1000 ppm, egg survival decreases (ADFGR 2001). Direct comparisons are difficult because most toxicology studies are performed in a laboratory setting using concentrations of a single solid rather than a natural setting where TDS includes many solids.

Many of the species absent from the 2007 survey were smaller fish more likely to be found in the streams that were inundated with the creation of SCR. It is likely that the majority of the minnows, darters, redhorse, shiners, and sunfish missing in the 2007 survey have simply become prey for other fish or failed to find acceptable spawning habitat. The absence of smallmouth bass and walleye is likely attributable to failed stocking due to unacceptable environmental conditions leading to a poor survival rate.

Another consideration in the differences between the 2007 and earlier fish samples is the different "unit of effort" being exercised between the 1987 and 2007 samplings. Initial efforts likely involved a more thorough assessment attempting to document everything present while more recent surveys focus on a "cross section" of the community to reduce stress and mortality in the community being sampled.

Millions of fish in Lake Granbury have been killed by golden algae blooms in recent years. In 1981, 29 fish species were identified in the lake. Species richness has decreased over time. A 2005 study identified only 13 species in Lake Granbury (Table 2.4-14). Although community structure appears to be healthy, fish densities are below levels recorded prior to golden algae infestation (TPWD 2007o).

In 2007 and 2008, fish were collected from four sites northwest of DeCordova Dam in Lake Granbury predominantly using experimental monofilament gill nets placed perpendicular to the shoreline. Sampling efforts were conducted in July and November 2007 and January of 2008 (Table 2.4-14). Striped bass, white bass, smallmouth buffalo and white crappie were collected but common carp, channel catfish, and gizzard shad were most common (Bio-West 2008b).

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The aquatic community of the Brazos River downstream of Lake Granbury (starting approximately 1.8 miles (2.9 kilometers) downstream of DeCordova Bend Dam) was assessed for 246 feet (75 meters) longitudinally. Wetted widths of the river in this area ranged from 108 feet (33 meters) to 377 feet (115 meters). The aquatic habitats included side channels, backwaters, pools, runs, and riffles. The riparian vegetation community was highly diverse with several tree, shrub, and grass species dominating the banks. The river bottom substrates at the site ranged from silt (backwaters) to gravel, cobble, and bedrock in the main channel (Bio-West 2008b).

The most common fish captured at the Brazos River site was the inland silverside (Menidia beryllina), making up 57% of the total collection. Red shiners (Cyprinella lutrensis) were also relatively abundant at this site, totaling 17% (Bio-West 2008). The smalleye shiner (Notropis buccula) and the sharpnose shiner (Notropis oxyrhynchus) (federally listed candidate species and state listed rare but with no regulatory listing status species (TPWD 2008)), were not observed in the surveys conducted by Bio-West. These species are endemic to the Brazos River drainage but populations are likely extirpated in the middle Brazos River (Possum Kingdom Reservoir to Waco, Texas) (TSU 2009a and TSU 2009b). No other rare, candidate, threatened, or endangered fish species are federally or state listed by USFWS or TPWD as occurring in the middle Brazos River in Hood County (TPWD 2008).

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Juvenile channel catfish (Ictalurus punctatus) were common in riffle habitat in the summer. Sunfish (Lepomis spp.) were especially common in the river during the fall and winter sampling. Longear sunfish (L. megalotis) and green sunfish (L. cyanellus) were the most common species captured. White bass (Morone chrysops) were relatively common (making up 3% of the total collection), while largemouth bass (Micropterus salmoides) were infrequently encountered (Bio-West 2008). No gar species (including alligator gar) were observed during these surveys although Zeug et al. (2005) reported collection of four alligator gar specimens in the middle Brazos River from 1993 to 1996.

The alligator gar (Atractosteus spatula) is not federally listed as a candidate, threatened, or endangered species nor is it state listed as rare, threatened, or endangered (TPWD 2008). The American Fisheries Society lists it as vulnerable due to the present or threatened destruction, modification, or reduction of habitat or range and over-exploitation for commercial, recreational, scientific, and/or educational purposes (TSU 2009c). Alligator gar are usually found in slow sluggish waters, although running water seems to be necessary for spawning (TPWD 2009). Springflow for the Brazos River from January 2007 to February 2008 ranged from approximately 20 cfs to 80,000 cfs (Bio-West 2008b). Because flows in this section of the Brazos River are extremely variable (USGS, 2009), it is unlikely that this would be preferred alligator gar habitat.

The total amount of water withdrawn from Lake Granbury by Units 3 and 4 totals 84.64 cfs (37,995 gpm) and of this, 34.28 cfs (15,388 gpm) will be discharged back into Lake Granbury (Table3.4-2 of the ER). Lake Granbury is approximately an 8,000-acre lake and maintained by an open spillway and retention time has been estimated at 260 days. Yield analysis for Lake Granbury indicates a firm yield of 64,712 ac-ft in 2000 and 63,212 ac-ft in 2060 (Subsection 2.3.1). The approximate 50 cfs lost to the new reactors will make very little difference in the extremely variable discharge (ranging from 300 cfs to 3,600 cfs in the past 68 years) for the Brazos River (USGS 2009). Changes in flow from the addition of the Units 3 and 4 should not be significant enough to adversely affect any imperiled species downstream. The Brazos River Authority (BRA), Texas Commission on Environmental Quality (TCEQ), and Texas Water Development Board (TWDB) will continue to monitor the ecological health of the water within the Brazos River watershed and Lake Granbury, including the area around the CPNPP intake and discharge (Subsections 2.3.3 and 4.2.2) to ensure there is no change in water quality that would adversely affect imperiled species downstream. The Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) limits will also be in place to ensure compliance with the Texas water quality standards and to protect downstream uses.

2.4.2.3 Macroinvertebrates

Macroinvertebrates are larger-than microscopic invertebrate animals including aquatic insects, crustaceans (crayfish and others), mollusks (clams and mussels), gastropods (snails), and oligochaetes (worms).

Invertebrates in SCR were sampled using a Ponar grab sampler and D-frame nets in four seasons of 2007. Sampling locations were identical to fish sampling locations (Subsection 2.4.2.2). In winter, midge fly larvae (93 percent of insect total) and aquatic amphipods dominated the samples. Midge fly larvae (93 percent of insect total) were also predominant in the spring.

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