Whetton, Linda A

From: Whetton, Linda A
Sent: Friday, August 19, 2011 4:21 PM
To: 'Benemelis, Perri'; 'Castle, Anne'; 'Charley Bulletts'; 'Gimbel, Jennifer'; Gold, Anamarie; 'Halliday, John'; 'Harkins, Jayne'; 'Heuslein, Amy'; 'Jackson-Kelly, Loretta'; 'James, Leslie'; 'Jansen, Sam'; 'Jordan, John'; 'Kearns, Leanette'; 'Kucate, Arden'; 'Kuwanwisiwma, Leigh J.'; 'Kyriss, LaVerne'; 'Lash, Nikolai'; 'Lopez, Estevan'; 'Orton, Mary'; 'Rampton, Ted'; 'Shields, John W.'; 'Spiller, Sam'; 'Stevens, Larry'; 'Strong, Dennis J.'; 'Uberuaga, Dave'; Walkoviak, Larry P.; 'White, Frederick H.'; 'Balsom, Janet R.'; 'Barrett, Clifford'; 'Bills, Debra'; 'Cantley, Garry'; 'Christensen, Kerry'; 'Cox, Jerry'; 'Davis, William'; 'Dongoske, Kurt'; 'Downer, Alan'; 'Hahn, Martha'; 'Harris, Christopher'; Heffernan, Beverley; 'Joe, Tony'; 'Johnson, Rick'; 'King, Robert'; 'Kowalski, Ted'; 'Myers, Gerald'; Ostler, Don; 'Palmer, S. Clayton'; 'Peterson, McClain'; 'Riley, Larry'; 'Skrzynski, LeAnn'; 'Sponholtz, Pam'; 'Stewart, Bill'; 'Yeatts, Michael'
Cc: 'Harms, Paul'; 'Hughes, Chris'; Knowles, Glen W; 'Kubly, Dennis'; 'LaGory, Kirk'; 'McCraw, Patricia'; 'Anderson, Mark'; 'Bennion, David'; 'Capron, Shane'; 'Chaudhry, Todd'; Crawford, Marianne; 'Makinster, Andy'; 'Seaholm, Randy'; 'Thiriot, James'; Aaron, Patricia (Patti) M; 'Bair, Janet'; 'Battle, Gladys'; 'Caramanian, Lori'; 'Case, Lee'; 'Cherry, Cathryn'; 'Gourley, James L. (Lonnie)'; 'Hamilton, Lynn'; 'Henderson, Norm'; Hutchinson, Levi L; 'Johnson, Lynn'; 'Keay, Jeffrey A.'; Kelleher, Jayne A; 'Landers, Mary Jo'; Lawler, Deborah L; Little, Virginia (Ginny); Lucero, Jeffrey M; 'Lyder, Jane'; 'Moore, Bruce'; 'Nimkin, David'; 'Noojibail, Gopaul'; 'Patterson, Daniel R.'; 'Pellegrino, Colby'; 'Rae, Kerry'; Roberts, Melynda; 'Schmidt, Jack'; 'Sogge, Mark'; 'Stewart, Cheryl'; 'Sucec, Rosemary'; Tighi, Shana G; 'Trubee, Meghan'; 'Trujillo, Laura'; 'Trujillo, Tanya'; 'Vinson, Terzinda'; 'Wegner, David'; 'Wilson, Palma'; 'Daugherty, Mary'; 'Davis, Phil'; 'Fairley, Helen'; 'Garrett, David'; 'Grams, Paul'; 'Mankiller, Serena'; 'Melis, Ted'; 'Pistorius, Shelley'; 'Vanderkooi, Scott'
Subject: Message from Anne Castle Re: DFCs
Attachments: 4_DFCs_Final_Draft.pdf; 1_DFCs draft AIF.docx; 2_DFC BACKGROUND.pdf; 3_DFC memo.pdf

Importance: High

See attached files.

Interior will provide a table comparing the changes in August 19 Draft DFCs with the version the Ad Hoc Group forwarded to Interior on November 8, 2010 in advance of the AMWG meeting.

Copies of the attached documents will be provided at the meeting and will be posted to the AMWG meeting page for downloading at:

http://www.usbr.gov/uc/rm/amp/amwg/mtgs/11aug24/index.html

Hope you all have a good weekend. Travel safely and we'll see you next week.

DFC Differences in Overall Edits August 19, 2011 vs. November 8, 2010. Note, the chart shows differences between the DFC Ad Hoc Group and Final DOI Draft. The first column shows the page the text is on in the August 19, 2011 draft, the second column shows the DFC category, and the third and fourth columns identify the new language in the August 19 DFCs, and the section in which it is located, and the old language in the November 10 DFCs. Redline indicates new or revised language in the August 19, 2011 draft. Strikeout in the DFC Ad Hoc Group Column indicates deleted or revised words or deleted sentences. All references in the November 8 Ad Hoc Group version to prior drafts of the DOI DFCs have been eliminated in order to create a stand-alone document. These deletions are not separately noted.

Page	Cat	Final Draft DFCs, August 19, 2011	DFC Ad Hoc Group, November 8, 2010
2	CRE	Ecosystem definition: Second paragraph in original moved to first paragraph, AMP substituted for "Glen Canyon Dam Adaptive Management Program."	
2	CRE	DFC Background and Legislation	Deleted [references moved to separate background section]: ~~These impacts are summarized in Schmidt et al. (1998)*~~
2	CRE	DFC Background and Legislation, last two sentences revised: The CRE DFCs are designed to be consistent with the 1992 Grand Canyon Protection Act, Law of the River, and other appropriate laws and mandates. The CRE DFCs apply the requirements of the Grand Canyon Projection Act to "protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park (GCNP) and Grand Canyon National Recreation Area (GCNRA) were established," including natural resources, and are the goals that AMWG members will consider when making recommendations to the Secretary.	The CRE DFCs are designed ~~to meet the intent of the 1997 Record of Decision (ROD), which was implemented~~ to be consistent with the 1992 Grand Canyon Protection Act, Law of the River, and other appropriate laws and mandates. They were designed to protect, mitigate adverse impacts to, and improve the values for which the Grand Canyon National Park and Glen Canyon National Recreation Area were established that include but are not limited to natural and cultural resources and visitor use.
2	CRE	Why the CRE DFCs are Important These CRE DFCs address the natural resource values for which the GCNP and the GCNRA were established.	The DFCs address the natural resource values for which the ~~Grand Canyon National Park and the Grand Canyon National Recreation Area~~ were established.
2	CRE	Why the CRE DFCs are Important Moved second and third sentences from Overall Policy Goal in November 8, 2010 version to second and third sentences of first paragraph, with edits: The DFCs aim to maintain, enhance, and restore native species, natural habitats, and	The DFCs ~~also~~ aim to maintain, enhance, and ~~where practical,~~ restore native species,

		natural ecosystem processes. Native and non-native species are to be managed in accord with Federal regulations, policies, and guidelines.	natural habitats, and natural ecosystem processes. Native and non-native species are to be managed in accord with federal regulations, policies, and guidelines.
2	CRE	Why the CRE DFCs are Important The CRE described herein includes most of the native natural resources found in the Colorado River.	The ~~human-dominated~~ CRE described herein includes most of the native natural resources found in the Colorado River.
3	CRE	Why the CRE DFCs are Important The health of the river ecosystem and the protection of the resource values of GCNP and GCNRA are important to the nation, many Native American Tribes, the economy of the Southwest, and the millions of visitors to the parks and the region.	The health of the river ecosystem ~~is~~ important to the nation, ~~to~~ many Native American Tribes, ~~to~~ the economy of the Southwest, and ~~to many~~ visitors to the Parks and region.
3	CRE	Why the CRE DFCs are Important: Added new paragraph The CRE DFCs will provide a foundation for and help define the components of the Core Monitoring Program under development by the Grand Canyon Monitoring and Research Center (GCMRC). The Core Monitoring Program will be essential to ultimately quantifying, measuring, and reporting the status of the natural resources, allowing the Secretary and the AMP to track progress toward desired outcomes. DFCs will also provide foundation support in the development of other planning and management assignments associated with the GCDAMP.	
3	CRE	CRE DFCs [Removed inconsistent language concerning the level of improvement or maintenance desired to focus solely on the desired condition of the resource.] ☐ DFC 1 – An aquatic food base capable of supporting viable populations of desired species at higher trophic levels; ☐ DFC 2 – Viable populations of existing native fishes, and the prevention of adverse modification to their habitat (including critical habitat); ☐ DFC 3 – Restoration of viable populations of extirpated species; ☐ DFC 4 – A sustainable recreational trout fishery in the Lees Ferry reach; ☐ DFC 5 – Viable populations of the	☐ DFC 1 – ~~Protect or improve the~~ aquatic food base ~~so that it supports viable~~ populations of desired species at higher trophic levels); ☐ DFC 2 – ~~Maintain or attain~~ viable populations of existing native fishes, and ~~prevent~~ adverse modification to their habitat (including critical habitat); ☐ DFC 3 – ~~Restore~~ viable populations of extirpated species; ☐ DFC 4 – ~~Maintain a self-sustaining~~ recreational trout fishery in the Lees Ferry

		Kanab ambersnail; ☐ DFC 6 – Healthy biotic riparian, wetland, spring and old high water zone plant communities and healthy associated biological processes within the CRE (including threatened and endangered species and their habitat); ☐ DFC 7 – A level of water quality that supports ecosystem functions (dissolved oxygen, nutrient contributions and cycling, and temperature to the extent feasible consistent with the life history requirements of focal aquatic species; ☐ DFC 8 – Levels of sediment storage within the main channel and along shorelines that achieve ecosystem goals.	reach; ☐ DFC 5 – ~~Maintain or attain~~ viable populations of the Kanab ambersnail; ☐ DFC 6 – ~~Protect or improve the~~ biotic riparian, wetland, spring and old high water zone plant communities and their associated biological processes within the CRE (including threatened and endangered species and their habitat); ☐ DFC 7 – ~~Maintain or attain~~ water quality ~~in support of~~ ecosystem functions (dissolved oxygen, nutrient contributions and cycling, and temperature ~~[~~to the extent feasible~~]~~) consistent with the life history requirements of focal aquatic species; ☐ DFC 8 – ~~Maintain or attain~~ levels of sediment storage within the main channel and along shorelines that achieve ecosystem goals.
2	CRE	Why the CRE DFCs are Important Those resources are managed, consistent with the Law of the River, under the National Park Service (NPS) Organic Act, the Redwoods Amendment, NPS 2006 Management Policies, the Wilderness Act, the Antiquities Act, the Endangered Species Act, the Grand Canyon Protection Act, the Fish and Wildlife Coordination Act, and other Federal legislation.	Deleted [Overall Policy Goal deleted, but revised language included in Why the CRE DFCs are Important]: ~~Overall Policy Goal: The goal of the CRE DFCs is to achieve the balance of resource benefits envisioned by the Grand Canyon Protection Act, Glen Canyon Dam Environmental Impact Statement Record of Decision (ROD), and NPS 2006 Management Policies, and Fish and Wildlife Coordination Act recommendations.~~
3	CRE	Sediment-related Resources ☐ High elevation open riparian sediment deposits are created, maintained, and enhanced along the Colorado River in sufficient volume, area, and distribution so as to provide habitat to sustain native biota and ecosystem processes, as well as cultural and recreational resources.	High elevation open riparian sediment deposits are created, maintained, ~~or~~ enhanced along the Colorado River in sufficient volume, area, and distribution so as to provide habitat to sustain native biota and ecosystem processes, as well as cultural and recreational resources
3	CRE	Sediment-related Resources Maintain adequate sand bars (including camping beaches) for recreation in Glen Canyon National Recreation Area and Grand Canyon National Park and enhance as needed once maintained. Maintain nearshore habitats for native fish and	Maintain ~~or enhance~~ adequate sand bars (including camping beaches) for recreation in Glen, Marble, and Grand Canyon critical reaches.

		enhance as needed once maintained. [note typographical error—these two bullets were inadvertently combined]	
		Sediment-related Resources [see above note]	Maintain ~~or enhance~~ nearshore habitats for native fish.
3	CRE	Sediment-related resources Maintain marsh and riparian habitat for fish (food chain maintenance) and wildlife and enhance as needed once maintained.	Maintain ~~or enhance~~ marsh and riparian habitat for fish and wildlife.
3	CRE	Sediment-related resources Maintain cultural resources ~~and enhance as needed once maintained.~~	Maintain ~~or enhance~~ cultural resources.
4	CRE	CRE Aquatic Domain The aquatic food base will sustainably support viable populations of other desired species at all trophic levels.	The aquatic food base will sustainably support viable populations of other desired species at all ~~higher~~ trophic levels.
4	CRE	Native Species Native fish species and their habitats (including critical habitats) are sustainably maintained throughout in each species' natural ranges in the CRE and enhanced as needed once maintained.	Native fish species and their habitats (including critical habitats) are sustainably maintained ~~or enhanced~~ throughout each species' natural ranges in the CRE
4	CRE	Native Species Maintain a self-sustaining humpback chub (HBC) population in its natural range in the CRE and enhance as needed once maintained.	Maintain ~~or enhance~~ a self-sustaining humpback chub (HBC) population in its natural range in the CRE.
4	CRE	Native Species Ensure an ecologically appropriate habitat is maintained for the HBC in the mainstem and enhance as needed once maintained	Ensure an ecologically appropriate habitat is maintained ~~or enhanced~~ for the HBC in the mainstem.
5	CRE	Native Species Maintain healthy, self-sustaining populations of other remaining native fish with appropriate distribution (flannelmouth sucker, bluehead sucker, speckled dace and enhance as needed once maintained, so that listing under the ESA is not needed.	Maintain or enhance healthy, self-sustaining populations of other remaining native fish with appropriate distribution (flannelmouth sucker, bluehead sucker, speckled dace).

5	CRE	Native Species, New bullet Minimize emigration of non-native warm water fish to the mainstem Colorado River.	
	CRE		Deleted [Trout Fishery addressed in Recreation] ~~Trout Fishery:~~ ~~The recreational trout fishery between Glen Canyon Dam and the Paria River is healthy, self-sustaining, and a high quality (DOI DFC 4).~~ ~~Maintain a fishable population of rainbow trout in the Lees Ferry Reach from Glen Canyon Dam to the mouth of the Paria River sufficient to provide a high quality fishing opportunity and experience for anglers/vistors.~~ ~~Maintain angler and visitor satisfaction to minimize undesired emigration of trout from that management reach.~~
5	CRE	Non-fish Biotic Communities: Maintain, enhance, and, where feasible, restore populations of native non-fish species (invertebrates and vertebrates, including Northern Leopard Frog).	Maintain, enhance, and, where feasible, restore populations of native non-fish species (invertebrates and vertebrates).
5	CRE	Non-fish Biotic Communities: Protect and improve dam-influenced aquatic, wetland, and springs plant communities and associated biological processes, including threatened and endangered species and their habitats.	Protect ~~or~~ improve dam-influenced aquatic, wetland, and springs plant communities and associated biological processes, including threatened and endangered species and their habitats (DOI DFC 6).
5	CRE	CRE Riparian Domain Native riparian systems, in various stages of maturity, are diverse, healthy, productive, self-sustaining, and ecologically appropriate.	Native riparian ~~species assemblages and seral stages~~ are diverse, healthy, productive, self-sustaining, and ecologically appropriate.
5	CRE	CRE Riparian Domain Maintain native, self-sustaining riverine wetlands, and riparian vegetation and habitat, with appropriate mixture of age classes and enhance as needed once maintained.	Maintain ~~or enhance~~ native, self-sustaining riverine wetlands, and riparian vegetation and habitat, with appropriate mixture ~~of seral stages.~~
6	CRE	CRE Riparian Domain Maintain healthy, self-sustaining populations of native riparian fauna (both resident and	Maintain ~~or enhance~~ healthy, self-sustaining populations of native riparian fauna (both

		migratory) and enhance as needed once maintained.	resident and migratory).
6	CRE	CRE Riparian Domain Maintain, enhance, and, where possible, restore habitat of sensitive species within the zone of river influence	Maintain, enhance, and, where possible, restore ~~populations~~ of sensitive species within the zone of river influence~~, including the Kanab Ambersnail, Northern and other Leopard Frogs, Southwestern Willow Flycatcher, Bald Eagle, Peregrine Falcon, and other listed species, consistent with the intent of the Fish and Wildlife Coordination Act.~~
6	CRE	CRE Riparian Domain Resolve the taxonomic status of the Kanab Ambersnail (e.g., completely describe the taxa and subspecies).	~~Encourage resolution~~ of the taxonomic status of the Kanab ambersnail.
6	CRE	CRE Riparian Domain Maintain and where possible, restore habitat of neotropical migratory birds, waterfowl, and other appropriate native bird species.	Maintain and restore ~~populations~~ of neotropical migratory birds, waterfowl, and other appropriate native bird species.
6	CRE	ADDITIONAL INFORMATION [Figure 1 included in separate background section; conforming revisions in text] Physical characteristics, *including climate, site-specific geomorphology, dam-related discharge and flow, and tributary flows,* generally predominate over biological processes. The aquatic and riparian components of the CRE are linked to fluvial habitat distribution and the collection, composition, structure, and population dynamics of living organisms. "Lateral" bio-ecological processes, such as competition, and "top-down" processes, such as predation, parasitism, and decomposition, can influence some elements of these linkages over time.	~~The CRE consists of 13 geomorphically defined reaches between Glen Canyon Dam (15.5 miles upstream from Lees Ferry) and upper Lake Mead (Mile 278; Fig. 1). These reaches vary in length, width, depth, and configuration, as noted by Schmidt and Graf (1990)*.~~ Physical characteristics ~~and processes~~ generally predominate over biological processes in the CRE, *including climate, reach-based geomorphology, dam-related discharge and flow, and tributary flows* ~~(Stevens et al. 1995, 2001)*.~~ ~~Each reach, depicted as a "page" in Figure 1, shapes linked aquatic and riparian domains of the river ecosystem, affecting fluvial habitat distribution, as well as biotic assemblage, composition, structure, and population dynamics. Also affected are cumulative effects occurring over distance downstream.~~ "Lateral" bio-ecological processes, such as competition, and "top-down" processes, such as predation, parasitism, and decomposition, can influence

			some ~~elements of assemblage composition, structure, and population dynamics~~ over time.
6	CRE	ADDITIONAL INFORMATION Recreational benefits have heretofore been regarded as resulting from healthy ecosystem conditions. Hydropower production and water storage and release are managed through Glen Canyon Dam under the authority of the Secretary of the Interior.	Recreational benefits have heretofore been regarded as resulting from healthy ecosystem conditions ~~(ROD 1997)*.~~ Hydropower production and water storage and release are managed through Glen Canyon Dam under the authority of the Secretary of the Interior ~~(the Secretary).~~
6	CRE	Metrics These DFCs are intended to guide the gathering and analysis of data pertinent to the CRE in Grand Canyon National Park and Glen Canyon National Recreation Area.	These DFCs are intended ~~to support~~ the gathering and analysis of data pertinent to the CRE in Grand Canyon National Park and Glen Canyon National Recreation Area.
7	CRE	Metrics Percentage of critical habitat lost or gained; Condition of species variability (native population, abundance, distribution); Carrying capacity thresholds; Population estimates	
1	CRE	Preface There are many direct and indirect, short-term and long-term ecosystem responses to dam existence and operations. These DFCs are directly or indirectly linked on short and long-term bases through dam-related flows, sediment retention and distribution, hydropower production, fish and wildlife populations, recreation, and visitor experience.	Relationship to Dam Operations, Section Deleted, but information moved to Preface, and Figure 1 included as separate background document. There are many direct and indirect, short-term and long-term ecosystem responses to dam existence and operations. ~~Many of these are discussed in the SCORE Report (Gloss et al. 2005*; Fig. 1). This and the other three proposed~~ DFCs are directly or indirectly linked on short and long-term bases through dam-related flows, sediment retention and distribution, hydropower production, fish and wildlife populations, recreation, and visitor experience.
	CRE		Section Deleted, CRE References Cited, Included as separate background document
8	POW	Power moved to follow CRE DFCs so that DFCs are in numerical order (i.e., DFC 9, Power, follows DFC 8)	

8	POW	Power DFC did not have a definition. Created definition from language in the background section and new redline: Hydroelectric power is generated by the release of stored water through Glen Canyon Dam. The dam's eight generators can produce up to 1,320 megawatts: enough electricity to serve 1.3 million residential customers. The integration of hydropower and other resources provides an efficient and flexible operation of this region's electrical resources. Releases of water from Glen Canyon Dam are adjusted in part to follow customer loads.	Releases of water from Glen Canyon Dam are adjusted in part to follow ~~seasonal~~ loads.
8	POW	DFC Background and Legislation:	~~As the largest source of renewable electricity generation in the U.S., hydropower provides a wide range of benefits to the country. Hydropower is a minimal emission, low-cost source of energy that can be relied upon for the long-term, stable production of domestic energy. * [footnote also deleted]~~
8	POW	DFC Background and Legislation, moved from DFC Description in DFC Ad Hoc Group version: Revenues from the sale of Glen Canyon hydropower generation and other CRSP facilities are used to repay the reimbursable costs, and interest on the interest-bearing costs of the Federal investment in the CRSP, and are also used to repay over 85 percent of the irrigation costs of the CRSP Federal irrigation projects. These revenues are also used, instead of annual Federal appropriations, to pay for the yearly operation, maintenance and replacement costs of Glen Canyon Dam and other CRSP facilities.	Originally in DFC Description Revenues from the sale of Glen Canyon hydropower generation are used to repay, ~~with interest,~~ the Federal investment in the Colorado River Storage Project (CRSP), including over ~~95%~~ of the costs of the federal irrigation projects. ~~In other words, hydropower revenues ensure that the authorized purposes of the CRSP remain viable.~~
8	POW	DFC Background and Legislation The Reclamation Project Act of 1939 provides that hydropower produced by Glen Canyon Dam and other CRSP facilities be offered for sale first to municipalities and other public corporation and cooperatives and other nonprofit organizations under financed in whole	Originally in DFC Description The Reclamation Project Act of 1939 provides that hydropower produced by Glen Canyon Dam be offered for sale first ~~to public, municipal and rural electric customers (all not-for-profit entities).~~

		or in part by the Rural Electrification Act of 1936.	
8	POW	DFC Background and Legislation New Paragraph Glen Canyon Dam is authorized by and subject to the Colorado River Storage Project Act of 1956 and is currently managed in accordance with the October 1996 ROD implementing the Grand Canyon Protection Act of 1992. The goal of the preferred alternative selected in that ROD was not to maximize benefits for the most resources, but rather to find an operating plan for the dam that would permit recovery and long-term sustainability of downstream resources while limiting hydropower capability and flexibility only to the extent necessary to achieve recovery and long-term sustainability. The Secretary is charged with balancing a complex set of interest in operating the dam, including endangered species below the Dam, tribal interests, the seven Colorado River basin states, large municipalities that depend on water and power from Glen Canyon Dam, agricultural interests, the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, and national energy needs.	[first sentence of new paragraph is a paraphrase of first sentence in third paragraph of DFC Description.]
8	POW	Why the Power DFC is Important Hydropower is a resource that is under long-term contract to not-for-profit entities and 57 tribal entities.	Hydropower is ~~a major component of the Salt Lake City Area Integrated Projects (SLCA/IP)~~ resource that is under long-term contract to not-for-profit entities and 57 tribal entities.
9	POW	Why the Power DFC is Important	~~Fluctuations can be used to disadvantage non-native fishes.~~
9	POW	Why the Power DFC is Important Hydropower is a renewable resource that is an important component in the Western Electricity Coordinating Council (WECC). Hydropower production is a national objective to help meet the Nation's needs for reliable, affordable, and environmentally sustainable electricity.	Hydropower is a renewable resource that is an important component in the Western Electricity Coordinating Council (WECC). Hydropower production is a national objective to help meet the Nation's needs for reliable, affordable, and environmentally

			sustainable ~~hydropower.~~ [footnote deleted]
9	POW	Why the Power DFC is Important Glen Canyon generation has the ability to "ramp up" to meet system reliability obligations that are important when regional power shortages or power/transmission system disruptions occur.	Glen Canyon generation has the ability to "ramp up" to meet system reliability obligations that are important when regional power shortages or power/transmission system disruptions occur. ~~The generation resource can be "ramped up" to avoid massive blackouts (such as occurred in California in 2000).~~
9	POW	Power DFC **DFC 9** – Maximize hydropower capability and flexibility at Glen Canyon dam by limiting hydropower capability and flexibility at Glen Canyon dam only to the extent necessary to achieve recovery and long-term sustainability of Grand Canyon and Glen Canyon resources.	DFC 9 – ~~Maintain power production capacity and energy generation, and increase where feasible and advisable, within the framework of the Adaptive Management ecosystem goals.~~
9	POW	Power DFC Goals and Objectives—this section was revised to combine two sections in the original, Overall Policy Goal and DFC Objectives.	
9	POW	Power DFC Goals and Objectives Moved from DFC Objectives Consistent with applicable law, ensure continued delivery of Glen Canyon Dam hydropower to the existing customers who have entered into long-term firm power contracts with WAPA.	Ensure continued delivery of Glen Canyon Dam hydropower to the existing customers who have entered into long-term firm power contracts with WAPA.
9	POW	Power DFC Goals and Objectives Moved from DFC Objectives (No change) Ensure sufficient and efficient production of Glen Canyon Dam hydropower in order to provide the revenues to support the CRSP facilities and purposes.	Ensure sufficient and efficient production of Glen Canyon Dam hydropower in order to provide the revenues to support the CRSP facilities and purposes.
9	POW	Power DFC Goals and Objectives Moved from DFC Objectives (No change) Maintain the operational flexibility (including	Maintain the operational flexibility

		but not limited to load following capability, ramp rates, and emergency operations allowances) that enable Reclamation and WAPA to meet the system operating and other regulatory requirements of WECC, North American Electric Reliability Corporation (NERC) and the Federal Energy Regulatory Commission (FERC), as well as emergency operating criteria for safety and human health situations.	(including but not limited to load following capability, ramp rates, and emergency operations allowances) that enable Reclamation and WAPA to meet the system operating and other regulatory requirements of WECC, North American Electric Reliability Corporation (NERC) and the Federal Energy Regulatory Commission (FERC), as well as emergency operating criteria for safety and human health situations.
	POW		DFC Overall Policy Goals, section heading deleted, and first and fourth bullets deleted: ~~***DFC Overall Policy Goal:***~~ ➢ ~~Maximize Glen Canyon power generation and the economic and financial benefits while achieving a balance with CRE resource objectives.~~ ➢ ~~Help manage water temperatures through hydropower generation.~~
9	POW	Power DFC Goals and Objectives Moved from DFC Overall Policy Goal (No change) Maximize the environmental benefits of hydropower generation at Glen Canyon Dam.	Maximize the environmental benefits of hydropower generation at Glen Canyon Dam.
10	POW	Power DFC Goals and Objectives Moved from DFC Overall Policy Goal Minimize carbon emissions through hydropower generation at Glen Canyon Dam.	Minimize ~~coal or natural gas~~ air emissions through hydropower generation at Glen Canyon Dam.
10	POW		DFC Description: Moved first two paragraphs to Background Deleted second two paragraphs ~~The economic, financial, and power generation-related values of Glen Canyon Dam generation are maximized when Reclamation and Western Area Power Administration (WAPA) are allowed to operate the facility with no flow restrictions to meet load requirements of wholesale~~

			~~power customers.~~ ~~When a flow restriction such as Modified Low Fluctuating Flows (MLFF) is imposed, then other generation (generally non-renewable) is used to meet these needs. When this occurs, the economic and, and environmental benefits of Glen Canyon Dam generation are reduced.~~
10	POW		DFC Description ~~Generation-related environmental attributes that are impacted when hydropower generation is restricted include greatly increased power plant emissions (such as CO_2, SO_2 and NO_X) and increased water consumption for power plant cooling.~~
10	POW		DFC Objectives, deleted third and fourth bullets: Deleted: ~~Maximize the amount of electric generation capacity and energy produced at Glen Canyon Dam, while seeking to achieve a balance with CRE resource objectives.~~ ~~Maximize the operational flexibility with which Reclamation and WAPA can operate Glen Canyon Dam, consistent with AMP goals and objectives.~~
10	POW		Compliance section deleted
10	POW	Metrics: Replace first three bullets with: Undertake an economic analysis of the impact of any operating changes at Glen Canyon Dam looking at, among other things:	Metrics: Deleted ~~Identify the average annual economic, financial, and environmental benefits of Glen Canyon Dam hydropower generation under its original operating condition (before interim operating criteria and MLFF were imposed).~~ ~~Identify the average annual economic, financial, and environmental values of Glen Canyon Dam hydropower generation under MLFF and other potential future flow~~

			~~regimes.~~ ~~Calculate the impacts of MLFF and other potential future flow regimes from the foregoing.~~
	POW		Relationship to Dam Operations, section deleted
	CUL	*Universal edit:* "affiliated culture" changed to "traditionally associated peoples"	
11	CUL	Cultural Resources Definition, added at end of paragraph This includes resources within the Grand Canyon region, including resources along the river corridor in Glen and Grand Canyons.	
11	CUL	DFC Background and Legislation, added at end of paragraph: The Cultural Resources DFCs apply the requirements of the Grand Canyon Projection Act to "protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park (GCNP) and Grand Canyon National Recreation Area (GCNRA) were established," including cultural resources, and are the goals that AMWG members will consider when making recommendations to the Secretary.	Deleted: ~~In reality, the dividing line between cultural resources that are covered by NHPA, and those that are not, is somewhat arbitrary from the standpoint of historic and cultural importance.~~
11	CUL	Why the Cultural Resources are Important: Bullets re-written into sentences and additional language added as follows: The cultural resources of the Grand Canyon provide a record of human history in the area. They also encompass the traditional cultural use and significance of the Grand Canyon. Maintaining these resources is important to the nation as a whole so we can better understand the long history of the people who came before us and to the traditional groups that consider this area to have traditional significance to them. A number of Native American groups believe the Grand Canyon is their place of origin. These DFCS will help maintain compliance with relevant cultural resource laws; maintain traditional cultural linkage with the Grand Canyon; and maintain traditional cultural access to and use of resources in the	Maintain a record of human history in the Grand Canyon; Maintain traditional cultural use and significance of the Grand Canyon; Maintain compliance with relevant cultural resource legislation; Maintain traditional cultural linkage with the Grand Canyon; Maintain traditional usage of resources in the Grand Canyon

		Grand Canyon in accordance with applicable law.	
12	CUL	DFC 10A, National Register Eligible (or Potentially Eligible) Historic Properties These resources are historic properties that are eligible or potentially eligible for inclusion in the National Register of Historic Places.	These resources ~~include the suite of resources~~ that are eligible or potentially eligible for the National Register of Historic Places.
12	CUL	DFC 10A, National Register Eligible (or Potentially Eligible) Historic Properties List of traditional cultural properties changed second bullet: Traditional resource use areas	~~Plant collection locations~~
12	CUL	DFC 10A Objectives Prehistoric Archaeological Sites and Historic Sites To the extent feasible, maintain significance and integrity through preservation in place. (On lands administered by the NPS, there is the desire to maintain access to some sites for users of the river corridor as long as the integrity of the sites is not compromised. The NPS classifies these sites as Class I and II sites. Class I sites are sites that have a long history of tourist use, are marked on USGS topographic maps, are described in widely available guide books, are generally known to visitors, or are actively promoted as tourist destinations. Class II sites are more fragile or vulnerable to visitor impacts than Class I or have other concerns that require restricted visitation. Class II site locations may only be disclosed to the public when visitors request the information by site name, photograph or other description). On tribal lands, public access to sites is not a desired condition unless the tribal permitting authority specifically authorizes and encourages it.	Maintain significance and integrity through preservation in place. ~~(On NPS land,~~ there is the desire to maintain access to some sites for users of the river corridor as long as integrity is not compromised. NPS classifies these sites as Class I and II sites. On tribal lands, site visitation by the public is not a desired condition unless ~~specifically authorized by the tribal permitting authorities.)~~ [made into a separate bullet]
13		DFC 10A Objectives	Deleted second two bullets: ~~If significance or integrity is threatened, implement preservation treatments that will reduce or eliminate threats and allow continued preservation in place. Treatments~~

			~~should be consistent with NPS management policies, traditional tribal values, and cultural resource legislation, including agreement documents that incorporate CRE cultural resources.~~ ~~If integrity cannot be preserved in place, measures to mitigate the loss should be implemented following the requirements of §106 of NHPA, the 1994 Programmatic Agreement on Cultural Resources (1994 PA)*, or other agreement documents as appropriate. Treatments should be consistent with NPS management policies and traditional tribal values. At 54 sites along the river corridor, Reclamation has determined that, for the purposes of §106 of NHPA as resolved through the 1994 PA, integrity cannot be preserved in place and that various levels of data recovery will need to be implemented. Once finalized, this will complete the commitment of Reclamation to mitigate the current damage at these sites related to the operations of Glen Canyon Dam. Other activities of the AMP may require separate compliance with NHPA.~~
13	CUL	Traditional Cultural Properties (TCPs): To the extent feasible, maintain attributes such that National Register eligibility is not compromised. These attributes will be specific to the traditionally associated peoples and will need to be identified by the federal agencies in consultation with those groups	Maintain attributes ~~required for National Register eligibility.~~ These attributes will be specific to the ~~affiliated culture and will need to be identified by that culture.~~
13	CUL	Traditional Cultural Properties (TCPs): Maintain the ability of traditionally associated peoples to access and use the resource in accordance with applicable law.	Maintain the ability for the affiliated cultural group to access and ~~traditionally use the resource~~.
13	CUL	Traditional Cultural Properties (TCPs): To the extent feasible, maintain the resource for culturally appropriate condition based on traditional ecological knowledge, and integrate this desired condition into relevant monitoring and management programs.	~~Manage~~ resource for culturally appropriate condition based on traditional ecological knowledge, and integrate this desired condition into relevant monitoring and management programs. ~~The desired condition for a TCP, especially a biological resource, may be related to values beyond~~

			~~the simple presence or absence of the resource.~~
13	CUL	Traditional Cultural Properties (TCPs): Maintain ongoing consultation with the groups for whom the resource has traditional value. Because the desired condition of a TCP needs to be determined by the group for whom it has the traditional value, ongoing consultation is necessary to assess the condition of the resource.	Maintain ongoing consultation with the ~~group having traditional value for the resource.~~ Because the desired condition of a TCP needs to be determined by ~~the group that has the traditional values for the resource~~, ongoing consultation is necessary to assess the condition of the resource.
13	CUL	Traditional Cultural Properties (TCPs): Mitigate impacts that affect the integrity of the TCPs. How and if effects can be mitigated will need to be developed in conjunction with the traditionally associated peoples for whom the resource holds value.	Mitigate impacts that affect the integrity of the TCPs. How and if effects can be mitigated will need to be developed in conjunction with the ~~cultural group that holds the traditional values for the resource.~~
	CUL	DFC 10A Additional Information	Compliance responsibility section deleted
14	CUL	DFC 10A Additional Information Linkages The goals for the following resources all directly or indirectly affect the condition of resources with traditional cultural significance:	The goals for the following resources all directly or indirectly affect the condition of ~~culturally significant resources:~~
14	CUL	DFC 10B Description – Resources of Traditional cultural Significance These are resources of cultural significance to a traditionally associated people, often Native American tribe, that do not meet some aspect for eligibility for inclusion in the National Register of Historic Places.	These are resources of traditional significance to ~~a cultural group, most likely a Native American tribe, which~~ do not meet some aspect for eligibility for the National Register of Historic Places.
14	CUL	DFC 10B Objectives Maintain the ability of traditionally associated peoples to access and use the resource in accordance with applicable law.	~~Maintain the ability to continue traditional use of the resource.~~
14	CUL	DFC 10B Objectives Maintain effective consultation with the groups for whom the resource has traditional cultural significance.	Maintain effective consultation with the ~~group that has traditional value for the resource.~~
15	CUL	DFC 10B ADDITIONAL INFORMATION	Compliance Responsibility section deleted
15	CUL	Linkages The goals for the following resources all directly or indirectly affect the condition of resources with traditional cultural significance:	The goals for the following resources all directly or indirectly affect the condition ~~of culturally significant resources:~~

15	CUL	Metrics Because culture defines the roles that resources play in that culture, only members of that culture can assess the status or health of the resources. Therefore, measures for resource status or health and appropriate management will need to be determined individually by the federal agencies in consultation with the traditionally associated peoples.	Because culture defines the roles that resources play, it can only be from within a culture that assessments regarding the status of the resources can be adequately developed. Therefore, measures for resource health and appropriate management will need to be determined individually by the culturally affiliated group.
16	REC	Definition The Recreation DFCs are meant to describe goals and objectives for human use of the Colorado River Ecosystem (CRE) through GCNRA and the GCNP. They are intended to include not only traditional recreational activities such as whitewater rafting, camping, and fishing, but also such things as educational activities, spiritual engagement, and other appropriate activities and values.	The Recreation DFCs are meant to describe goals and objectives for human use of the Colorado River Ecosystem (CRE) through ~~Glen Canyon National Recreation Area and the Grand Canyon National Park.~~ They are intended to include not only traditional recreational activities such as whitewater rafting, camping, and fishing, but also such things as educational activities, spiritual engagement, ~~and non-use values.~~
16	REC	DFC Background and Legislation: Recreational use began before there were any dams on the Colorado River, though the exact beginnings are unknown. Recreational and other activities and values in the Grand Canyon and Glen Canyon have increased greatly since the time of the construction of Glen Canyon Dam.	~~Cultural use of Glen and Grand Canyons extends well into prehistory.~~ Recreational use began before there were any dams on the Colorado River, though the exact beginnings are unknown. ~~Due to changes in our culture,~~ the recreational ~~and non-use value of~~ the Grand Canyon and Glen Canyon have increased greatly since the time of the construction of Glen Canyon Dam.
16	REC	DFC Background and Legislation: The Recreation DFC applies the requirements of the Grand Canyon Projection Act to "protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park (GCNP) and Grand Canyon National Recreation Area (GCNRA) were established," including visitor use/recreation, and the goals that AMWG members will consider when making recommendations to the Secretary.	~~These DFCs are designed to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National park and Glen Canyon national Recreation Area were established.~~
16	REC	Why the Recreation DFC is Important: New headers added: **Grand Canyon National Park:** The Grand	The Grand Canyon is a unique place in this

		Canyon is a unique place in this world. Its natural beauty, challenging environment, fascinating history, wilderness character, biodiversity and sheer size offer a rare and valuable experience. The river corridor is at the heart of the Grand Canyon. The river corridor and the canyon are worthy of the greatest possible respect, treatment, and protection that we can afford them. They must be kept vital and intact for future generations. **Glen Canyon National Recreation Area:**	world. Its natural beauty, challenging environment, fascinating history, wilderness character, biodiversity and sheer size offer a rare and valuable experience. The river corridor is at the heart of the Grand Canyon. The river corridor and the canyon are worthy of the greatest possible respect, treatment, and protection that we can afford them. They ~~should~~ be kept vital and intact for future generations.
17	REC	DFC Objectives River Recreation in Grand Canyon National Park Stewardship worthy of the Grand Canyon so that it can be passed from generation to generation unimpaired.	Stewardship worthy of the Grand Canyon
17	REC	DFC Objectives River Recreation in Grand Canyon National Park Provide maximum opportunity to experience the wilderness character of the canyon.	Maximum opportunity to experience the wilderness character of the canyon.
17	REC	DFC Objectives River Recreation in Grand Canyon National Park Numerous campable sand bars distributed throughout the canyon.	Numerous campable sand bars distributed throughout the canyon ~~within scour zone between the 8,000 to 35,000 cfs levels, built and maintained by appropriate and feasible flows or other methods.~~
17	REC	DFC Objectives River Recreation in Grand Canyon National Park Minimize impacts to recreational and wilderness experiences from research and management activities.	~~Minimal~~ impacts to recreational and wilderness experiences from research and management activities.
17	REC	DFC Objectives River Recreation in Glen Canyon National Recreation Area Maintain and improve the quality of the recreation experience in Glen Canyon. Maintain camping beaches suitable for recreational use.	~~Maximize Glen Canyon recreation resources and their social and economic benefits while achieving a balance with other DFC resources.~~ Maintain ~~or~~ improve the quality of the recreation experience in Glen Canyon. Camping beaches suitable for recreational use.

18	REC	DFC Objectives Trout Fishery in Glen Canyon National Recreation Area Maintain a high-quality sustainable recreational trout fishery in the river corridor in GCNRA, while minimizing emigration of non-native fishes.	~~Maximize Glen Canyon trout fishing resources and their social and economic benefits while achieving a balance with other AMP resources.~~ Maintain a high-quality, ~~self-sustaining~~ trout fishery in the river corridor in GCNRA.
18	REC	DFC Objectives River Corridor Stewardship Stewardship worthy of the Grand Canyon, so it can be proudly passed from generation to generation unimpaired.	~~Maximize the integrity, preservation, and long-term protection of the river corridor through the Grand Canyon while achieving a balance with other AMP resources.~~ Stewardship worthy of the Grand Canyon, so it can be proudly passed from generation to generation ~~in a condition that is as natural and unmarred as possible.~~
18	REC	DFC Additional Information Linkages Socio-economic values of quality recreation opportunities: Outfitters and guiding opportunities Local businesses	Socio-economic values of ~~Glen Canyon Dam~~