

Pima County Trails System Guidelines for Native Species: Reconciliation of Habitat Needs and Trail Design



Jennifer Becker, *Pima County Regional Flood Control District*
Neva Connolly, *Pima County Office of Conservation Science*
Jennifer Psillas, *Pima County Natural Resources, Parks and Recreation*
Dr. Phil Rosen, *University of Arizona*
Bill Singleton, *Pima County Graphic Services*

Project Goal

Develop a series of design guidelines for the Pima County Regional Trail System that facilitates native plant and animal diversity, water harvesting, erosion control and trail protection as well as educational opportunities.

- Plant and maintain trail landscapes to provide habitat in addition to other trail functions
- Construct basins to provide habitat, save water, and reduce erosion

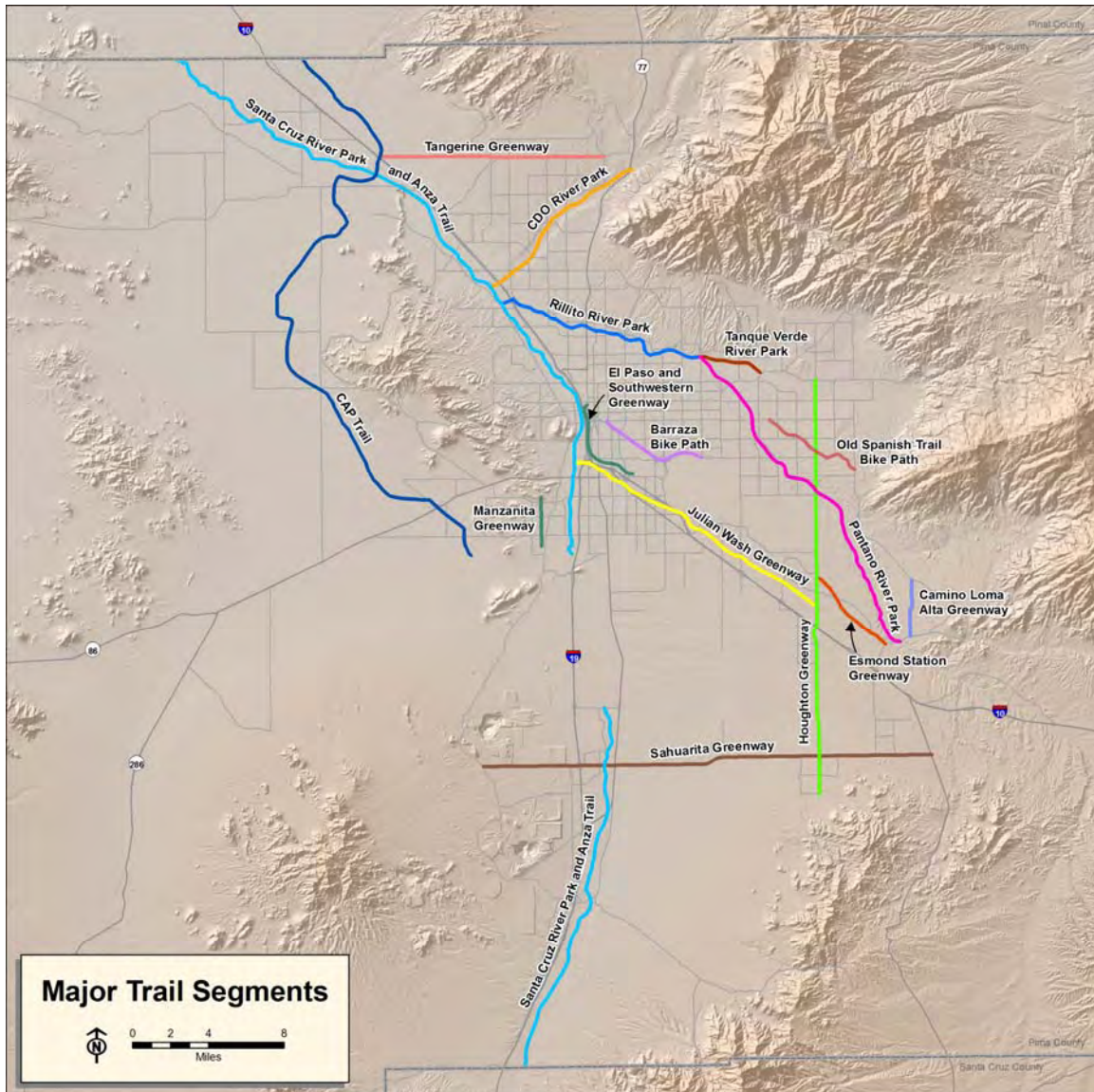


Figure 1: Pima County major regional trail segments, both existing and planned, with trail names identified.

General Guidelines for Tucson's Birds & Lizards

Provide a variety of plants

- Include native trees, larger shrubs, sub-shrubs, grasses, cacti and flowering plants to give lizards a variety of food sources, basking sites, and cover
- Include plant species that will provide birds a varied diet of seeds, berries, and nectar

Mass plantings

- Place various sized and seasoned plants close to one another to provide escape cover from predators
- Create a mosaic of open and mass-planted areas, taking cues from nearby natural surroundings regarding which vegetation structure type should be dominant

Provide structural diversity

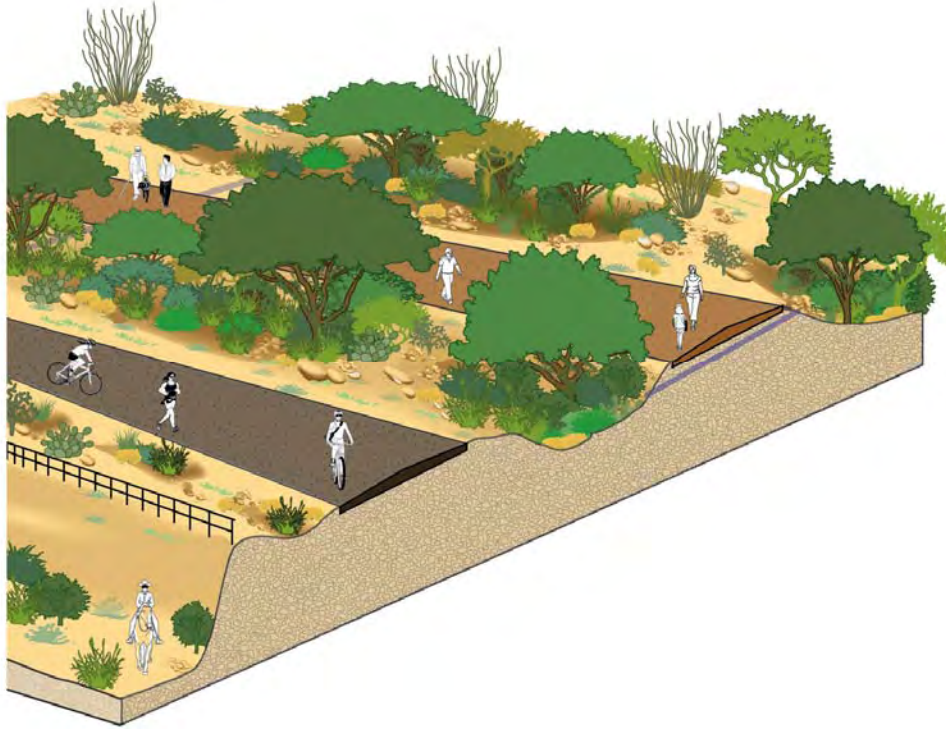
- Include ground cover, shrubs, and trees in planting design
- Plant areas of dense, thorny shrubs (>3' away from trail edges)
- Allow areas of "unmaintained" vegetation. Allow mistletoe to grow in trees

Include complex structures

- Rock piles, wood piles and brush piles (such as flood debris) offer cover, foraging, and basking sites (>3' away from trails edge for pedestrian safety)
- Leaf and twig litter and organic soil, such as found under mesquite trees or cottonwoods, provide insect and lizard habitat and improves water infiltration; it may also serve as a weed barrier
- Snags and dead wood provide avian roosting and nesting sites

Use insecticides sparingly

- Lizards and birds can die from eating poisoned insects, and may be poisoned indirectly by accident
- Lizards and birds aid in pest control by eating insects and other pests



Bio-Retention Basins

Purposes:

- Harvest rainwater
- Capture leaf litter
- Provide habitat
- Reduce erosion to earthen trail

Design Notes:

- Supplemental irrigation should have moisture sensor controls
- Pipes are optional if basins are appropriately sized and maintained
- Locate plants in appropriate basin positions (see lists by R. Buhrow @ TCP)

Maintenance:

- Minimal pruning (only for public safety)
- Leave leaf litter, log or rock piles in bottom of basin
- Remove any excess dirt in bottom of basin or at drains after catastrophic flood events (especially pre-vegetation establishment)
- Avoid use of all insecticides - let the natural predators do this work

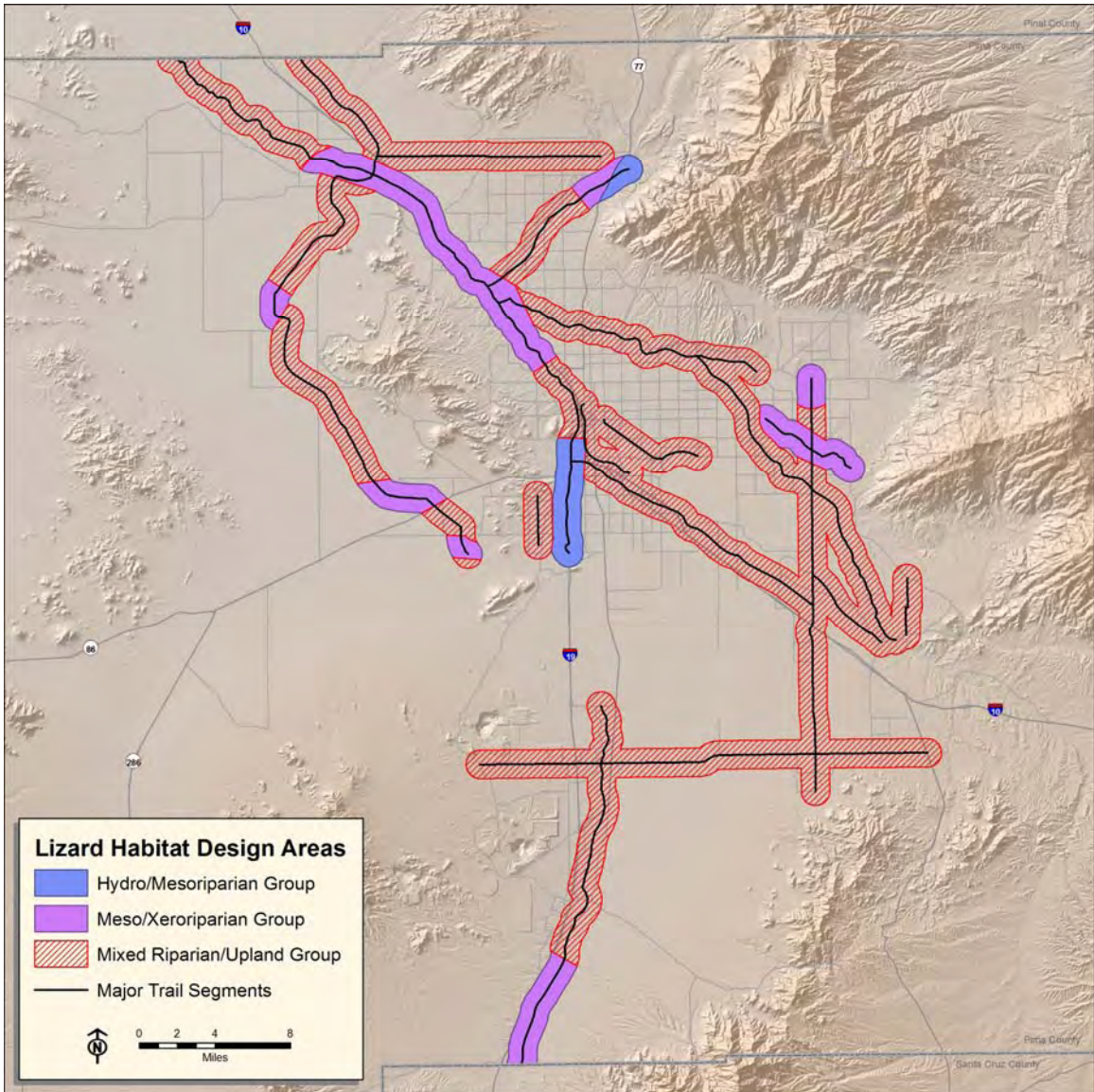


Figure 2: Lizard habitat trail design areas, based on expert input and Sonoran Desert Conservation Plan Maps by species and/or species type. Wherever feasible, design and manage trailside area with the goal of replicating or simulating the lizard habitat conditions per trail area.

Lizards

Hydro/Mesoriparian Lizards

GIANT SPOTTED WHIPTAIL *Aspidoscelis burti stictogramma*

CLARK'S SPINY LIZARD *Sceloporus clarkii*

SONORAN SPOTTED WHIPTAIL *Aspidoscelis sonora*

NORTHERN TREE LIZARD *Urosaurus ornatus*

MADREAN ALLIGATOR LIZARD *Elgaria kingii*

SOUTHERN PRARIE (COWLES FENCE) LIZARD *Sceloporus [undulatus] cowlesi*



Habitat Needs

- Strong structural diversity and high plant density
- Diverse native species including grasses and vines
- Substantial, though not 100% canopy cover in trees, plus shrubs and sub-shrubs in irregular clusters or clumps
- >120' long continuous vegetated segments/basins (with narrow gaps for safety/maintenance needs only)
- Permanent rock/log piles and flat rocks for foraging and cover

Diet Needs

- Forages by digging in leaf litter and under logs, wood piles, rocks, and chasing in the open for insects including ants, termites, beetles, and caterpillars. It also eats a variety of spiders

Meso/Xeroriparian Lizards

CLARK'S SPINY LIZARD *Sceloporus clarkii*

DESERT SPINY LIZARD *Sceloporus magister*

SONORAN SPOTTED WHIPTAIL *Aspidoscelis sonora*

NORTHERN TREE LIZARD *Urosaurus ornatus*

ZEBRA-TAILED LIZARD *Callisaurus draconoides*

WESTERN BANDED GECKO *Coleonyx variegates*



Habitat Needs

- Abundance of tall native trees
- Mixture of shrubs of all sizes
- Varied ground condition including rock/log piles, flat rocks, and leaf litter

Diet Needs

- Beetles, ants, caterpillars, wasps, moths, butterflies, grasshoppers, bugs, aphids, cicadas, crickets, spiders, and some plant material such as wolfberry (*Lycium*) fruit.

Mixed Riparian/Upland Lizards

SONORAN SPOTTED WHIPTAIL *Aspidoscelis sonorae*
WESTERN BANDED GECKO *Coleonyx variegates*
ZEBRA-TAILED LIZARD *Callisaurus draconoides*
COMMON LESSER EARLESS LIZARD *Holbrookia maculata*
LONG-TAILED BRUSH LIZARD *Urosaurus graciosus*
COMMON SIDE-BLOTCHED LIZARD *Uta stansburiana*
DESERT IGUANA *Dipsosaurus dorsalis*
REGAL HORNED LIZARD *Phrynosoma solare*
LONG-NOSED LEOPARD LIZARD *Gambelia wislizenii*
GILA MONSTER *Heloderma suspectum*



Habitat Needs

- Mosaic of vegetation structures, dominance based on local observations
- Strong vertical areas with dense plantings
- Areas of open ground with widely spaced or no trees and scattered sub-shrubs
- Open areas with significant grasses, shrubs, and sub-shrubs and/or cactus
- Varied ground condition including rock/log piles and leaf litter

Diet Needs

- Varies by species, may include insects, spiders, plants, other lizards, snakes, and plant materials such as flowers, buds, and small fruits, plus nestlings and the eggs of birds and reptiles

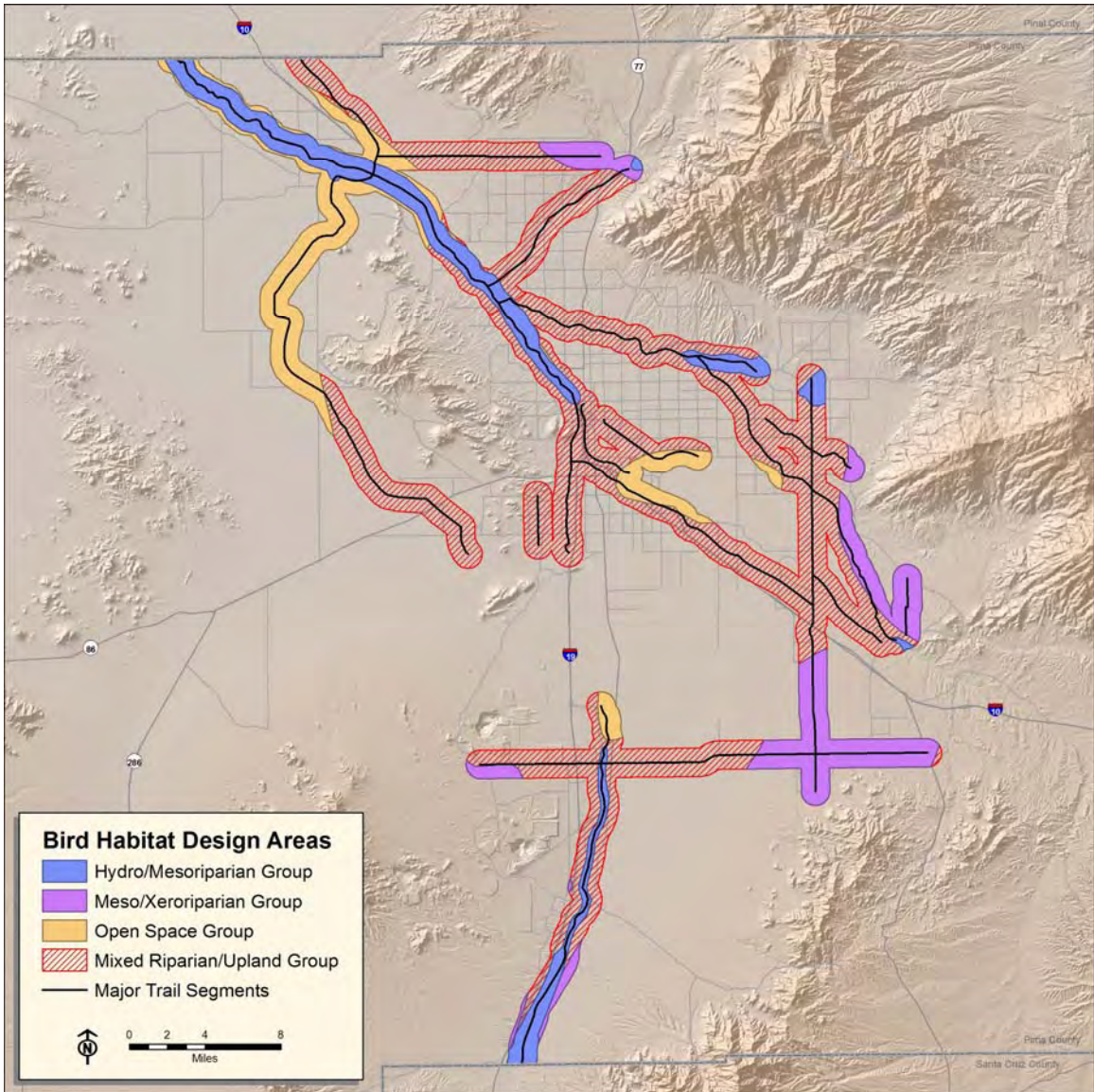


Figure 2: Bird habitat trail design areas, based on expert input and Sonoran Desert Conservation Plan Map habitat layers by species and/or species type. Wherever feasible, design and manage trailside area with the goal of replicating or simulating the bird habitat conditions per trail area.

Birds

Hydro/Mesoriparian Birds

ABERT'S TOWHEE *Pipilo aberti*

BELL'S VIREO *Vireo bellii*

WESTERN YELLOW-BILLED CUCKOO *Coccyzus americanus occidentalis*



Habitat Needs

- Mesquite bosques and cottonwood-willow forests
- Dense, shrubby understory of varying heights

Diet Needs

- Diet varies by species, may include insects, frogs, berries, and seeds

Meso/Xeroriparian Birds

RUFOUS-WINGED SPARROW *Aimophila carpalis*



Habitat Needs

- Thorny shrubs along wash banks
- Grassy areas scattered with thorny and/or dense shrubs

Diet Needs

- Insects, grass, and weed seeds



Mixed Riparian/Upland Birds

CACTUS FERRUGINOUS PYGMY OWL *Glaucidium brasilianum cactorum*

GAMBEL'S QUAIL *Callipepla gambelli*

PYRRHULOXIA *Cardinalis sinuatus*

PHAINOPEPLA *Phainopepla nitens*

CARDINAL *Cardinalis cardinalis*

Habitat Needs

- Dense, woody thickets including thorny shrubs and trees
- Variety of desert tree species
- Trees and cacti large enough to provide nesting cavities



Diet Needs

- Varies by species, may include insects, berries, and seeds; the pygmy owl diet includes insects, birds, and lizards

Open Space/Barren Area Birds

BURROWING OWL *Athene cunicularia*

Habitat Needs

- Open areas interspersed with grasses, such as grasslands, prairies, and open areas caused by human disturbance

Diet Needs

- Feeds on insects, small rodents, lizards, and birds



References

- Where Do Lizards Lounge brochure by Heidi Flugstad & Dennis Caldwell.
- The Wildlife Friendly Garden - Arizona Game and Fish, www.azgfd.gov/w_c/landscaping_wildlife_garden.shtml
- Reptiles of Arizona, by Thomas C. Brennan, <http://www.reptilesfaz.com/>
- Desert Bird Gardening, Arizona Native Plant Society, 1997.
- Strategies for integrating pedestrian needs and bird habitat in trail design along secondary watercourse in Tucson, Arizona brochure by Jennifer Patton.
- Tucson Bird Count, www.tucsonbirds.org
- Pima County Sonoran Desert Conservation Plan Maps, habitat layers by species and/or species type, <http://dot.pima.gov/cmo/sdcpmaps/>
- Kendal Kroesen, Tucson Audobon Society, personal communication

