Adaptive Management Program
Vision Narrative

Introduction

The strategic plan for the Glen Canyon Dam Adaptive Management Program (AMP) is based on the premise that key elements of natural ecological processes can, to a sufficient degree, be simulated by dam operations and other management actions to achieve desired future resource conditions for the Colorado River ecosystem (CRE)[1]. In addition, the principles developed by the Adaptive Management Work Group (AMWG) explicitly recognize that Glen Canyon Dam is an integral part of this ecosystem. Water and power are among the goods and services this ecosystem provides. The construction and operation of Glen Canyon Dam, and the introduction of non-native species, have altered the natural processes and habitat that support the natural, physical, and cultural resources of the CRE.

The biological and physical attributes of the river prior to dam construction, introductions of nonnative plants and fish, and other recent human alterations represent the conditions under which the natural, physical, and cultural resources in the CRE developed. The AMP seeks to achieve resource conditions within the CRE described below. It is assumed that appropriate dam operations and other management actions that restore elements of natural patterns and processes, consistent with the Grand Canyon Protection Act, "Law of the River," National Park Service Organic Act (and amending legislation), and other guiding legal imperatives (as referenced in the Guidance Document), will improve conditions of the CRE.

The AMP desired future resource condition for the CRE centers on maintaining viable populations and communities of native plants and animals while retaining other valued components of the post-dam system, such as the tailwater trout fishery and hydropower generation. We desire a CRE, including the dam and humans, that is dynamic in nature and is temporally punctuated by flow events such as beach/habitat-building flows, habitat maintenance flows, low steady summer flows, daily/monthly hydropower operations, and tributary flows. Adaptation to these events (i.e., disturbance regimes), will predominately influence the structure and composition of the plant and animal communities within the CRE, as well as recreational quality and the protection of cultural values within the corridor. Thus individual resources will vary both spatially, depending on their location in the CRE, and temporally depending on the nature (i.e., timing, magnitude, duration, periodicity) of the event. See Figure ? for a portrayal of these temporal effects. The

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[1] The CRE is defined as the Colorado River mainstem corridor and interacting resources in associated riparian and terrace zones, located primarily from the forebay of Glen Canyon Dam to the western boundary of Grand Canyon National Park, a distance of approximately 293 river miles (Figure 1).

desired future resource conditions described below are the envisioned result of successful implementation of the AMP strategic plan.

Desired Future Condition: Aquatic Resources

The aquatic resources are those found in the area that is typically inundated by the Colorado River and its tributaries in the CRE. We envision a system where dam releases and tributary inputs support an introduced (e.g., scuds) and native foodbase for naturally reproducing rainbow trout in the Lees Ferry reach and native fish throughout the CRE. Native fish include humpback chub, flannelmouth sucker, bluehead sucker, and speckled dace. Those extirpated species that were reintroduced are thriving.

Viability of native fish populations is not constrained or threatened by predation or competition by non-native fish, or by introduced diseases or parasites. The Colorado River and its tributaries support a community of viable, self-sustaining native fish populations that benefit from dam operations and other management actions.

The characteristics of the water (e.g., temperature, dissolved oxygen, nutrients) greatly influence the aquatic environment. These characteristics vary through time and space and are also dependent on dam releases and tributary inflows. The water is of sufficient quality to support the aquatic foodbase, fish, and other desired organisms such as bald eagle, waterfowl, and beaver. It meets governmental standards for designated uses.

The clear water immediately below the dam supports primary productivity that helps feed the ecosystem (in addition to tributary and terrestrial sources). Muddy water, when it occurs, provides cover and habitat for native fish. The native species adapted to the pre-dam extremes persist and flourish within this dynamic environment.

The aquatic ecosystem within the CRE is healthy and benefits future generations.

Desired Future Condition: Riparian Resources

Riparian resources are the natural elements of the ecosystem in a zone along the river influenced by river processes. These elements include plants, animals (including culturally important species), and the sediment upon which they exist.

The riparian ecosystem is comprised of several identifiable communities of plants and animals that occur in discontinuous bands running parallel to the river. The width and distribution of these bands is largely determined by geomorphology and flood frequency, magnitude, and duration. As one moves downstream, the species comprising these communities changes. Our vision is that all of these communities are important and an appropriate mix is maintained.

The natural communities native to the CRE dominate the riparian ecosystem. The upper band occurs above the scour zone (e.g., flood terraces, sand dunes, or talus slopes) and below desert vegetation. The dominant species comprising the upper band may be

hackberry, oak, Apache plume, catclaw acacia, mesquite, and barrel cactus. The lower band occurs in the scour zone and is a patchwork mosaic of sand beach, marsh, and tamarisk/willow communities.

The frequency associated with the coming or going of the lower band is directly correlated with the frequency and magnitude of flood events. As large flows reset the system, a patchwork mosaic of lower band communities is created and the upper band communities are enhanced. In years without flood disturbance, marsh and tamarisk/willow communities expand and flourish. Throughout these communities, non-native species are not dominate and do not impair the abundance, composition, and distribution of the communities, nor alter the natural processes that shape them.

[At least four diagrams – River Mile –15 to 40, 40-77, 77-167, 167-278]

Desired Future Condition: Cultural Resources

Cultural resources are those resources of traditional, religious, and historic importance to Indian tribes and to the American people. They include, but are not limited to, archeological, historical, and traditional cultural resources. Cultural resources are important because their continued existence and use is integral to the cultural identity and existence of the Indian tribes that use or are connected with the CRE. The continued existence of cultural resources is also important to other traditional users. Cultural resources can inform all people about history.

One of the most fundamental examples of these is the Colorado River, which shapes the CRE and all its natural resources. Many places in the CRE that were used centuries ago, such as trails, river crossings, and campsites, are still in use today.

Traditional cultural resources include tangibles and intangibles, such as landscapes (including Glen and Grand Canyons, rim to rim) and ethno-botanical resources that have cultural and spiritual value to the tribes. These continue to exist and are integrated into their worldview. Other groups have also forged special relationships with the CRE that span multiple generations (e.g., river runners and EuroAmerican pioneers).

Historical and archeological resources are important because they allow us to experience and learn about our past. Human-caused degradation of these places is prevented or stopped whenever possible. Current and future generations experience historical, archeological, and traditional cultural resources much as they existed in the past. Historical resources include Bridge Canyon camp, Lees Ferry, and the river gauge at Phantom Ranch. Unkar Delta is an example of an archeological resource.

Some resources are stabilized or conserved for visitor enjoyment and education and for future generations. Others are purposefully left to the natural processes of erosion and sediment deposition. In some cases, these resources are easy to access and enjoy. In other cases, access is restricted because of the fragile or sacred nature of the place. Other strategies to manage these resources, in consultation with the affiliated tribes, include

excavation to preserve the important information contained there and development of the oral history associated with each place.

In all cases, visitors develop a deep appreciation for the resources and show proper respect when visiting these places. Public outreach and education, including a living museum at Lees Ferry, is used to convey important cultural and spiritual values.

Many people develop strong physical, spiritual, emotional, mental, and aesthetic ties to Glen and Grand Canyons. Even if visitors may not understand the history or cultural richness of the place, their passage through the CRE increases their appreciation for this international treasure.

Desired Future Condition: Recreational Resources

The CRE provides a spectrum of recreational activities that cause minimal impact on the environment. The primitive backcountry experience includes such things as solitude, connection to nature, whitewater boating, hiking, scenic beauty, personal renewal, and opportunities to visit archeological and cultural sites. Other outdoor experiences include camping, fishing, boating, and hunting in the Lees Ferry area, mule trips to Phantom Ranch, and camping, lodging, and dining.

The CRE is remarkable in the length and breadth of its unbroken, primitive character. It provides unique opportunities for experiencing the natural sounds and natural quiet of the desert and river. Opportunities for solitude, connection to nature, fun, and personal contemplation outside the trappings of civilization are deeply valued. Visitors often learn humility, responsibility, and environmental stewardship.

Much of the time, visitor experience a relatively uncrowded CRE where there is little competition for lunch stops, campsites, and places of interest. There are abundant beaches that have large expanses of open sand and vegetation for shade. These beaches are clean and show little evidence of human impact. Their appearance changes from year to year as sediment and vegetation come and go. Abundant opportunities for hiking and exploring exist. Places of interest are available for visitor use and visitors demonstrate their deep appreciation and respect for the aesthetic, ecological, cultural, and spiritual values of these sites.

Opportunities for visitors to learn more about the human and natural history, cultural values, and scientific activities are easily accessible.

Desired Future Condition: Water and Power Resources

As part of the Colorado River Storage Project, Glen Canyon Dam produces renewable electricity and is an integral part of the electric supply grid for the western United States. It provides necessary load following capacity to furnish electricity for homes, communities, businesses, and manufacturing.

Glen Canyon Dam and the powerplant operate in a manner consistent with the "Law of the River," including the Grand Canyon Protection Act. The Upper Basin delivers water to the lower basin as required by compact.

The powerplant operates to maximize value of the power resource, consistent with the balancing of competing interests described in the EIS and ROD. Dam operations and other management actions result in recovery and long-term sustainability of downstream resources, while limiting hydropower capability and flexibility only to the extent necessary to achieve that recovery and long-term sustainability.

As a result, power customers have the certainty that energy and capacity will be available from Glen Canyon Dam at a predictable cost.