Southwest Partners in Amphibian and Reptile Conservation

Regional Priority Species

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Introduction

Partners in Amphibian and Reptile Conservation (PARC) is an umbrella group of federal, state, and local agencies and non-government entities devoted to the conservation of herpetofauna. While it focuses on the United States of America, the organization also has an active outreach to bordering countries (Canada and Mexico) as well as the Caribbean. The PARC’s mission is “to conserve amphibians and reptiles and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public-private partnerships.” PARC is dedicated to conserving rare species and keeping common species common. More information on PARC can be found at www.PARCplace.org

PARC is divided into five geographic regions:

- Northwest
- Southwest
- Midwest
- Southeast
- Northeast

There are two commonly used delineations of the PARC regions. One of the maps is of the “member” states belonging to the region and the other is an ecological boundary map that crosses state and national boundaries. Each map has its purposes. For example, the state delineation is important for regional meetings and mailing lists. The ecological boundary map is important for regional outreach to other states and countries, and recognizes ecological provinces rather than the artificial construct of political boundaries. For the Regional Priority Species list, both are important, and were used in the process for species selection, as described below.
Each PARC region has a Regional Priority Species (RPS) list. There is no standard approach (i.e., national PARC guidance) to selecting RPS, because each region has its own characteristics, so regional flexibility in selecting RPS seems prudent.

**About the Southwest Region**

The Southwest Region of PARC (SWPARC) is the largest of the regions, both in terms of the number of member states and the ecological boundary area. The member states include:
- California
- Nevada
- Utah
- Arizona
- New Mexico
- Colorado
- Texas
- Oklahoma

The ecological boundary map includes large parts of all of these states as well as parts of northern Mexico. In addition, all states share ecological boundaries with other PARC regions, except for Arizona. The far northern reaches of California, Nevada, and Colorado are ecologically more similar to the Northwest Region. Eastern Texas and southeastern Oklahoma are more ecologically similar to the Southeast Region. Parts of Colorado and Oklahoma are ecologically allied with the Midwest Region.

Each region has its own characteristic habitats and herpetofauna. The core of the SWPARC region is characterized by being generally arid, having vast expanses of open space, and possessing high biological diversity. By contrast, the Northwest region has a cooler, mesic climate, so has a lower herpetofaunal diversity. It also has large amounts of open space. The Southeast region also has a high diversity of amphibians and reptiles, but is well known for its warm, mesic climate (hot and sticky in the summer). Of course, among regions, there are not absolutes.

The Habitat Management Guides (HMGs) and RPS process relied on state and international boundaries to construct the species list for each of the regions. This was done primarily because information on occurrence of amphibians and reptiles by states is precise, whereas ecological boundaries are not (e.g., there are ecotones; inclusions of different habitat types; and localized climate patterns, soil types, and vegetation communities).

The Southwest has the highest biological diversity of any PARC region, with over 400 species of amphibians and reptiles. According to the regional HMGs, the number of species range from 94 species in the Northwest to 246 species in the Southeast. Admittedly, part of the reason the Southwest has so many more species than the
Southeast is partly because of the inclusion of Texas, a large and very biologically diverse state, spanning western, midwestern, and eastern herpetofaunal elements. Because most of the Southwest Region is relatively warm and dry, the characteristic herpetofauna is composed largely of species that have adapted to deserts or other arid regions, or inhabit mesic and aquatic habitats within arid areas. The highest diversity of squamates (lizards and snakes) is in the American Southwest. In particular, lizards are better represented than in any other region (96 mostly Southwestern endemic species, with only 19 additional species in the rest of the country). Surprisingly, SWPARC region also has a relatively high diversity of amphibians. For example, the hot and xeric area of southern Arizona has nearly as many species (n = 19) as western Washington (n = 20), an area famous for its mild temperatures in a temperate rain forest. However, in an area as arid as the Southwest (exacerbated by prolonged drought from to climate change), it should not be surprising that a large percentage of RPS are amphibians, due to their need for mesic environments or surface water. Turtles are not well represented, except in eastern Texas and Oklahoma, an area more herpetologically similar to the Southeast Region, as evidenced by the ecological boundary map.

**Definition**

The SWPARC regional priority species list is a list of species of amphibians and reptiles that the SWPARC RPS Working Group and other contributors determined has high priority conservation needs within the SWPARC ecological region. It is a regional list of species for which there is genuine concern that the species is headed for extinction or extirpation within the United States of America.

**Why another list?**

The goal of the RPS list is not to replace or supersede any list already available, but rather provide a regional context to individual states and federal agencies.

During the process of selecting RPS, the working group was often asked “why do we need another list?” The question was usually followed with a statement that “each of the states already has their list of species of conservation concern.” People were often referring to the state lists of “Species of Greatest Conservation Need (SGCN).” The SGCN were developed in all states as part of State Wildlife Action Plans. In addition to SGCN, other lists available to land managers are those that list sensitive species lists for federal government agencies or county and local government lists, and even lists from non-government entities.

In a nutshell, the SWPARC RPS list is the only list that is regional in scope, corresponding with characteristic herpetofaunal elements within similar ecological provinces. The regional approach does not recognize state boundaries, but it does recognize the international boundary (Mexico). The rationale is that state boundaries
are an artificial construct that effectively “cut off” species ranges based on political, rather than ecological attributes. The state lists consider a species’ range within the state, while the RPS list generally considers the species itself (save the Mexico caveat, below). This is not to say that one approach or list is better than the other, as both state-centric and region-centric lists are useful, depending on the needs and objectives of the end-user. All states have their SGCN lists and all states have management guidance for those species they are concerned about within their boundaries (i.e., the State Wildlife Action Plans). So, state management mechanisms are already in place and each state is doing its part to help conserve its native herpetofauna. Similarly, there is often management guidance for species on federal, county, local government, and non-government organizations (NGO) lists. The SW RPS list is another tool in the toolbox, and if you have regional objectives, then you use your RPS list; if you have state objectives, you use the SGCN list.

Here is an example of state and regional differences. The Gila Monster (Heloderma suspectum) is on the SGCN lists in every state where it occurs, and is also protected in each of those states. At the state level, it is of conservation concern because of particular types of threats or limited distribution. In California, the range is very small and there are only a handful of records. Management in California considers this and there is guidance for managing the species; regulations are in place to protect it (e.g., no collecting without special permit). Since it is designated as a SGCN, there may be funding opportunities for research of conservation activities. Now consider this same species at the regional level. It has a fairly large range, being found in five states, in three deserts (Sonoran and Mojave, but also barely entering the Chihuahuan Desert) and semi-desert grasslands, plus it is relatively widespread in Sonora, Mexico. Although rarely encountered in the wild due to its secretive habits, in most of its range it is not uncommon. Because it receives protection in all five states and Mexico, this equates to some degree of regional (and national) protection.

This does not imply that state and regional conservation needs of species are mutually exclusive or species do not appear on both lists. State and regional efforts are separate, based on somewhat different selection criteria, so species’ conservation needs are addressed on a species-by-species basis. In particular, where SGCN and RPS lists often overlap is with state or small-range endemics and some species more typical of Mexico. A good example is that of the relict species of slender salamanders (genus Batrachoseps) in California. Conservation is needed at both state and regional levels, because they are rare and threatened within the state and within the region.

So, if we are not recognizing state boundaries, why are we recognizing the international boundary between the United States of America and Mexico? First, the states in the US are bound by a number of similar attributes, including a federal regulatory framework (e.g., Endangered Species Act and National Environmental Policy Act), that are not shared with Mexico, at least not in the same manner. Guidance for management of species (not without exception) in the US often has no jurisdiction in Mexico. Administration, land uses, and cultures in the two countries also differ. For example, there are many public land management agencies in the US, but not in Mexico. There
are also many public lands in the US, while in Mexico private lands and ejidos (system of communal farming lands) are the rule. Second, there are a large number of species typical of Mexico only found in the US near the border, so their range in the US is small. There are few artificial barriers between US state boundaries, but along the border, there are a number of threats associated with the border itself, including impenetrable walls and high-speed security roads, so some populations may already be genetically dissociated from Mexican populations. Inclusion of RPG based on this principle is admittedly biased toward recognizing peripheral species on the other side of a political boundary, but the SWPARC RPS Working Group decided it was within the best interest of the region to keep otherwise Mexican species extant in the US. Of course, not all peripheral species were considered to be of conservation need in the US, so just having a small range in the US did not warrant inclusion into the list, but it was a factor for consideration.

The above presents the rationale for existence of different lists, but does not completely explain how one would use different lists. At a very local level, such as a few hundred acres of land managed by The Nature Conservancy, there may be a list that highlights a few species of conservation concern typical of that area. As such, management activities revolve around those species in that area. Obviously, the SGCN list is a source for identifying state conservation needs. There are often funding opportunities for management and research of these species, sometimes through state sources, but also through federal sources. At the SWPARC regional level, the emphasis actually equates to species that are in conservation need throughout their range or in the entire United States. The SW RPS list will be useful in the establishment of Priority Areas for Reptile and Amphibian Conservation Areas1 (PARCA’s). Because the list emphasizes ecoregions rather than state or local delineations, it lends itself to other regional to national conservation efforts. For example, PARC (including SWPARC) is integrated into the Landscape Conservation Cooperative systems (LCC’s), another system that is ecoregion based, corresponding well to the SWPARC ecoregion (e.g., the Desert LCC is the heart of SWPARC). Similarly, the Trilateral Committee for Wildlife and Ecosystem Conservation and Management addresses national and international management conservation needs across the US and Mexico border, and area encompassing four US states, all within the SWPARC region.

It is anticipated that the PARC RPS lists will benefit from federal government support in a number of ways, such as management, legislation, and/or funding opportunities for conservation, because it emphasizes regional, national, and sometimes international conservation priorities. The PARC RPS lists are developed by experts at the regional level, and together provide a national framework for the conservation of amphibians and reptiles. The lists represent the best available science and professional judgment of experts, complemented by regional PARC products, including the Habitat Management Guides and PARCA’s. The lists and other products are sanctioned by a multiple partner entity that specializes in conservation and management of amphibians at the national

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1 PARCAs are discussed in other documents, but are essentially areas established that highlight both state and regional species of conservation need and high biodiversity. In the SW Region of PARC, the development of PARCAs is starting at a state level, and then going through a regional filter (see below).
level (PARC). This umbrella organization is already has federal nexus. There is a full-time, paid Federal Agencies Coordinator and a Federal Agencies Steering Committee and PARC working groups. This federal nexus joins regional chapters, as well as state and non-government organizations, via the Joint National Steering Committee. In other words, PARC should become the "go-to" organization for federal conservation issues of amphibians and reptiles, just as Partners in Flight (PIF) is the go-to organization for national and regional conservation of birds (more on that below).

One could argue that the US Fish and Wildlife Service (FWS) is already the federal agency to address species at risk, because the agency manages the Endangered Species Act (ESA). However, there are numerous beaurocratic issues that constrain the FWS’s ability to protect many species. This agency is seriously backlogged and must review proposals for federal listing as they come in, regardless of the source. Often species are not carried forward because there is "not enough information" or do not meet listing criteria specific to the act. Even if the species is found to be at risk, more often than not, the end result is that species will be “warranted but precluded” (nothing will happen unless a lawsuit drives the process forward), or a Conservation Agreement precludes ESA listing. Conservation Agreements are not part of the ESA process per se, but can be just as effective for conservation of species. As an example, the Flat-tailed Horned Lizard was petitioned for listing three times and was never carried forward, despite significant threats to the species. Various agencies and NGO’s, with the help of SWPARC, developed an international Conservation Agreement to help conserve the lizard. Southwest PARC now organizes an annual training program to help with surveys to mitigate effects of ground-disturbing activities, much as ESA protection would, but without the additional beaurocratic hoops. In a nutshell, the RPS list is not the ESA, but it does consider protection by ESA and other mechanisms.

Partners in Flight is a partnership similar to PARC. It provides a case study of how regulations can be developed from priority species lists developed by umbrella partnerships. Executive Order 13186 specifically mentions that federal agencies can use PIF guidance to comply with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. By extension, this EO also provides the framework for other regulations, including the National Environmental Policy Act and National Forest Management Act. For example, the USDA Forest Service is directed by policy (at least in the SW Region) to use the PIF priority species list and Important Bird Areas (the bird area counterpart of PARCAs) in their specialist reports that form the basis for effects analyses to those species in Environmental Assessments and Environmental Impact Statements.

Perhaps the most alluring potential use for a list is demonstrated by PIF, which has been established for many years. There are numerous grant opportunities, including federal (e.g., management by FWS, LCC’s), that consider conservation and management of species on the PIF priority species list, ecoregion list (a finer scale than PARC ecoregions), and Important Bird Areas. It seems inevitable that as PARC is further developed, grant opportunities will arise.
In summary, a partnership-generated list developed by taxa experts at the regional to national level should open many doors of opportunity for conservation, management, research, and funding not available at state- or local-level programs. Having state, local, regional, and national tools available can only help to “conserve rare species and keep common species common,” important objectives of the PARC mission.

Process

The process of selecting SWPARC RPS spanned several years, partly because of changing Priority Species Working Group (PSWG) members (each annual meeting had mostly different members, but there was some continuity), but also because we were dealing with over 400 species, more than any other region. The process of selecting species was unique for SWPARC; establishing regional standards and guidance were not considered prudent by national PARC. Each region was allowed flexibility to develop the most useful species list for their region. Although the SW PSWG reviewed the process of other PSWG’s and other listing processes, such as the SGCN for various states, we ultimately decided on the approach presented herein.

Although a SW PSWG was initiated at the 2008 annual meeting, there were little more than discussions about the process to make the list, until the 2010 SWPARC annual meeting. At that time, previous discussions were carried forward and the process was established. The PSWG agreed upon the following:

- The primary purpose for making this list was to highlight species with the greatest conservation need for the region, which is also usually the same as national (herp distribution tends to be much more regional than birds and mammals, so regional usually equals national priority for species within in the SW Region)
- In order for the list to be useful, we would identify a small subset of species with the greatest conservation need. The group felt that 25-35 species seemed reasonable; relatively speaking, this would generally be a much smaller percentage that on state SGCN lists
- We would use a species-level approach
- We would use the taxonomy and nomenclature of Crother et al. (2008, but now updated to 2012)\textsuperscript{3} as the standard, although post-publication changes could be made to the list. The idea of recognizing subspecies of conservation need was considered, but due to the enormity of that task (>400 species, with many more infraspecific taxa and designations) and conceptual and logistical issues of the “subspecies” concept, infraspecific issues were diverted to the future or other listing entities (e.g. states can deal with subspecies, if desired). However, it was decided that infraspecific designations could be mentioned in a section of the Species Accounts in the Priority Species Guide.

\textsuperscript{2} Because the PSWG membership changed annually, we did not revisit the 2010 “founding” process and decisions in subsequent years, or the list would never come to fruition.

\textsuperscript{3} This is also the national PARC standard
• The list to use as a starting point would be from the Habitat Management Guide spreadsheet, then updated as needed. This starting list was a list of all species found in AZ, CA, CO, NM, NV, OK, TX, and UT.
• The group decided that state boundaries would not be recognized as criteria for listing species at a regional level, although the international boundary with Mexico was a consideration.
• Only species that are typical of the SWPARC region would be considered for RPS list, rather than also including species more typical of other regions (fringe-range species, save Mexico).
• Consider existing protections in developing the priority species list.
• Consider the ability to manage for species.
• All efforts should be made to discourage “charisma” as a selection criterion.
• All efforts should be made to discourage “favorite species” as a selection criterion.
• The list will be presented in a Priority Species Guide, designed as an end user-friendly hard-copy or pdf publication.

The method the PSWG developed to meet this guidance was basically a three-tiered approach. First, there was a weighted scorecard ranking system, followed by input from herpetologists representative of all SWPARC member states (first expert oversight), and reviewed by PARC participants at the 2012 annual meeting (second expert oversight). This three-tiered approach used as a system of checks and balances, by providing a relatively unbiased foundation, followed by expert review, then finally PARC oversight. The list is to be updated periodically, to stay current.

**Weighted Scorecard Approach**

The first of the three-tiered approach was to develop a scorecard that considered factors to go into a scorecard ranking system, including the general criteria sanctioned by the 2010 PSWG. Species found primarily in other regions were excluded from the list for further consideration. Some of the caveats above were front-loaded into the instructions to respondents, accompanying the scorecard. This included direction such as: “do not consider state boundaries as criteria; only consider the entire species range within the SWPARC ecoregion” and “do not select favorite species or charismatic species.” The scorecard had four overarching themes that were to be considered in ranking. These were:

- Extinction or extirpation risk
- Range, distribution, and population status
- Ability to manage

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4 Although this would seem obvious to some, charismatic species and favorite species are not criteria based on conservation needs; rather they are an artifact of human nature. Such species have invariably made their way into other lists, including federal sensitive species lists, state lists, and even the ESA. Thus, there had to be a concerted effort to ensure this would not happen with SW PARC RSL.

5 This document is an intermediate product until that publication can be finalized.
• Threats

After each of the criteria was developed for these four themes, it became apparent that the scorecard would have to be weighted in order to effectively detach priority species from the pack. The way we decided to ensure spread by weighting was to use 0, 5, and 10 for scores. Thus, priority species would be teased out by having a much higher frequency of “10” scores than “5” or (especially) “0” scores. Prior to sending out the scorecard and instructions to potential respondents, the PSWG ran a “red-face” test on a number of species to ensure results were logical. The red-face test was done by ranking some species that everyone should agree are in need of conservation vs. some that everyone should agree on are not. Not surprisingly, we passed the red-face test with flying colors. After an internal review and refinement, the instructions and scorecard were sent out to the entire SWPARC mailing list. We only asked that people familiar with numerous species across their range respond to the questionnaire. This was an effort to exclude single-taxa and sub-regional bias, as with (for example) people who only work with Boreal Toad, *Lithobates pipiens* complex, or *Gopherus*, especially if expertise was limited to a single state or regional subset.

Below is the scorecard ranking questionnaire. The actual scores were tabulated on a spreadsheet.

**EXTINCTION OR EXTIRPATION RISK**

1. **Global Conservation Ranking** (NatureServe)
   - G1 or G2: 10 pts.
   - G3: 5 pts.
   - G4 or G5: 0 pts.

2. **Extirpation risk from a significant portion of its range**: Is the level of extirpation risk from a significant portion of its range high, moderate or low?
   - High risk: 10 pts.
   - Moderate or low risk: 5 pts.
   - Very low or no risk: 0 pts.

3. **Global extinction risk**: Is the level of global extinction risk high, moderate or low?
   - High risk: 10 pts.
   - Moderate risk: 5 pts.
   - Low risk: 0 pts.

4. **Phylogenetic uniqueness**: How unique is this species or the genus of the species relative to others?
   - Monotypic genus (the only genus in its family): 10 pts.
   - Monotypic species (the only species in its genus): 5 pts.
   - Multiple congeneric species or confamilic genera (multiple species within multiple genera): 0 pts.

**RANGE, DISTRIBUTION & POPULATION STATUS**

5. **Range in the United States**: Is the relative range of the species in the U.S. discrete, limited, moderate, or widespread?
   - Discrete: 10 pts.
   - Limited or moderate: 5 pts.
   - Widespread: 0 pts.
6. **Perceived abundance**: Is the perceived abundance for this species rare, uncommon or common?
   - Rare: 10 pts.
   - Uncommon: 5 pts.
   - Common: 0 pts.

7. **Population trend status**: Is the species population decreasing, stable, or increasing?
   - Large decrease or completely unknown: 10 pts.
   - Decreasing: 5 pts.
   - Stable or increasing: 0 pts.

8. **Range status**: Is the species range decreasing, stable, or increasing?
   - Large decrease: 10 pts.
   - Moderate or slight decrease: 5 pts.
   - Stable or increasing: 0 pts.

**ABILITY TO MANAGE**

9. **Land ownership**: Consider the proportion of a species distribution over its range that occurs on protected lands as well as the lands’ relative level of protection afforded to herpetofauna or their habitats (national wildlife refuges, state wildlife management areas, national parks, state parks, military installations, wilderness, areas of critical environmental concern, private lands, etc.).
   - Low or no protection afforded: 10 pts.
   - Moderate protection afforded: 5 pts.
   - High protection afforded: 0 pts.

10. **Management protection**: What level of protection is afforded by land or wildlife management agencies, based on species listings and designated critical habitat for species?
    - Low: not listed in any way and no critical habitat designated. 10 pts.
    - Moderate: listed in a non-regulatory sense (e.g., Wildlife Action Plan Species of Greatest Conservation Need, county level Habitat Conservation Plan covered species, etc.) or critical habitat has been designated. 5 pts.
    - High: Federally or State listed as endangered, threatened, sensitive, or otherwise protected. 0 pts.

11. **Perceived collection pressure and/or lack of collection regulations**: Is the species undergoing high, medium, or low collection pressure? Or is there a lack of collection regulations or enforcement specifically impacting this species?
    - High collection pressure and/or little or no collection regulations or enforcement: 10 pts.
    - Moderate collection pressure and/or moderate collection regulations or enforcement: 5 pts.
    - Low or no collection pressure and/or sufficient collection regulations or enforcement: 0 pts.

**THREATS**

12. **Climate change**: Is the species vulnerability to climate change perceived to be high, moderate or low? For example, most species with low dispersal abilities that are strongly associated with, or completely restricted to, riparian areas or mountain tops are expected to be impacted by climate change in the southwest.
    - High: 10 pts.
    - Moderate: 5 pts.
    - Low: 0 pts.
13. **Development, habitat loss, and/or fragmentation**: Consider development and its associated infrastructure and resulting air, soil, and water pollutants for residential, agricultural, energy, or industry purposes. Is this species vulnerability to habitat development/conversion, degradation, fragmentation and/or loss high, moderate, or low across its range?
   - High: 10 pts.
   - Moderate: 5 pts.
   - Low: 0 pts.

14. **Invasive species**: How is the species population affected by invasive species (flora or fauna)?
   - Highly affected: 10 pts.
   - Moderately affected: 5 pts.
   - Barely affected or not affected at all: 0 pts.

15. **Disease**: Is the species vulnerability to population altering disease(s) high, moderate, or low?
   - Populations are highly altered by disease(s): 10 pts.
   - Populations are moderately altered by disease(s): 5 pts.
   - Populations are not altered by disease(s): 0 pts.

As can be seen from the scorecard, anyone familiar with a given species would not have too much trouble deciding which of the three choices (0, 5, 10, generally corresponding to High, Moderate, or Low, or similar qualitative spread across the range of potential values) were appropriate for the 15 ranking criteria. However, this was a fairly daunting task for someone familiar with many species. The results were compiled. Not surprisingly, there was not a large sample of respondents, and some species that are not generally well known were underrepresented. So, there was an additional outreach to fill in the gaps by contacting people from certain states. Even with the additional outreach, input from California was not adequate. Some communication from select Californian herpetologists basically stated that the resources for us to determine priority species at a regional scale were already available from a large statewide effort to prioritize species of conservation concern. So, we took the draft state list of these species and applied them to a filter using the concepts and weighting factors in the scorecard. The resulting species list from the entire region was then sent out for expert state review.

**Expert State Review (First Oversight)**

There were state herpetologists who were well-versed not only in species occurring in their respective states, but also having a good working knowledge of herpetology in the American Southwest. The list from the weighted scorecard was sent to the state representatives selected by the PSWG (except California, see scorecard discussion). After input from the state representatives, the list was further refined. This first expert review period was especially useful for species from Texas (excluding species typical of the Southeast Region, of course). Of course, the state review still had all of the same criteria for listing as in the scorecard portion of the selection process. However, there were sometimes species-specific and regional considerations not tiering to scoring that
might cause a particular species to be selected when not warranted, or vice versa (hence, the need for second oversight).

SWPARC Review (Second Oversight)

The resulting draft list was first reviewed by the PSWG and SWPARC Steering Committee. It was later reviewed by participants of the 2012 SWPARC annual meeting. Again, this review also had all of the same criteria for listing as in the scorecard portion of the selection process. Only one species (Flat-tailed Horned Lizard) was dropped as of this review, due to significant protection from a conservation agreement—and the fact that SWPARC sponsors training workshops to help implement the agreement, including methods for pre-disturbance surveys. No species were added during this review. However, during the first and second oversight discussions, it became apparent there were (1) too many species to effectively address, (2) several of the species are closely related and ecologically similar, with similar threats. So, in order to ameliorate these concerns, it was decided that the species would be put into groups with similar concerns, where applicable. In this manner, the number of written accounts in the Priority Species Guide should be reasonable, and conservation concerns would not be lost for any of the species.

Results

Of the 337 species carried forward into the process (those considered more typical of the SW Region than any other region), 252 were scored by about 20 participants in the initial selection phase. Scoring sample size by species ranged from 0-7. Scores ranged from 0 to 95. For the scorecard portion, the PSWG decided on selecting species whose score was 60 or greater. After the oversight portions of the selection, the resulting list was considered final for 2012. This list (Table 1) represents the first official SWPARC Priority Species List, December 2012 version. There are 31 species or species groups, representing 62 species, about 15% of the total number of species in the SWPARC Region.

During the taxonomic and nomenclatural update of Crother et al. (2012), one species (Gray Checkered Whiptail, *Aspidoscelis dixoni*) was considered subsumed into *A. tesselata*, so it was taken out of SWPARC this list. Some other species adjustments were made between Crother et al. (2008) and Crother et al. (2012), including the description of new *Batrachoseps*, but this list has not completely incorporated Crother (2012). However, all species listed are considered valid by Crother et al. (2012).

Updates to Priority Species Guide

This document serves as the initial SWPARC Priority Species Guide, outlining the rationale and process, as well as species selected. Southwest PARC is planning to
expand the guide to include other sections and thus make the publication even more useful for agencies and non-government organizations in managing the species and their habitats. The updated version will likely be a user-friendly online having species and species-groups accounts. The accounts will have:

- Photographs
- Range maps, including areas of extirpation
- A summary of threats
- Existing conservation measures
- Recommended conservation approaches
- Identification of relevant laws
- Identification of relevant PARCAs (see below)

**PARCAs**

The Priority Amphibian and Reptile Conservation Areas (PARCAs) are similar to the well-known Important Bird Areas, except they target reptiles and amphibians, of course. These areas identify locations where species of conservation concern and biodiversity hotspots occur. The PARCAs are not to be so specific that poachers can use them as a resource map to aid in their illegal trade. A PARCA selection guidance manual has just been developed by the national working group (PARC 2012). At the time of this writing, the report is not yet available publicly. There was Southwest PARC representation on the national team. This effort, though national in scope, did have a strong state bias (e.g., state status and SGCN are among the criteria for area selection). This would seem to be somewhat counter to the selection of priority species using regional, rather than state, criteria, for SWPARC. However, at the SWPARC meeting in 2012, the SW Priority Species Working Group decided we needed to have RPS integrated into the selection process of PARCAs, and using the individual states as a starting point was actually and effective way to get at the regional objective for SW PARCAs. Currently, because of the overlap of RPS and PARCA objectives, there is a single working group overseeing both.

After approval of the SWPARC RPS list, the 2012 working group decided PARCA selection would start at the individual state level. Participants of all states were tasked with developing a first cut of likely areas to be considered. The state to regional nexus was not a problem because the state-level SGCN is always more inclusive than the RPS list, so no species would likely be left out of a final, regional approach. When all states have completed this task, the working group will compile input from all states, and develop a rough draft for the region. For example, numerous species on the SWPARC Priority Species list occur across the Arizona-New Mexico state line in similar, contiguous habitats (e.g., Chiricahua Leopard Frog, Lowland Leopard Frog, Mexican Gartersnake, and Narrow-headed Gartersnake), so areas identified at the state levels can be modified to make a more meaningful system of PARCAs at the regional level. Although SWPARC has a regional approach, it should be noted that PARCAs can be identified at the state level, even if there are no SWPARC RPS present, as allowed by
the PARCA selection guideline document. It is also possible that PARCAs may cross regional and international (Mexico) boundaries.

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Members of the 2012 SW Priority Species and PARCA working group included: Polly Conrad, Tom Giermakowski, Kenn Guadalupe, Danna Hinderlee, Clint Henke, Larry Jones, Tom Jones, Bruce Palmer, Leland Pierce, Mason Ryan, Steve Spear, and Rod Wittenberg.
Chiricahua Leopard Frog (*Lithobates chiricahuensis*)

Lowland Leopard Frog (*L. yavapaiensis*)

Relict Leopard Frog (*L. onca*)

Tarahumara Frog (*L. tarahumarae*)

Arizona Treefrog (*Hyla wrightorum*)

American Bullfrog (*L. catesbeiana*)

Figure 1. Closely related amphibian species, such as the ranid frogs in the top four photos, have similar threats (disease, surface water loss, invasive species), so they can often be managed for as a group, as with a multiple-species management plan. The Arizona Treefrog may co-occur with *L. chiricahuensis* in the Huachuca Mountains, where there is a distinct population that is similarly threatened. One of the threats to most ranid frogs is the invasive American Bullfrog (native to the eastern U.S.), so management efforts may need to target bullfrog eradication. Some bullfrog removal efforts have proven extremely successful in ranid population recovery. Photos © L. L.C. Jones.
Thornscrub Hook-nosed Snake (*Gyalopion quadrangulare*)

Sonoran Desert Tortoise (*Gopherus morafkai*)

Bezy’s Night Lizard (*Xantusia bezyi*)

Blainville’s Horned Lizard (*Phrynosoma blainvillii*)

Mohave Fringe-toed Lizard (*Uma scoparia*)

Dunes and wind power facility, Palm Springs, CA

Figure 2. Representative reptiles. These species have a variety of threats, hence various management options. Left-right: The Thornscrub Hook-nosed Snake has a tiny US range along the US border, an area of pedestrian fences and high-speed traffic. The two desert tortoise species are icons of reptile research and management. Bezy’s Night Lizard is threatened by its small range and habitat destruction. Blainville’s Horned Lizard has succumbed to urban development. Fringe-toed lizards as a group have very specialized habitats—sand dunes—and renewable energy developments in lowland deserts offer a challenge to resource managers. Photos © L. L.C. Jones.
Southwest Partners in Amphibian and Reptile Conservation

Regional Priority Species

AMPHIBIANS

Single Species

- California Tiger Salamander (Ambystoma californiense)
- Mexican White-lipped Frog (Leptodactylus fragilis)
- Mexican Treefrog (Smilisca baudinii)

Groups

Slender Salamanders (genus Batrachoseps)
- Inyo Mountains Salamander (B. campi)
- Hell Hollow Slender Salamander (B. diabolicus)
- San Gabriel Mountains Slender Salamander (B. gabieli)
- Sequoia Slender Salamander (B. kawia)
- Kings River Slender Salamander (B. regius)
- Relictual Slender Salamander (B. relictus)
- Kern Plateau Salamander (B. robustus)
- Tehachapi Slender Salamander (B. stebbinsi)

Web-toed Salamanders (genus Hydromantes)
- Limestone Salamander (H. brunus)
- Mount Lyell Salamander (H. platycephalus)
- Shasta Salamander (H. shastae)

Woodland Salamanders (genus Plethodon)
- Scott Bar Salamander (P. asupak)
- Jemez Mountain Salamander (P. neomexicanus)
- Siskiyou Mountains Salamander (P. stormi)

Ranid Frogs (genera Lithobates and Rana)
- Chiricahua Leopard Frog (L. chiricahuensis)
- Relict Leopard Frog (L. onca)
- Northern Leopard Frog (L. pipiens)
- Tarahumara Frog (L. tarahumarae)
- Foothill Yellow-legged Frog (R. boylii)
- California Red-legged Frog (R. draytonii)
- Southern Mountain Yellow-legged Frog (R. muscosa)

North American Toads (Genus Anaxyrus)
- Arroyo Toad (A. californicus)
- Yosemite Toad (A. canorus)
- Black Toad (A. exsul)
- Arizona Toad (A. microscaphus)
- Amargosa Toad (A. nelsoni)
REPTILES

Single Species

- Orange-throated Whiptail (*A. hyperythra*)
- Baja California Ratsnake (*Bogertophis rosaliae*)
- Southern Rosy Boa (*Charina umbbratica*)
- Regal Black-striped Snake (*Coniophanes imperialis*)
- Reticulate Banded Gecko (*Coleonyx reticulatus*)
- Switak’s Banded Gecko (*C. switaki*)
- Reticulate Collared Lizard (*Crotaphytus reticulatus*)
- Baja California Collared Lizard (*C. vestigium*)
- Speckled Racer (*Drymobius margaritiferus*)
- Panamint Alligator Lizard (*Elgaria panamintina*)
- Cope’s Leopard Lizard (*Gambelia copeii*)
- Blunt-nosed Leopard Lizard (*G. sila*)
- Mohave Desert Tortoise (*Gopherus agassizii*)
- Sonoran Desert Tortoise (*G. morafkai*)
- Thornscrub Hook-nosed Snake (*Gyalopion quadrangulare*)
- Spot-tailed Earless Lizard (*Holbrookia lacerata*)
- Blainville’s Horned Lizard (*Phrynosoma blainvillii*)
- Dunes Sagebrush Lizard (*Sceloporus arenicolus*)
- Blue Spiny Lizard (*S. cyanogenys*)

Species Groups

Black-headed Snakes (genus *Tantilla*)
- Mexican Black-headed Snake (*T. atriceps*)
- Chihuahuan Black-headed Snake (*T. wilcoxi*)
- Yaqui Black-headed Snake (*T. yaquia*)

North American Gartersnakes (genus *Thamnophys*)
- Mexican Gartersnake (*T. eques*)
- Giant Gartersnake (*T. gigas*)
- Narrow-headed Gartersnake (*T. rufipunctatus*)

Fringe-toed Lizards (genus *Uma*)
- Coachella Fringe-toed Lizard (*U. inornata*)
- Colorado Desert Fringe-toed Lizard (*U. notata*)
- Yuman Desert Fringe-toed Lizard (*U. rufopunctata*)

Night Lizards (genus *Xantusia*)
- Bezy’s Night Lizard (*X. bezyi*)
- Sandstone Night Lizard (*X. gracilis*)
- Sierra Night Lizard (*X. sierrae*)