

appears to be low (Dudley and Platania 2001, 2002a, 2002b; Service 2002). Nevertheless, we conclude that this area is essential to the conservation of the silvery minnow because the additional loss of any habitat that is currently occupied could increase the likelihood of extinction (Hoagstrom and Brooks 2000, Service 1999). Similarly, if the species or habitat were severely impacted within this reach, the continued existence of silvery minnows in downstream reaches would be affected (i.e., the extirpation of fish within this reach would create a very unstable population within the downstream reaches). This reach currently contains the primary constituent elements (described above) during all or part of the year. We believe that special management is necessary within this reach to create and maintain the habitat complexity (e.g., backwater areas, debris piles, meandering river) that was historically but may not be currently be present within this reach. Thus, we designate this reach as critical habitat.

e. San Acacia Diversion Dam to the utility line crossing the Rio Grande with UTM coordinates of UTM Zone 13: 311474 E, 3719722 N, near Elephant Butte Reservoir (San Acacia Reach)—9 mi (14.5 km) of river immediately downstream of the San Acacia Diversion Dam to the utility line crossing the Rio Grande with UTM coordinates of UTM Zone 13: 311474 E, 3719722N. The channel width within this reach varies from approximately 15 m (50 ft) to approximately 198 m (650 ft). The substrate is mostly sand and silt. The flow regime within this reach was historically, and is currently highly variable. In fact, this stretch may not have provided continuous flow in some years prior to the 1900s (MRGCD 1999; Scurlock and Johnson 2001).

Currently, the river channel has been highly modified by water depletions from agricultural and municipal use, dams and water diversion structures, bank stabilization, and the infrastructure for water delivery (e.g., irrigation ditches). These modifications have led to the loss of sediment, channel drying, separation of the river from the floodplain, and changes in river dynamics and resulting channel morphology. Consequently, this reach requires special management considerations similar to those discussed above. This reach currently contains the primary constituent elements (described above) during all or a part of the year. Although the silvery minnow continues to be widespread within this reach with higher abundance than the Angostura or Isleta

reaches (Dudley and Platania 2001, 2002a, 2002b), the variable flow regime and modifications to the river have increased the potential for short- and long-term impacts not only to the silvery minnow, but also to its habitat. Thus, we determine that this area is essential to the conservation of the species and in need of special management considerations or protections; we designate this reach as critical habitat.

3. Downstream of Elephant Butte Reservoir to the Caballo Dam, Sierra County, NM. This short 16-mi (26-km) reach is highly channelized with widely variable flow regimes. Construction of Elephant Butte and Caballo Reservoirs in 1916 and 1938, respectively, severely altered the flows and habitat within this reach (Bestgen and Platania 1991). The silvery minnow has not been documented within this reach since 1944 (Service 1999). This river reach is currently highly channelized to expedite water deliveries and very few native fish remain (Propst *et al.* 1987; International Boundary and Water Commission 2001). This reach is subject to prolonged periods of low or no flow and there is no spring runoff spike (Service 1999). Altered flow regimes will continue to affect habitat quality in this reach, which does not contain suitable habitat for the silvery minnow. The stream length in this reach is inadequate (e.g., less than 134 to 223 mi (216 to 358.8 km)) to ensure the survival of downstream drift of eggs and larvae and recruitment of adults (Platania and Altenbach 1998). We conclude this area is not essential to the conservation of the species. Therefore, this river reach is not designated as critical habitat.

4. Downstream of Caballo Dam to American Reservoir Dam, Sierra and Dona Ana Counties, NM, and El Paso, County, TX. This approximately 110-mi (176-km) reach has a highly regulated flow regime from releases of water stored in Caballo Reservoir. This reach is also highly channelized with winter flows near zero in the upper portions, and does not contain suitable habitat for the silvery minnow (Service 1999; IBWC 2001a). Silvery minnows have not been reported from this reach since 1944 (Bestgen and Platania 1991, Service 1999). The reach is currently inhabited by many non-native fish species (IBWC 2001a). Due to lack of suitable habitat, and diminished and highly regulated flow (IBWC 2001a), this reach of river no longer contains suitable habitat for the silvery minnow and is not essential to the conservation of the species. Thus, this reach is not designated as critical habitat.

5. Downstream of American Reservoir to the upstream boundary of Big Bend National Park, El Paso, Hudspeth, and Presidio, Counties, TX. Portions of this reach, primarily upstream of Presidio, TX, are continually dewatered, especially between Fort Quitman and Presidio (Hubbs *et al.* 1977; Department of Interior 1998). River flow is augmented downstream of Presidio by waters flowing from the Rio Conchos. The near-continuous input of municipal waste has led to a deterioration of water quality, with corresponding changes to the ichthyofauna (fish species assemblage within a region) (Hubbs *et al.* 1977; Bestgen and Platania 1988; IBWC 1994; El-Hage and Moulton 1998a). Flows in this reach consist of a blend of raw river water, treated municipal waste from El Paso, TX, untreated municipal water from Juarez, Mexico, irrigation return flow, and the occasional floodwater (Texas Water Development Board 2001). Water temperature patterns can be elevated and oxygen levels decreased by the input of various pollutants (e.g., nitrogen, phosphorus) (Texas Water Development Board 2001; IBWC 2001b). Water quality is believed to improve farther downstream of the confluence of the Rio Conchos and Rio Grande. The development of agriculture and population growth in this area has resulted in a decrease of water quantity and quality, which has had a significant impact on the range and distribution of many fish species within this reach (IBWC 1994; El-Hage and Moulton 1998a). There are no current or museum records of silvery minnow from this reach (Service 1999). Because of upstream dewatering and the degraded water quality, we believe this reach of river would never provide suitable habitat for the silvery minnow. Thus, this river reach is not essential to the conservation of the silvery minnow and is not designated as critical habitat.

6. The upstream boundary of Big Bend National Park 2 mi (3.2 km) downstream of Lajitas), Brewster County, to the southern boundary of the wild and scenic river designation at Terrell/Val Verde County line, TX. This approximately 230-mi (368-km) reach of the lower Rio Grande was historically occupied but is currently unoccupied by the silvery minnow (Hubbs 1940; Trevino-Robinson 1959; Hubbs *et al.* 1977; Bestgen and Platania 1991). The continuing presence of members of the pelagic spawning guild (e.g., speckled chub and Rio Grande shiner) are evidence that the lower Rio Grande through Big Bend National Park area may support reestablishment of the