ESTES VALLEY WATERSHED COALITION

UPPER BIG THOMPSON WPG ENVIRO & REC

FINAL REPORT

PREPARED FOR: COLORADO WATER CONSERVATION BOARD, WPG PROGRAM
ATTN: ANDREA HARBIN-MONAHAN

OCTOBER 5, 2022
GRANT AMOUNT: $19,205

PREPARED BY

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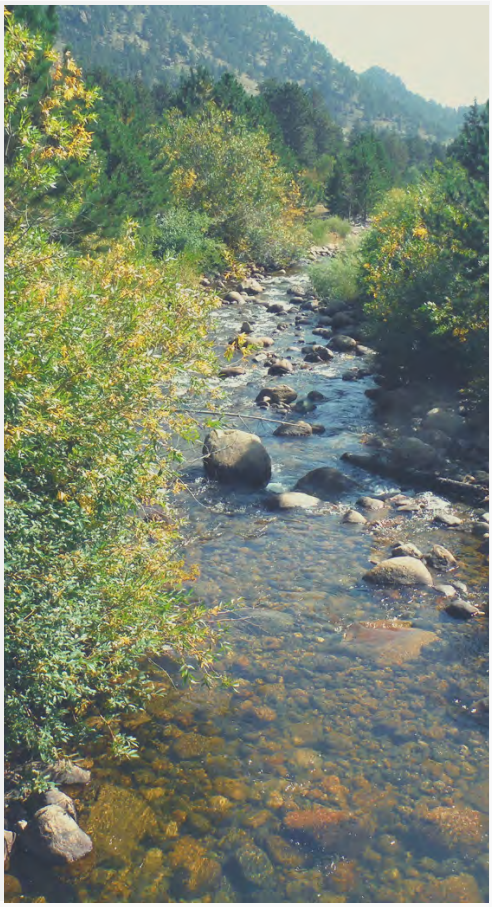
PROJECT DESCRIPTION

The Estes Valley Watershed Coalition partnered with 10 private properties to utilize native vegetation to provide biostabilization and resiliency and continued support for watershed health along the Upper Big Thompson River in the Estes Valley. After a review of the Upper Big Thompson Master Plan (2017), EVWC hired a landscape restoration consultant with expertise in native riparian vegetation to review current field conditions and modify the 30% design as appropriate. Following the review, EVWC was able to select the most critical areas in the five identified projects that could be accomplished with available funding.

This project adds to the restoration efforts that were completed following the damage from the 2013 flood and supports improved water quality and overall watershed health. EVWC also used this project as an opportunity to build on its adaptive management and community stewardship efforts. EVWC was also able to use the project to reach out to the community and provide information on how individual partners can help support the watershed, too.

PROJECT GOALS & OBJECTIVES

- Utilize the Master Plan that was generated following the 2013 flood to continue to support restoration and recovery efforts
- Support streambank stabilization along the river using native plants
- Provide an opportunity for community and property-owner involvement
- Produce outreach materials that help the community support river and watershed health
- Strengthen EVWC community and agency partnerships
- Engage with volunteer groups to provide materials and labor to support the project

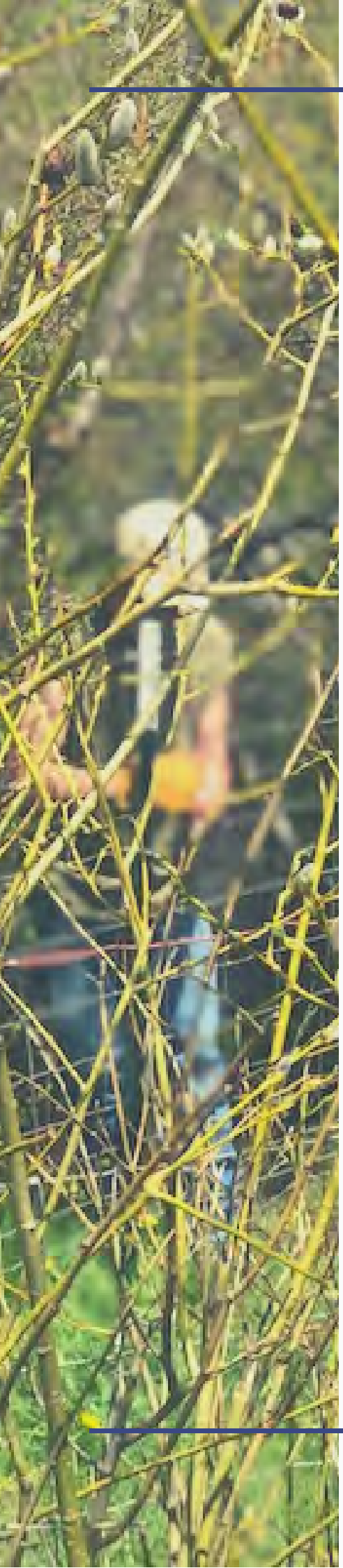


METHODS

Initially, the EVWC board reviewed the Upper Big Thompson Master Plan for projects that were not funded during the flood recovery. The Master Plan listed 3200 feet of riverbank that would benefit from planting for bank stabilization and improved river health.

EVWC contracted with Ramboll, Inc to review the entire area where re-vegetation for bank stabilization had been recommended. EVWC and Ramboll employees visited all of the sites, took reference photos, and updated the recommendations. EVWC reached out to the private landowners in the project area to determine participations and found 10 property owners along the river who wanted to partner with us on the project. Ramboll employees worked with EVWC and property owners to determine which plants would be best for the locations. EVWC and Ramboll also put together a river bank planting guide for the Estes Valley that has been shared with the project property owners, the Town, and other groups. EVWC coordinated volunteers for a four day planting event that resulted in both willow stakes and native container stock plants installed at the sites.

In order to ensure we met the 20% success rate, EVWC shared a watering protocol for property owners to follow for the first few months. The coalition also monitored the plant health by following a protocol developed by Ramboll ecologist, Sara Copp-Franz. The monitoring included photo points of the planting locations along with criteria to assess survivorship, vigor, adequate watering, human impacts, and insect/wildlife damage. The coalition also included observation notes about the vegetation planted on each property.



PROJECT TIMELINE

SEPTEMBER- DECEMBER 2020

Completed walk through of original riverbank suggestions and updated the project design.

JANUARY- MARCH 2021

Sourced plants and willow stakes for project. Designed a rivers-and-streams planting guide with plant suggestions for riparian zones.

MAY 2021

Harvested & planted willow stakes and shared planting guide.

JUNE 2021

Coordinated, installed and fenced container stock along river bank.

AUGUST 2021

Monitored sites and met with landowners to discuss any concerns. Plant survival is great!

MAY-SEPTEMBER 2022

Continued monitoring of sites with some replanting along one site.

CONCLUSIONS

This project was a great community-supported effort that will help not only provide more bank stability along the Upper Big Thompson River, and will also improve water quality and wildlife habitat in the area. The Upper Big Thompson Biostabilization project utilizes native vegetation to provide biostabilization and resiliency in order to promote watershed health along the Upper Big Thompson River in the Estes Valley. This was accomplished by planting locally-harvested native hardwood stakes and native nursery stock to provide both bank stabilization and wildlife habitat. Replanting was needed at one site, but this was due to the plants not being overwintered correctly at the nursery before install.

258 WILLOW STAKES
(HARVESTED & PLANTED)

250 NATIVE CONTAINER
PLANTS INSTALLED

43 VOLUNTEERS
240+ HOURS DONATED

74% AVERAGE SURVIVAL
RATE

LESSONS LEARNED & PROJECT ADDITIONS

Lessons Learned

Overall we are pleased with how the project turned out, but we will consider the following on future projects:

- Organize planting days after June 1 to help minimize weather impacts.
- Verify all plants were overwintered properly to support survival after planting.
- Work with property owners to ensure that everyone is able to remove noxious weeds from inside plant enclosures. Potentially add a task item to the grant to include weed abatement.

Project Additions

With approval, we reallocated funds to:

- Expanded outreach and education efforts by designing a Riparian Planting Guide for Estes (see Appendix section A).
- Ordered additional willow planting tools to help install willow stakes (see Appendix section B).
- Replanted one site that lost most of their plantings due to a nursery error.

BUDGET

Project Name: Upper Big Thompson Biostabilization

Billing/Timeline: August 2020-September 2022

TASK	TOTAL BUDGET	CWCB BILLED	EVWC MATCH FUNDS	IN KIND*	DESCRIPTION
1	$11,360.00	$5,330.00	$4,145.11	$700.00	Consultant selection, project review, field investigation, updated project design, landowner outreach *in kind rate=$28.54
2	$23,850.00	$10,255.48	$1,130.11	$8,700.00	Planting plan by property, outreach brochure and guide, plant acquisition, plant installation, irrigation by property owners *in kind rate=$28.54
3	$3,740.00	$1,040.00	$2,700.00		Project monitoring, semi-annual inspections, reporting, replace willow stake planters, replace plants at one site
TOTALS	$38,950.00	$16,625.48	$7,975.22	$9,400.00	Due to overall site health and an unusally wet year in 2021, EVWC did not need to use all of the funds allocated for the project. Funds remaining: CWCB $2,579.52 and EVWC $2,369.78

Budget Narrative

The original grant budget included a line item for native grass seed but after evaluating the project site, we determined this was not needed. In addition, the beginning of summer 2021 was exceptionally wet in Estes, so no additional irrigation equipment was needed.

EVWC was able to reallocated funds to support other tasks that benefitted the community and stayed true to the origins of the project.

Thanks to the natural environment working with us in 2021, EVWC did not need to use $2,579.52 of the CWCB funds or $2,369.78 of the EVWC match funds.

THANK YOU

WE WANT TO THANK THE CWCB AND NORTHERN COLORADO WATER CONSERVANCY DISTRICT FOR THE FUNDING SUPPORT!

AND ALSO TO OUR MANY COMMUNITY VOLUNTEERS AND THE PROPERTY OWNERS FOR HELPING US GET THE PROJECT FINISHED ON THE GROUND!

APPENDIX

A. UPDATED DESIGN BUILD PLAN

These were the plants that were recommended to provide the best stabilization and habitat for the project area. Ramboll and EVWC coordinated with the landowners to make sure we were able to install plants that appealed to the property owner and that the owner felt they could adequately care for in the long term.

We did have three landowners opt out of the project after the updated designs were discussed. These are noted on the following pages.

APPENDIX

NUMBER OF PLANTS LISTED BY PROPERTY

Property	Drop Point	*Scientific Name*	Common Name	Container	Plant Number
Project 4- Property 1 (Fun City)	Fun City	*Ribes aureum*	golden current	D40	7
Project 4- Property 1 (Fun City)	Fun City	*Dasiphora fruticosa*	shrubby cinquefoil	D40	11
Project 4- Property 2 (Freedman)	Fun City	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	2
Project 4- Property 2 (Freedman)	Fun City	*Ribes aureum*	golden current	D40	5
Project 4- Property 2 (Freedman)	Fun City	*Salix monticola*	Rocky Mountain willow	48-inch cutting	23
Project 4- Property 2 (Freedman)	Fun City	*Salix monticola*	Rocky Mountain willow	D40	6
Project 4- Property 2 (Freedman)	Fun City	*Betula occidentalis*	western river birch	#1	11
Project 4- Property 2 (Freedman)	Fun City	*Carex utriculata*	beaked sedge	10 ci	12
Project 4- Property 2 (Freedman)	Fun City	*Carex aquatilis*	water sedge	10 ci	6
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Salix geyeriana*	Geyer's willow	48-inch cutting	13
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Ribes aureum*	golden current	D40	5
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Salix monticola*	Rocky Mountain willow	48-inch cutting	13
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Betula occidentalis*	western river birch	#1	5
Project 4- Property 5 &6 (SPEEDLIN)	Fun City	*Carex aquatilis*	water sedge	10 ci	6
Project 4- Property 7 (Kingswood)	Fun City	*Salix geyeriana*	Geyer's willow	48-inch cutting	8
Project 4- Property 7 (Kingswood)	Fun City	*Populus angustifolia*	narrowleaf cottonwood	D40	5
Project 4- Property 7 (Kingswood)	Fun City	*Salix monticola*	Rocky Mountain willow	48-inch cutting	12
Project 4- Property 7 (Kingswood)	Fun City	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 6- Properties 2,3,4 (Tanton)	Fun City	*Salix bebbiana*	Bebb's willow	D40	5
Project 6- Properties 2,3,4 (Tanton)	Fun City	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 6- Properties 2,3,4 (Tanton)	Fun City	*Ribes aureum*	golden current	D40	7
Project 6- Properties 2,3,4 (Tanton)	Fun City	*Salix monticola*	Rocky Mountain willow	48-inch cutting	26
Project 6- Properties 2,3,4 (Tanton)	Fun City	*Dasiphora fruticosa*	shrubby cinquefoil	D40	2
Project 7- World Mark	Trout Haven	*Carex utriculata*	beaked sedge	10 ci	19
Project 7- World Mark	Trout Haven	*Salix geyeriana*	Geyer's willow	48-inch cutting	15
Project 7- World Mark	Trout Haven	*Salix monticola*	Rocky Mountain willow	48-inch cutting	15
Project 7- World Mark	Trout Haven	*Dasiphora fruticosa*	shrubby cinquefoil	D40	4
Project 7- World Mark	Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 7- World Mark	Trout Haven	*Carex aquatilis*	water sedge	10 ci	19
Project 7- World Mark	Trout Haven	*Betula occidentalis*	western river birch	#1	5
Project 9- Spruce Lake RV	Trout Haven	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 9- Spruce Lake RV	Trout Haven	*Ribes aureum*	golden current	D40	5
Project 9- Spruce Lake RV	Trout Haven	*Populus angustifolia*	narrowleaf cottonwood	D40	6
Project 9- Spruce Lake RV	Trout Haven	*Salix monticola*	Rocky Mountain willow	48-inch cutting	35
Project 9- Spruce Lake RV	Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 9- Spruce Lake RV	Trout Haven	*Betula occidentalis*	western river birch	#1	6
Project 9- Tiny Town	Trout Haven	*Salix bebbiana*	Bebb's willow	D40	8
Project 9- Tiny Town	Trout Haven	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 9- Tiny Town	Trout Haven	*Ribes aureum*	golden current	D40	5
Project 9- Tiny Town	Trout Haven	*Populus angustifolia*	narrowleaf cottonwood	D40	3
Project 9- Tiny Town	Trout Haven	*Salix monticola*	Rocky Mountain willow	48-inch cutting	18
Project 9- Tiny Town	Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	12
Project 9- Tiny Town	Trout Haven	*Betula occidentalis*	western river birch	#1	9
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Salix geyeriana*	Geyer's willow	48-inch cutting	11
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Ribes aureum*	golden current	D40	2
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Populus angustifolia*	narrowleaf cottonwood	D40	2
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Salix monticola*	Rocky Mountain willow	48-inch cutting	15
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Salix bebbiana*	Bebb's willow	D40	3
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	8
Project 9- Trout Pond/ Trout Haven	Trout Haven	*Betula occidentalis*	western river birch	#1	6
RIVERROCK TOWNHOMES INC	Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	7
RIVERROCK TOWNHOMES INC	Trout Haven	*Betula occidentalis*	western river birch	#1	8

APPENDIX

FUN CITY PLANTING RECOMMENDATIONS

Project 4- Property 1 (Fun City)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Shrubs					
Dasiphora fruticosa	shrubby cinquefoil	50	D40 or 1-gallon	6-foot Spacing	7
Ribes aureum	golden current	50	D40	6-foot Spacing	7
					14

Dasiphora fruticosa (shrubby cinquefoil)

Ribes aureum (golden currant)

Wildlife Protection Fence

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APPENDIX

BSF SOARING EAGLES AND MICHENER RECOMMENDATIONS

Project 4- Property 2 (BSF SOARING EAGLES LLC)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Betula occidentalis	western river birch	20	D40	5-foot spacing	5
Populus angustifolia	narrowleaf cottonwood	20	D40	5-foot spacing	5
Salix monticola	Rocky Mountain willow	25	D40	5-foot spacing	6
Salix monticola	Rocky Mountain willow	35	48-inch cutting	3-foot spacing	23
					39

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

Salix monticola (Rocky Mountain willow)

Wildlife Protection Fence

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Project 4- Property 4 (MICHENER)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	6-foot spacing	3
Dasiphora fruticosa	shrubby cinquefoil	30	D40	5-foot spacing	6
Salix geyeriana	Geyer's willow	10	48-inch cutting	3-foot spacing	6
Salix monticola	Rocky Mountain willow	20	48-inch cutting	3-foot spacing	11
Graminoids					
Carex aquatilis	water sedge	10	10 ci	2-foot spacing	12
Carex utriculata	beaked sedge	10	10 ci	2-foot spacing	12
					50

Alnus incana ssp tenuifolia (thinleaf alder)

Dasiphora fruticosa (shrubby cinquefoil)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

Carex aquatilis (water sedge)

Carex utriculata (beaked sedge)

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Wildlife Protection Fence

This landowner opted out after designs were discussed.

APPENDIX

SPEEDLIN AND KINGSWOOD RECOMMENDATIONS

Alnus incana ssp tenuifolia (thinleaf alder)

Project 4- Property 5 and 6 (SPEEDLIN)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	5 foot spacing	5
Betula occidentalis	western river birch	20	D40	5 foot spacing	5
Ribes aureum	golden current	20	D40	5 foot spacing	5
Salix geyeriana	Geyer's willow	20	48-inch cutting	3-foot spacing	13
Salix monticola	Rocky Mountain willow	20	48-inch cutting	3-foot spacing	13
					41

Betula occidentalis (western river birch)

Ribes aureum (golden currant)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

Wildlife Protection Fence

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Alnus incana ssp tenuifolia (thinleaf alder)

Project 4- Property 7 (KINGSWOOD)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	6 foot spacing	3
Populus angustifolia	narrowleaf cottonwood	30	D40	6 foot spacing	5
Salix geyeriana	Geyer's willow	20	48-inch cutting	3ft spacing	8
Salix monticola	Rocky Mountain willow	30	48-inch cutting	3ft spacing	12
					28

Populus angustifolia (narrowleaf cottonwood)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

Wildlife Protection Fence

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APPENDIX

NAHRING AND TANTON TRUST RECOMMENDATIONS

Alnus incana ssp tenuifolia (thinleaf alder)

Project 6- Property 1 (NAHRING)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	6-foot spacing	2
Betula occidentalis	western river birch	20	D40	6-foot spacing	2
Salix bebbiana	Bebb's willow	25	D40	6-foot spacing	3
Salix drummondiana	Drummond's willow	5	48-inch cutting	2-foot spacing	5
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	9
Salix monticola	Rocky Mountain willow	20	48-inch cutting	2-foot spacing	18
					39

Betula occidentalis (western river birch)

Salix bebbiana (Bebb's willow)

Salix drummondiana (Drummond's willow)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

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This landowner opted out after designs were discussed.

Alnus incana ssp tenuifolia (thinleaf alder)

Project 6- Property 2, 3, 4 (TANTON TRUST)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	15	#1	5-foot spacing	5
Betula occidentalis	western river birch	20	D40	5-foot spacing	6
Ribes aureum	golden current	25	D40	5-foot spacing	7
Salix bebbiana	Bebb's willow	15	D40	5-foot spacing	5
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	18
Salix monticola	Rocky Mountain willow	15	48-inch cutting	2-foot spacing	26
					67

Betula occidentalis (western river birch)

Salix bebbiana (Bebb's willow)

Ribes aureum (golden currant)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

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APPENDIX

WORLDMARK RECOMMENDATIONS

Alnus incana ssp tenuifolia (thinleaf alder)

Project 7- (WORLDMARK)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	5-foot spacing	5
Betula occidentalis	western river birch	20	D40	5-foot spacing	5
Dasiphora fruticosa	shrubby cinquefoil	15	D40	5-foot spacing	4
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	15
Salix monticola	Rocky Mountain willow	10	48-inch cutting	2-foot spacing	15
Graminoids					
Carex aquatilis	water sedge	12.5	10 ci	2-foot spacing	19
Carex utriculata	beaked sedge	12.5	10 ci	2-foot spacing	19
					82

Betula occidentalis (western river birch)

Dasiphora fruticosa (shrubby cinquefoil)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

Carex utriculata (beaked sedge)

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Carex aquatilis (water sedge)

APPENDIX
TROUT HAVEN RECOMMENDATIONS

Alnus incana ssp tenuifolia (thinleaf alder)

Project 9- (TROUT HAVEN)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	5-foot spacing	3
Betula occidentalis	western river birch	20	D40	5-foot spacing	3
Populus angustifolia	narrowleaf cottonwood	10	D40	5-foot spacing	2
Ribes aureum	golden current	15	D40	5-foot spacing	2
Salix geyeriana	Geyer's willow	15	48-inch cutting	2-foot spacing	11
Salix monticola	Rocky Mountain willow	20	48-inch cutting	2-foot spacing	15
					36

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

Ribes aureum (golden currant)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

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Wildlife Protection Fence

APPENDIX

TINY TOWN AND SPRUCE LAKE RV RECOMMENDATIONS

Alnus incana ssp tenuifolia (thinleaf alder)

Project 9- (TINY TOWN)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	5-foot spacing	6
Betula occidentalis	western river birch	20	D40	5-foot spacing	6
Populus angustifolia	narrowleaf cottonwood	10	D40	5-foot spacing	3
Ribes aureum	golden current	15	D40	5-foot spacing	5
Salix bebbiana	Bebb's willow	15	D40	5-foot spacing	5
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	18
Salix monticola	Rocky Mountain willow	10	48-inch cutting	2-foot spacing	18
					61

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

Ribes aureum (golden currant)

Salix bebbiana (Bebb's willow)

Salix geyeriana (Geyer's willow)

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Salix monticola (Rocky Mountain willow)

Alnus incana ssp tenuifolia (thinleaf alder)

Project 9- (SPRUCE LAKE RV LLC)					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	15	#1	5-foot spacing	5
Betula occidentalis	western river birch	20	D40	5-foot spacing	6
Populus angustifolia	narrowleaf cottonwood	20	D40	5-foot spacing	6
Ribes aureum	golden current	15	D40	5-foot spacing	5
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	18
Salix monticola	Rocky Mountain willow	20	48-inch cutting	2-foot spacing	35
					75

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

Ribes aureum (golden currant)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

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Wildlife Protection Fence

APPENDIX

RIVERROCK TOWNHOMES AND RIVER BEND CONDOS RECOMMENDATIONS

RIVERROCK TOWNHOMES INC					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	33	#1	6-foot spacing	5
Betula occidentalis	western river birch	34	D40	6-foot spacing	5
Populus angustifolia	narrowleaf cottonwood	33	D40	6-foot spacing	5
					15

Alnus incana ssp tenuifolia (thinleaf alder)

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

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Alnus incana ssp tenuifolia (thinleaf alder)

RIVER BEND CONDOS					
Scientific Name	Common Name	% of Mix	Container Size	Spacing	Plant Number
Trees and Shrubs					
Alnus incana ssp. tenuifolia	thinleaf alder	20	#1	5-foot spacing	3
Betula occidentalis	western river birch	20	D40	5-foot spacing	3
Populus angustifolia	narrowleaf cottonwood	20	D40	5-foot spacing	3
Salix bebbiana	Bebb's willow	20	D40	5-foot spacing	3
Salix geyeriana	Geyer's willow	10	48-inch cutting	2-foot spacing	9
Salix monticola	Rocky Mountain willow	10	48-inch cutting	2-foot spacing	9
					30

Betula occidentalis (western river birch)

Populus angustifolia (narrowleaf cottonwood)

Salix bebbiana (Bebb's willow)

Salix geyeriana (Geyer's willow)

Salix monticola (Rocky Mountain willow)

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Wildlife Protection Fence

These landowners opted out after designs were discussed.

APPENDIX

B. PLANTING GUIDE INSERT & BROCHURE

RIPARIAN PLANTING ZONES

What should you plant along rivers and streams in the Estes Valley?

PUT TOGETHER YOUR OWN PLANTING PLAN WITH THESE TIPS

ZONE 1 - CHANNEL EDGE, WETLAND PLANT COMMUNITY

Plant sedges, rushes, and wetland grasses. Native plants include: water sedge, meadow sedge, Baltic rush, swordleaf rush, fowl bluegrass, bluejoint grass, American mannagrass, and creeping spikerush.

ZONE 2 -LOWER RIPARIAN, MIXED SHRUB PLANT COMMUNITY

Plant shrubs, sedges, rushes, and select wetland grasses. Native plants include: include thinleaf alder, Western river birch, redosier dogwood, and willows: Bebb's, bluestem, whiplash, Rocky Mountain, Drummond's, and Geyer's.

ZONE 3 - TRANSITIONAL AREA. UPPER RIPARIAN PLANT COMMUNITY.

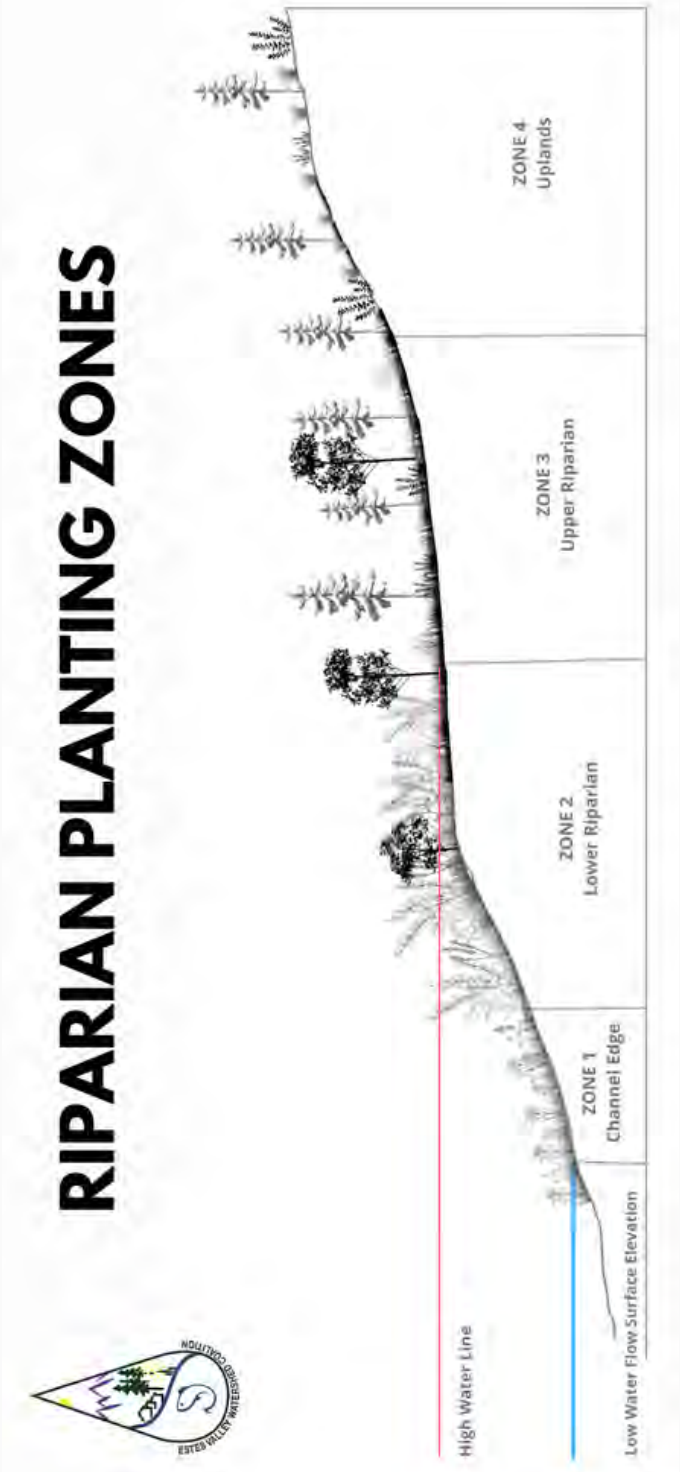
Ponderosa pine, narrowleaf cottonwood, chokecherry, snowberry, wood's rose, Rocky Mountain maple, golden currant, western wheatgrass, Indian ricegrass, green needlegrass, Idaho fescue, bluebunch wheatgrass, junegrass, and little bluestem.

ZONE 4 - UPLAND PLANT COMMUNITY.

Ponderosa Pine, Rabbitbrush, common juniper, wax currant, golden currant, Oregon grape, Rocky Mountain juniper, Boulder raspberry, indian ricegrass, big bluestem, sideoats gramma, Idaho fescue,Canada wild rye, western wheatgrass, junegrass, and little bluestem.

Riparian areas supply food, cover, and water for many animals and serve as migration routes and stopping points between habitats for a variety of wildlife. Trees and grasses also help stabilize streambanks and slow down floodwater.

www.evwatershed.org



APPENDIX

Colorado Resources for Landowners:

Resilient Crossings

Stream Stewardship and Recovery Handbook

For more information and links please visit: www.EVWatershed.org/resources

Estes Valley Watershed Coalition
970-290-1829
PO Box 4494
Estes Park, Colorado, 80517-4494
www.evwatershed.org
Visit us on Facebook and Instragram.

Rev 5 (2018-06-15)

ESTES VALLEY WATERSHED COALITION

Rivers and Streams Planting Guide for the Estes Valley

Healthy Riparian Habitat

The riparian zone is strip of land that borders rivers and other bodies of surface water.

Benefits of a Healthy Riparian Habitat:

- Reduces force, height, and volume of floodwaters by allowing water to spread horizontally along the floodway and across the floodplain.
- Creates habitat for aquatic and terrestrial organisms and wildlife.
- Provides a corridor of excellent habitat for plants and wildlife.
- Reduces streambank erosion and stabilizes the bank during high water events.
- Reduces water temperatures which are important to maintain fish habitat.
- Improves water quality by trapping runoff of excess sediment and nutrients.
- Provides recreational and aesthetic value

How to Encourage Healthy Riparian Habitat

- Plant native vegetation including trees, shrubs, grasses, and wildflowers to stabilize the river bank and provide aesthetic value.
- Control invasive species.
- Create no-mow zones and naturalized riparian buffer starting 6-10 feet from the river bank to allow for native plants to seed and reestablish within the riparian zone.
- Remove the non-natural piles of needles or leaves from the river's edge to allow for natural regeneration.
- Keep "good wood", wood that doesn't pose flood risk but provides variety of benefits, such as floodplain roughness, wildlife or fish habitat, bank stabilization, and also supports water movement.
- Use market posts, boulders, signs, and fences to direct people and traffic away to reduce vegetation trampling.

Invasive Weed Management

Invasive weeds are non-native plants that displace native vegetation and can be detrimental to the land use of a property. These plants can cause problems not only for people and pets but also for wildlife and our landscape.

Weeds can be controlled using a wide range of techniques including combination of mechanical, chemical, biological, and preventive weed control methods.

For more information on how to identify and control weeds:

- Visit the Colorado State Department of Agriculture online at: https://ag.colorado.gov/conservation/noxious-weeds
- Stop by our office or check online at https://estespark.colorado.gov/weeds for more information and a digital guide to **"Ob-Noxious Weeds of the Estes Valley."**
- Estes Land Stewards Association also hosts free weed drop offs for all residents to get rid of bagged, invasive weeds.

APPENDIX

B. MONITORING PLAN

ESTES VALLEY WATERSHED COALITION

OBSERVATION REPORT

Project: Investigator

River: Number of Site Photos:

Date: Weather:

Reaches Visited	Survival % per reach
Project 4- Fun City	
Project 4- Freedman	
Project 4- Speedlin	
Project 4- Kingswood	
Project 6- Tanton	
Project 7- World Mark	
Project 9- Spruce Lake RV	
Project 9- Tiny Town	
Project 9- Trout Haven	
Riverrock Townhomes	
Average Survival	

CWCB Success Criteria: A 20% success rate on our plantings by Spring 2022.

General Observational Notes:

Watering:

Watering Condition Scale	Characteristics
1	No additional watering required. >80% have normal foliage with no signs of wilting or dry, dead leaf tips. Soil appears moist to touch on 80% of plants.
2	Some additional watering required. Between >20% normal foliage with some signs of wilting or dry, dead leaf tips. Soil around roots appears and feels moist to the touch on <80% of the plants.
3	Additional watering required. <20% normal foliage with signs of wilting or dry, dead leaf tips. Soil around roots appears and feels moist to the touch on <20% of the plants. Any slow growth and dieback.

Human Impacts:

Human Impact Scale	Characteristics
1	No additional protection required. > 80% have normal foliage and stems. <20% of the plants have impacts such as broken branches or trampling.
2	Some additional protection may be required. >20% of plants have normal foliage and stems. <80% of plants have impacts such as broken branches or trampling.
3	Additional plant protection required. <20% have normal foliage and stems. >80% of plants have impacts such as broken branches or trampling.

Wildlife and Insect Damage:

Signs of Wildlife/ Insect Damage	Characteristics
Yes	• Bark shows signs of scrape marks/rubbing • Bark appears eaten/peeled off • Branch tips/buds/leaves appear eaten • Signs of leaf damage • Presence of sticky sap or honeydew. • Signs of insect boring/exit holes in branches • Holes in leaves
No	• No signs of characteristics outlined above.

Wildlife Fencing Condition:

Fencing Condition	Characteristics
0	No damage
1	Minor damage
2	Requires minor repair
3	Requires major repair/replacement

APPENDIX

Table 3: Full landowner plant list by property.

Property	*Scientific Name*	Common Name	Container	Plant Number
Project 4- Property 1 (Fun City)	*Ribes aureum*	golden current	D40	7
Project 4- Property 1 (Fun City)	*Dasiphora fruticosa*	shrubby cinquefoil	D40	11
Project 4- Property 2 (Freedman)	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	2
Project 4- Property 2 (Freedman)	*Ribes aureum*	golden current	D40	5
Project 4- Property 2 (Freedman)	*Salix monticola*	Rocky Mountain willow	48-inch cutting	23
Project 4- Property 2 (Freedman)	*Salix monticola*	Rocky Mountain willow	D40	6
Project 4- Property 2 (Freedman)	*Betula occidentalis*	western river birch	#1	11
Project 4- Property 2 (Freedman)	*Carex utriculata*	beaked sedge	10 ci	12
Project 4- Property 2 (Freedman)	*Carex aquatilis*	water sedge	10 ci	6
Project 4- Property 5 &6 (SPEEDLIN)	*Salix geyeriana*	Geyer's willow	48-inch cutting	13
Project 4- Property 5 &6 (SPEEDLIN)	*Ribes aureum*	golden current	D40	5
Project 4- Property 5 &6 (SPEEDLIN)	*Salix monticola*	Rocky Mountain willow	48-inch cutting	13
Project 4- Property 5 &6 (SPEEDLIN)	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 4- Property 5 &6 (SPEEDLIN)	*Betula occidentalis*	western river birch	#1	5
Project 4- Property 5 &6 (SPEEDLIN)	*Carex aquatilis*	water sedge	10 ci	6
Project 4- Property 7 (Kingswood)	*Salix geyeriana*	Geyer's willow	48-inch cutting	8
Project 4- Property 7 (Kingswood)	*Populus angustifolia*	narrowleaf cottonwood	D40	5
Project 4- Property 7 (Kingswood)	*Salix monticola*	Rocky Mountain willow	48-inch cutting	12
Project 4- Property 7 (Kingswood)	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 6- Properties 2,3,4 (Tanton)	*Salix bebbiana*	Bebb's willow	D40	5
Project 6- Properties 2,3,4 (Tanton)	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 6- Properties 2,3,4 (Tanton)	*Ribes aureum*	golden current	D40	7
Project 6- Properties 2,3,4 (Tanton)	*Salix monticola*	Rocky Mountain willow	48-inch cutting	26
Project 6- Properties 2,3,4 (Tanton)	*Dasiphora fruticosa*	shrubby cinquefoil	D40	2
Project 7- World Mark	*Carex utriculata*	beaked sedge	10 ci	19
Project 7- World Mark	*Salix geyeriana*	Geyer's willow	48-inch cutting	15
Project 7- World Mark	*Salix monticola*	Rocky Mountain willow	48-inch cutting	15
Project 7- World Mark	*Dasiphora fruticosa*	shrubby cinquefoil	D40	4
Project 7- World Mark	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 7- World Mark	*Carex aquatilis*	water sedge	10 ci	19
Project 7- World Mark	*Betula occidentalis*	western river birch	#1	5
Project 9- Spruce Lake RV	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 9- Spruce Lake RV	*Ribes aureum*	golden current	D40	5
Project 9- Spruce Lake RV	*Populus angustifolia*	narrowleaf cottonwood	D40	6
Project 9- Spruce Lake RV	*Salix monticola*	Rocky Mountain willow	48-inch cutting	35
Project 9- Spruce Lake RV	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	5
Project 9- Spruce Lake RV	*Betula occidentalis*	western river birch	#1	6
Project 9- Tiny Town	*Salix bebbiana*	Bebb's willow	D40	8
Project 9- Tiny Town	*Salix geyeriana*	Geyer's willow	48-inch cutting	18
Project 9- Tiny Town	*Ribes aureum*	golden current	D40	5
Project 9- Tiny Town	*Populus angustifolia*	narrowleaf cottonwood	D40	3
Project 9- Tiny Town	*Salix monticola*	Rocky Mountain willow	48-inch cutting	18
Project 9- Tiny Town	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	12
Project 9- Tiny Town	*Betula occidentalis*	western river birch	#1	9
Project 9- Trout Pond/ Trout Haven	*Salix geyeriana*	Geyer's willow	48-inch cutting	11
Project 9- Trout Pond/ Trout Haven	*Ribes aureum*	golden current	D40	2
Project 9- Trout Pond/ Trout Haven	*Populus angustifolia*	narrowleaf cottonwood	D40	2
Project 9- Trout Pond/ Trout Haven	*Salix monticola*	Rocky Mountain willow	48-inch cutting	15
Project 9- Trout Pond/ Trout Haven	*Salix bebbiana*	Bebb's willow	D40	3
Project 9- Trout Pond/ Trout Haven	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	8
Project 9- Trout Pond/ Trout Haven	*Betula occidentalis*	western river birch	#1	6
RIVERROCK TOWNHOMES INC	*Alnus incana ssp. tenuifolia*	thinleaf alder	#1	7
RIVERROCK TOWNHOMES INC	*Betula occidentalis*	western river birch	#1	8

Survivorship Guidance:

Reach	Containers			Cuttings		
	Number alive	Total number planted	% survival	Number alive	Total number planted	% survival
Project 4- Fun City		18			0	
Project 4- Freedman		42			27	
Project 4- Speedlin		21			26	
Project 4- Kingswood		10			20	
Project 6- Tanton		14			55	
Project 7- World Mark		52			31	
Project 9- Spruce Lake RV		22			61	
Project 9- Tiny Town		37			45	
Project 9- Trout Haven		21			25	
Riverrock Townhomes		15			0	

Vigor Estimation Classification:

Vigor	Vigor Characteristics
1	80% normal foliage <5% dieback
2	<80% dieback 21-100% normal foliage
3	<20% normal foliage Any dieback

Percent Cover Estimation Charts:

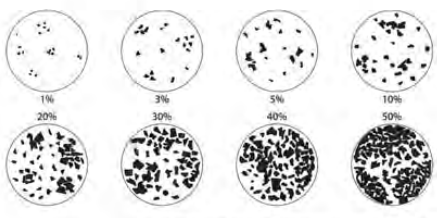


Chart source: Owens, E.H., and G.A. Sergy. Field Guide to the Documentation and Description of Oiled Shorelines. Environment Canada, Edmonton, Alberta, Canada. March 1994. ISBN 0-662-22045-X.

APPENDIX

C. WATERING PLAN FOR LANDOWNERS

Estes Valley Watershed Coalition
P.O. Box 4494
Estes Park, CO 80517
970-290-1829

Watering Protocol for Upper Big Thompson plantings is similar to what the guidance outlines below:

- Water three times a week for the first 3 weeks following planting.
- Following 3 weeks, gradually cut back to once every other week with a goal of water 1- 10 gallons per containerize plant per season.
- In general, any water is better than no water AND watering after planting is most critical.
- We can adjust these numbers based on what is reasonable for the landowner.

*"Watering Plants will need to be watered for at least the first season, **with the most critical time being the first three weeks after planting**. **Once they are established, water can be cut back gradually.** After establishment, some natives can be taken off irrigation completely. Place plants that have higher water needs nearer the house or other highly used areas. These plants can also be planted in swales (lower areas), or near downspouts for passive water harvesting."*

" 0-3 gallons per square feet/season"

Estes Valley Watershed Coalition November 17, 2018

B. Water Budget Worksheet

1. ET Reference Location:
Identify the general Evapo-Transpiration (ET) Reference Location in which you are located. The four largest regions are listed below and include surrounding metropolitan areas:

__Denver __Colorado Springs __Grand Junction __Pueblo

2. Gallons of Water Needed by Plant Category:
Determine the water needs of the various plants in your design. A plant list that identifies water needs (High, Moderate, Low, Very Low) is included in Section Three of this Best Practices Manual.

Plant Water Need Category		Gallons of Water used (ET Rate)*
H =	High water plants	(20 gallons/SF/season -- Denver)
M =	Moderate water plants	(10 gallons/SF/season -- Denver)
L =	Low water plants	(0-3 gallons/SF/season -- Denver)
VL =	Very Low water plants	(no irrigation needed; typical rainfall is sufficient)

The ET Rates for regions other than Denver are not yet accurate. One might assume that the ETR for Colorado Springs is 10% less than Denver's, and those for Grand Junction and Pueblo may be as much as 25% higher than Denver's.

3. Irrigation Areas (zones) based on Plant Water Need Category:
Identify each zone requiring irrigation, and calculate the area (in square feet) of each zone. If plants are already installed and/or not grouped together by water need, pick the highest water need category included in each zone.

4. Water-Use Calculations:

HIGH WATER ZONES: _____S.F. x (____ gals./S.F.) =_____gals / season
MODERATE WATER ZONES: _____S.F. x (____ gals. /S.F.) =_____gals / season
LOW WATER ZONES: _____S.F. x (____ gals./S.F.) =_____gals / season
VERY LOW WATER ZONES: _____S.F. x (____ gals./S.F.) =_____gals / season
TOTAL gallons needed by ALL ZONES: =_____gals / season
TOTAL Square Feet (S.F.) of ALL ZONES: =_____S.F.
***AVERAGE GALS./S.F./SEASON, ALL ZONES:** Total Gals / Total SF =_____**gals / season**

**The average needs to be a maximum of 15 gals. / S.F. / season.*

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APPENDIX

C. WILLOW STAKE PLANTING TOOLS

PHOTO 1 - WILLOW STAKE PLANTER TOOLS BEING USED TO INSTALL STAKES.

PHOTO 2 - NEW WILLOW STAKE PLANTING TOOLS.