

Arkansas River Shiner Vulnerability Assessment Outline: Consideration for Case Study
Paul Barrett, Regional Science Advisor, Albuquerque, New Mexico

Location and Scale: Arkansas River shiner, *Notropis girardi*, was found historically throughout the western portion of the Arkansas River basin in Kansas, New Mexico, Oklahoma, and Texas. It has lost over 80 percent of its historical habitat, it is currently found along the Canadian River in Oklahoma, Texas, and New Mexico, with a small population still found in the Cimarron River in Oklahoma and Kansas. The planned VA will be spatially explicit, with the shiner's remaining range in the Arkansas River basin serving as the overall study area.

Arkansas River shiner was selected as a focal species because it has many characteristics that uniquely qualify it as a candidate for a VA:

- 1) Little is known of its life history, yet it is classified as threatened pursuant to the Endangered Species Act of 1973, as amended.
- 2) Its range is primarily on private land. Predicted drying in western Oklahoma coupled with increasing demand for water by municipal and agricultural interests complicate recovery efforts.

The **objectives** of the Sonoran pronghorn VA include:

- 1) Determine how climate change will affect water availability over the next century.
- 2) Develop alternative strategies for purchasing instream flow rights to protect the shiner.

Status: The Oklahoma Ecological Services Field Supervisor has requested a VA for the Arkansas River shiner. Funding from the Great Plains LCC may be available to assist the process.

Exercise 4.1: Build-your-own VA

Length: 3 – 4 hours

Format: small group work

Output: Scope of Work for someone to do a VA (can use agency templates) or a process outline for a VA (template at end of exercise)

Prior to the exercise:

Solicit projects from the participants and then select different projects based on making sure we have contrasting examples.

Framing

In working to build their own VAs, groups will have the opportunity to go through some of the confusion, discovery, and frustration common in one's first VA in a situation where there are plenty of VA experts around to help them. In particular, we'd like participants to become more comfortable with designing and managing a vulnerability assessment and identifying key steps and resource

Steps:

1. Divide into smaller groups (maybe do this based on agency, biome, or some other common denominator?).
2. Provide groups with a few options for how to focus this exercise. These are essentially scenarios for the context, goal, and timeline for developing their VA (see below). Groups can also choose their own focus, but must clearly state the context, goal, and timeline.
3. Each group should select appropriate models, tools, and data for their context/goal. Have groups consider what they would do if they had different levels of:
 - a. Funding/staffing, e.g. if they had unlimited budget what would they do? If they had no budget what would they do?
 - b. Pre-existing data, e.g. no baseline data vs. heaps of baseline data; no downscaled models for their region vs. good downscaled models; good historical and current data on species distributions vs. none.
4. Each group should either complete a process outline for their VA using our template, or follow the process for completing a Process Work Statement, Statement of Work, etc. for their agency
5. Poster session
6. Whole group discussion. Questions:
 - a. What was straightforward about planning a VA?
 - b. What was difficult?
 - c. How confident are you that you will receive the desired product?
 - d. Where were your biggest uncertainties (e.g. budget, data, stakeholder influence)?
 - e. What differences and similarities among the groups was striking to you?
 - f. At some point, have people take a few minutes to write down the most important thing they learned from doing this exercise, and their biggest

outstanding question. Asking them about their biggest outstanding question is a good discussion-starter.

Context/goal ideas:

- An LCC establishing research or management priorities for a large area (could be species or habitat focused). If our audience is entirely at this level, we could have each group use this general approach, but focusing on different regions, species, or habitats
- A consortium charged with restoring a particular species or habitat.

Job Aids: Our process outline template and templates from participants' agencies

Location: Florida Keys

Scale/focus: The proposed project will examine the effects of sea level rise (SLR) and ocean acidification on 3 marine habitats in the Florida Keys (mangroves, beaches, coral reefs) and predict how those effects may drive vulnerabilities for 3 test SGCN (Goliath grouper, spiny lobster, loggerhead turtles). Three workshops will be convened and will be comprised of experts and managers. The first workshop will develop alternative future scenarios to consider and participants will examine the associated impacts to habitats by climate change. The workshop will be comprised of habitat experts from local, state, and federal agencies as well as NGOs and academia; a second workshop will focus on the effects on species using species experts. A third workshop will include marine and coastal managers who will use the results from the previous workshops to determine best management strategies for each scenario. The vulnerability of the test species and strategies to address those vulnerabilities will be tied closely to habitat function for that species (i.e., is the habitat used exclusively for cover, reproduction, and/or forage).

Objective:

- Determine the effects of climate change scenarios on critical habitats within the Florida Keys coral reef ecosystem
- Examine how changes to those habitats may impact different life-history stages of 3 sentinel SGCN

Status: Starts April 2012

The project is not a typical ‘vulnerability analysis’ project because it is focused on examining alternative future scenarios; however, a VA will definitely help inform the development of the project by providing important aspects to consider within the workshops as the project progresses and as the managers try to develop adaptation strategies that are useful for the habitats and species under consideration. The project is a pilot study.

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Example Vulnerability Assessment- Joshua Reece, postdoctoral fellow at the University of Central Florida working in collaboration with Reed Noss (University of Central Florida), Tom Hocht (University of Florida), Michael Volker (University of Florida), and Jon Oetting (Florida Natural Areas Inventory).

Location: Entire State of Florida

Scale/focus: 1000 species that occur in Florida and are tracked by the Florida Natural Areas Inventory Program because they are rare, endemic, of high economic or environment importance, or vulnerable to extinction.

Objective: Beginning with a list of 1000+ species, identify the approximately 50 to 100 species that are at the greatest vulnerability to the combined effects of sea-level rise, climate change, and land-use change over the next 50 to 100 years.

Status: Our current strategy is as follows:

1. From initial list of 1000 plants and animals, we will identify the 300 most vulnerable to sea level rise at various projected inundation levels by 2050 and 2100.
2. For each of these 300 species, specialists will fill out a questionnaire (similar to the Millsap 1999 or NatureServe CCVI ranking schema) to describe conservation value and vulnerability. We will identify the 50 of these species with the highest priority based on these scores
3. For each of these 50 species, we will conduct environmental envelope/niche modeling to identify potential future habitat, and where possible spatially-explicit demographic viability models to make assessments of extinction risk under a variety of climate, sea level rise, and land use scenarios. These data will lead to detailed conservation recommendations for each of these taxa, and at the broad scale for the communities in which they exist.

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Sonoran Pronghorn Vulnerability Assessment Outline: Consideration for Case Study
Paul Barrett, Regional Science Advisor, Albuquerque, New Mexico

Location and Scale: Cabeza Prieta National Wildlife Refuge in southern Arizona may be one of the first areas to see the effects of climate change in the contiguous United States. Although originally established as a bighorn sheep refuge it spends considerable time managing Sonoran pronghorn, *Antilocapra americana sonoriensis*. The planned VA will be spatially explicit, with the Sonoran pronghorn range in the United States serving as the overall study area, including Cabeza Prieta and Kofa NWRs, Organ Pipe National Monument, and Barry M. Goldwater Range. The boundaries include area north of Interstate 8 and south of Interstate 10, bounded by the Colorado River on the west and Interstate 10 on the east; and an area south of Interstate 8, bounded by Highway 85 on the west, Interstates 10 and 19 on the east, and the U.S.- Mexico border on the south.

Sonoran pronghorn was selected as a focal species because it has many characteristics that uniquely qualify it as a candidate for a VA:

- 1) It was one of the original species grandfathered into the Endangered Species Act of 1973, as amended. Its range is almost exclusively on public land and thus its loss would be perceived as a failure of the Federal government to properly manage its resources.
- 2) Downscaled climate models differ, but some predict, even drier conditions in southern Arizona that may remove the few remaining water sources and vegetation the antelope requires.
- 3) It is uniquely adapted to harsh desert conditions. Some research suggests that it has unique kidney allowing it to better withstand extremely dry conditions than other subspecies.

The **objectives** of the Sonoran pronghorn VA include:

- 1) Determine where population is generally headed with regard to projected changes on landscape. How will climate change and associated changes in vegetation and free water affect the viability of the subspecies?
- 2) Which adaptation efforts are best to implement immediately and in the long-term (10+ years)?

Status: The biologist for Cabeza Prieta NWR has requested a VA for the Sonoran pronghorn. Funding from the Desert LCC may be available to assist the process.