Regulated Riparian Habitat Mitigation Standards and Implementation Guidelines

Supplement to Title 16 Chapter 16.54 of the Watercourse and Riparian Habitat Protection and Mitigation Requirements

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## Glossary

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section one: the ordinance
What is the history and purpose of this Ordinance?

Title 16, Chapter 16.54, of the Pima County Code: “Watercourse and Riparian Habitat Protection and Mitigation Requirements” was adopted by the Pima County Board of Supervisors on July 19, 1994. Chapter 16.54 was adopted for the purpose of enhancing wildlife values by preserving riparian vegetation along watercourses and floodplains. Chapter 16.54 is referred to throughout this document as “The Ordinance.”

Also adopted with the Ordinance were maps indicating the location of existing riparian habitat meeting certain criteria, referred to in this document as “Regulated Riparian Habitat”. The Ordinance seeks to protect these mapped habitat areas and requires mitigation when sites containing Regulated Riparian Habitat are developed or subdivided.

Where is the Ordinance applied?

The Ordinance applies to all property in unincorporated areas of Pima County which contain regulated habitat including property owned by Pima County.

The Ordinance does not apply to:
- Any property where regulated habitat is not present
- Properties owned by federal, state, or local incorporated municipalities or school districts.
- Properties within the boundaries of incorporated cities and towns in Pima County.

When is the Ordinance applied?

Administration/Enforcement of the Ordinance will occur when a Development Plan, Subdivision Plat, or an application for a building permit is submitted to Pima County for review on a property which contains regulated habitat.
What is considered alteration of Regulated Riparian Habitat?

The Ordinance considers habitat to be altered on the subject property when:

- There is any disturbance to Regulated Hydro-Mesoriparian Habitat.
- 1/3 acre or more of the Regulated Xeroriparian A, B, or C Habitat.
- Regulated habitat, in excess of the amount noted above, is mass graded, partially graded, cleared, thinned, planted with exotic (non-native) species, or otherwise modified to reduce vegetative volume, or diminish the value of the regulated habitat present on the site.
When regulated habitat is present on a site to be developed or subdivided, the following options are available for treatment of the regulated habitat.

**The regulated habitat is avoided and preserved.**
This alternative is preferred and is required whenever feasible. To encourage avoidance and preservation, Modified Development Standards may be approved under certain circumstances.

The Modified Development Standards available as incentives for preservation of riparian habitat include:
- a reduction in minimum setbacks
- a reduction in minimum lot size
- a reduction in the quantity of plants required to be installed within required bufferyards
- a reduced number of required parking spaces
- relaxation of building height restrictions

See Page 6 for more information related to Modified Development Standards. Detailed information can be found in Chapter 18.07 of the Pima County Zoning Code. The zoning code can be found at: www.co.pima.az.us/cob/code/

**The regulated habitat may be removed if an approved Mitigation Plan is installed.**

This alternative is available only when it can be demonstrated that there is no “reasonably practical alternative” to the proposed impact. An Approved Mitigation Plan is required before disturbance to a regulated riparian habitat can occur.

In some instances, the utilization of Modified Development Standards may be requested as part of a Mitigation Plan submitted to Pima County. (See Chapter 18.07 of the Pima County Zoning Code).
This option can only be used when it can be demonstrated that preservation or on-site mitigation is not feasible.

In some instances the regulated habitat may be removed or altered concurrent with the payment of funds to a “Mitigation Bank” or account established by Pima County for the purpose of purchasing high resource value riparian habitat. This action requires the approval of the Pima County Board of Supervisors.

The amount of the contribution will be determined by the Board. Items to be considered in establishing an amount will include: the estimated cost of an on-site mitigation, had it been provided, and the economic value of the land from which the regulated habitat was removed.
To encourage the preservation of riparian habitat on sites to be subdivided or developed, Section 18.07 of the Pima County Zoning Code allows for the use of Modified Development Standards, these include:

Setback reductions may be approved by the Zoning Administrator pursuant to procedures and standards included in Section 18.07.70 of the Zoning Code. The code can be found on the internet at: www.co.pima.az.us/cob/code/

A reduction in lot size may be approved when such a reduction will allow for the preservation of riparian habitat. The sum of the reductions in lot size area may not exceed the area of the riparian habitat preserved and the preserved area must be protected by recorded covenants. When such conditions are met, the following lot size reductions may be approved:

- Minimum lot sizes for CR-1 and GR-1 subdivisions may be reduced from 36,000 square feet to 18,000 square feet.
- Minimum lot sizes for CR-2 subdivisions may be reduced from 16,000 square feet to 12,000 square feet.
- Minimum lot sizes for CR-3 and CMH-1 subdivisions may be reduced from 8,000 square feet to 7,000 square feet.

The number of off-street parking spaces required may be reduced pursuant to Chapter 18.75 of the Zoning Code, if such an adjustment will not result in increased traffic or danger to persons or property.

The number of trees to be planted in a required Bufferyard may be reduced by one tree per each 300 square feet of riparian habitat preserved. The maximum reduction in the required tree quantity shall not exceed 50% of the quantity that would have been required without preservation.
I plan to develop or subdivide my property (Check maps)

I do not have any Regulated Habitat on my property

I will Avoid or Preserve the Regulated Habitat

I will submit my Development Plan or Plat to the County

Pima County Review

I have Regulated Habitat on my property (Check maps)

I will Avoid the Regulated Habitat and request Development Standard Modifications

I will submit my Development Plan/Plat

I will submit a Floodplain Use Permit Application

Pima County Review

Pima County Board of Supervisors Decision

I will alter/disturb Regulated Habitat and Mitigate on my site

I will submit my Development Plan/Plat

I will submit a Floodplain Use Permit Application

I will submit a Mitigation Plan

Pima County Review

Pima County Board of Supervisors Decision

Xeroriparian Habitat

Hydro-Mesoriparian Habitat

I will alter/disturb Regulated Habitat and propose to make a contribution to the Mitigation Bank

I will submit my Development Plan/Plat

I will Request Board Approval to contribute to the mitigation bank

Pima County Staff will review and offer their recommendation

Pima County Board of Supervisors Decision

Overview of Submittal and Review Process
Mitigation Plan Components

Submittal Checklist

Site Specific Delineation of Regulated Habitat (2 Blueline Prints)

Mitigation Planting Plan (2 Blueline Prints and 1–11”x17” reduction)

SUBMITTAL REQUIREMENTS:
Mitigation Plans Submitted to Pima County for review and approval shall include the following information.

SITE SPECIFIC DELINEATION OF REGULATED HABITAT

The Regulated Habitat Delineation shall be prepared at a scale of 1”=40’ or larger, and shall include:

- Site specific limits of the regulated habitat.
- An aerial photograph of the site not more than 3 years old.
- Limits of development on the site.

Pima County Regulated Riparian Habitat maps are prepared at 1”=1000’, providing only a general location of regulated habitat and may not be completely accurate. The actual limits of the Regulated Riparian Habitat on each site must be specifically delineated using aerial photography or field mapping.

MITIGATION PLANTING PLAN

The Mitigation Planting Plan shall be prepared at a scale of 1”=40’ or larger, and shall include:

- The limits of the disturbed and mitigated areas.
- Footprints of proposed buildings.
- Proposed finished grades within the mitigated area. Finished grades shall be depicted by contours (1 or 2 foot contour interval) or by other method that clearly depicts the finished grades and slope conditions.
- The location of proposed plantings with the species of all new trees and shrubs identified.
- A plant list or schedule that identifies plant species, quantities, and plant size at time of installation.
- Scale, north arrow, location map, brief description of site location, and other general information as appropriate for the project.
- Calculations and Quantities as described in the next section.
Mitigation Irrigation Plan

The Mitigation Irrigation Plan shall be prepared at a scale of 1"=40’ or larger, and shall include:

- Site specific limits of the mitigated area.
- Development Plans and/or Plats.
- Proposed finished grades within the mitigated area. Finished grades shall be depicted by contours (1 or 2 foot contour interval) or by other method that clearly depicts the finished grades and slope conditions.
- The source of irrigation water, including any required backflow prevention devices.
- The control system including power source for the controller, and remote control valves.
- The mainline, lateral line, and distribution tubing system.
- Details and/or schedules indicating the type of applicator (drip emitter, bubbler, etc.) to be installed at each plant.

Homeowners with small, single family lots may be able to meet the irrigation requirement with an approved irrigation schematic and irrigation schedule.
DEVELOPMENT PLAN OR TENTATIVE SUBDIVISION PLAT

Copies of the Development Plan or Tentative Plat for the Project on which the mitigation will occur shall be included with the Mitigation Plan Submittal.

The mitigation plan shall be updated to reflect any changes in the development plan or plat that occur between the preliminary and final approvals. The Mitigation Plan shall be resubmitted with the final Development Plan or Plat. No grading permits shall be issued until revisions to the Approved Mitigation Plan are approved to ensure the final Development Plan or Plat are reconciled.

SUMMARY OF REQUESTED DEVELOPMENT STANDARD MODIFICATIONS

A narrative summary of requested Development Standard Modifications, if any, shall be included with the Mitigation Plan. Areas where the Development Standard Modifications will apply shall be shown on the Development Plan or Tentative Plat.
Appeals related to the application and administration of the Ordinance may be filed using the procedures outlined below.

Applicant submits a letter to the Manager of the Flood Control Division.

The letter shall include the following:
- Why the concern is being filed.
- How they believe the actual habitat present on the site is different than that indicated on the Pima County Habitat Maps.
- If applicable, a description of how the proposed development will impact the actual habitat the applicant believes is present on the site.

Pima County staff will review the issue and schedule a meeting to discuss and negotiate options with the applicant and requirements for mitigation.

If mutual agreement cannot be reached with staff, the applicant shall submit a letter of appeal to the Chief Engineer of the Flood Control District.

If mutual agreement cannot be reached with the Chief Engineer, the applicant shall submit a letter of appeal to the Pima County Board of Supervisors.

All Mitigation Plans will be inspected for compliance between one and three years after the issuance of building permits.

Sites found to be out of compliance with the approved Mitigation Plan will be subject to the penalties outlined in Section 18.72.140 (Compliance, Conflict, Violations, Penalties, and Assurances) of the Pima County Zoning Code. The code can be found on the internet at: www.co.pima.az.us/cob/code/
Section Two: Riparian Habitat Locations, Descriptions & Mitigation Requirements
Habitat Maps

The official maps illustrating the location of regulated riparian habitat are on file at the offices of the Pima County Department of Transportation and Flood Control District, County/City Public Works Center.

201 North Stone Avenue, 4th Floor, Tucson, Arizona
(520) 740-6350

Maps are also available for viewing on the Pima County Flood Control District website at:

www.dot.co.pima.az.us/flood/

These 1"=1000' scale maps illustrate both real estate parcels and the location(s) of each type of regulated habitat. These habitat maps may be reviewed and photocopied at the Floodplain Information Counter of the Department of Transportation and Flood Control District. Arrangements can be made to purchase duplicates of originals from Pima County EGIS, 9th Floor, Public Works Building ((520) 740-6670).

Please note: These maps are provided for information only. The map boundaries may be in error by several hundred feet. The actual location of the boundaries must be determined on site.

Additional information about the Habitat Maps can be found on the Department of Transportation and Flood Control District web page:

www.dot.co.pima.az.us/flood/riparian/using.htm
When is Mitigation Required?

On-site mitigation is generally required when development or subdivision of a site will result in the alteration or removal of regulated riparian habitat.

If the regulated riparian habitat on your site is preserved and undisturbed, or if disturbance is only incidental (as defined by the Ordinance) during development, no on-site mitigation is necessary.

The requirement for on-site mitigation may also be waived if and when a financial contribution to the Mitigation Bank is approved by the Pima County Board of Supervisors.

What is the Purpose of On-Site Mitigation?

The purpose of on-site mitigation is to provide new habitat of similar value to that which was removed as a result of the construction of physical improvements on the developed or subdivided site.

The ordinance requires that within five years of installation, the replacement (mitigation) habitat be of similar or equal value to the removed habitat.

What does On-Site Mitigation Require?

On-site mitigation must include:

- **Site Planning** to locate the mitigation improvements in an area where there is the potential to recreate habitat with value equal to that removed from the site. (i.e. locate mitigation habitat near existing habitat, near preserved habitat, or in low areas that will receive enough water to support riparian vegetation.)

- **Planting and Seeding** of trees, shrubs, and understory as required to reestablish a natural riparian plant community similar to the removed habitat.

- **Irrigation** to facilitate the establishment of plantings and to assist in reestablishment of habitat values within the five years required by the Ordinance.

- **Maintenance** for a period of five years to ensure the reestablishment of riparian vegetation.

Specific Standards for mitigation (including plant quantities, sizes, etc.) are outlined on the following pages.
The Ordinance and the associated maps identify three general types of habitat, Hydroriparian, Mesoriparian, and Xeroriparian. These Regulated Riparian Habitat maps were adopted with the Ordinance, and will serve as the final designation of habitat types. Because Hydroriparian and Mesoriparian are regulated with the same requirements, they are

Hydroriparian habitats are generally associated with the perennial watercourses where plant species such as Cottonwood and Willow are present.

What is Hydroriparian Habitat?

All habitat types are designated by the Regulated Habitat maps, and must be confirmed on-site.

Mesoriparian habitats are associated with areas with shallow ground water and/or intermittent stream flow. Mesquite bosques are characteristic of this habitat type.

What is Mesoriparian Habitat?

All habitat types are designated by the Regulated Habitat maps, and must be confirmed on-site.

Example of Hydroriparian Habitat

Example of Mesoriparian Habitat
1. Where to locate your Mitigation Area

Basic Requirements:
You must locate your Mitigation Area adjacent to preserved Regulated Hydroriparian or Mesoriparian habitat.

Options to Basic Requirements:
You may locate your Mitigation Area in an area not adjacent to preserved regulated habitat if you can demonstrate that this will enhance the overall habitat value of the site.

Examples: An acceptable area would be replanting in a disturbed drainageway. Unacceptable areas would be planting in parking lots or in areas with high volumes of pedestrian traffic.

Other Guidelines:
The mitigation area must be one continuous area in a density that creates habitat...not scattered trees used as amenity landscaping on the site.

Mitigation vegetation not adjacent to preserved habitat should be placed in areas that will receive sufficient water to facilitate growth/maintenance of habitat.

2. Size of your required Mitigation Area

Basic Requirement:
Minimum Size: 1.5 times the area to be disturbed. For example, if one acre of habitat is disturbed, 1.5 acres must be mitigated.

Options to Basic Requirements:
Required area of mitigation may be reduced to 1.0 times (equal to) the area disturbed if, in addition to on-site mitigation, you make a financial contribution to the Pima County fund established for the purchase of high value riparian habitat.

3. Trees: How many & what kind are required

Basic Requirements:
How many: At least 90 trees per acre of mitigation.
What size: At least 50% of the trees planted must be 24” box. The remaining 50% must be at least 15 gallon.
What kind: You may use any tree species found on the approved Hydro-Mesoriparian tree list in Appendix A. No more than 75% of the trees used in the mitigation area can be of a single species. A minimum of 3 tree species are required. Use existing tree species as a guide for species selection.

Options to Basic Requirements:
All trees may be installed at 15 gallon if you add 20% to the total required number of trees.

Other Guidelines:
You must select trees from the Approved Hydro-Mesoriparian Plant List and use standard, approved planting methods.
4. Shrubs: How many & what kind are required

Basic Requirement:
How many: 200 shrubs per acre of mitigation.
What size: All shrubs must be 5 gallon or larger.
What kind: You may use any shrub species found on the approved Hydro-Mesoriparian shrub list in Appendix A. No more than 35% of the shrubs selected may be of a single species. Where the size of the site allows, a minimum of 5 shrub species is recommended. Use existing shrub species as a guide for species selection.

Options to Basic Requirements:
All shrubs may be installed at 1 gallon if you add 20% to the total required number of shrubs.

Other Guidelines:
You must select shrubs from the Approved Hydro-Mesoriparian Plant List and use standard, approved planting methods.

5. Seeding/Understory requirements

Basic Requirement:
You must hydroseed/hydmulch all disturbed areas within the Mitigation Area with the approved Hydro-Mesoriparian seed mix found in Appendix A.

Options to Basic Requirements:
You may also seed the area using these methods:
- Drill seeding with crimped straw mulch
- Broadcast seeding and raking into seedbed with straw or other appropriate mulch.

Site specific seed mixes may be proposed and approved if they better reflect existing/desired conditions.

Other Guidelines:
You must use the approved standard Hydro-Mesoriparian seed mix and follow standard, approved planting methods.

6. Grading and Erosion Control Requirements

Basic Requirements:
The Mitigation Area must be graded to collect and retain stormwater runoff within the mitigated area.
Harvesting of stormwater runoff from other areas of the site is encouraged and acceptable if consistent with applicable county, state, and federal regulations.

Other Guidelines:
You must adhere to all requirements found in the Pima County Grading Manual and the Pima County Stormwater Retention/Detention Manual.
7. Irrigation System Requirements

**Basic Requirement:**
You must install an automatic drip irrigation system within the Mitigation Area to provide water to:
- All transplanted/salvaged trees and shrubs
- All planted nursery stock trees and shrubs.
The irrigation system must be capable of providing appropriate volumes of water to the trees and shrubs.

**Options to Basic Requirements:**
An automatic bubbler or other irrigation system capable of efficiently providing water to the tree and shrub root zones may be proposed. For approval, it must be demonstrated that the alternative irrigation system will provide sufficient irrigation water at the appropriate intervals to ensure establishment of mitigation plantings.

Individual homeowners may not be required to install extensive automatic irrigation system if it can be demonstrated that they will provide adequate irrigation.

**Other Guidelines:**
You must meet all requirements in the Pima County/City of Tucson Standard Specifications for Public Improvements.

8. Required Maintenance

**Basic Requirement:**
Your mitigation plan must include the statement:
“The project owner, and/or the Owner’s successors, agree to preserve and protect the mitigation area for the duration of the project.
Further, the project owner and/or their successors agree to actively maintain the mitigated area for a period of not less than five years. Maintenance activities shall include, but not be limited to, the regular operation of the irrigation system, the replacement of dead trees, and the removal of noxious plant species.”

You, or your successors, are bound to perform the maintenance outlined in this statement.

**Other Guidelines:**
You must follow the Maintenance Guidelines found in Appendix B.
What is Xeroriparian Habitat?

All habitat types are designated by the Regulated Habitat maps, and must be confirmed on-site.

Xeroriparian habitats are typically associated with ephemeral streams (those that flow only in response to rainfall). The plant species present are similar to those found in upland areas but the plant densities are greater due to the relative abundance of water.

Examples of Xeroriparian Habitat

Xeroriparian habitats have been further subdivided into four pre-determined sub-classes based on the total vegetation volume present.

**Xeroriparian A:** The most dense Xeroriparian subcategory.

**Xeroriparian B:** Moderately dense Xeroriparian subcategory.

**Xeroriparian C:** Less dense Xeroriparian subcategory.

**Xeroriparian D:** An additional subcategory of Xeroriparian habitat which is associated with sparse vegetation. This habitat subcategory is not regulated habitat, and removal does not require mitigation or a contribution to the Mitigation Bank. However, to encourage the preservation of this habitat type the Pima County Zoning Code (See Section 18.070.080) allows for the use of modified development standards if you preserve this habitat on your site.
Xeroriparian Densities

What does Xeroriparian Habitat look like?

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Total Vegetation Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xeroriparian A</td>
<td>Greater than 0.856 cubic meters per square meter (M³ / M²)</td>
</tr>
<tr>
<td>Xeroriparian B</td>
<td>Less than or equal to 0.856 M³ / M² and greater than 0.675 M³ / M²</td>
</tr>
<tr>
<td>Xeroriparian C</td>
<td>Less than or equal to 0.675 M³ / M² and greater than 0.500 M³ / M²</td>
</tr>
<tr>
<td>Xeroriparian D</td>
<td>Less than or equal to 0.500 M³ / M²</td>
</tr>
</tbody>
</table>

Example of Xeroriparian Habitat

Example of Xeroriparian Habitat
1. Where to locate your Mitigation Area

Basic Requirements:
You must locate your Mitigation Area adjacent to preserved Regulated Xeroriparian habitat.

Options to Basic Requirements:
You may locate your Mitigation Area in an area not adjacent to preserved regulated habitat if you can demonstrate that this will enhance the overall habitat value of the site.

An example of an acceptable non-adjacent location would include replanting a previously disturbed natural drainageway.

An example of an unacceptable non-adjacent location would be planting within parking lots, or in areas with a high volume of pedestrian traffic.

Other Guidelines:
The mitigation area must be one continuous area in a density that creates habitat...not scattered trees used as amenity landscaping on the site.

Mitigation vegetation not adjacent to preserved habitat should be placed in areas that will receive sufficient water to facilitate growth/maintenance of habitat.

2. Size of your required Mitigation Area

Basic Requirement:
Minimum Size: 1.0 times the area to be disturbed. For example, if 1.0 acre of habitat is disturbed, 1.0 acre must be mitigated.

3. Trees: How many & what kind are required

Basic Requirements:

How many:
- Xeroriparian A: At least 75 trees per acre of mitigation.
- Xeroriparian B: At least 60 trees per acre of mitigation
- Xeroriparian C: At least 45 trees per acre of mitigation

What size: At least 50% of the trees planted must be 15 gallon. The remaining 50% must be at least 5 gallon.

What kind: You may use any tree species found on the approved Xeroriparian tree list in Appendix A. No more than 75% of the trees used in the mitigation area can be of a single species. A minimum of 3 tree species are required. Use existing tree species as a guide for species selection.

Options to Basic Requirements:
If you use all 15 gallon trees instead of 50% 5 gallon, the total quantity of required trees may be reduced by 20%.

Other Guidelines:
You must select trees from the Approved Xeroriparian Plant List and use standard, approved planting methods.
4. Shrubs: How many & what kind are required

Basic Requirement:

How many:
- Xeroriparian A: 175 shrubs per acre of mitigation.
- Xeroriparian B: 135 shrubs per acre of mitigation.
- Xeroriparian C: 100 shrubs per acre of mitigation.

What size: 50% must be 5 gallon or larger, the remaining 50% may be 1 gallon.

What kind: You may use any shrub species found on the approved Xeroriparian shrub list in Appendix A. No more than 35% of the shrubs selected may be of a single species. Where the size of the site allows, a minimum of 5 shrub species is recommended. Use existing shrub species as a guide for species selection.

Options to Basic Requirements:
If all 5 gallon shrubs are planted instead of 50% 1 gallon, the required number of shrubs may be reduced by 20%.

Other Guidelines:
You must select shrubs from the Approved Xeroriparian Plant List and use standard, approved planting methods.

5. Seeding/Understory requirements

Basic Requirement:
You must hydroseed/hydromulch all disturbed areas within the Mitigation Area with the approved Xeroriparian seed mix found in Appendix A.

Options to Basic Requirements:
You may also seed the area using these methods:
- Drill seeding with crimped straw mulch
- Broadcast seeding and raking into seedbed with straw or other appropriate mulch.

Site specific seed mixes may be proposed and approved if they better reflect existing/desired conditions.

Other Guidelines:
You must use the approved standard Xeroriparian seed mix and follow standard, approved planting methods.

6. Grading and Erosion Control Requirements

Basic Requirements:
The Mitigation Area must be graded to collect and retain stormwater runoff within the mitigated area. Harvesting of stormwater runoff from other areas of the site is encouraged and acceptable if consistent with applicable county, state, and federal regulations.

Other Guidelines:
You must adhere to all requirements found in the Pima County Grading Manual and the Pima County Stormwater Retention/Detention Manual.
7. Irrigation System Requirements

Basic Requirement:
You must install an automatic drip irrigation system within the Mitigation Area to provide water to:
- All transplanted/salvaged trees and shrubs
- All planted nursery stock trees and shrubs.

The irrigation system must be capable of providing appropriate volumes of water to the trees and shrubs.

Options to Basic Requirements:
An automatic bubbler or other irrigation system capable of efficiently providing water to the tree and shrub root zones may be proposed. For approval, it must be demonstrated that the alternative irrigation system will provide sufficient irrigation water at the appropriate intervals to ensure establishment of mitigation plantings.

Other Guidelines:
You must meet all requirements in the Pima County/City of Tucson Standard Specifications for Public Improvements.

8. Required Maintenance

Basic Requirement:
Your mitigation plan must include the statement:
“The project owner, and/or the Owner’s successors, agree to preserve and protect the mitigation area for the duration of the project. Further, the project owner and/or their successors agree to actively maintain the mitigated area for a period of not less than five years. Maintenance activities shall include, but not be limited to, the regular operation of the irrigation system, the replacement of dead trees, and the removal of noxious plant species.”

You, or your successors, are bound to perform the maintenance outlined in this statement.

Other Guidelines:
You must follow the Maintenance Guidelines found in Appendix B.
section three: frequently asked questions
Answers to Commonly Asked Questions

Q. The map does not show habitat where we are building on our property. Why are we required to mitigate?

A. The maps indicate the general location of regulated habitat. The actual habitat boundaries may be shifted relative to the parcel boundaries shown on the maps. Habitat boundaries must be verified using current aerial photos and/or field mapping.

Q. Can I plant other species than are included on the list?

A. Yes, but only listed plants count toward your mitigation requirements.

Q. Can I get credit for landscaping done previously to this improvement?

A. Only if you can show when and what species of plants were installed, and that plants are thriving and provide habitat value.

Q. Will my mitigation plantings be inspected?

A. Yes. Property inspections occur on a regular basis. You will be notified if you fail to follow your mitigation plan.

Q. When will I need to do my mitigation planting?

A. Planting shall occur during the first growing season following construction completion.

Q. Do I need to install a drip irrigation system?

A. Newly planted trees and shrubs require irrigation in order to establish a healthy root system. Even drought tolerant plants must be irrigated during their initial, formative years. Any type of irrigation system will work but drip is the most efficient and lessens the chance of plant loss. Subdivision and commercial sites require automatic irrigation systems.
Q. How do these riparian mitigation standards compare to the Native Plant Preservation Ordinance (NPPO) standards? Do I need to do both?

A. The NPPO may require an inventory of the native plants on the entire site, while Riparian Habitat Protection Ordinance only pertains to the vegetation in Regulated Habitat.
Yes, you must submit both the NPPO and Riparian Habitat Mitigation Plan, but vegetation planted as NPPO mitigation may count toward your Regulated Riparian Habitat mitigation as well.

Q. Where can I find the plants and seeding mixes that I need?

A. A list of local landscaping companies who provide the appropriate native species is included in Appendix A.

Q. My property is in a hydro-mesoriparian habitat. How long will it take for my mitigation plan to be approved?

A. Mitigation in xero-riparian areas can be approved in this office under normal permitting procedures. Mitigation in hydro-mesoriparian habitat must be approved by this office and by the Board of Supervisors (BOS). The time for the entire approval process varies with the BOS schedule and preparation of the mitigation plan.
Minimum time to schedule a BOS agenda item is 3-4 weeks. This can be scheduled during the same time your building plans are being reviewed by development services.

Q. Can I use my site plan as my mitigation plan?

A. You can modify your Development Services site plan to show the location, number and types of trees, shrubs and seeding. Two full size mitigation plans should be submitted for review by this office. For the BOS submittal, the mitigation plan should be reduced to 11" x 17" size paper.
appendix A

approved plant lists
<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Thorns</th>
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<th>Flowers</th>
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<tr>
<td>Acacia greggii**</td>
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<td>Celtis reticulata</td>
<td>Hackberry</td>
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<tr>
<td>Chilopsis linearis</td>
<td>Desert Willow</td>
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<td>Fraxinus velutina **</td>
<td>Arizona Ash</td>
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<td>Juglans major**</td>
<td>Arizona Walnut</td>
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<td>Platanus wrightii **</td>
<td>Arizona sycamore</td>
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<td>Populus fremontii **</td>
<td>Fremont Cottonwood</td>
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<td>Screwbean Mesquite</td>
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<td>Prosopis velutina **</td>
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<td>Salix gooddingii **</td>
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<td>Sapindus saponaria</td>
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** High Water Requirement
** Tolerates drier conditions

See Following Pages for Photographs of Species
<table>
<thead>
<tr>
<th>Botanical Name</th>
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<th>Thorns</th>
<th>Fruits/Berries</th>
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<tr>
<td>Acacia greggii</td>
<td>Catclaw Acacia</td>
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<td>Anisacanthus thurberi</td>
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<td>Garrya wrightii**</td>
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<td>Lobelia cardinalis**</td>
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<tr>
<td>Lycium spp.**</td>
<td>Wolfberry</td>
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<td>Muhlenbergia rigens**</td>
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<td>Quercus emoryi</td>
<td>Emory Oak</td>
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<td>Rhus glabra</td>
<td>Smooth Sumac</td>
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<tr>
<td>Rhus ovata</td>
<td>Sugar bush</td>
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<tr>
<td>Rhus trilobata</td>
<td>Squawbush</td>
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<td>Ribes aureum</td>
<td>Wax Currant</td>
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<td>Salix exigua**</td>
<td>Coyote willow</td>
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<td>Sambucus mexicana</td>
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<td>Senecio salignus</td>
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<td>Sporobolus wrightii</td>
<td>Sacaton (grass)</td>
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</tr>
</tbody>
</table>

** Tolerates drier conditions

See Following Pages for Photographs of Species

HW High Water Requirement
The approved seed mix can be purchased from one of the following approved vendors:

- Wildland Restoration  
  Tucson, Arizona  
  (520) 882-0969
- Wild Seed  
  Tempe, Arizona  
  (602) 276-3536
- Desert Enterprises  
  Wickenberg, Arizona  
  (602) 388-2448
- Granite Seed  
  Salt Lake City, Utah  
  FAX (801) 768-4422
  (801) 768-3967

The approved seed mix shall include the following:

- Andropogon barbinodus—Cane Beardgrass  
  5.0 lbs/acre
- Aquilegia chrysantha—Yellow Columbine  
  2.0 lbs/acre
- Bouteloua curtipendula—Sideoats Grama  
  10.0 lbs/acre
- Clematis drummondii—Old Man’s Beard  
  2.0 lbs/acre
- Ericameria laricifolia—Turpentine Bush  
  1.0 lbs/acre
- Justicia candidans—Red justicia  
  2.0 lbs/acre
- Lobelia cardinalis—Monkey flower  
  1.5 lbs/acre
- Lycium spp.—Wolfberry  
  3.0 lbs/acre
- Muhlenbergia rigens—Deergrass  
  2.0 lbs/acre
- Nolina microcarpa—Beargrass  
  3.0 lbs/acre
- Panicum obtusum—Vine Mesquite  
  5.0 lbs/acre
- Penstemon spp.—Penstemon  
  4.0 lbs/acre
- Sporobolus wrightii—Sacaton  
  2.0 lbs/acre
## Approved Xeroriparian Tree Species

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Thorns</th>
<th>Fruits/ Berries</th>
<th>Flowers</th>
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</thead>
<tbody>
<tr>
<td>Acacia greggii</td>
<td>Catclaw acacia</td>
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<tr>
<td>Acacia constricta</td>
<td>Whitethorn acacia</td>
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<td>Cercidium floridum</td>
<td>Blue Palo Verde</td>
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<td>Celtis reticulata</td>
<td>Canyon Hackberry</td>
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<tr>
<td>Chilopsis linearis</td>
<td>Desert Willow</td>
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<tr>
<td>Olneya tesota</td>
<td>Ironwood</td>
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<tr>
<td>Prosopis velutina</td>
<td>Velvet Mesquite</td>
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<tr>
<td>Psorothamnus spinosa</td>
<td>Smoketree</td>
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## Approved Xeroriparian Shrub Species

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<td>Aster tanacetfolius</td>
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<td>Atriplex canescens</td>
<td>Fourwing Saltbush</td>
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<tr>
<td>Atriplex lentiformis</td>
<td>Quail Bush</td>
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<td>Calliandra eriophylla</td>
<td>Fairy Duster</td>
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<td>Celtis Pallida</td>
<td>Desert Hackberry</td>
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<td>Dodonaea viscosa</td>
<td>Hopbush</td>
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<td>Encelia farinosa</td>
<td>Brittlebush Bush</td>
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<td>Ericameria laricofolia</td>
<td>Turpentine Bush</td>
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<tr>
<td>Eriogonum fasciculatum</td>
<td>Flat Top Buckwheat</td>
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<td>Hymenoclea monogynra</td>
<td>Burro Bush</td>
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<tr>
<td>Larrea tridentata</td>
<td>Creosote Bush</td>
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<tr>
<td>Lycium spp.</td>
<td>Wolfberry</td>
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<td>Nolina microcarpa</td>
<td>Beargrass</td>
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<td>Parthenium incanum</td>
<td>Mariola</td>
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<tr>
<td>Simmondsia chinensis</td>
<td>Jojoba</td>
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<tr>
<td>Vauquelinia californica</td>
<td>Arizona Rosewood</td>
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<td>Zinnia acerosa</td>
<td>Desert Zinnia</td>
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<td>Zizyphus obtusifolia</td>
<td>Greythorn</td>
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  (520) 882-0969

- Wild Seed  
  Tempe, Arizona  
  (602) 276-3536

- Desert Enterprises  
  Wickenberg, Arizona  
  (602) 388-2448

- Granite Seed  
  Salt Lake City, Utah  
  FAX (801) 768-4422

The approved seed mix shall include the following:

- Aristida purpurea—Purple Three-Awn 2.0 lbs/acre
- Aster tanacetifolius—Purple Aster 3.0 lbs/acre
- Baileya multiradiata—Desert Marigold 1.5 lbs/acre
- Dischlostemma pulchellum—Blue Dicks 5.0 lbs/acre
- Ericameria laricifolia—Turpentine Bush 1.0 lbs/acre
- Erigonum fasciculatum—Flat top buckwheat 1.0 lbs/acre
- Hyptis emoryi—Desert Lavender 4.0 lbs/acre
- Leptochloa dubia—Green Sprangletop 4.0 lbs/acre
- Lycium spp.—Wolfberry 3.0 lbs/acre
- Larrea tridentata—Creosote 2.0 lbs/acre
- Nolina microcarpa—Beargrass 3.0 lbs/acre
- Parthenium incanum—Mariola 2.0 lbs/acre
- Penstemon parryi—Penstemon 4.0 lbs/acre
- Sphaeralcea ambigu—Globemallow 3.0 lbs/acre
- Sporobolus cryptandrus—Sand Dropseed 2.0 lbs/acre
Acacia constricta
Whitethorn Acacia

Height = 10 feet
Spread = 15 feet

Fragrant yellow flowers in spring. Thorny. Quail eat seeds, bees use for honey.

Hydroriparian
Mesoriaparian
Xeroriparian (all)

Acacia greggii
Catclaw Acacia

Height = 10’
Spread = 15’

Yellow flowers in spring. Bees use for honey, quail eat seeds. Thorny, keep away from walks/patios.

Mesoriaparian
Xeroriparian (all)

Celtis reticulata
Canyon Hackberry

Height = 10’-30’
Spread = 10’-30’

Decidious. Red berries, provides good shelter and food for birds.

Mesoriparian
Xeroriparian

MSN=Photograph compliments of Mountain States Nursery
**Cercidium floridum**  
Blue Palo Verde  
*Height = 20’*  
*Spread = 25’*  
Smooth blueish green bark. Yellow flowers in spring. Birds and insects use for forage.

**Chilopsis linearis**  
Desert Willow  
*Height = 20’*  
*Spread = 15’*  
Decidious. Pink flowers throughout Summer. Persistent Seed pods.

**Fraxinus velutina**  
Arizona Ash  
*Height = to 30’*  
*Spread =20’*  

MSN=Photograph compliments of Mountain States Nursery
Juglans major
Arizona Walnut

Height = 30'-50'
Spread = 20'-30'

Deciduous. Edible fruits ripen in fall
Hydropirarian

Platanus wrightii
Arizona sycamore

Height = 50'-75'
Spread = 30'-60'

Deciduous. Peeling bark reveals white trunk. Inconspicuous flowers/seeds.
Hydropirarian

Olneya tesota
Ironwood

Height = 25'
Spread = 25'

Evergreen. Pink flowers in May-June. Edible seeds. Cold damage under 20°F. long lived, slow growing.
Xeropirarian

MSN=Photograph compliments of Mountain States Nursery
Populus fremontii

Fremont Cottonwood

Height = up to 100'
Spread = 30'-40'

Deciduous. Leaves yellow in fall. Cottony flowers in spring. Very high water requirements.

Hydoriparian

Prosopis velutina

Velvet Mesquite

Height =15'-20'
Spread =30'

Yellow flowers in spring—Produces 5" pods in summer. Pods eaten by wildlife. Seeds can be ground into flour for baking. Good source of protein.

Hydoriparian
Mesoriparian
Xeroriparian (all)

MSN=Photograph compliments of Mountain States Nursery
**Prospis pubescens**
Screwbean Mesquite

- Height = 15’
- Spread = 15’


**Sambucus mexicana**
Mexican Elderberry

- Height = 10’-15’
- Spread = 6’-12’

White flowers in spring/summer. Edible blue/black berries. Deciduous.

**Mesoriparian**

**Xeroriparian (all)**
Acacia constricta
Whitethorn Acacia

Height = to 10 feet
Spread = 15 feet

Fragrant yellow flowers in spring.
Thorny. Quail eat seeds, bees use for honey

Hydoriparian
Mesoriaparian
Xeroriparian (all)

Anisacanthus thurberi
Desert Honeysuckle

Height = 4’
Spread = 3’

Orange flowers in spring and summer.

Hydoriparian
Mesoriaparian
Xeroriparian (all)

Atriplex canescens
Fourwing Saltbush

Height = 5’
Spread = 8’

Evergreen.
Inconspicuous flowers. Yellowish fruits. Provides food and shelter for wildlife.

Xeroriparian
Atriplex lentiformis
Quail Bush

Height = 8'
Spread = 12'


Xeroriparian (all)

Calliandra eriophylla
Fairy Düster

Height = 3'
Spread = 4'


Xeroriparian

Celtis pallida
Desert Häckberry

Height = 8'
Spread = 10'

Greenish yellow flowers in spring. Orange berries in fall. Provides food and shelter for wildlife.

Mesoriparian
Xeroriparian

MSN=Photograph compliments of Mountain States Nursery
**Ericameria laricifolia**

Turpentine Bush

- Height = 2’
- Spread = 3’

Bright green leaves.— smell like turpentine when crushed.

Yellow flowers

*September-November.*

Xeroriparian

**Encilia farinosa**

Brittlebush

- Height = 3’
- Spread = 4’

Silvery foliage.

Evergreen. Yellow flowers

*March-May.*

Xeroriparian

**Dodonaea viscosa**

Hopbush

- Height = 10’
- Spread = 6’

Evergreen.

Papery winged fruit in summer. Quail and doves eat fruits.

Xeroriparian

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*MSN=Photograph compliments of Mountain States Nursery*
Eriogonum fasciculatum
Flat Top Buckwheat

Height = 1.5'
Spread = 2'

Xeroriparian

Larrea tridentata
Creosote Bush

Height = 6'
Spread = 8'

Airy, olive green foliage. Leaves smell like desert rain. Small yellow flowers year-round.
Xeroriparian

Nolina microcarpa
Beargrass

Height = 5'
Spread = 8'

Cluster of white flowers on 3' stalk in May-June.
Xeroriparian

MSN=Photograph compliments of Mountain States Nursery
Rhus ovata  
Sugar Bush  
**Height = 10’  
Spread = 10’**

Evergreen.  
Reddish buds open to pinkish/white flowers March-May. Small reddish fruits.

Mesoriparian  
Hydoriparian  

Simmondsia chinensis  
Jojoba  
**Height = 6’  
Spread = 10’**

Evergreen. Yellow/green flowers December-July. Large, edible seeds.

Xeroriparian  

Rhus trilobata  
Squaw Bush  
**Height = 6’  
Spread = 8’**


Mesoriparian  

Rhus ovata  
Sugar Bush  

**Height = 10’  
Spread = 10’**

Evergreen.  
Reddish buds open to pinkish/white flowers March-May. Small reddish fruits.

Hydoriparian  

Simmondsia chinensis  
Jojoba  

**Height = 6’  
Spread = 10’**

Evergreen. Yellow/green flowers December-July. Large, edible seeds.

Xeroriparian
Vauquelina californica
Arizona Rosewood

Height = 20’
Spread = 15’

Small white flowers in March.

Xeroriparian (all)

For more information on these, and other native plants, you may find the following resources helpful.

Native Plants for Southwestern Landscapes
Judy Milke, 1993, University of Texas Press

Landscape Plants for Dry Regions

A Field Guide to the Plants of Arizona

Pruning, Planting and Care: Johnson’s Guide to Gardening Plants for the Arid West.

Where can I find more information on plants?

MSN=Photograph compliments of Mountain States Nursery
The following is a list of some nurseries in the area that sell native plants you will need to implement your plan. This list is for information only and is in no way exhaustive. It is not required that you purchase your plants from these vendors.

Desert Survivors Plant Nursery  
(520) 791-9309  
1020 W. Starr Pass  
Tucson AZ 85713

Civano Nursery  
(520) 546-9200  
5301 S Houghton Road  
Tucson AZ 85747-9324

Harlow Gardens Nursery  
(520) 886-5475  
4520 E Pima  
Tucson AZ 85712-3462

Mesquite Valley Growers  
(520) 721-8600  
8005 E Speedway Blvd.  
Tucson AZ 85710-1628

Plants For The Southwest  
(520) 628-8773  
50 E Blacklidge Drive  
Tucson AZ 85705-4697

Mountain States Nursery  
1-800-840-8509  
10020 W. Glendale Ave.  
Glendale, AZ 85307 (wholesale)
appendix B
maintenance requirements
All mitigation plantings and related improvements shall be maintained for a period of five years following installation to ensure the establishment of a new riparian plant community.

During this initial establishment period, the irrigation of trees and shrubs will be of great importance. The monitoring, repair, and proper operation of the irrigation system will be an essential part of the maintenance program.

The intent of the mitigation plantings, however, is to establish vegetation that replicates the natural conditions within a riparian area. With this goal, regular pruning and shaping of trees is discouraged. Understory plants should also be allowed to grow to their natural form. Mowing and/or chemical control of understory plant growth should be avoided.

The following is an outline of a general irrigation schedule. Your irrigation system should be adjusted seasonally. Site specific conditions may require adjustments to this schedule.

- **November-March “cold season”**
  - trees once a month
  - shrubs once every 2 weeks
- **March– May “growing season”**
  - trees once every 2 weeks
  - shrubs once every week
- **May-September “hot season”**
  - trees once every five days
  - shrubs once every three days
- **September-November “growing season”**
  - trees once every 2 weeks
  - shrubs once every week
The following is an outline of the minimum requirements for mitigation planting maintenance. Site specific conditions may make additional maintenance necessary and appropriate for certain projects.

<table>
<thead>
<tr>
<th>What to do</th>
<th>How often</th>
</tr>
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<tbody>
<tr>
<td>Check Irrigation System Operation</td>
<td>At least once per month</td>
</tr>
<tr>
<td>Reprogram Irrigation System Controller(s)</td>
<td>4 times/Year (see general schedule )</td>
</tr>
<tr>
<td>Repair Damaged Irrigation System Components</td>
<td>As-needed</td>
</tr>
<tr>
<td>Check Plants/Replace Dead Trees &amp; Shrubs</td>
<td>4 times/Year</td>
</tr>
<tr>
<td>Remove Noxious Plant Species/Weeds</td>
<td>2 times/year</td>
</tr>
<tr>
<td>Reseed &amp; Stabilize Eroded Areas</td>
<td>As-needed</td>
</tr>
<tr>
<td>Check &amp; Repair Damaged Tree Stakes</td>
<td>Once a month for first growing season</td>
</tr>
</tbody>
</table>
glossary of terms
### Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval</td>
<td>Written notice by the county approving mitigation plans.</td>
</tr>
<tr>
<td>Approved plan</td>
<td>The most current plan which bears the authorized signature of approval of the county.</td>
</tr>
<tr>
<td>Disturbed</td>
<td>The condition of existing habitat after it has been damaged, demolished or eliminated.</td>
</tr>
<tr>
<td>Development</td>
<td>Any permitted or nonpermitted human alteration to land and its vegetation, soil, geology, drainage, hydrology and surface features; changing the appearance and character of land; and including but not limited to the acts of grubbing, clearing, and grading of land, and placing improvements on the land such as buildings, structures, signs, paving, vegetation, and outdoor use areas.</td>
</tr>
<tr>
<td>Ephemeral</td>
<td>Streams that flow only during and immediately after rain.</td>
</tr>
<tr>
<td>Erosion</td>
<td>The wearing away of the ground surface as a result of the movement of wind, water or ice.</td>
</tr>
<tr>
<td>Floodplain</td>
<td>Relatively flat valley floor adjacent to the stream channel which is formed by floods.</td>
</tr>
<tr>
<td>Grade</td>
<td>The vertical location of the ground surface.</td>
</tr>
<tr>
<td>Grading</td>
<td>The clearing, brushing, grubbing, excavating, or filling of a site</td>
</tr>
<tr>
<td>Hydroriparian Habitat</td>
<td>Riparian plant communities generally associated with perennial watercourses where plant species such as cottonwood and willow are present.</td>
</tr>
<tr>
<td>Hydroseed/hydromuch</td>
<td>A mixture of seed, mulch and soil ameliorants sprayed by machine onto large or otherwise inaccessible areas.</td>
</tr>
<tr>
<td>Intermittent</td>
<td>Streams which flow for only certain times of the year when they receive water from springs or runoff.</td>
</tr>
<tr>
<td>Mesoriparian Habitat</td>
<td>Riparian habitats generally associated with perennial or intermittent watercourses or shallow ground water. Plant communities may be dominated by species that are also found in drier habitats.</td>
</tr>
<tr>
<td><strong>Mitigation:</strong></td>
<td>The replacement and/or restoration of a damaged or disturbed site feature or a high resource value element on-site to a condition that replicates the natural undisturbed condition that historically existed on-site or in the neighborhood. (See also Restoration).</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Native Plant:</strong></td>
<td>Growing in the Arizona portion of the Sonoran Desert, without cultivation, and not introduced after 1920. A plant that occurs within the range of Sonoran Desert plants, but only in Mexico, is not native.</td>
</tr>
<tr>
<td><strong>Perennial:</strong></td>
<td>Streams that essentially flow continuously year-round.</td>
</tr>
<tr>
<td><strong>Regulated riparian habitat areas:</strong></td>
<td>Also referred to as “riparian habitat” shall mean riparian habitat areas identified on the county’s riparian habitat maps as established by Article X of the “Pima County Floodplain and Erosion Hazard Management Ordinance.”</td>
</tr>
<tr>
<td><strong>Restoration:</strong></td>
<td>The process of repairing a previously disturbed, damaged, or graded site area or site feature and replicating its previously undisturbed, undamaged, or ungraded condition of vegetation, plant communities, geologic structures, grade, drainages, and riparian habitat that historically existed on site or in the neighborhood.</td>
</tr>
<tr>
<td><strong>Riparian habitat:</strong></td>
<td>Plant communities occurring in association with any spring, cienega, lake, watercourse, river, stream, creek, wash, arroyo, or other body of water, either surface or subsurface, or channel having banks and bed through which waters flow at least periodically.</td>
</tr>
<tr>
<td><strong>Site:</strong></td>
<td>A single lot or a combination of contiguous lots (or parcels), or a leased area on a lot that meets the minimum zoning standards of the applicable zone.</td>
</tr>
<tr>
<td><strong>Subdivision:</strong></td>
<td>Improved or unimproved land or lands divided or proposed to be divided for the purpose of sale, lease, or for cemetery purposes, whether immediate or future, into six or more lots, parcels or fractional interests.</td>
</tr>
<tr>
<td><strong>Watercourse:</strong></td>
<td>Any lake, river, stream, creek, wash, arroyo or other body of water or channel having banks and bed through which waters flow at least periodically.</td>
</tr>
<tr>
<td><strong>Xeroriparian Habitat:</strong></td>
<td>Riparian habitat generally associated with an ephemeral water supply. These communities typically contain plant species also found in upland habitats, however, these plants are typically larger and/or occur at higher densities than adjacent uplands.</td>
</tr>
</tbody>
</table>