# GCDAMP Goal 1: Protect or improve the aquatic food base so that it will support viable populations of desired species at higher trophic levels.

RIN 1.1 - What are the fundamental trophic interactions in the aquatic ecosystem?

RIN 1.1.1/1.1.2 - How are the composition and biomass of primary producers between GCD and the Paria River affected by flow and water quality (including nutrients, temperature, light regime, toxins, dissolved oxygen), waterborne diseases, or other factors?

RIN 1.1.2 - What is the estimated productivity for the reach between GCD and the Paria River? (Note: If the cost of obtaining these data, relative to the benefit of the information suggests the information is not worth the expense, this RIN will not be pursued.)

RIN 1.1.3 - How do top-down effects (grazing and predation) on primary producers affect food base productivity?

RIN 1.1.4 - What are the habitat characteristics between GCD and the Paria River that most affect primary productivity? How are these characteristics affected by GCD operations?

RIN 1.2 - How are the production, composition, density, and biomass of the benthic invertebrate community affected by primary productivity vs. allochthonous inputs?

RIN 1.2.2 - What is the estimated productivity of benthic invertebrates for the reach between GCD and the Paria River? (Note: If the cost of obtaining these data, relative to the benefit suggests the information is not worth the expense, this RIN will not be pursued.)

RIN 1.2.3 - How do top-down effects (grazing and predation) affect the abundance and composition of benthic invertebrates?

RIN 1.2.4 - What are the habitat characteristics between GCD and the Paria River that most affect benthic invertebrates? How are these characteristics affected by GCD operations?

RIN 1.3 - What food base criteria do other agencies use to assess aquatic ecosystem health?

RIN 1.3.1 - How are the composition and biomass of primary producers in the CRE below the Paria River affected by flow and water quality (including nutrients, temperature, light regime, toxins, dissolved oxygen), and waterborne diseases, or other factors?

RIN 1.3.2 - What is the estimated primary productivity in the CRE below the Paria River? (Note: If the cost of obtaining these data, relative to the benefit of the information suggests the information is not worth the expense, this RIN will not be pursued.)

RIN 1.3.3 - How do top-down effects on primary producers (grazing and predation) affect food base productivity?

RIN 1.3.4 - What are the habitat characteristics in the CRE below the Paria River that most affect primary productivity? How are these characteristics affected by GCD operations?

RIN 1.4 - What is the current carbon budget for the CRE?

RIN 1.4.1 - How are the composition and biomass of benthic invertebrates in the CRE below the Paria River affected by flow, water quality (including nutrients, temperature, light regime, toxins, dissolved oxygen), new invasive species, waterborne diseases, or other factors? (Note: If the cost of obtaining these data, relative to the benefit suggests the information is not worth the expense, this RIN will not be pursued.)

RIN 1.4.2 - What is the estimated productivity of benthic invertebrates in the CRE below the Paria River? (Note: If the cost of obtaining these data, relative to the benefit of the information suggests the information is not worth the expense, this RIN will not be pursued.)

RIN 1.4.3 - How do top-down effects (grazing and predation) affect the abundance and composition of benthic invertebrates?

RIN 1.4.4 - What are the habitat characteristics in the CRE below the Paria River that most affect benthic invertebrates? How are these characteristics affected by GCD operations?

RIN 1.5.1 - How are the composition and biomass of drift in the CRE affected by flow and water quality (including nutrients, temperature, light regime, toxins, dissolved oxygen), and waterborne diseases, or other factors?

RIN 1.5.2 - How do top-down effects (grazing and predation) affect the abundance and composition of drift?

RIN 1.5.3 - How has the value and availability of drift as a food source for HBC changed with the implementation of ROD operations?

# GCDAMP Goal 2: Maintain or attain viable populations of existing native fish, remove jeopardy from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat.

RIN 2.1.1 - What is the minimum population size of HBC that should be sustained in the LCR, to ensure a viable spawning population of HBC in the LCR?

RIN 2.1.2 - Quantify sources of mortality for humpback chub (HBC) 51 mm in rearing habitats in the Little Colorado River (LCR) and mainstem, and determine how these sources of mortality are related to dam operations.

RIN 2.1.3 - What is the relationship between size of HBC and mortality in the LCR and the mainstem? What are the sources of mortality (i.e., predation, cannibalism, other) in the LCR and the mainstem?

RIN 2.1.4 - What habitats enhance recruitment of native fish in the LCR and mainstem? What are the physical and biological characteristics of those habitats?

RIN 2.1.5 - Determine the timing and quantity of YoY HBC dispersal (passive and active) from the LCR.

RIN 2.2.1 - What is a viable population and what is the appropriate method to assess population viability of native fish in the CRE? What is an acceptable probability of extinction over what management time period for HBC throughout the CRE?

RIN 2.2.2 - Determine if a population dynamics model can effectively predict response of native fish under different flow regimes and environmental conditions.

RIN 2.2.3 - What are the measurable criteria that need to be met in order to remove jeopardy for HBC in the Colorado River ecosystem (CRE)?

RIN 2.2.4 - What is the relationship between the ―aggregations‖ in the mainstem and LCR? Are mainstem aggregations ”sinks” of the LCR? Are aggregations real or due to sampling bias?

RIN 2.2.5 - What are the appropriate habitat conditions for HBC spawning? Where are these found? Can they be created in the mainstem?

RIN 2.2.6 - What are the criteria for establishment of spawning aggregations (i.e., how does one determine if it is “established”)?

RIN 2.2.7 - Determine if implementation and operation of the TCD and/or steady flows represent a technically feasible, ecologically sustainable, and practical option for establishing mainstem spawning.

RIN 2.2.8 - What combination of dam release patterns and nonnative fish control facilitates successful spawning and recruitment of HBC in the CRE?

RIN 2.2.9 - What is the appropriate role of HBC augmentation as a management strategy to establish mainstem spawning aggregations?

RIN 2.2.10 - What techniques are available to determine natal stream of fishes in the CRE?

RIN 2.2.11 - What are the impacts of current recreational activities on mortality, recruitment and the population size of HBC?

RIN 2.2.12 - What are the impacts of research activities on mortality, recruitment, and the population size of HBC?

RIN 2.3.1 - How do parasite/disease loads affect population viability?

RIN 2.3.2 - How will warming mainstem temperatures affect the abundance and distribution of parasites/disease?

RIN 2.3.3 - How does nonnative fish control/affect disease/parasite loads? (Note: The concept is if there are fewer hosts, there will be a lower incidence of parasites.)

RIN 2.4.1 - What are the most effective strategies and control methods to limit nonnative fish predation and competition on native fish?

RIN 2.4.2 - Determine if suppression of nonnative predators and competitors increases native fish populations?

RIN 2.4.3 - To what degree, which species, and where in the system are exotic fish a detriment to the existence of native fish through predation or competition?

RIN 2.4.4 - What are the target population levels, body size, and age structure for nonnative fish in the CRE that limit their levels to those commensurate with the viability of native fish populations?

RIN 2.4.5 - What are the sources (natal stream) of nonnative predators and competitors?

RIN 2.4.6 - What are the population dynamics of those nonnative fish that are the major predators and competitors of native fish?

RIN 2.5.1 - If RBS were stocked into the CRE, what is the risk that hybridization with FMS would compromise the genetic integrity of either species?

RIN 2.5.2 - How do existing RBS and FMS affect the genetic integrity of either species? What are the factors contributing to this ongoing hybridization?

RIN 2.5.3 - What characteristics define suitable habitat for razorback sucker (RBS)? Does suitable habitat for RBS occur in the CRE?

RIN 2.5.4 - What is the feasibility and advisability of augmenting RBS in the CRE to attain a viable population including technical/legal/policy constraints?

RIN 2.5.5 - What are the genetic and ecological criteria for reintroducing RBS into the CRE?

RIN 2.5.6 - What are the measurable criteria that would need to be met to remove jeopardy for RBS in the CRE?

RIN 2.6.1 - What is a viable population?

RIN 2.6.3 - What are the physical and biological characteristics of habitats that enhance recruitment of FMS, BS, and SD populations in the CRE?

RIN 2.6.4 - What is the age structure, including relationship between age and size of FMS, BS, and SD in the CRE?

RIN 2.6.5 - How are movement patterns for FMS, BS, and SD in the CRE affected by age, natal stream, and dam operations?

RIN 2.6.6 - How is the rate of mortality for FMS, BS, and SD in the CRE related to individual body size? What are the sources of mortality for FMS, BS, and SD in the CRE?

RIN 2.6.7 - How does temperature modification in the mainstem affect recruitment and mortality for FMS, BS, and SD originating from tributary spawning?

# GCDAMP Goal 3: Restore populations of extirpated species, as feasible and advisable.

RIN 3.1.1 - What information (including technical, legal, economic, and policy issues) should be considered in determining the feasibility and advisability of restoring pikeminnow, bonytail, roundtail chub, river otter, or other extirpated species?

# GCDAMP Goal 4: Maintain a naturally reproducing population of rainbow trout above the Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.

RIN 4.1.1 - What is the target proportional stock density (i.e., tradeoff between numbers and size) for RBT in the Lees Ferry reach?

RIN 4.1.2 - What is the minimum quantity and quality of spawning substrate necessary for maintaining a wild reproducing RBT population in the Lees Ferry reach?

RIN 4.1.3 - To what extent is there overlap in the Lees Ferry reach of RBT habitat and native fish habitat?

RIN 4.1.4 - How does the genetics or ―strain‖ of RBT in the Lees Ferry reach influence the average size of fish creeled by anglers?

RIN 4.2.3 - How is the rate of emigration of RBT from the Lees Ferry reach to below the Paria River affected by abundance, hydrology, temperature, and other ecosystem processes?

RIN 4.2.4 - What is the target population size of RBT appropriate for the Lees Ferry reach that limits downstream emigration?

RIN 4.2.5 - To what extent is there overlap in the CRE below the Paria River of RBT habitat and native fish habitat?

RIN 4.2.6 - What is the rate of emigration of RBT from the Lees Ferry reach?

RIN 4.2.2 - What is the most effective method to detect emigration of RBT from the Lees Ferry reach?

RIN 4.2.6 - To what extent are RBT below the Paria River predators of native fish, primarily HBC? At what size do they become predators of native fish, especially HBC, i.e., how do the trophic interactions between RBT and native fish change with size of fish?

RIN 4.2.7 - What dam release patterns most effectively maintain the Lees Ferry RBT trophy fishery while limiting RBT survival below the Paria River?

# GCDAMP Goal 5: Maintain or attain viable populations of Kanab ambersnail.

RIN 5.1.1 - What constitutes population viability for KAS at Vaseys Paradise?

RIN 5.1.2 - What parameters have the greatest influence on population viability of KAS at Vaseys Paradise (e.g., parasites, predation, discharges, habitat size, quality, and human use/visitation)?

RIN 5.1.3 - Develop a population dynamic model to predict KAS viability under different flows and environmental conditions.

RIN 5.1.4 - Identify and evaluate alternative Management Actions to ensure viability of KAS at Vaseys Paradise where (1) the population dynamic model predicts loss of population viability, or (2) monitoring discovers substantial habitat or KAS population declines.

RIN 5.1.5 - What is the taxonomic identity of the Oxyloma snails at Vaseys Paradise? Is a change to the existing taxonomic status warranted?

RIN 5.1.6 - What is the range of occurrence of the ambersnail taxon found at Vaseys Paradise? (NOTE: Intended to address the issue of whether this is an endemic population or a relict population or part of a metapopulation.)

RIN 5.1.7 - What is the historic range of Oxyloma haydeni? Can this range be determined from subfossil or fossil evidence? (NOTE: This is intended to determine if this is a relict species and the initial work would be done at Vaseys Paradise, South Canyon and other probable sites within the CRE.)

RIN 5.1.8 - What are the measurable criteria that need to be met to remove jeopardy for KAS at Vaseys Paradise?

RIN 5.1.9 - How can incidental take for KAS at Vaseys Paradise be minimized?

RIN 5.2.1 - How does the size, quality, and recovery time of KAS habitat change following natural scours or other events?

RIN 5.2.2 - How does the size and quality of the habitat used by Kanab ambersnail (KAS) change in response to an experiment performed under the Record of Decision (ROD), unanticipated event, or other management action?

RIN 5.2.3 - How can remote sensing technologies be used to less intrusively and more cost effectively characterize and monitor KAS habitat at Vaseys Paradise (vegetation type and distribution)?

# GCDAMP Goal 6: Protect or improve the biotic riparian and spring communities, including threatened and endangered species and their critical habitat.

IN 6.1 - Develop GIS coverages of natural communities in the CRE to use in identification of status and trends.

RIN 6.1.1 - How has the abundance, composition, distribution, and area of the marsh community changed since dam closure (1963), high flows (1984), interim flows (1991) and the implementation of ROD operations (1996)?

IN 6.2 - Develop or adopt an existing ecological community classification system. The system should describe the composition and frequency of vascular plants, vertebrates, arthropods, and mollusks to an appropriate taxonomic level.

RIN 6.2.1 - How has the patch number, patch distribution, composition, and area of the NHWZ community changed since dam closure (1963), high flows (1984), interim flows (1991) and the implementation of ROD operations (1996)?

IN 6.3 - How is the abundance of vertebrate consumers affected by seasonal shifts in food base abundance in the CRE?

RIN 6.3.1 - How has the abundance, composition, and distribution of the OHWZ community changed since dam closure (1963), high flows (1984), interim flows (1991), and the implementation of ROD operations (1996)?

RIN 6.3.2 - What dam operations (Category A), or other management actions (Category B), have the potential to maintain the OHWZ community at the current stage elevation, or establish the community at a lower stage elevation?

IN 6.4 - How much allochthonous material (e.g., leaf litter) is exchanged between the terrestrial and aquatic systems?

RIN 6.4.1 - How have the abundance, composition, and distribution of the sand beach community changed since dam closure (1963), high flows (1984), interim flows (1991), and the implementation of ROD operations (1996)?

RIN 6.5.1 - Determine if nonnative species are expanding or contracting at a local scale (patch or reach).

RIN 6.5.2 - What dam operations (Category A), or other management actions (Category B), have the potential to increase or decrease the distribution and abundance of nonnative species?

RIN 6.5.3 - How has the abundance and distribution of nonnative species changed since dam closure (1963), high flows (1984), interim flows (1991) and the implementation of ROD operations (1996)?

RIN 6.6.1 - How is seep and spring habitat affected by variation in dam operations, variation in seep or spring flow, and variation in water quality? How do flow rates and water quality parameters at seeps and springs compare with historic measurements?

RIN 6.6.2 - Which seeps and springs are culturally important or occupied by rare and endemic species?

RIN 6.6.3 - How has the composition, abundance and distribution of seep and spring communities changed since dam closure (1963), high flows (1984), interim flows (1991) and the implementation of ROD operations (1996)?

RIN 6.6.4 - What is the distribution, patch size, total area, and composition of seep and spring communities and the flow rate and water quality of all seeps and springs within the CRE?

RIN 6.7.1 - What is the function of the CRE as a migratory corridor for southwestern willow flycatcher (SWWF)?

RIN 6.7.2 - What is the food base that supports SWWF and other terrestrial vertebrates?

RIN 6.7.3 - What constitutes suitable SWWF habitat?

RIN 6.7.4 - How has the abundance, distribution and reproductive success of SWWF changed since dam closure (1963), high flows (1984), interim flows (1991) and the implementation of ROD operations (1996)?

RIN 6.7.5 - What is the need, feasibility, and priority of maintaining habitat suitability for southwestern willow flycatcher in the CRE?

# GCDAMP Goal 7: Establish water temperature, quality, and flow dynamics to achieve the GCDAMP ecosystem goals.

RIN 7.1.1 - What are the desired ranges of spatial and temporal patterns of water temperatures for the CRE?

RIN 7.1.2 - What are the most likely downstream temperature responses to a variety of scenarios involving a TCD on GCD?

RIN 7.1.3 - What are the potential ecological effects of increasing mainstem water temperatures?

SIN 7.2.1 - How do the hydrodynamics and stratification of Lake Powell influence the food base or fisheries downstream?

SIN 7.2.2 - Which water quality variables influence food base and fisheries in the CRE?

RIN 7.2.1 - Which major ions should be measured? Where and how often?

RIN 7.2.2 - Which nutrients should be measured? Where and how often?

RIN 7.2.3 - Which metals should be measured? Where and how often?

RIN 7.2.4 - What are the waterborne pathogens that are a threat to human health? How should they be monitored? Where and how often?

RIN 7.3.1 - Develop simulation models for Lake Powell and the Colorado River to predict water quality conditions under various operating scenarios, supplant monitoring efforts, and elucidate understanding of the effects of dam operations, climate, and basin hydrology on Colorado River water quality.

RIN 7.3.1.a - Determine the status and trends of chemical and biological components of water quality in Lake Powell as a function of regional hydrologic conditions and their relation to downstream releases.

RIN 7.3.1.b - Determine stratification, convective mixing patterns, and behavior of advective currents in Lake Powell and their relation to GCD operations to predict seasonal patterns and trends in downstream releases.

SIN 7.3.1 - Measure appropriate water quality parameters to determine the influence of these parameters on biological resources in the CRE.

RIN 7.3.2 - How accurately can modeling predict reservoir dynamics and operational scenarios?

RIN 7.3.3 - How do dam operations affect reservoir limnology?

RIN 7.4.2 - What is the desired pattern of seasonal and annual flow dynamics associated with powerplant operations, BHBFs, HMFs, or other flows to meet GCDAMP Goals and Objectives?

RIN 7.4.3 - How do changes in flow volume and rate of change affect food base and energy productivity in the CRE?

RIN 7.4.4 - How does flow rate and fluctuation affect habitat availability and utilization by fish and other organisms?

# GCDAMP Goal 8: Maintain or attain levels of sediment storage within the main channel and along shorelines to achieve Adaptive Management ecosystem goals.

IN 8.1 - If sediment cannot be preserved in the system using available management actions, what is the feasibility (including technical, legal, economic, and policy issues) of sediment augmentation as a means of achieving this goal?

RIN 8.1.1 - What is the longitudinal variability of fine-sediment inputs, by reach?

RIN 8.1.2 - What is the temporal variability of fine-sediment inputs, by reach?

RIN 8.1.3, 8.2.1, 8.3.1, 8.4.1, 8.5.6 - What fine sediment abundance and distribution, by reach, is desirable to support GCDAMP ecosystem goals? (Note: Definition of “desirable” will be derived from targets for other resources and managers goals.)

RIN 8.5.1 - What elements of ROD operations (upramp, downramp, maximum and minimum flow, modified low fluctuating flow (MLFF), habitat maintenance flow (HMF), and BHBF) are most/least critical to conserving new fine-sediment inputs, and stabilizing sediment deposits above the 25,000 cfs stage?

SIN 8.5.1 - How do sandbar textures influence biological processes?

SIN 8.5.2 - What is the relationship between the fine-sediment budget and turbidity?

SIN 8.5.3 - What is the relationship between turbidity and biological processes?

SIN 8.5.4 - What is the role of turbidity and how can it be managed to achieve biological objectives?

SIN 8.5.5 - How can the ongoing fine sediment supply be managed to achieve sustainable habitats?

SIN 8.5.6 - What are the grain-size characteristics of sandbars associated with designated riparian vegetation zones?

RIN 8.5.2 - What is the reach-scale variability of fine-sediment storage throughout the main channel?

RIN 8.5.3 - What is the pre- and postdam range of grain-size in fine-sediment deposits, by reach?

RIN 8.5.4 - What is the significance of aeolian processes in terrestrial sandbar reworking?

RIN 8.5.5 - What are the historic and ongoing longitudinal trends of fine-sediment storage, above 25,000 cfs?

SIN 8.5.7 - What are the limiting factors that regulate substrate availability and its distribution?

SIN 8.5.8 - What is the total area of different aquatic habitat types (cobble, gravel, sand, talus, etc,) in the CRE?

SIN 8.5.9 - How are sandbar textures related to cultural site stability?

SIN 8.5.10 - How are sandbar textures related to recreational site stability?

RIN 8.6.1 - How do ongoing inputs of coarse-sediment from tributaries influence storage of fine sediment within pools, runs, and eddies throughout the CRE?

RIN 8.6.2 - How do ongoing inputs of coarse-sediment from tributaries alter the distribution of main channel habitats needed by benthic organisms within pools, runs, and eddies throughout the CRE?

# GCDAMP Goal 9: Maintain or improve the quality of recreational experiences for users of the Colorado River ecosystem, within the framework of the GCDAMP ecosystems goals.

RIN 9.1.1 - What are the attributes of a quality river experience? (How do you define a quality river experience?)

RIN 9.1.2 - Determine the appropriate carrying capacity for recreational activities within the CRE.

RIN 9.1.3 - How do ongoing inputs of coarse-sediment from tributaries diminish or enhance navigability of rapids throughout the CRE?

RIN 9.3.1 - What is the desired target level of camping beaches by reach?

RIN 9.4.1 - Identify the elements of wilderness experience specific to the CRE.

RIN 9.5.1 - What effects do administrative trips, including research and monitoring activities have on recreational users?

# GCDAMP Goal 10: Maintain power production capacity and energy generation, and increase where feasible and advisable, within the framework of the Adaptive Management ecosystem goals.

IN 10.1 - Determine and track the impacts to power users from implementation of ROD dam operations and segregate those effects from other causes such as changes in the power market.

RIN 10.1.1 - What would be the effects on the CRE and marketable capacity and energy of increasing the daily fluctuation limit?

RIN 10.1.2 - What would be the effects on the CRE and marketable capacity and energy of increasing the upramp and downramp limit?

RIN 10.1.3 - What would be the effects on the CRE and marketable capacity and energy of raising the maximum power plant flow limit above 25,000 cfs?

RIN 10.1.4 - What would be the effects on the CRE and marketable capacity and energy of lowering the minimum flow limit below 5,000 cfs?

RIN 10.1.5 - How do power-marketing contract provisions affect GCD releases?

RIN 10.3.1 - What are the effects of providing financial exception criteria?

RIN 10.4.1 - What are the effects on the CRE and marketable power and energy of increasing Automatic Generation Control at GCD?

# GCDAMP Goal 11: Preserve, protect, manage, and treat cultural resources for the inspiration and benefit of past, present, and future generations.

RIN 11.1.1 - What are the sources of impacts to historic properties?

RIN 11.1.1.a - What and where are the geomorphic processes that link loss of site integrity with dam operations as opposed to dam existence or natural processes?

RIN 11.1.1.b - What are the terrace formation processes and how do dam operations affect current terrace formations processes?

RIN 11.1.1.c - Determine if and where dam operations cause accelerated erosion to historic properties?

RIN 11.1.1.d - What are the potential threats to historic properties relative to integrity and significance?

RIN 11.1.2 - What are the historic properties within the area of potential effects?

RIN 11.1.2.a - For each tribe and living community, what are the register eligible TCPs?

RIN 11.1.2.b - How do specific sites meet National Register Criteria for Evaluation?

RIN 11.1.2.c - Identify GCDAMP activities that affect National Register eligible sites?

RIN 11.1.2.d - Identify NPS permitted activities that affect National Register eligible sites.

RIN 11.1.3 - What are the thresholds triggering management actions?

RIN 11.1.3.a - Determine the necessary information to assess resource integrity.

RIN 11.1.3.b - How should adverse effects to historic properties be mitigated?

RIN 11.1.5 - What are appropriate strategies to preserve resource integrity?

RIN 11.2.1 - What are traditionally important resources and locations for each tribe and other groups?

RIN 11.2.2 - What is the baseline measure for resource integrity?

RIN 11.2.3 - Determine acceptable methods to preserve or treat traditionally important resources within the CRE.

RIN 11.2.4 - What changes are occurring in cultural resource sites, and what are the causes of those changes?

# GCDAMP Goal 12: Maintain a high-quality monitoring, research, and adaptive management program

IN 12.1 - Develop information that can be used by the Technical Work Group (TWG), in collaboration with GCMRC, to establish current and target levels for all resources within the GCDAMP as called for in the GCDAMP strategic plan.

RIN 12.1.1 - What is the economic value of the recreational use of the CRE downstream from GCD?

RIN 12.1.2 - What are the use (e.g., hydropower, trout fishing, rafting) and nonuse (e.g., option, vicarious, quasi-option, bequest and existence) values of the CRE?

RIN 12.1.3 - How does use (e.g., hydropower, trout fishing, rafting) and nonuse (e.g., option, vicarious, quasi-option, bequest and existence) values change in response to an experiment performed under the ROD, unanticipated event, or other management action?

IN 12.2 - Determine what information is necessary and sufficient to make recommendations at an acceptable level of risk.

RIN 12.3.1 - As necessary, investigate the most effective methods to integrate and synthesize resource data.

RIN 12.3.2 - What are the differences between western science and tribal processes for design of studies and for gathering, analyzing, and interpreting data used in the adaptive management program? How well do research designs and work plans incorporate tribal perspectives and values into the standard western science paradigm? Is it more beneficial to keep the perspective separated?

RIN 12.3.3 - How effective is the GCDAMP in addressing the EIS statement “Long-term monitoring and research are … implemented to measure how well the selected alternative meets resource management objectives”?

RIN 12.5.1 - What are the most effective means to build GCDAMP public support through effective public outreach?

RIN 12.5.2 - What are the most effective means to attain and maintain effective communication and coordination with other resource management programs in the Colorado River basin to ensure consideration of their values and perspectives into the GCDAMP and vice versa?

RIN 12.5.3 - To what extent does the public understand and support the GCDAMP?

RIN 12.5.4 - What is the most effective way to distribute information to our stakeholders and the public in a secure and accessible fashion?

RIN 12.5.5 - Identify the desired level of information, education, and outreach provided for Glen and Grand Canyon river users and the general public.

RIN 12.7.1 - How effective are the current strategies to achieve tribal consultation?

RIN 12.7.2 - How well do the current strategies to achieve tribal consultation meet legal and GCDAMP protocols?

RIN 12.8.1 - How well does current tribal participation in the GCDAMP research and long-term monitoring programs meet tribal needs and desires?

RIN 12.9.1 - What is the impact on downstream resources of short-term increases to maximum flow, daily fluctuations, and downramp limits?

RIN 12.9.2 - What is the best combination of dam operations and other management actions to achieve the vision, mission, goals, and objectives of the GCDAMP?

RIN 12.9.3 - What are the relationships between dam operations and other management actions in their effects on resources addressed by GCDAMP management objectives?

RIN 12.11.1 - What are the most effective methods to maintain or attain the participation of externally-funded investigators?