4.3 Ecological Impacts

This section discusses potential impacts to terrestrial and aquatic communities from construction of STP 3 & 4 and their facilities. Section 3.9 describes the construction activities, including site preparation and construction of facilities and supporting infrastructure, and provides a schedule for construction activities. The construction schedule is important since the timing and duration of activities can affect ecological impacts.

4.3.1 Terrestrial Ecosystems

The terrestrial ecology of the proposed site of STP 3 & 4, the STP site in general, and the region are described in Subsection 2.4.1, providing a baseline from which to assess potential impacts. Sections 3.1 and 3.9S provide details of the proposed construction activities and potential landscape alterations associated with STP 3 & 4.

4.3.1.1 The Site and Vicinity

Impacts of construction on land use are discussed in Subsection 4.1.1. Construction of STP 3 & 4, as discussed in Section 3.9S, will result in approximately 770 acres being disturbed during the construction phase and approximately 90 acres of these lost permanently due to construction of new facilities and a new heavy haul road (see Figure 3.9S-1). At the conclusion of the construction activity, the temporarily disturbed soil will be graded, landscaped to match the surrounding area, and revegetated (see Subsection 3.1.2). Clearing methods, disposal of construction waste, and methods for control of erosion, runoff, and siltation are discussed in Subsection 3.9S.2.

The proposed project area is a mosaic of previously developed land (existing warehouses, sheds, and concrete pads), mowed fields, and relatively open habitat, dominated by bluestem grasses (*Andropogon* spp.), dewberry (*Rubus* spp.), and sea myrtle (*Baccharis halimifolia*) (Figure 2.4-1 and Reference 4.3-1), all plants common to disturbed or abandoned agricultural land in this region (Reference 4.3-2). Biological surveys of the construction project area, associated laydown/parking areas, and adjacent lands did not identify any listed, rare or unusual plants (Reference 4.3-1); therefore, construction activities should not reduce local or regional diversity of plants or plant communities.

There are no important species as defined by NUREG-1555 (Reference 4.3-3) on the proposed construction site. Only common game species such as white-tail deer (*Odocoileus virginianus*), squirrels (*Sciurus niger* and *S. carolinensis*), feral pigs (*Sus scrofa*), and possibly mourning doves (*Zenaidura macroura*) and northern bobwhites (*Colinus virginianus*) are present. Construction will reduce the available acres of habitat for these species on the site, causing some species to leave the site, but this should not impact their local or regional populations. There are no areas designated by the U.S. Fish and Wildlife Service (USFWS) as critical habitat for endangered species within the proposed construction area or on the STP site. Pedestrian surveys for threatened and endangered species in the construction/laydown/spoils areas were conducted during six observation days from December 2006 through March 2007. No federal or state-listed threatened or endangered species, critical habitat, or suitable

habitats associated with potential species were observed during those surveys (Reference 4.3-1).

Three listed species (bald eagle, brown pelican, and alligator) have been observed within the STP site (see Subsection 2.4.1). The Texas Prairie Wetland Project is located several hundred yards from the STP 3 & 4 site, but given the distance from the construction site and the limited duration of the construction activities, the long-term presence of waterbirds on the site should not be impacted by construction. Therefore, STP 3 & 4 construction activities should have no impact on important species, including threatened and endangered terrestrial species. There are no other known federal or state projects within the region that could affect or potentially affect the same threatened and endangered species (or their habitats) that exist on or near the STP site. STPNOC has initiated consultations with the USFWS, the National Oceanic and Atmospheric Administration Fisheries Service, and Texas Parks and Wildlife Department (TPWD) regarding endangered and threatened species (Reference 4.3-4, Reference 4.3-5, and Reference 4.3-6).

Based on information received from the ~~Texas Parks and Wildlife Department~~ TPWD, an active bald eagle nest is located on the STP site near its eastern boundary. Although recently delisted under the Endangered Species Act (Reference 4.3-7), the bald eagle remains protected under the Bald and Golden Eagle Protection Act (References 4.3-7). On June 1, 2007, new national management guidelines for bald eagles, which established a single recommended protection zone to extend out 660 feet from each eagle nest, were enacted for all bald eagles in the lower 48 states (Reference 4.3-8). No activities related to construction of STP 3 & 4 will occur within one mile of the eagle nest.

4.3.1.1.1 Wetlands

The status of twelve wetlands within the construction footprint (including laydown and spoil areas) was assessed by ENSR in 2006/2007 (Reference 4.3-1). ENSR used U.S. Army Corps of Engineers 1987 wetland delineation criteria to classify the sites, based on environmental parameters such as hydrology, soils, and vegetation, as well as history of land use. Given that the twelve wetlands were not directly connected to waters of the United States, and did not fall within the 100-year floodplain, there was no historic evidence that the wetlands existed before site construction, and that ENSR classified these wetlands as isolated, all wetlands were classified as non-jurisdictional. One of these wetlands (Wetland No. 001 – Reference 4.3-1), which is 0.165 acre in size, is located in the cooling tower footprint and will have to be filled. This is less than 5% of the total wetland acreage (3.9 acres) within the construction footprint and temporary laydown and spoil areas. These remaining 11 sites will be avoided during the construction phase, thus limiting direct impacts (see Figure 3.9S-1).

Several surface water and storm water drainage ditches are likely to be impacted and/or filled during construction. The east-west drainage ditch (Figure 2.4-3) in the power block footprint is approximately 8 to 10 feet wide, and approximately 4 to 5 feet deep, although the water is normally restricted to a more narrow channel (approximately 2 to 4 feet wide) approximately 1 to 2 feet deep. This ditch has several

perpendicular ditches draining into it from the industrial land between the ditch and the berm. Portions of the ditch margins are mowed to the water level, other portions are vegetated with small shrubs (primarily sea myrtle) and semiaquatic grasses/rushes. This ditch will be relocated 650–700 feet north of its present position, just north of the new power block.

Another man-made ditch within the construction area is Little Robbins Slough (Figure 2.4-1). Its upstream reaches are found in the proposed borrow and spoils area, and it then flows south past the western edge of the Main Cooling Reservoir (MCR) toward the marsh. This slough was relocated to its present location during STP 1 & 2 construction in the late 1970s to replace the drainage function of the original slough that was filled to create the MCR (Reference 4.3-2). STP is committed to employing best construction management practices (see Subsection 3.9S.2) to reduce the amount of construction-area erosion and limit the sediment entering the site drainages, such as Little Robbins Slough, thus minimizing downstream sedimentation effects on flora and fauna. Aside from Little Robbins Slough, other storm water and surface water ditches created on historically upland habitat were routinely maintained and thus were not considered jurisdictional waters (Reference 4.3-1).

4.3.1.1.2 Other Construction Impacts

Noise is another potential construction-related activity that could impact wildlife at the proposed STP 3 & 4 construction site. Although noise levels in construction areas can be high (up to 100 dBA at 100 feet from sources of noise) and of varying duration, these high local noise levels would not be expected to propagate far beyond the boundaries of the construction site (Reference 4.3-9). Table 3.9S-2 shows the rapid attenuation of construction noise over relatively short distances. For example, at 400 feet from the source of 100 dBA construction noise, noise levels have generally dropped to 60–80 dBA, below levels known to startle small mammals and waterfowl (Reference 4.3-9). Even with this attenuation, some displacement of local small mammals and birds due to noise is expected during construction activities. This displacement may be permanent for some species and temporary for others. These impacts are considered SMALL, generally short-term, localized, and not ecologically significant.

Avian mortality because of collisions with man-made structures is sometimes a concern with very tall structures, although it varies relative to species characteristics such as size, flight behavior, and habitat use, and other characteristics including weather, landscape features, and size/type of equipment/structures (Reference 4.3-10). While poor conditions occasionally result in major bird kills, such mortalities are not thought to significantly impact common/abundant bird species. STP 1 & 2 have not experienced any such major bird kills. The proposed facilities are similar to existing STP facilities and there should be little additional impact. Avian collisions during STP 3 & 4 construction should be negligible and these impacts SMALL.

4.3.1.1.3 Transmission Corridors

As discussed in Subsection 2.2.2, there are no new transmission corridors for STP 3 & 4; however, some upgrading of transmission line conductors would be necessary on one 20-mile long right-of-way. There would be small ecological impacts associated

with noise/movement of construction equipment and workers involved in changing out conductors and installing replacement towers. This kind of work normally involves a crew with several flatbed “conductor trucks” (carrying large cable spools) and large bucket trucks. A variety of birds, small mammals, and larger mammals (white-tailed deer) could be disturbed by this activity, but the impact of this disturbance in most circumstances would be minor—animals moving away or avoiding the area for several days while crews are working. Many of the STP-associated transmission lines traverse mostly agricultural lands (Reference 4.3-11), thus there would be few animals using the corridors for activities other than foraging or possibly resting. Nesting of some ground-nesting birds (e.g., Northern bobwhite, wild turkeys, meadowlark, horned lark, killdeer) in adjacent habitats could be disrupted temporarily if these species are present and if the work is carried out during the spring/early summer nesting period. If work is carried out in non-nesting periods, impacts to birds will be SMALL and negligible.

4.3.1.2 Summary

In summary, construction will result in the loss of some common habitats for local wildlife, although the impacts cannot be quantitatively assessed because population data for species on and near the STP site are not available. However, approximately 800 acres of the construction-impacted areas (borrow and spoil, parking, etc.) will be available as wildlife habitat when construction is complete, and relatively similar open habitats will remain on site and are present offsite. Construction activities should not reduce local biodiversity or impact threatened or endangered species. Potential impacts of construction noise and bird collisions during construction should be negligible. Therefore, construction-related impacts to terrestrial resources are considered SMALL.

4.3.2 Aquatic Ecosystems – Construction Impacts

Section 3.9S includes a footprint of the proposed construction area, a description of construction methods, and a proposed construction schedule.

4.3.2.1 Impacts to Impoundments and Streams

Construction impacts on aquatic habitats in the immediate area, which range from temporary disturbance to permanent loss, are described in this section. As discussed in Subsection 4.2.1, the following surface water bodies are on or near the site:

- MCR (7,000 acres)
- Kelly Lake (34.4 acres) and the slough that feeds it
- Little Robbins Slough, which drains into a coastal marsh north of Matagorda Bay
- Drainage areas associated with two unnamed sloughs
- West branch of the Colorado River

As discussed in Subsection 3.9S.3.10, a permanent sheet pile cofferdam will be installed on the east and west side of the north separation dike of the MCR to facilitate construction of the new intake and pumphouse for STP 3 & 4, while a temporary cofferdam will be erected on the interior of the MCR embankment to facilitate installation of the discharge structure. Installation of these cofferdams and associated dewatering systems would allow earth-moving and construction equipment to operate on dry ground, which is more efficient than working "blind" from shore or barge. This also provides the added benefit of reducing the potential for erosion and sedimentation. Sediment and soil removed would be transported to an onsite spoils area in an upland area in the southwest portion of the site, preventing this material from moving into site wetlands and watercourses. The areas up-slope and adjacent to the new circulating water intake/discharge construction area will be stabilized with erosion-control devices appropriate to soil type and terrain to ensure that soil loosened by heavy equipment is not carried into the MCR with storm water runoff. When construction has been completed, the disturbed areas will either be rip-rapped or seeded with a mixture of grasses and legumes to establish a perennial vegetative cover and prevent erosion. Although best construction management practices will be employed during construction of the cofferdams and intake/discharge structures, some erosion and sedimentation is to be expected in the immediate area of construction during the construction period. Suspended sediment can interfere with respiration and feeding of benthic macroinvertebrates and fish, while deposited sediment can smother benthic organisms and degrade fish spawning areas. However, some benthic organisms and most juvenile and adult fish are able to leave areas with high sediment loads and move to areas offering better water quality.

As described in Reference 4.3-1 and Subsection 4.1.1.1, construction of STP 3 & 4 would require filling an approximately 0.165-acre, non-jurisdictional wetland. When a wetland or other surface water body is filled by construction activities, and aquatic organisms are present, impacts to these organisms are expected. If the water body has an outlet, and the disturbance is gradual rather than abrupt, some animals may relocate. Oftentimes, however, construction impacts to small wetlands or other surface waters result in loss of the fishes and invertebrates, which is anticipated to occur for this wetland. No rare or unique aquatic species is known or thought to occur in the construction zone (see Subsection 2.4.2).

The aquatic species that occur on site are ubiquitous, common, and easily located in nearby waters, as described in Subsection 2.4.2. The 1975 Final Environmental Statement (FES-CP) (Reference 4.3-12, pages 4–7) listed species common in wetlands near the site, including the grass shrimp (*Palaemonetes kadiakensis*), crayfish (several genera occur in the area) (Reference 4.3-13), blue crab (*Callinectes sapidus*), red shiner (*Cyprinella lutrensis*), mosquitofish (*Gambusia affinis*), silverband shiner (*Notropis shumardi*), sailfin molly (*Poecilia latipinna*), green sunfish (*Lepomis cyanellus*), warmouth (*Lepomis gulosus*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), tidewater silverside (*Menidia peninsulae*), striped mullet (*Mugil cephalus*), and several species of killifish (Family ~~*Cyprinodontidae*~~ Cyprinodontidae, likely *Lucania* sp. and *Fundulus* spp.). A survey of the STP 1 & 2 Essential Cooling Pond in 2002 yielded two fish species: the sailfin molly and the sheepshead minnow (*Cyprinodon variegatus*) (Reference 4.3-14). In May 2007,

STPNOC commissioned a rapid bioassessment of the 1500-meter-long drainage ditch that crosses the area slated for construction (Reference 4.3-15). The bioassessment was intended to characterize the water quality and fish community of the ditch before its relocation, supporting the assessment of construction impacts. Fish collections from the STP ditch system were dominated by mosquitofish, sunfish (largemouth bass and three common *Lepomids*), sailfin molly, and sheepshead minnow. Most of these common species tend to be tolerant of salinity and temperature fluctuations, and are ubiquitous in coastal wetlands along the Gulf Coast (see Subsection 2.4.2).

In addition to the crustaceans (shrimp, crayfish, and crab) mentioned above, important aquatic invertebrate species in the wetland include the juvenile stages of flying insects. Although the wetland areas themselves are considered a sensitive and valuable resource, the particular wetlands that would be impacted on site are not substantively distinguishable from other wetland acreage in the vicinity, as discussed in Subsection 4.3.1. The 1975 FES-CP (Reference 4.3-12) indicated that the rerouting of Little Robbins Slough would cause declines in several insect populations, including midges, beetles, mayflies, biting midges, dragonflies, and damselflies. Potential impacts were considered acceptable because these ubiquitous species readily recolonize available surface waters, and so would not be lost to the area.

Several other drainages and impoundments at the site may be moderately impacted during construction. Proposed construction activities that could potentially affect onsite water bodies are described in Section 4.2. It is possible, and even likely, that some sediment would be deposited in the onsite wetlands, impoundments, and channels, with rainfall runoff during and immediately following construction. Best construction management practices would reduce the amount of erosion and sedimentation associated with construction, however, and would limit impacts to aquatic communities in down-gradient water bodies. Although unlikely, it is also possible that excavated soil placed in the proposed spoils and overflow storage area would be disturbed and move with storm water runoff into streams on site. Details of potential impacts are given in Subsection 4.2.1 and summarized here:

- Increased runoff from approximately 111 acres of impervious surfaces for new buildings (reactor containment building, turbine building), structures (e.g., switchyard, cooling towers), and parking lots.

- Increased sediment loads into onsite drainages and sloughs resulting from land clearing and disturbances for constructing infrastructure such as roads and storm water drainage systems, and disturbance of currently vegetated areas for construction laydown areas, concrete batch plants, sand/soil/gravel stockpiles, and construction-phase parking area.

- Filling of one small, isolated, non-jurisdictional wetland contained in the footprint of the cooling towers.

During construction, effects to aquatic ecosystems may result from sedimentation (because of erosion of surface soil) and, to a lesser extent, spills of petroleum products. A recent report on human impacts to stream water quality listed siltation as

the primary cause of stream degradation by a wide margin (Reference 4.3-16). In a nationwide survey by the USFWS on impacts to stream fisheries, sedimentation was named the most important factor (Reference 4.3-16).

Three major groups of aquatic organisms are typically affected by the deposition of sediment in streams: (1) aquatic plants, (2) benthic macroinvertebrates, and (3) fish. The effects of excess sediment in streams, including sediment generated by construction activities, are influenced by particle size. Finer particles may remain suspended, blocking the light needed for photosynthesis, and initiating a cascade of effects following from damage to primary producers. Turbidity associated with suspended sediments may reduce photosynthetic activity in both periphyton and rooted aquatic plants. Suspended particles may also interfere with respiration in invertebrates and newly hatched fish, or reduce their feeding efficiency by lowering visibility. Slightly larger particles fall out of suspension to the substrate, where they can smother eggs and developing fry, fill interstitial gaps, or degrade the quality of spawning grounds. As the gaps in the substrate are filled, habitat quality is decreased for desirable invertebrates such as Ephemeroptera, Plecoptera, and Trichoptera, and less desirable oligochaetes and chironomids become dominant. Such changes in the benthic community assemblage result in a loss of fish forage, and a subsequent reduction in fish populations (Reference 4.3-16).

Construction sites are known to contribute to erosion, which can then lead to sedimentation in streams. In addition to road construction, which contributes significantly to sedimentation, construction-related activities such as excavation, grading for drainage during and after construction, temporary storage of soil piles, and use of heavy machinery all disturb vegetation and expose soil to erosive forces. Reducing the length of time that disturbed soil is exposed to the weather is one of the most effective ways of controlling excess erosion and sedimentation (Reference 4.3-16).

The construction contractor will avoid or minimize construction impacts to water resources through best management practices and good construction engineering practices such as storm water retention basins and silt screens. A Storm Water Pollution Prevention Plan (SWPPP) that specifies methods for control of erosion and sedimentation will be prepared before construction in accordance with guidelines provided by the Texas Commission of Environmental Quality (Reference 4.3-17).

Preventing onsite erosion by covering disturbed areas is a preferred method of controlling sedimentation. When erosion cannot be prevented entirely, intercepting and retaining sediment before it reaches a stream is a high priority (Reference 4.3-15). For example, new retention ponds and connecting drainage ditches would collect surface water runoff from the construction area, as described in Subsection 4.2.1. Sediment carried in the water from construction and dewatering activities would be trapped in the ditches and ponds rather than carried to the point of discharge, thereby reducing the sediment load in receiving waters.

Any small spills of construction-related fluids, such as petroleum products, would be mitigated according to a Spill Contingency and Control Plan developed for construction activities.

No significant impacts to Little Robbins Slough or to the coastal marsh at its terminus at Matagorda Bay are expected. Construction of STP 3 & 4 will not require any alteration of Little Robbins Slough, and would not affect any rare or specially protected aquatic species in the man-made channel or in the coastal marshes of Matagorda Bay, as none occur there (Reference 4.3-12). Temporary, minimal sedimentation is possible, as discussed above.

Construction activities will not affect Kelly Lake, which is protected from sedimentation and surface runoff by a large drainage ditch.

4.3.2.2 Impacts to Colorado River and Matagorda Bay

As described in Subsection 4.2.1, no significant sedimentation or runoff into the Colorado River is expected from construction of the STP 3 & 4 generating facilities and associated infrastructure. The construction area is more than two miles from the river, and surface runoff would be channeled away from the river. Construction activities at the Reservoir Makeup Pumping Facility (RMPF) and Spillway and Blowdown Facilities (includes spillway discharge channel and blowdown pipeline) would be limited to installing new pumps in the existing bays at the RMPF.

STPNOC anticipates that some dredging will be required to prepare the existing barge slip for vessels transporting large components such as reactor vessels and steam generators to the STP site. Dredging for the barge slip would increase turbidity and siltation downstream of the barge slip area, which could affect spawning beds of freshwater fish species that spawn in shallows (e.g., sunfishes, some Notropids) or spawn in holes (e.g., catfish) in the immediate vicinity of the landing. Any impacts would occur over a relatively brief period (one spawning season) and would not produce long-term or lasting impacts. During construction of the existing barge slip, which involved removal of 50,000 cubic yards of earth along the west bank of the Colorado River, sheet piling was erected around the construction area to reduce soil erosion and limit downstream increases in turbidity and siltation. Similar measures could be employed to limit the effect of siltation associated with dredging. Less than one acre of benthic habitat and associated resident biota was believed destroyed by construction of the existing barge slip (Reference 4.3-12).

No threatened or endangered species are expected to be affected by the proposed construction. As part of the review of the original license application for STP 1 & 2, the USFWS provided a Section 7 consultation, under the Endangered Species Act Amendments of 1978 (PL 95-632), stating that no endangered or threatened aquatic species occurred near the site (Reference 4.3-11). However, a single blue sucker was captured in a gill net at a Colorado River sampling station 1.5 miles upstream of the STP site by biologists conducting preoperational surveys of the lower Colorado River in 1973 (Reference 4.3-2). The blue sucker is currently listed as Threatened by ~~Texas Parks and Wildlife~~ TPWD (Reference 4.3-18), but was not listed by the state at the time of capture in 1973. This species, which is found in large, unpolluted rivers with strong

currents and firm (often gravel or rock) substrates (Reference 4.3-19, Reference 4.3-20, Reference 4.3-21), is known to exist in small numbers in segments of the Colorado River well upstream of the plant (Reference 4.3-22), but should not be affected by the proposed construction.

The assemblage of aquatic species present in the Colorado River near the project area varies throughout the year due to spawning and migration patterns of individual fish and invertebrate species, as described in Subsection 2.4.2. Interannual variability is also high, mediated by precipitation throughout the drainage basin (Reference 4.3-12).

The season of the year in which construction occurs would determine which specific aquatic resources within Matagorda Bay may be affected. However, because the area to be disturbed is small and in a protected near shore area that is already dedicated to intake functions, the overall impact on aquatic species is expected to be SMALL and temporary.

4.3.2.3 Transmission Corridors

No incremental effect on aquatic resources within the transmission corridors is expected to result from construction or operation of STP 3 & 4.

4.3.2.4 Summary

Construction activities that may cause erosion that could lead to harmful deposition in aquatic water bodies would be (1) of relatively short duration, (2) permitted and overseen by state and federal regulators (Reference 4.3-16), and (3) guided by an approved ~~Storm Water Pollution Prevention Plan~~ SWPPP. Some wetland habitats occur within the area expected to be affected by construction activities; however, no important aquatic species are expected to be affected. Impacts to aquatic communities from construction would be SMALL and temporary, and would not warrant mitigation.

4.3.3 References

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