3.2 POTENTIALLY AFFECTED AREA

Interim surplus criteria could affect the operation of the Colorado River system (i.e., reservoir levels and river flow volumes) as a result of surplus determinations and associated water deliveries that may not have occurred in the absence of such criteria. This section describes the general geographic scope in which specific issues and potential effects associated with the interim surplus criteria alternatives were considered in this FEIS. Also discussed are the AMP, and how the program influences flows between Lake Powell and Lake Mead.

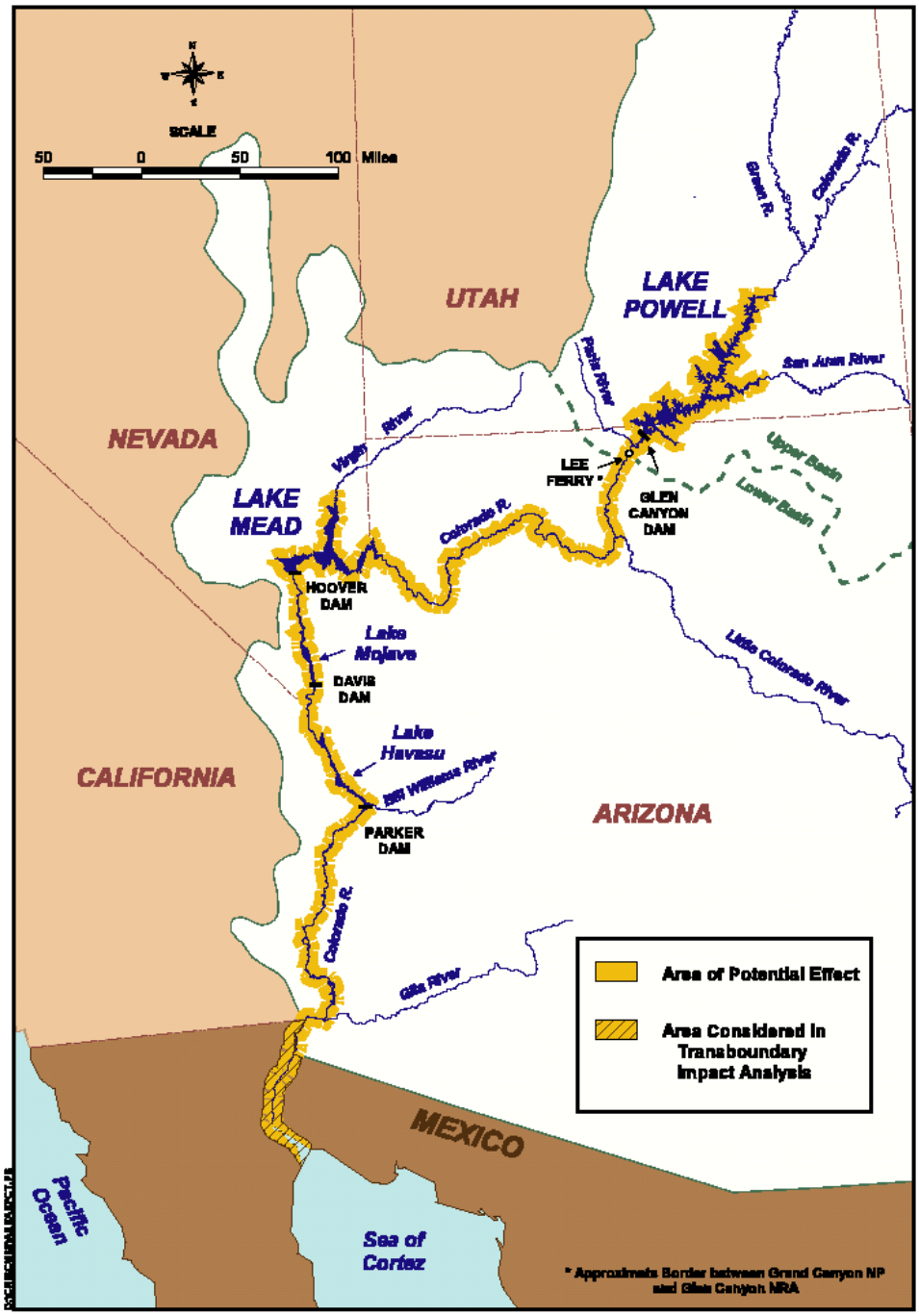
In addition to influencing conditions within the Colorado River system, it is recognized that continued delivery of surplus water that could result from interim surplus criteria would complement ongoing and proposed state actions in the Lower Basin. These actions could result in environmental effects outside of the river corridor. However, these actions have independent utility and are not caused by or dependent on interim surplus criteria for their implementation. Environmental compliance would be required on a case-by-case basis prior to their implementation. Therefore, Reclamation determined that the appropriate scope of this analysis is to consider only those potential effects that could occur within the Colorado River corridor as defined by the 100-year flood plain and reservoir maximum water surface elevations.

Interim surplus criteria are based on system conditions and hydrology. Water supply to the Lower Division states of Arizona, California and Nevada is achieved primarily through releases and pumping from Lake Mead. As a result of Lake Powell and Lake Mead equalization requirements (discussed further in Section 3.3), interim surplus criteria effects on Lake Mead surface elevations could also influence Lake Powell surface elevations and Glen Canyon Dam releases. However, operation of the other Upper Basin reservoirs is independent of Lake Powell. Therefore, the upstream limit of the potentially affected area under consideration in this FEIS is the full pool elevation of Lake Powell. The downstream limit of the potentially affected area within the United States is the SIB between the United States and Mexico. Section 3.16 of this FEIS addresses potential transboundary impacts in Mexico extending to the mouth of the Colorado River as required pursuant to Executive Order 12114 - Environmental Effects Abroad of Major Federal Actions, January 4, 1997, and the July 1, 1997 Council on Environmental Quality (CEQ) Guidelines on NEPA Analyses for Transboundary Impacts.

3.2.1 COLORADO RIVER SEGMENTS AND ISSUES ADDRESSED

As shown on Map 3.2-1, the Colorado River corridor from Lake Powell to Mexico consists of flowing river reaches, two large reservoirs (Lake Powell and Lake Mead) and two smaller reservoirs downstream of Lake Mead (Lake Mohave and Lake Havasu). The river corridor and adjacent areas comprise a heterogeneous composite of various geographic and hydrologic regimes, which differ in their resource composition and resource management administration.

Map 3.2-1
Area of Potential Effect



For the purposes of presentation, and to focus analysis of the potential effects of the interim surplus criteria, the river corridor has been divided into four areas: Lake Powell, the Colorado River between Glen Canyon Dam and Lake Mead, Lake Mead, and the Colorado River between Hoover Dam and the SIB. The following sections discuss the areas segmented for this analysis and introduce the issues considered within each area.

3.2.1.1 LAKE POWELL

Lake Powell is a large reservoir on the Colorado River formed by Glen Canyon Dam. The reservoir is narrow and long (over 100 miles). Lake Powell provides water storage for use in meeting delivery requirements to the Lower Basin.

The normal operating range of Lake Powell is between elevations 3490 and 3700 feet msl. Elevation 3490 feet msl corresponds to minimum power pool. (Releases from Glen Canyon Dam can be made below 3490 feet msl down to elevation 3370 feet msl via the river bypass tubes.) Elevation 3700 feet msl corresponds to the top of the spillway radial gates. During floods, the elevation of Lake Powell can go above 3700 feet msl by raising the radial spillway gates, resulting in spillway releases. In 1983, Lake Powell reached a high elevation of 3708.34 feet msl.

Lake Powell is located within the GCNRA, which is administered by the NPS. Reclamation retains authority and discretion for the operation of Glen Canyon Dam and Lake Powell. Issues considered in this FEIS associated with Lake Powell include: hydrology (i.e., projected reservoir surface elevations); salinity; aquatic resources; special-status species; recreational facilities, boating and sport fishing; power generation from Glen Canyon Dam; changes in pumping costs for Navajo Generating Station and the City of Page; visual and air quality effects associated with exposed reservoir shoreline; environmental justice; cultural resources; and Indian Trust Assets (ITAs).

3.2.1.2 COLORADO RIVER FROM GLEN CANYON DAM TO LAKE MEAD

The segment of the Colorado River between Glen Canyon Dam and Lake Mead is comprised of a narrow river corridor through the Grand Canyon that is administered primarily by the Grand Canyon National Park. Flows within this reach of the river consist primarily of releases from Glen Canyon Dam as discussed in Section 3.3.1. Issues considered in this FEIS within this segment of the river address those associated with a program of low steady summer flows and Beach/Habitat-Building Flow (BHBF) releases, as discussed in Section 3.2.2.

3.2.1.3 LAKE MEAD

Lake Mead is a large reservoir on the Colorado River formed by Hoover Dam. The reservoir provides water storage for use in regulating the water supply and meeting

delivery requirements in the Lower Basin. The normal operating range of the reservoir is between elevations 1219.61 and 1083 msl. Elevation 1083 msl corresponds to the minimum power pool. (Releases can be made from Hoover Dam below 1083 msl down to 895 feel msl via the intake towers.) During floods, the elevation of Lake Mead can go above 1219.61 msl. The top of the raised spillway gates is at 1221.0 msl. Since its initial filling in the late 1930s, the reservoir water level has fluctuated from a high of 1225.85 feet msl (as occurred in July, 1983) to a low of 1083.21 feet msl (as occurred in April, 1956).

The reservoir is located within the LMNRA, which is administered by the NPS. However, Reclamation retains authority and discretion for the operation of Hoover Dam and Lake Mead. Issues considered in this FEIS associated with Lake Mead include: hydrology; water supply for Nevada; salinity; water quality associated with Las Vegas Wash and SNWA intakes; aquatic resources; special-status species; recreational facilities, boating and sport fishing; power generation from Hoover Dam; visual and air quality effects associated with exposed reservoir shoreline; environmental justice; cultural resources; and ITAs.

3.2.1.4 COLORADO RIVER FROM HOOVER DAM TO THE SOUTHERLY INTERNATIONAL BOUNDARY

The Colorado River from Hoover Dam to the SIB is contained within the shallow Colorado River Valley in which Lake Mohave, Lake Havasu and other smaller diversion reservoirs are located. Within this segment, especially along river reaches below Parker Dam, the Colorado River is fringed with riparian vegetation and marshy backwaters, and contains a number of diversion dams and a system of levees. The northern reach of this segment, including Lake Mohave, lies within the LMNRA. The lower reach is bordered by a combination of federal, Tribal and private land. The last 22 miles (approximately) is along the international border with Mexico. Reclamation retains authority and discretion for river operations in the reaches of this segment.

Under the BCPA and the Decree, discussed previously in Chapter 1, releases from Hoover Dam are governed by orders for downstream water deliveries to Arizona, California, Nevada and Mexico. However, releases may exceed orders when flood releases are required under the Corps' flood control criteria, as discussed in Chapter 1 or for other purposes consistent with the BCPA and the Decree.

Issues considered in this FEIS associated with this river segment include hydrology; water supply for Arizona, California, Nevada and Mexico; costs of flood damages downstream of Hoover Dam; water quality; potential effects of changes in flows on special-status species; potential effects of changes in the temperature of water released from Hoover Dam on sport fisheries and fishing; environmental justice; cultural resources; and ITAs.

3.2.2 ADAPTIVE MANAGEMENT PROGRAM INFLUENCE ON GLEN CANYON DAM RELEASES

In March 1995, Reclamation completed an EIS on the operation of Glen Canyon Dam. The EIS developed and analyzed alternative operation scenarios designed to meet statutory responsibilities for conserving downstream resources, while meeting other authorized project purposes, and protecting Native American interests. Major issues of concern included native and endangered species, beach erosion, recreation (including white-water boating, sport fishing, and camping), vegetation, wildlife habitat and food base, water supply, hydroelectric power generation, cultural resources, and Native American interests. The Secretary signed a ROD on October 8, 1996, which specified certain types of releases from Glen Canyon Dam. Prior to the ROD, Glen Canyon Dam was operated as a peaking power facility, maximizing the value of power produced. The patterns of releases resulting from this type of operation were recognized to be detrimental to downstream resources and were therefore modified by the ROD. Reclamation also consulted with the Service under the ESA. The Service issued a biological opinion containing a recommendation for a reasonable and prudent alternative, which was incorporated into the ROD (see Section 1.4.2.1).

To determine if the operation of Glen Canyon Dam under the ROD is meeting the objectives of downstream resource protection, an AMP was instituted as described in Section 1.4.2.1. Through this process, the effects of dam operations and the status of resources are monitored and studied. The results are used to formulate potential recommendations to the Secretary on refinements to dam operations to ensure that the purposes of the Grand Canyon Protection Act are met. As long as the AMP continues to successfully function, the natural and cultural resources within the Colorado River corridor between Glen Canyon Dam and Separation Canyon (just upstream of Lake Mead) will be protected and conserved.

Two types of releases from Glen Canyon Dam, BHBFs and low steady summer flows, are part of a program of experimental flows being developed and refined through the AMP, as called for in the Biological Opinion (USFWS, 1994). The change in the frequency with which BHBFs and low steady summer flows would be triggered under each of the alternatives has been analyzed (see Section 3.6). Flows from Glen Canyon Dam, which could be affected by the adoption of interim surplus criteria, will remain within the range of flows analyzed in detail in the Glen Canyon Dam EIS. Therefore, effects of potential changes in the frequencies of these flows on downstream resources require no further analysis outside of the Glen Canyon Dam ROD and the AMP.