

SAC response prepared for councilmember Pool

2 March 2016

Will SH45 SW fragment habitat for wildlife in the vicinity of its proposed route, and if so, how?

This proposed roadway will fragment habitat for wildlife. At the most simple level of understanding fragmentation, an examination of aerial photos in the FEIS (screen capture 1) indicates that the construction of this new roadway will bisect formerly contiguous and relatively undisturbed natural areas, and in particular it will bisect City of Austin Water Quality Protection Lands and managed lands (screen capture 2). The mechanism for how the impact occurs is that fragmentation creates smaller natural areas, and these areas inherently will contain fewer species (less richness) and fewer individuals (less abundance). Less diversity (diversity = richness + abundance) leads to communities that are not able to withstand environmental fluctuations, localized extirpations, and genetic bottlenecks. After one or more of these things happen, a 'chain reaction' of extirpations occur until the community is left with only the most resilient species. These tend to be very simple communities of urban species dominated by animals like raccoons, mice, common urban birds, cockroaches, etc.

Fragmentation impacts wildlife in these ways:

- Direct reduction of habitat in the path of the roadway itself
- Associated development and maintenance activities will occur along the roadway, and cause additional habitat destruction
- It is well established fact that smaller natural areas contain fewer species (= less richness) and fewer individuals (= less abundance) of each species. When the diversity is reduced, these communities can not survive fluctuations in climate or resources (like food and water). This is because minor upsets in population health or numbers are not mitigated by neighboring healthy populations coming in from other areas (such as occurs in an unfragmented area). Think of it like a healthy economy. If a town has three or four cell phone providers, and one starts to do a bad job, for example by having poor customer service or reduced coverage area, the others will step in and take those customers.
- Fragmented areas have more edge. Edge effects include small changes to the habitat such as wind, temperature, and light that favor different types of plants and animals (e.g. poison ivy loves edges). Certain species love edges and they will outcompete the interior species along those edges. Thus the total habitat reduction actually extends deeper into the footprint of the natural area along the edges. Edge effects can extend hundreds of feet into the interior.
- Animals that do not travel well across roadways (e.g. turtles, snakes) will have a much harder time mating with individuals on the other side. This leads to problems with genetic bottlenecks. In a bottleneck, there are fewer total individuals (= less abundance) so there is a loss of members of the population that have certain traits, such as ability to withstand temperature extremes or drought. Ultimately this leads to inbreeding problems and extirpation (= localized extinction) of the species in that smaller area.
- Extirpation (= localized extinction) of any one species in an area is not a big problem, but at a certain point enough species are lost and a 'house of cards' falls. Also referred to as 'ecological release,' this chain reaction of events disrupts the normal food web and causes further loss of diversity. This is because one species relied on another for some ecosystem function (as food or

as a predator), and that species is no longer there. Maybe another species can take its place for a little while, but with time there is not enough diversity to fill the gaps.

- Corridors. Many species spend most of their lives in a relatively small area, but it's important for the species survival that some of the individuals for some of their life travel farther and wider. This maintains genetic diversity, and is built into their behavior patterns. If travel corridors are blocked by a dangerous feature, like a road, it will not stop the animal. They are genetically programmed to make that trip, whether it kills them or not. The roadways weed out those needed travelling individuals, contributing to genetic isolation and bottlenecking of populations.

Wildlife in the vicinity of this project that is subject to fragmentation is addressed generally in the FEIS (screen capture 3) and also includes (but is not limited to):

-Many non-listed songbirds such as Painted Buntings (and see technical reports for more species)

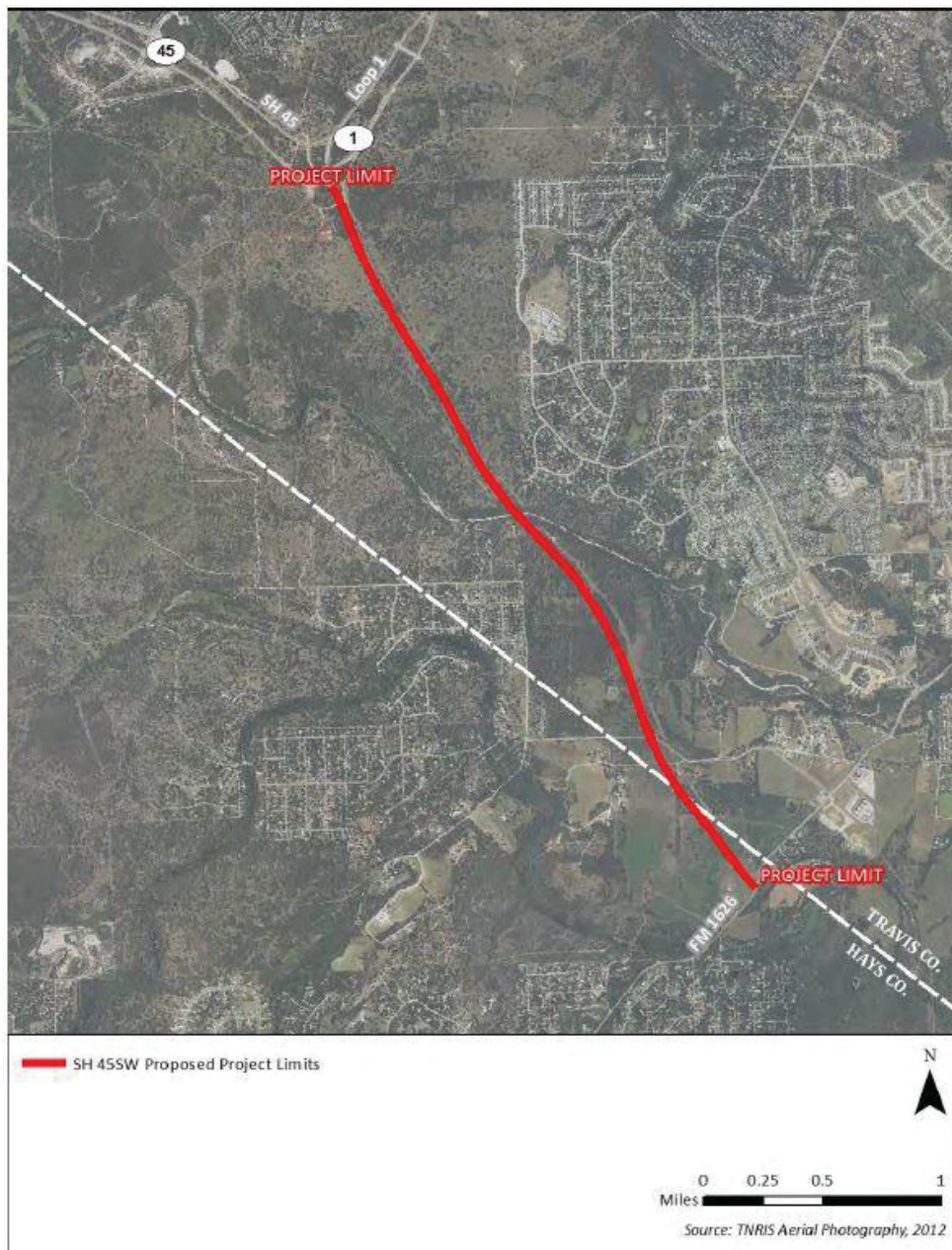
-Karst invertebrates, including those listed as Species of Concern and protected by a 'no-surprises' clause in the Balcones Canyonlands Conservation Plan

-Reptiles including the coachwhip

-Federally endangered *Eurycea sosorum* (Barton Springs Salamander) (SH45 is located between 2 known localities)

This is a brief overview of the regional issue and general principles of fragmentation. There are many species that were not listed here, and other nuances of fragmentation not discussed. The topic is relevant for this problem and there are many texts and scholarly articles that could be referenced for further details.

Figure ES-1: Proposed Project Limits



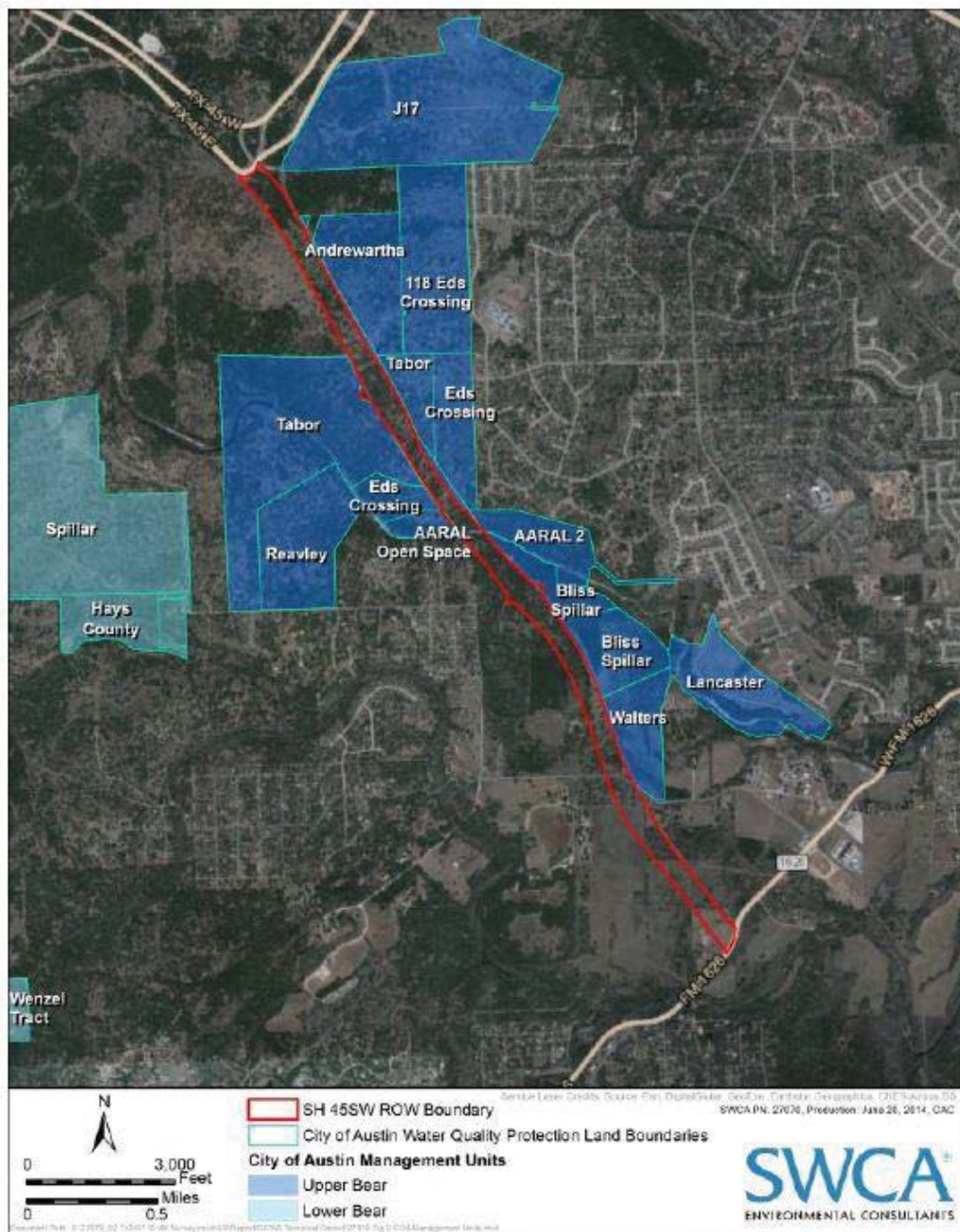


Figure 2. Location of the SH 45SW right-of-way relative to lands owned by the City of Austin.

Wildlife and Fish

The study area is located within the Edwards Plateau ecoregion. This area supports a variety of native wildlife species that have the potential to occur within the study area. Species common to the southern Travis County and northern Hays County area include but are not limited to: white-tailed deer (*Odocoileus virginianus*), nine-banded armadillo (*Dasypus novemcinctus*), raccoon (*Procyon lotor*), Virginia possum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), Texas spiny lizard (*Sceloporus olivaceus*), bullsnake (*Pituophis catenifer sayi*), western diamondback rattlesnake (*Crotalus atrox*), cricket frog (*Acris crepitans*), and bullfrog (*Rana catesbeiana*) (Kutac and Caran, 1994).

A variety of bird species also occur within this area of Texas, many of which are migratory. Some of these species are Northern Mockingbird (*Mimus polyglottos*), Northern Cardinal (*Cardinalis cardinalis*), Blue Jay (*Cyanocitta cristata*), Carolina Wren (*Thryothorus ludovicianus*), Carolina Chickadee (*Poecile carolinensis*), Black-crested Titmouse (*Baeolophus atricristatus*), White-winged Dove (*Zenaida asiatica*), Mourning Dove (*Zenaida macroura*), Inca Dove (*Columbina inca*), House Finch (*Haemorhous mexicanus*), a variety of native sparrows, White-eyed Vireo (*Vireo griseus*), Ruby-crowned Kinglet (*Regulus calendula*), Killdeer (*Charadrius vociferous*), Red-shouldered Hawk (*Buteo lineatus*), Black Vulture (*Coragyps atratus*), and Turkey Vulture (*Cathartes aura*) (TPWD, 2013b).

Fish species common to rivers and streams in central Texas include: Texas shiner (*Notropis amabilis*), golden shiner (*Notemigonus crysoleucas*), blacktail shiner (*Cyprinella venusta*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), green sunfish (*Lepomis cyanellus*), and longear sunfish (*Lepomis megalotis*), among many others

(TPWD, 2013c). See Tables 4 – 6 in the *Biological Evaluation of State Highway 45 Southwest, Travis and Hays Counties, Texas* (Appendix M: Biological Evaluation and Technical Reports) for comprehensive lists of wildlife species that are known to occur, or may occur, in the SH 45SW ROW.