answer the following question, “How can we save the Santa Ana sucker?” As we have seen, this is a generic question that needs to be constrained, defined, and subject to what we already know about the sucker. In addition, we need to define the terms used in the question, such as who is “we”? What do we mean by “save”? And finally, when we ask “how”, what are the options available that might fit into the “how”?

## 2 Learning Goals

- Evaluate sucker habitat using the following tools:
  - Define Water Quality Goals
  - Characterize Hydrology and Geomorphology
  - Analyze Community Profile of Periphyton
- Propose and evaluate options to improve Santa Ana sucker habitat.
- Prepare sets of practical and effective measures that might protect (or increase) the extant populations of the Santa Ana sucker.

## 2.1 Why these learning goals?

## 3 Project Stages

- Session 1: Define 'Public Product'
- Session 2: Revise 'Driving Question' and list resources needed

## 4 Defining the Public Product

For this project, each student will contribute to one of four briefs on the science available to "rescue and protect" the Santa Ana Sucker.

Although the audience will be the public... the briefs will be submitted to the USFWS, the USFWS and City of San Bernardino... etc...??

Each "issue" of the research briefs, will address a different scientific issue associated with the Santa Ana sucker—where each issue addresses a specific driving question with respect to the sucker. EA 30 Research Briefs are short (3-4 pages) descriptions of recently EA30 project results. These "briefs" highlights also include one image, a caption (50 words), and several publication citations. Each student scientist is invited to develop one to several briefs that will be made available to the public.

Teams will be in charge of each issue, but each student will make an individual contribution. The group will decide how to arrange the order of each individual based on the quality and potential interests for each of the sections.

**Issue 1: Habitat Loss**

**Issue 2: Food Quality**

**Issue 3: Water Quality**

**Issue 4: Hydrology**

**Issue X: Geomorphology**

### 4.1 Examples

<https://www.fws.gov/Endangered/esa-library/index.html>  
<http://blogs.scientificamerican.com/extinction-countdown/>

### 4.2 Evaluation Criteria of Public Products

## 5 Driving Question

### 5.1 Define and constrain driving question

As one of our first exercises, we will explore the meaning of the driving question. As we work to understand our driving question, we will create groups of students to act as research teams that will address a portion of the driving question.

## **5.2 Resources to answer driving question**

Each team will determine what resources are available and/or needed to address the driving question. Working with the instructor is key because these resources need to be made available for the following week.

## **5.3 Determine Required Resources and Methods**

## **5.4 Answering the Driving Questions**

## **5.5 Data Collection and Analysis**

# **6 Create Public Product**

## **6.1 Writing and Presenting Results**