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Memorandum

To: Chief, Technical Services Division, Yuma Area Office, Bureau of Reclamation,  
Yuma, Arizona

From: Field Supervisor

Subject: Biological Opinion for Laughlin Lagoon Dredging Project, Clark County, Nevada

This document transmits the Fish and Wildlife Service's biological opinion (BO) based on our review of the proposed Laughlin Lagoon dredging project located on the Colorado River in Clark County, Nevada, and its effects on the endangered razorback sucker (*Xyrauchen texanus*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your August 6, 1999, request for formal consultation was received on August 10, 1999.

This biological opinion is based on information provided in the August 6, 1999 biological evaluation, memoranda from the Bureau of Reclamation (BOR) dated April 21, 1999, and June 21, 1999, meetings between the Service and BOR on March 9, 1999, August 2, 1999, and August 9, 1999, and other sources of information. A complete administrative record of this consultation is on file at this office.

Consultation History

The Service issued a BO for a proposed dredging project in Laughlin Lagoon was issued to the U.S. Army Corps of Engineers on December 23, 1992. The proposed project was intended to provide river access to shoreline landowners cut off by placement of a training structure in the 1960's by the BOR. This proposed project was privately designed and planned, however sufficient funding was never obtained and the proposed project was never implemented. The BOR was not involved in this proposed project. However, based on commitments made at the time of the construction of the training structure, BOR believes it has a responsibility to provide access for the landowners under the Colorado River Front Work and Levee System Act of 1946. That believe is the justification for the proposed action now submitted for consultation.

Planning for the present proposed action began in February, 1998 after BOR was approached by the landowners at Laughlin Lagoon. The privately developed, 1992 proposed action was not deemed suitable for the maintenance type of action envisioned by BOR, and planning on a new proposed action was initiated. Several meetings between BOR, landowners and other interested parties were held during 1998 (February 24, April 1, May 6, June 4, July 15, October 7, and November 18) and 1999 (February 10, April 22, and June 23). The Service had a representative at the February 10, 1999, meeting. The Service and BOR met concerning this project on March 9, 1999 and August 2, 1999. Materials provided for the consultation were given to the Service at a meeting on August 9, 1999, with additional materials provided via e-mail on August 10, 1999.

The Service received a request for concurrence with a finding of “may affect, not likely to adversely affect” (NLAA) for the proposed action and the razorback sucker, Yuma clapper rail (*Rallus longirostris yumanensis*) and southwestern willow flycatcher (*Empidonax traillii extimus*) on April 21, 1999. The Service responded in a memorandum dated May 12, 1999, stating that we could not concur with a NLAA finding based on the information provided. We suggested additional information be developed by BOR to justify the finding. The BOR responded on June 21, 1999, with additional information on the habitat for the three endangered species in the project area, and more detailed project information and again requested concurrence with a finding of NLAA. The Service responded on July 15, 1999, and concurred with the NLAA for the Yuma clapper rail and the southwestern willow flycatcher. We did not concur with the NLAA for the razorback sucker based on the presence of razorback suckers in the immediate area and the importance of backwater habitats for this species and we recommended initiation of formal consultation. The August 2, 1999, meeting between the Service and BOR addressed the additional information needed to initiate formal consultation. Of special concern to BOR is the imminent start date for the proposed project (August 24, 1999) and the difficulty of altering schedules for dredges over the next several years. The Service recognizes these concerns, and agreed to expedite the completion of this BO.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

Laughlin Lagoon is an artificial backwater of the Colorado River on the Nevada shore downstream from the town of Laughlin. Much of the original river shoreline now behind the training structure is privately owned and has residential and failed commercial developments down to the shoreline. Access from these properties to the Colorado River existed prior to the construction of the lagoon. The lagoon was created in the 1960's when the river training structure was built by BOR to protect the shoreline from erosion as the Colorado River attempted to meander to the west. The cut-off portion of the channel became the lagoon. The lagoon is approximately 127 surface acres with a maximum depth of about 15 feet at high water levels (Walter Development Corporation 1992). Located approximately eight miles below Davis Dam, the Colorado River in the vicinity of the lagoon is significantly affected by the highly variable releases from the dam. These large water level fluctuations in the Colorado River have a

significant effect on actual water depths and wetted surface area in the lagoon. Water releases from Davis Dam are highest in the summer and lowest during the winter, with significant daily and weekly variation (BOR 1996). During high summer flows, surface acreage is approximately 90 acres with depths of two to three feet common over much of that with a maximum depth of eight feet. In the winter, water surface acreage may be as low as 28 acres with a maximum depth of five feet and about 67 acres of mudflats (Walter Development Corporation 1992). The action area for the purposes of this consultation includes Laughlin Lagoon and adjacent shoreline areas and the mainstem Colorado River in the Mohave Valley Division (Davis Dam downstream approximately to the Interstate 40 highway bridge). The action area is larger than the project area due to the probable relationship between fish populations in the main channel and in the available backwaters such as Laughlin Lagoon.

The training structure that created the lagoon has an existing opening approximately half-way along its length that provides a direct connection to the Colorado River. There was also a culvert in the eastern end of the structure. The limited water flow through this culvert resulted in reduced circulation at this end. Water temperatures in this portion of the lagoon were higher than in the main channel (Walter Development Corporation 1992). In December, 1998, BOR installed two additional culverts at the eastern end of the training structure to allow more water to flow through the lagoon. At the same time, two culverts were also placed at the downstream end to provide for water circulation through the western half of the lagoon. The placement of these culverts has already had some effect on water flows and temperatures through the lagoon. A finding of “no effect” must have been made by BOR for the placement of these culverts. The Service does not have a record of a request for concurrence or consultation for that activity.

The proposed project would provide river access for shoreline landowners by removing approximately 200,000 cubic yards of material from a 3,100 foot long, 100 foot wide channel paralleling the Nevada shoreline (the “parallel channel”) and a 1,100 foot long, 100 foot wide channel connecting the parallel channel with the existing inlet from the Colorado River (the “access channel”). These channels would be dredged to be 10 feet deep at a water surface elevation of 493 feet. One section in front of a wash inflow would be dredged to 20 feet to accommodate sediments deposited into the lagoon from this wash. In addition to these channels created by the hydraulic dredge, a 1.2 acre area at the inlet will be deepened using ground based equipment and a circulation channel of 940 feet long by 18 feet (bottom width) wide and six feet deep would be created by an amphibious excavator. The circulation channel is designed to enhance water circulation in the western half of the lagoon. Habitats in the work area are largely cattail (*Typha* spp.) and bulrush (*Scirpus* spp.) with some common reed (*Phragmites australis*). Where water depths allow, submerged plants such as pondweed (*Potamogeton* spp.), spiny naiad (*Najas marina*) and water milfoils (*Myriophyllum* spp.) may be found. Two areas of the parallel channel, one at the eastern end of the lagoon and one at the western end, have filled in to such an extent that they currently support low quality salt cedar-screwbean mesquite stands.

A dredge launch platform would be constructed by the amphibious excavator at the water’s edge near the western end of the parallel channel. This would measure 125 feet by 200 feet. The

dredge launch platform is on mostly bare ground. The hydraulic dredge would access the project site from here. The amphibious excavator would use the training structure itself to access the inlet work area and would access the circulation channel area from the adjacent uplands..

The BOR estimates 200,000 cubic yards of dredge spoil would be placed in one of three sediment disposal areas, totaling 36 acres. Most of the dredged material is composed of various sized sands and gravels and occasional cobble sized rock. The disposal areas are all upland habitats containing salt cedar (*Tamarix chinensis*), screwbean mesquite (*Prosopis pubescens*) and several saltbush (*Atriplex*) species. These habitats are very disturbed by human activities and lack the horizontal and vertical complexity needed to be significant wildlife habitats. Materials from the amphibious excavator (4,750 cubic yards) would be placed on either side of the new circulation channel. The material from the inlet structure work (4,900 cubic yards) would be placed against the existing training structure.

Although not part of the proposed project, the BOR is discussing with the Nevada Department of Wildlife (NDOW) creation of several small islands in the lagoon using a portion of the dredge spoil. These areas would naturally revegetate with cattail and bulrush habitats after the project is completed and could be used to offset the loss of marsh habitats caused by creating the deeper channels. Depending upon placement of these islands, they may be useful in controlling boat and personal watercraft traffic in the lagoon. This BO will not assume that these islands would be created, but will separately evaluate the potential impact caused by them if they were to be created.

The proposed project is scheduled to begin on August 22, 1999. Work to create the dredge launch platform and other preparatory activities will be the first tasks. The amphibious excavator is proposed to be used to create the launch platform starting August 22, 1999, and be finished by August 25, 1999. The circulation channel would be started on August 25, 1999, and completed by September 2, 1999. The excavator would move to the training structure and begin work at the inlet on September 2, 1999, and finish that portion of the project by September 16, 1999. Set up for the dredge would take from August 25, 1999, to September 30, 1999. Dredging Area 1 of the 10 and 20 foot channels would begin at the western end of the parallel channel on October 1, 1999 and 3,150 feet would be completed by January 13, 2000. This would include the 20 foot deep portion and the connection between the inlet and the parallel channel. Area 2 is east of Area 1 and is 900 feet long. This would be dredged from January 14, 2000, to February 1, 2000. Area 3 contains both marsh and upland sites and is 1,100 feet long. It would be dredged from February 2, 2000 to March 1, 2000. The current schedule does not allow for dredging activities after March 1, 2000. This is to minimize effects of dredge operation on razorback sucker spawning periods in the Colorado River. Take down of equipment on the site would occur during March, 2000.

## STATUS OF THE SPECIES

The razorback sucker was listed as an endangered species on October 23, 1991. Critical habitat was designated on March 21, 1994. Although the action area was included in the draft critical habitat proposal, it was not included in the final rule. Critical habitat exists upstream of the action area and is not expected to be affected by the proposed project.

This BO does not contain a complete discussion of the life history and habitat requirements for the razorback sucker. Information on the life history, distribution, and population trends has been summarized in the 1998 Razorback Sucker Recovery Plan (USFWS 1998) and the biological support document for the critical habitat designation (Maddux et al. 1993). Another comprehensive summary of the status of the razorback sucker is available in the book *Battle Against Extinction: Native Fish Management in the American West* (Minckley and Deacon 1991). The cursory information presented in this section is largely summarized from these documents. For more complete information, please refer directly to these documents or the primary literature referenced in them.

The razorback sucker is an endemic fish of the Colorado River basin and historically was found in all major rivers and tributaries within the basin. The genus *Xyrauchen* is monotypic and is unlike other members of the sucker family by having a large, keel-like hump on the dorsal side behind the head and in front of the dorsal fin. Razorback suckers may reach three feet in length and weigh up to 12 pounds. Based on information from spawning adults in Lake Mohave, females are generally larger than males (Minckley 1983).

The pre-development Colorado River basin contained a wide variety of habitats ranging from turbulent canyon reaches, meandering low gradient reaches, seasonal and “permanent” backwaters and sloughs as well as isolated backwaters. Wide variation in flows over the course of a year, seasonal changes in water quality and very high as well as very low temperatures were characteristic of these aquatic habitats. Razorback suckers utilized almost all of these habitats at various times of the year. Backwaters and flooded bottomlands are believed to have been especially important for nursery areas for young of the year fish as well as feeding areas for adults (Tyus 1987, Tyus and Karp 1990). There is some evidence to suggest that some razorback suckers had extensive migrations through the system, while others may not have moved great distances. If behaviors from Lake Mohave razorback suckers are indicative of other razorback sucker populations, then there is some fidelity to spawning sites. Adult razorback suckers return to the same shoreline areas in Lake Mohave each year to spawn. These areas are generally near to wash inflows to what was the Colorado River, now inundated under Lake Mohave.

Razorback suckers are long lived fish, reaching 40 to 50 years of age (McCarthy and Minckley 1987). Upon reaching maturity, adults produce viable gametes virtually until the end of their lives. Individuals spawn every year, however successful recruitment to the population likely did not occur every year. The wide variation in local conditions, especially of seasonal flows, had significant effects on success of each year’s cohort. With a long-lived species such as the razorback sucker, significant recruitment every year was not needed to maintain the local population.

Razorback sucker populations have significantly declined throughout their range in the last 100 years. In some river systems in the Colorado River basin, for example the Gila River basin, native populations became extirpated. Failure of recruitment due to the abundance of non-native fish and invertebrate predators and competitors has been identified as the primary cause of these declines. Alterations in habitat that prohibit migration, cut off access to bottomlands and backwaters, and create large reservoir impoundments are significant contributing factors. Without recruitment, the age distribution of the population becomes skewed to older individuals and eventually these begin to die off. This can be seen in the declines from an estimated 60,000 individual fish in Lake Mohave in the early 1990's to the present estimates which run as low as 9,000 adults. The same population disappearance within 40 to 50 years of reservoir closure has been observed in the Gila River basin reservoirs and in Lakes Mead and Havasu. However, a small natural population has been retained in Lake Mead and shows evidence of some limited recruitment that has allowed it to persist.

The largest extant native population is in Lake Mohave and is providing genetic stock for augmentation and reintroduction efforts in at least in the lower Colorado River basin. The genetic diversity in the Lake Mohave stock is high, with all known genotypes represented (Dowling et al. 1996), thus we have a sound stock to draw from for these programs. Reintroductions and augmentation of existing populations are happening in several areas of the basin, however, these efforts provide for young, sub-adult fish to enter the population and restore numbers of fish. The problems preventing sufficient natural recruitment to those numerically restored populations still exist and need to be solved to allow for true recovery.

## ENVIRONMENTAL BASELINE

The environmental baseline is a discussion of the current status of conditions within the action area including the local status of the species. It must take into account the effects of past and ongoing actions on the species and its habitat. This is necessary in order to assess the type and severity of effects to the species from the proposed project.

Razorback suckers are part of the resident fish fauna of the Mohave Valley Division of the Colorado River. The size of this population has declined significantly and is likely fairly small this time. Surveys by NDOW in Laughlin Lagoon in 1986 and 1987 captured razorback suckers. Four individuals 542 millimeters to 600 millimeters in total length were taken in April and June of 1986 and six individuals averaging 555 mm total length were taken in November of 1987. Sierra Delta Corporation conducted surveys in May 1988 and captured three razorback suckers in the eastern end of the lagoon (Walter Development Company 1992). Surveys were not conducted by NDOW in 1988 and 1989 and were resumed in spring and fall from 1990 to 1994. No additional razorback suckers were taken in these surveys; however, flannelmouth suckers (*Catostomus insignis*) were a significant part of the catch in spring and fall sampling periods (NDOW 1999). Two other razorback suckers were observed in the main channel near Davis Dam in the late 1980's (Mueller 1999). It is important to recognize that these sampling efforts

were not extensive, being usually one night of gillnetting (spring) or electroshocking (winter), so the absence of razorback suckers in the catch record is not proof they were not present in the lagoon. Based on its information, NDOW believes that most use of the lagoon would be in the January to March period (NDOW 1999). It is also important to note that at low winter water levels, NDOW reported much of the lagoon was mud flats and that fish were restricted to the existing deeper channels. One of these is close to the existing shoreline, where the parallel channel would be dredged. The razorback suckers reported on in 1986, 1987, and 1988 were captured in the eastern end of the lagoon, quite probably in the then existing channel (Walter Development Company 1992).

In February and March 1999, three razorback suckers were captured in the Mohave Valley Division. One 570 mm female was taken just below Davis Dam and a male (350 mm) was taken at the inlet for Boy Scout Camp below Bullhead City Park. Another male (439 mm) was taken near the Park (Mueller 1999). These sites are all upriver from Laughlin Lagoon. No razorback suckers were taken from Laughlin Lagoon itself. All fish were in good condition and appeared to be young fish. The 350 mm male was wire-tagged (the others may have been but no detection equipment was available) and had been stocked into Lake Havasu at Windsor Beach in 1996 (Mueller 1999). The release site is approximately 50 miles downstream from the capture location. Given the health and physical condition of the other two razorback suckers, it is likely they too came from the augmentation efforts on Lake Havasu. That effort has put over 18,000 sub-adult razorback suckers into Lake Havasu (Bureau of Land Management 1999). Given the razorback sucker's ability to migrate in rivers over long distances, it would not be surprising that some of the Lake Havasu individuals would not have moved upstream into the Mohave Valley Division.

There is not sufficient information to estimate the size of the razorback sucker population in the Mohave Valley Division. It is also difficult to assess the habitat preferences of razorback suckers in the proposed action area. Mueller (1999) and his associates captured one of the three razorback suckers with a group of flannelmouth suckers. Mueller (1999) also reported observations of several groups of suckers in the survey area that included the vicinity of Laughlin Lagoon and flannelmouth suckers have often been captured in the lagoon itself (Walter Development Company 1992, NDOW 1999). If razorback suckers are accompanying flannelmouth suckers and utilizing the same habitats for at least part of the year then this may provide some information useful for this consultation. Unfortunately, there is little available information on the movements and habits of the flannelmouth suckers below Davis Dam.

There is, however, some information on the total fish fauna of the Mohave Valley Division that does shed some light on the likely preferences of fish species for the various habitats available. Under a BOR contract, Minckley (1979) evaluated the physical, chemical, and biological habitats of the lower Colorado River divisions. The main channel habitat in the Mohave Valley Division is cold and widely fluctuating water levels and velocities do not provide habitats conducive to maintaining large fish populations. Survey records indicate that generally, main channel fish

populations were significantly smaller than those found in the backwaters and were less diverse (Minckley 1979).

Additionally, the Arizona Game and Fish Department (AGFD), supported by BOR, has been investigating the habitat preferences of sub-adult and adult razorback suckers in the Imperial Division of the lower Colorado River. The Imperial Division and the Mohave Valley Division do not greatly resemble each other, and neither is similar to razorback sucker habitats in the upper Colorado River basin in Colorado and Utah. Nevertheless, the information obtained from sonic tagged fish in the Imperial Division has significant correlations with that from other locations and can be used in this assessment.

In the Imperial Division study, razorback suckers were shown to utilize backwaters significantly more often than would be expected based on their availability and the main channel significantly less than would be expected (Bradford et al. 1998). Backwaters are also used throughout the year by razorback suckers. Backwaters in the Imperial Division study were also selected on the basis of physical configuration (size, shape, entrance configuration, substrate and depth) rather than water quality, including temperature. Characteristics of the main channel that appeared to negatively affect selection were sand substrates and water velocity (Bradford et al. 1998).

Backwaters are considerably more available in the Imperial Division study area (making up approximately 42 percent of the total area) than in the Mohave Valley Division. Backwaters were also generally smaller in size than Laughlin Lagoon, but if larger size is a positive feature for selection, this may operate in favor of larger backwaters. Water level fluctuations in backwaters are significantly more variable in the Mohave Valley Division owing to the influence of Davis Dam. Fluctuations at Imperial Dam have been attenuated by distance and diversions. The main channel in the Mohave Valley Division, excluding the armored reach below the dam, is largely composed of sands and silts which were not preferred substrates and water velocities may be quite high during peak flows. Although water temperature is not important to selection in the Imperial Division, the water temperatures between the main channel and the backwaters may not be significantly different over most of the year. Water temperatures in the lagoon were several degrees higher than in the river (Walter Development Company 1992). The somewhat warmer conditions in the lagoon may therefore be more of a selection factor in the action area where the river water is released at 60° Fahrenheit all year.

Availability of preferred habitats in the action area is a factor in spatial distribution of the razorback sucker. There is obviously some use of the main channel, at least in the upper portion of the division. This may be tied to food availability on the armored substrates or the presence of potential spawning areas. In other areas, use is likely to be limited due to substrates and flows. The lower end of the Mohave Valley Division is near the extensive wetland complex at Topock Marsh. Entrance to a significant portion of this marsh complex from the river is limited due to water control structures. Marsh or backwater areas upstream of Topock are very limited in number and size due to the extensive channelization of the river. Most of both river shorelines are armored or otherwise modified and the Colorado River is prevented from moving within its

floodplain. There are some small backwaters and sloughs in the Division, some of which are completely cut off from the river. Aside from Topock Marsh, Laughlin Lagoon is the largest and most complex of the backwaters available in the Division and thus may have considerable importance for the razorback sucker population.

#### Past Activities and Consultations in the Action Area

Channelization of the Colorado River is not the only significant change in physical conditions that have affected the razorback sucker populations and created the present baseline. The creation of Hoover Dam in the 1930's altered the pattern of flows through the action area. Releases were timed for power production and agricultural needs, not based on the natural hydrograph. Creation of Lake Havasu by Parker Dam downstream of the action area caused the river channel to aggrade and backed water upstream onto the floodplain. This resulted in the first major dredging project on the Colorado River at Needles. Creation of Davis Dam further isolated this river reach and continued to significantly alter water release patterns and water temperatures since Davis Dam releases from the hypolimnion. Much of this activity was undertaken by the BOR using Federal funds and under the direction of Federal law and regulation.

The effects of these actions were not addressed under the Act until 1996 when the BOR entered into formal section 7 consultation with the Service on their operations and maintenance activities along the Colorado River. Some actions included in the consultation were water delivery schedules, front work and levee maintenance and power operations. Ongoing conservation activities for listed species were also included. The BO for that action made a finding of jeopardy and adverse modification of critical habitat for three species, one of which was the razorback sucker. The reasonable and prudent alternative (RPA) called on the BOR to undertake several tasks to improve the status of the razorback sucker in the lower Colorado River. While no specific tasks were identified for the Mohave Valley reach, the overall status of the species should improve throughout the lower Colorado River as a result of implementation of the RPA.

The Lake Havasu Fisheries Improvement Project (LHFIP), thought to be the source of at least one razorback sucker in the action area, did not intend to augment the Mohave Valley Division as part of their activities. However, that may be what is currently happening. The LHFIP is committed to stock another 12,000 sub-adult razorback suckers into Lake Havasu. Since these are mostly hatchery reared fish, they have no particular fidelity to any area of the reservoir. Once they achieve sexual maturity, it is not known where they will attempt to spawn. Upstream migrations to the apparently successful flannelmouth sucker habitats upstream of Laughlin Lagoon have occurred. If razorback suckers remain associated with the flannelmouth suckers there, this association may forecast the locations of future spawning events.

In addition to the BOR activities in the action area, issuance of permits under section 404 of the Clean Water Act by the Corps of Engineers does occur. The issuance of these permits is a federal action and consultation is required. Management of Topock Marsh by the Service and

other federal lands by the Bureau of Land Management (BLM) also constitute federal actions requiring consultation. Minor activities by other federal agencies can be expected in the action area, however, these are all subject to consultation. There are also Tribal land and water rights in the action area, the administration of some of which are Federal actions.

Significant amounts of the shoreline in the action area is owned by the Fort Mohave Indian Tribes and private individuals. Private land on the Arizona side is extensively developed in the vicinity of Laughlin Lagoon. On the Nevada side there is less actual development and at a much lower density at present than on the Arizona side. Upstream of the lagoon on the Nevada side, hotels and casinos line the river bank. Additional development of private and some Tribal lands is anticipated in the future within the area of the lagoon. This development will also result in an increased in recreational use of the river. Heavy use of boats and personal watercraft within the channel is already occurring. Accessible backwaters such as Laughlin Lagoon are also used by personal watercraft. These personal watercraft have very shallow drafts so do not require water depths needed for conventional boats and are able to access shallower water areas. Control of boat and personal watercraft traffic is a State responsibility.

#### EFFECTS OF THE ACTION

The Act requires that the Service evaluate the direct and indirect effects of the proposed project, including the interrelated and interdependent actions. Cumulative effects are also addressed as part of the analysis. Please note that the following analyses do not utilize the entire array of published and unpublished information sources regarding the effects of dredging on fishes, the changes to water quality as a result of dredging or for any other topic addressed herein. Sufficient information has been reviewed to provide a reasonable level of analysis for this section of the biological opinion.

#### Direct and Indirect Effects

Excavating and dredging activities would occur in Laughlin Lagoon from August 1999 to March 2000. The amphibious excavator would operate in the late summer and early fall period only, and operations are for 10 hours per day, four days a week. The hydraulic dredge would operate from October 1999 through February 2000, and operations are for 24 hours per day with a work schedule of 10 days on and four days off.

The amphibious excavator used at the inlet would remove materials from a roughly circular area on the lagoon side of the inlet. The substrates here are already somewhat armored due to the daily inflow and outflow from the river to the lagoon. However, there will still be some increase in turbidity resulting from the action of the excavator. Some of this turbidity may remain in the lagoon and some may enter the main channel of the river. The amount of this turbidity is not known. The harder substrate may support a more diverse benthic community than that on the sand/silt substrates elsewhere in the lagoon that would be temporarily lost as the substrates are removed. Water depths here are sufficient that the area is not dewatered during the summer

flows. Marsh vegetation on the site is classified as marsh type 7 which is an open-water dominated (at least 75 percent water) area adjacent to sparse marsh vegetation and may include sandbars and mudflats at low water periods. Enhancement of the inlet area would provide deeper water and less area of exposed mudflats at low flow periods. Marsh habitat losses would be minimal.

The amphibious excavator would also be used to create the circulation channel. Substrates here are dominated by sands and there is likely an organic material component near the top resulting from the decay of cattails and other marsh and aquatic plants. Summer water releases from Davis Dam are at their highest levels in the afternoon and evening during the period the work would be done. High flows may reach river elevation 495 feet at highest flows (BOR 1996). Even accounting for there being some time lag in water levels reaching the lagoon, and an additional dampening caused by restricted access at the inlet, water levels in the lagoon at the work area may be below the 493 elevation during much of the work (lowest levels reach approximately 491 feet in the main channel). The submerged benthic community in this area is likely dominated by oligochaete worms and chironomid dipteran larvae (Minckley 1979). Removal of the substrates to form the channel will temporarily eliminate the invertebrate and plant communities in the excavated area. These populations should re-establish. Local turbidity will increase as materials are relocated to the sides of the channel. This area does become a mudflat at some winter flow levels. The channel will provide permanent open water during those periods. Marsh vegetation on site is classified as types 3 and 4. These types contain limited open water, denser stands of cattails and bulrush, and a terrestrial component of trees and grasses. The lack of open water in this area reduces the potential for fish to be present here. This area is immediately adjacent to an upland area and the vegetation type reflects this. Some replacement of marsh vegetation on the excavated material would be expected, but would not equal the loss.

The parallel channel and the access channel from the inlet have largely sand and gravel substrates with some organic components. The operation of the dredge from September through February would take place in the fall and winter flow release periods when flows are considerably lower than in the summer. However, even at winter minimum flows, most of the parallel channel and the access channel would be under water during the work period (Walter Development Corporation 1992). Removal of the substrates to an upland disposal area will remove the organic components and the invertebrate fauna and increase local turbidity. Losses to aquatic plants and marsh emergent species would also occur. Marsh vegetation type 7 is the most predominant type in the affected area. As noted earlier, this type has much open water with scattered emergent marsh vegetation. Smaller areas of types 1 and 3 will also be eliminated by the parallel channel and the access channel. Type 3 marshes are found at the western end near the circulation channel and have been described previously. Type 1 marshes are densely vegetated and have very little open water. The position of the Type 1 marshes constricts the already narrow eastern end of the lagoon. These marshes are located along the training structure east of the inlet and extend in front of the new upstream culverts. Construction of the new channels would eliminate some of this dense vegetation and provide deeper water adjacent to the remaining vegetation. Banks of the channels would be sloped to discourage cattails or other emergents from rooting, preventing

return of these habitats. The cleared channels would eventually revegetate with aquatic, submerged vegetation that would provide cover for fish and invertebrates.

The parallel channel would also require removal of upland vegetation in two areas. The first, near the west end, is composed of Type 4 salt cedar-screwbean mesquite. The other is Type 5 salt cedar-screwbean mesquite. Both of these types are characterized by limited structural complexity (Anderson and Ohmart 1984) and have limited short or long term value to wildlife species. Dredging the 10 foot channels through these areas would permanently eliminate these as terrestrial wildlife habitats and create additional aquatic deep channel habitats.

All the excavation and dredging activity will involve an increase in noise levels in the surrounding area, as well as increased vibrations in the water. As noted in the BAE, these types of sounds generally frighten fish out of an area. In areas with dense vegetation or mudflats, fish are not likely to be in the immediate area. In areas with permanent, deeper water such as along the existing channel where the parallel channel would be placed, fish are more likely to be found and therefore affected by noise and other operations. During the low winter flows, there is limited area for the fish to occupy and existing channels become very important. Based on the catch records from NDOW in 1986-1987, and from Sierra Delta Corporation in 1988 (Walter Development Company 1992), razorback suckers were found in the warmer waters at the extreme eastern end of the lagoon during November (USFWS 1992) likely corresponding to Area 2 and part of Area 3. Dredging in Area 2 would begin January 14, 2000, and continue to February 1, 2000. Area 3 would be dredged from February 2, 2000, to March 1, 2000. The available sampling data cannot tell us when the razorback suckers are less likely to be in the area, however, NDOW believed that the January to March period was the most important. If the shallow, warmer waters are attracting them, then the lagoon may be occupied over a wider time period. Water released from Davis Dam is very cold (around 60° Fahrenheit) and does not warm up significantly in the eight miles to the lagoon (Minckley 1979). This would be especially true in winter where air temperatures are also low. It may be appropriate to assume that razorback suckers could be making use of the warmer waters during the entire dredging period. Owing to the narrowness of the lagoon in this area, combined with the Type 1 marshes along the south and the seasonal low water levels in the lagoon, there is a reasonable chance for razorback suckers to be “trapped” in front of the dredge as it moves east. Also, the operation of the dredge has the potential to cause them to move out of the available water covered area in the lagoon at a time when a considerable amount of the lagoon is composed of barely covered mud flats. The dredge would operate 24 hours a day for 10 days, then no dredging would occur for four days. During the down time, fish may move back into the work area only to be chased out again when work resumes. In the western end of the parallel channel and the access channel, this is less a concern because of the width of the aquatic habitat area even at low flows and the Type 7 marsh that surrounds the work area and makes fish movements through the area easier. The eastern end becomes very narrow and the Type 7 marsh is constrained by the denser Type 1 marsh on the south along the training structure. With less room to avoid the dredge, there is a higher risk of an individual razorback sucker being affected by operations if it was “trapped” in front of the dredge.

Completion of the proposed project will result in a series of changes to the lagoon, its water chemistry and perhaps its suitability for the razorback sucker. The new upstream culverts will allow river water to more efficiently enter the lagoon and the improved flow will likely travel along the parallel channel to the circulation channel and eventually out the lower culverts. Water will also be able to enter the lagoon through the inlet and the access channel. Water flow out of the lagoon during periods of dropping river water releases may also be enhanced by the improvements. The buffering effect of limited inflow/outflow may thus be reduced with the result that water level fluctuations within the lagoon may increase. This could decrease available habitats especially during low flow periods and crowd fish into the newly created deeper channels. An increase in predation or competition between non-native fish and the razorback suckers may be the result. Velocity of water moving through the lagoon may also change. Backwaters have higher productivity than the main channel habitats in part because organic materials can build up in the sediments and plankton populations do not easily get washed out since flows are low. Higher flows may reduce the productivity in the lagoon as a result of the proposed project

The changes in flow through the lagoon also have the potential to effect seasonal water temperatures. Water temperatures coming down river change with seasonal as well as daily releases. Lower flows move slower and have more chance to warm during the day. Higher flows move faster and have less opportunity to warm. Flows at night are affected by air temperatures to some degree in a similar fashion. As noted earlier, razorback suckers may be utilizing the shallow and warmer lagoon waters to avoid main channel temperatures. That razorback suckers can exist in those low temperatures is evident from the captures over the last years (Mueller 1999, NDOW 1999), however, warmer waters may be desirable for other reasons including sexual maturation, or food availability. Faster water flow through the lagoon, and the increase in deep water areas that are not easily affected by sunlight or air temperature, may combine to reduce temperatures in portions of the lagoon, especially at the eastern end. While in the summer months this may improve conditions for fish, it may also reduce the value of the habitat in the winter.

The current population of razorback suckers appears to be comprised of young fish, likely released as part of the LHFIP. Individuals were captured or possibly observed in “spawning” aggregations of flannelmouth suckers and are likely reaching sexual maturity. There are no known razorback sucker spawning grounds in the action area, however, it may be possible that the razorback suckers currently with the flannelmouth suckers will select the areas used by the other species. Larval razorback suckers have not yet been confirmed in the action area, but as the young sub-adults released into Lake Havasu mature, this is very likely to occur.

Larval razorback suckers in the upper Colorado River basin move downriver from spawning sites to occupy flooded bottomlands and other shallow backwater habitats. These habitats are often warmer than the adjacent river and are more productive earlier in the season. They remain in these habitats for several months feeding and growing. In the lower Colorado River, the floodplain backwaters likely served much the same function. These habitats are now rare in the

action area. It would be inappropriate to assume that Laughlin Lagoon would not provide the physical habitat parameters needed for larval razorback suckers, especially considering the paucity of backwaters in the Mohave Valley Division.

The increased flow into the lagoon from the upper culverts would tend to pull in more larvae from the river. Transported along the parallel channel, they could reach the adjacent shallow waters or find refuge in cover on the bottom of the channel once this redevelops. As noted above, the change in flows may alter the temperature and the productivity of the lagoon and this may have effects to habitat suitability for larvae and fry. There are several fish species that are known predators on eggs and larvae of razorback suckers found in the lagoon. These include the common carp (*Cyprinus carpio*) and green sunfish (*Lepomis cyanellus*). Populations of these predators can have effects substantial enough to ensure that few larvae survive to react to the changes in physical habitat.

#### Interrelated and Interdependent Activities

Interrelated and interdependent activities are evaluated under of direct effects. An interrelated activity is one that is part of the proposed project and depends on the proposed project for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. The “but for” test is used to evaluate activities that may or may not qualify as interrelated or interdependent.

The Service has identified the potential construction of dredge spoil islands within the lagoon as an activity that qualifies as interrelated or interdependent with the proposed project. The placement of the new culverts in the training structure might also have qualified under this heading, however, since they were done prior to the proposed action, they are part of the baseline.

The islands would be created in the vicinity of the areas to be dredged. Instead of the spoil pipeline transporting the dredged material to the appropriate disposal site, the spoil would be placed in mounds on portions of the shallow areas of the lagoon. Not all the spoil would be used for these purposes. Creation of the islands would provide replacement habitat for marshes lost to the creation of the channels and would eliminate shallow water habitats on site. There is little adverse effect from the elimination of some shallow water habitats in the lagoon, and there could also be benefits from increased habitat complexity (largely determined by the design of the islands). Using them to funnel and control boat and personal watercraft traffic speeds could reduce the level of disruptive noise and boat wake that degrades aquatic habitats. Fish are less likely to leave an area if noise levels are not excessive. Until these islands are designed, it is difficult to speculate on the details of their potential benefits or harms.

#### CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that

are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

General information about the potential for increased development in the action area is available. Continued urbanization is expected, especially in the Bullhead City and Laughlin areas. Some additional development on the Fort Mohave Indian Reservation may occur as a result of the Tribe pursuing opportunities associated with the private lands growth. Increased numbers of people living and visiting the area translates to increased recreational demands on the river.

Boat and personal watercraft traffic in Laughlin Lagoon is limited by the availability of water deep enough to safely operate the watercraft. The deep channels will provide more opportunity for boats to access the area. Increased speeds may be seen as the public realizes that there is deep water from the training structure to the shoreline (1,300 feet) and along the parallel channel (5,100 feet). Users of personal watercraft would also appreciate the increase in safe areas to operate at high speeds. It is not known how much of an increase in use of the lagoon by watercraft operators could be expected, nor is it clear how much speeds would increase. The State of Nevada through NDOW has the management authority for setting speed limits for watercraft in that state. What NDOW, in coordination with the shoreline landowners, determines to do will not be known for some time.

We do not know the effect of increased watercraft use and speeds on fish inhabiting the lagoon. Noise and vibration in the water will increase some level over present, and there may be a concentration of fish and watercraft users in the new channels that would exacerbate the situation. Excessive noise may cause the fish to abandon the area. Since the level of watercraft use on the river varies daily, weekly and seasonally, the issue of harassment of individual fish will also vary.

Watercraft used at high speeds create wakes that can be very destructive to shorelines and shallow water areas. Post-construction of the channels, there will still be significant shallow water areas adjacent to the new deep water areas that would be affected by wake. Large fish are generally not in waters shallow enough that they might become stranded if waves generated by watercraft displaced them and pushed them up onto the shore. However, very small fish are more vulnerable. Razorback sucker larvae, unable to swim strongly for long periods, seek cover in shallow water. Active at night, they avoid the period of high watercraft activity. However, forces from wakes that dislodge them from cover or require them to use additional energy stores to remain in place would be detrimental. As noted previously, no razorback sucker larvae have been located in the lagoon or surrounding area, so this is not currently an issue. If the extant sub-adult population does increase and matures to spawning age, this may change.

## CONCLUSION

After reviewing the current status of the razorback sucker, the environmental baseline for the action area, the effects of the proposed Laughlin Lagoon dredging project and the cumulative

effects, it is the Service's biological opinion that the dredging project, as proposed, is not likely to jeopardize the continued existence of the razorback sucker. Critical habitat for this species has been designated at Lake Mohave and downstream of Parker Dam on the Colorado River; however, this action does not effect those areas and no destruction or adverse modification of that critical habitat is anticipated.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such and extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to the and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BOR so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The BOR has a continuing duty to regulate the activity covered by this incidental take statement. If BOR (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7 (o)(2) may lapse. In order to monitor the impact of incidental take, the BOR must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

### **AMOUNT OR EXTENT OF TAKE**

The Service anticipates that incidental take of razorback suckers will be difficult to detect for the following reasons: (1) finding a dead or impaired specimen is unlikely; (2) the population within the action area is very small; (3) the type of take involved, mostly harassment, is difficult to document; and (4) the magnitude of effects to habitat and the response of the species to those changes is not known. However, the level of take of this species from the proposed action can be anticipated based on the length of time the dredging would continue and its seasonality and by evaluation of changes in razorback sucker use of the eastern end of the lagoon.

The Service anticipates that take of adults and sub-adult razorback suckers in the form of harassment through displacement from likely preferred habitats, thus interfering with normal behavior patterns will occur from October 1, 1999, through March 1, 2000. Razorback suckers have been documented in Laughlin Lagoon in November, April, and June and are likely present in October. The dredging would take place over a period of 152 days; however, on at least 36 of those days, the dredge will not be operating (normal schedule of 10 days work and four days non-work), leaving 106 days of harassment. In addition to harassment, there is a potential to kill an individual through direct dredge activity or if accidents occur while a fish is attempting to leave the The degree of risk for this happening is very difficult to assess. Effects to larvae are less likely during the dredging period since the work period is outside of a hypothesized razorback sucker spawning period in the action area. Active spawning was not recorded in February or March of 1999 (Mueller 1999) and for the near term a post-March start of spawning for the action area is reasonable. The present razorback sucker population may not be sexually mature by 2000, so there would not be any larvae to be entrained into the hydraulic dredge.

Take of habitat is harm when habitat is degraded such that it interferes with normal behaviors such as breeding, feeding or sheltering. The improved flow through the lagoon will change the water depth, velocity and temperature at the eastern end known to be used by razorback suckers. How these changes will affect the fish is not clear. There is limited information on water quality pre-December 1998 when the new culverts were installed and there is only occasional fish sampling records to document use of the area by razorback suckers. Even if adult razorback suckers do not show any measurable change in behavior resulting from the changes, there is a risk to larvae entering the backwater and not finding physical conditions suitable for development in the eastern end. The amount of take from this harm may be estimated by reductions in use of the eastern end or relocations of use areas by razorback suckers in the lagoon.

The BOR has included in the proposed project description several actions that reduce the risk of take from harassment and potential mortality. Core samples have been taken in appropriate locations to confirm the substrate materials and ensure that the proper equipment is used. This will reduce the likelihood of damage to the dredge that would put the project off schedule. The existing schedule does not allow for active dredging to occur after March 1, 2000, to avoid razorback sucker spawning seasons. There is also some flexibility in determining when certain areas could be dredged, and this may assist in avoiding occupied areas.

#### EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

#### REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize take of razorback suckers:

1. Measures will be taken to ensure completion of the dredging project within the scheduled time frame.
2. Measures will be taken to minimize the potential for an individual razorback sucker being harmed or harassed by the proposed action.
3. Measures will be taken to minimize the effects of changes in water temperature on razorback sucker habitats in the lagoon.

The intent of these measures is to avoid any potential razorback sucker spawning period by not having active dredging after March 1, 2000, and to reduce the risk of harassment and harm in the eastern end of the lagoon where razorback suckers have been recorded in the 1980's.

#### TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the BOR must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

To implement reasonable and prudent measure #1:

1. The BOR will provide the Service with monthly progress report on the dredging project, specifically including percentage of work done and any revised schedule of completion.
2. If, for any reason, the time schedule slips such that dredging would not be completed by March 1, 2000, the BOR will revise the schedule to avoid important razorback sucker habitats during the time period these fish are suspected to be present. Surveys under reasonable and prudent measure 2 will be needed for this analysis. This revision will be coordinated with the Service.

To implement reasonable and prudent measure #2

1. From November through February, at least two surveys per month of the eastern end of the lagoon will be made for razorback suckers. Trammel nets, electrofishing, or other suitable methods may be employed for this purpose. Reports of these surveys will be provided to the Service within two weeks of the activity.
2. If razorback suckers are located in the eastern end of the lagoon, then dredging operations will be altered such that Area 3 (including the upland area) is dredged before Area 2 and

Area 2 will be dredged from east to west to allow razorback suckers the optimal opportunity to avoid the dredge.

3. All work in the lagoon will be confined to the areas where the project features would be constructed. Construction equipment will be confined to those areas and not allowed in the lagoon outside of those areas.
4. If any razorback suckers are found killed or injured during the dredging or excavating operations, the Service is to be notified immediately. Disposition of the fish will be directed by the Service.

To implement reasonable and prudent measure #3

1. Monthly surveys of the dredged and excavated habitats for the presence of razorback suckers will begin after the dredging is complete and continue for two years. The survey will also include looking for larvae during the spring. In the absence of razorback suckers being found, information on flannelmouth suckers will serve as a surrogate.
2. At the time of the surveys, information on water depths, temperature profiles, and flows in the dredged channels will be obtained. Temperature readings will also be made at locations throughout the lagoon's undredged areas when covered with water.
3. At the end of the two year period, the BOR will meet with the Service and NDOW to discuss the results of the monitoring and, if necessary, evaluate options to attempt to minimize the changes. These could include seasonal closure of one or both of the upstream culverts to provide a warm water area.
4. Reports on items 1 and 2 above will be made yearly to the Service.

The Service believes that an undetermined number of razorback suckers will be taken during the 106 days of dredge activity resulting from the proposed project. Effects to habitat that cause harm will last beyond the construction period. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded (as defined by the number of dredge days or by reduction in use of the eastern end of the lagoon), such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The BOR must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

#### CONSERVATION RECOMMENDATIONS

Section 7 (a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help to implement recovery plans, or to develop information.

1. The BOR should work with NDOW to develop a plan to place islands of dredge spoil in Laughlin Lagoon such that these islands could assist in watercraft management actions or in directing flows to protect sensitive habitats.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

#### REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if : (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your efforts to preserve endangered and threatened species and their habitats. If you have any questions regarding this biological opinion or incidental take statement, please contact Lesley Fitzpatrick (x236) or Tom Gatz (x240).

/s/ David. L. Harlow

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