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## Data and Research Needs 2017

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### Cultural Resources

- Archaeological and ethnographic research in Deer Creek. The goal of the research would be to discern the archaeological chronology and purpose of man-made features on the west slope of the drainage and to synthesize human use and possible agricultural development of that part of the canyon.
  - Re-inventory and re-record archaeological sites on the Walhalla Plateau. Systematic inventory of the area is more than 30 years old. Archaeological sites need to be recorded using current methods and recording forms. Through this research come to a more in-depth understanding of the chronological and human use patterns in this part of the canyon.
  - Archaeological and ethnographic inventory in the Pasture Wash and Desert View areas. This research seeks to understand the breadth and complexity of settlement and use of the South Rim during the prehistoric and historic periods, particularly of ancestral and modern Native American peoples.
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### Fisheries

- Colorado pikeminnow reintroduction feasibility study (see Comprehensive fish management plan)
  - Natal origin study of high-risk predatory non-native species (also a priority in our CFMP)
  - Modeling of stream channel sensitivity to watershed disturbance data to assess overall trend in species composition and determination of overall condition and trend of the fish community
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### Physical Resources

- Continuous water quality and quantity monitoring using stream gauges
  - Spring Inventories for water quality, quantity, flora, and fauna
  - Cave data collection of sediment, microbiota, water to determine ecology and vulnerability
  - Cave visitation data (paired with bat counts)
  - Cave paleontology (Pleistocene deposits, giant ground sloth, Harrington Mountain Goat, etc).
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### Vegetation

- Database Management
  - Integration of disparate datasets to generate usable, comparable data to determine long-term trends in the mainstem and tributaries
- Measure changes in vegetation along tributaries
- Data on tamarisk removal using consistent methods
- Tamarisk beetle effects on the hydro-riparian areas along the mainstem and tributaries
- Trends in tamarisk mortality along the mainstem and tributaries using consistent methods
- Current status of marshes along the river corridor
- Riparian woodlands - historical (pre- and post-dam) and current extent and status, including groundtruthing known areas

- Regular surveys for exotic species at springs, especially on rim areas subject to impacts from ungulates and inner canyon areas with high human visitation
  - Spatial data for at least 3 special-status plant taxa known to occur in the analysis area (*Ipomopsis tridactyla*, *Phyllodoce empetriformis*, and *Silene menziesii*)
  - Sampling surveys across less-visited areas of the park for special-status species to improve understanding of spatial distributions
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### **Wildlife**

- Data collection of wildlife range expansion (or contraction) due to climate-induced changes
  - Information on the trend and distribution of javelina in GRCA, and about their effects on other park resources
  - The history and current status of and trends in the north and south rim elk populations
  - Elk habitat use patterns and interactions with other ungulates, predators, and humans
  - Social science research to develop new, more effective ways to convince hunters to reduce or eliminate the use of lead-based ammunition in carcasses available to scavengers
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### **Visitor Experience**

#### *Recreational resources*

- Improved understanding of the density of users and activities in the Greater Grand Canyon landscape beyond the boundaries of Grand Canyon NP, and evaluation of how stressors may impact the broader recreational landscape
- Carrying capacity/visitor capacity studies

#### *Night skies*

- Repeat measures of sky quality indices to monitor and track trends in data across the landscape

#### *Wilderness*

- Targeted surveys of biodiversity, improved spatial information, and information on the effects of management actions and treatments for all jurisdictions in the study extent as related to wilderness qualities and objectives