

hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

- Aquatic invasive species (e.g., tilapias (*Oreochromis* spp., *Tilapia zillii*), suckermouth armored catfish (*Hypostomus plecostomus*, *Pterigoplichthys* spp.), Asian clams (*Corbicula fluminea*), zebra mussels (*Dreissena polymorpha*)) or those not native to the subwatershed should not be relocated but rather should be dispatched. Invasive mussels attached to native mussels should be removed and destroyed or disposed prior to relocation of the native mussels. Prohibited aquatic invasive species, designated as such in 31 TAC §57.112, should be killed upon possession.

#### Aquatic Amphibian and Reptile BMPs:

- Inform TPWD WHAB during initial collaborative review phase for projects that may affect habitat for the following species: Black-spotted newt (*Notophthalmus meridionalis*), Cascade Caverns salamander (*Eurycea latitans*), Texas salamander (*Eurycea neotenes*), Brazos water snake (*Nerodia harteri*), Concho water snake (*Nerodia paucimaculata*)
- For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:
  - Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.
  - Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.
  - Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
  - Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
  - Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
  - When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs).
- For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement BMP for projects within existing ROW above plus those below:
  - For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
  - When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature.

#### Bat BMPs:

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings.

- Inform TPWD WHAB during initial collaborative review phase for projects that may impact the following bat species: Any *Myotis* spp. And Tricolored bat (*Perimyotis subflavus*).
- If identification of a bat species is in question, consult with TPWD or a qualified TxDOT biologist during initial collaborative review phase.

- For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.
- If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features.
- Conversion of property containing cave or cliff features to transportation purposes should be avoided.
- Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1 through October 31. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warm periods (nighttime temperatures  $\geq$  55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- Retain mature, large diameter hardwood forest species and native/ornamental palm trees.
- If gating a cave or abandoned mine is desired, consult with TPWD before installing gates. Gating should only be conducted by qualified groups with a history of successful gating operations. Gate designs must be approved by TPWD.
- In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.
- Coordinate with TPWD about the latest bat handling restrictions and protocols involving COVID19 and bat handling. In general, all staff must follow the guidelines listed below:
  - Do not handle bats if not part of a critical or time-sensitive research project. Contact TPWD to discuss your project needs before beginning work.
  - All participants must follow CDC social-distancing guidelines.
  - Wear a face mask to minimize the exchange of respiratory droplets such as a surgical mask, dust mask, or cloth mask when within 6 feet of a living bat.
  - Use disposable exam gloves or other reusable gloves (e.g., rubber dish-washing gloves) that can be decontaminated to prevent spread of pathogens. Do not touch your face or other potentially contaminated surfaces with your gloves prior to handling bats.
  - Limit handling to as few handlers as possible.
  - Do not blow on bats for any reason.
  - Use separate temporary holding containers for each bat such as disposable paper bags.
  - Caves housing bats should be avoided unless absolutely necessary.
  - Implement additional disinfection, quarantine, and cleaning procedures.
- Bat surveys of structures should include visual inspections of structural fissures (cracked or spalled concrete, damaged or split beams, split or damaged timber railings), crevices

(expansion joints, space between parallel beams, spaces above supports piers), and alternative structures (drainage pipes, bolt cavities, open sections between support beams, swallow nests) for the presence of bats.

- Before excluding bats from any occupied structure, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e., continuously active – not intermittently active due to arousals from hibernation).
  - Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
  - Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
  - Avoid using chemical and ultrasonic repellents.
  - Avoid use of silicone, polyurethane or similar non-water-based caulk products.
  - Avoid use of expandable foam products at occupied sites.
  - Avoid the use of flexible netting attached with duct tape.
- In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:
  - Experience in bat exclusion (the individual, not just the company).
  - Proof of rabies pre-exposure vaccinations.
  - Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
  - Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.
- Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

#### Fish BMPs:

- For projects in waters of the state and work is adjacent to water: Water Quality and Stream Crossing BMP.
- For projects in waters of the state and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.

#### Terrestrial Reptile BMPs:

- Inform TPWD WHAB during initial collaborative review phase for projects that may affect habitat for the following species: Black-spotted newt (*Notophthalmus meridionalis*), Brazos water snake (*Nerodia harteri*), Concho water snake (*Nerodia paucimaculata*), Dunes sagebrush lizard (*Sceloporus arenicolus*), Tamaulipan spot-tailed earless lizard (*Holbrookia subcaudalis*).
- void or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.
- Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.
- Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season. Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.
- When designing roads with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.