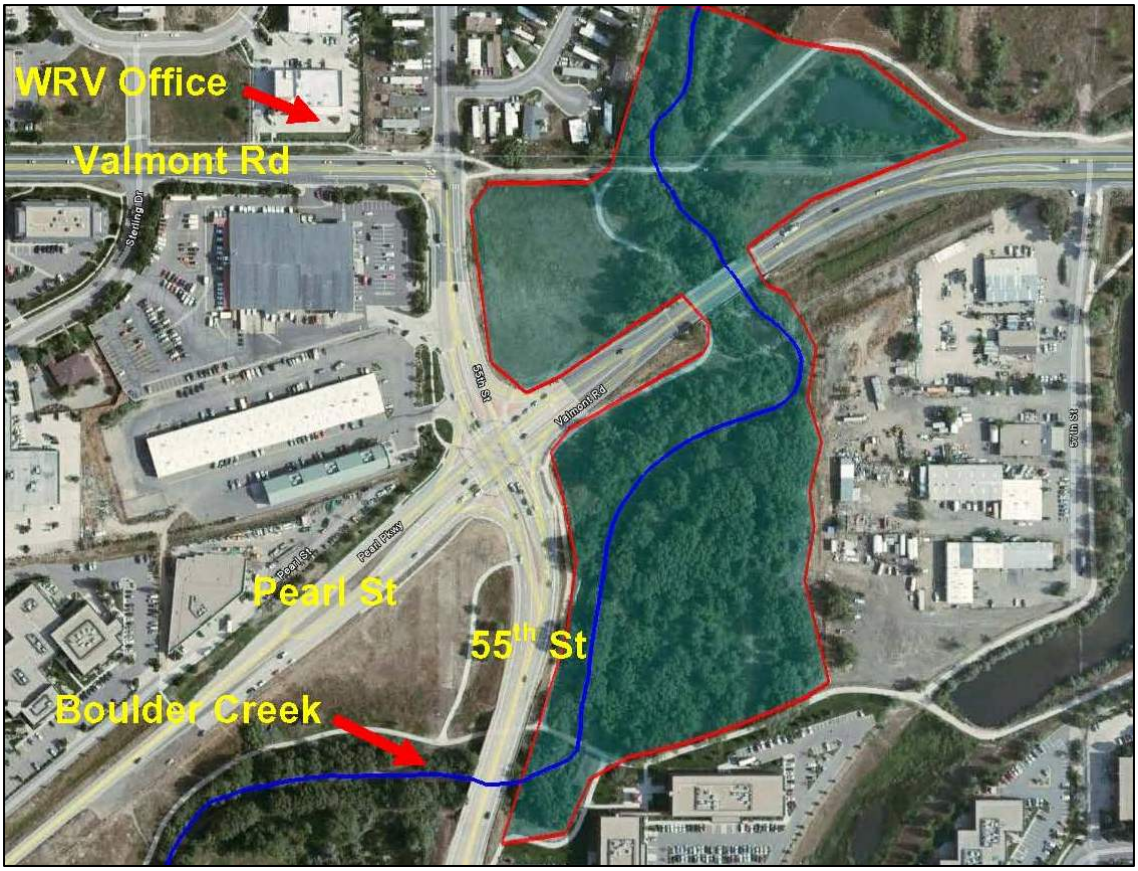
Boulder Creek Volunteer Restoration
2011 Final Report

Implemented by

Wildlands Restoration Volunteers

July 20 – December 31, 2011



Note: This report covers one of multiple phases of both the Boulder Creek Adopt Site Volunteer Restoration Project. The continuation of the larger restoration effort affecting many miles of stream and the larger watershed could be continued for 5-7 years assuming sufficient funding can be obtained.

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Timeline:

Project Planning and Project Team Coordinating -----Previous to the performance period
Volunteer Leader Training ----------Previous to the performance period
Volunteer Recruitment ----------Previous to the performance period
Technical Design ----------Previous to the performance period
Project Implementation ----------July – October, 2011
Youth Project Follow-Up ----------November, 2011
Project debriefs/evaluation ----------November, 2011

Each year, WRV scouts dozens of sites that could eventually qualify for a project. There are always more to do than resources allow, so choices must be made. These choices are made primarily by the WRV Project Selection Committee. The committee reviews all potential projects for a given year and ranks them on a spectrum of criteria. WRV staff and committee members then evaluate the master list to determine how many projects WRV can accomplish with resources likely to be available in the coming year. This list is presented to the Board of Directors for final approval.

Four Boulder Creek Adopt-Site projects (three of which occurred during the performance period) were among a slate of many projects approved for implementation in 2011 by a committee of 35 WRV volunteers in October of 2010. Committee members were asked to evaluate projects on ecological importance, overlap with WRV's mission, logistical requirements, available partnerships to help, leadership needs, financial resources needed and available, geographic availability, number of obstacles to project completion, number of volunteer-days necessary to complete the project, the ability of the project to satisfy volunteers, and how the project would complement others in the WRV project season.

WRV volunteers and staff trained 206 volunteers in a variety of roles for mentorship, who then were encouraged to co-lead with more experienced volunteers and staff at a variety of projects. Two well-attended events were hosted for the purpose of recruiting leaders and volunteer participants in February of 2011.

Further recruitment for the entire WRV project calendar was done through outreach events at Boulder Creek Festival, Boulder Creek Fest, Niwot Market, Rhythm on the Rails – Niwot, Rhythm on the River – Longmont, Peace Corps 50th Anniversary gathering – Boulder, CU Boulder – Peace Corps meet and greet, Colorado State Capitol – Outdoor Stewardship Day – April 21, New Vista High School – Volunteerism/Career Day, CSU Career Day – Fort Collins, Denver – Colorado & Company, REI – Denver flagship store, CU Boulder –Sewell Honors Program, REI –Boulder Adventure Film Festival, Naropa, and Micro Brews for the Environment. Finally, Facebook posts on WRV's ~600 member fan page, and emails to WRV's 4,500-member listserv were sent on dates approaching the project.

Project teams were assembled including volunteer leaders with extensive expertise, and each met prior to project dates for planning. Team members are listed below:

Project Teams

Boulder Creek #2
Brian Rasmussen, Project Lead
Amy Ansari, Technical Advisor
Eric Fairlee, Agency Liaison
Raymond Bridge, Tool Manager
Mary Eldred Project Support Cook Lead
Linda Sturm, Project Support Cook (PSC)
James Anderson, High School Crew Leader
Jean-Pierre Georges, Crew Leader (CL)
Ian Oeser, CL
Rob Pudim, CL
Rhonda Rankin, CL

Boulder Creek #3
Rachel Steel, Project Lead
Amy Ansari, Technical Advisor
Eric Fairlee, Agency Liaison
Brian Rasmussen, Tool Manager
Mary Eldred, PSC Lead
Dick Lindenmoyer, PSC
Rachel Steel, WRV Staff
Rob Pudim, Crew Leader of Youth (CLY)

Boulder Creek #4
Ian Oesser, Project Lead
Steve Johnson, Technical Advisor
Eric Fairlee, Agency Liaison
Ian Oesser, Tool Manager
Amy Ansari, PSC Lead
Dick Lindenmoyer, PSC
Nancy Martin, PSC
Sarah Egolf, WRV Staff
Jean-Pierre Georges, CL
Linard Cimermanis, CL
Brian Rasmussen, CL
Rob Pudim, CL
Mark Flower, CL
Eric Gertler, CL
Brian Rasmussen, CL
Meghan Mosher, CLY

Grant Budget

Task	Grant Funding	Match Funding	In-Kind Match	Total Amount
Staff (site visits, design, planning, vol recruitment, proj mgmt, monitoring)	$4,000	$3,450	$5,500	**$12,950**
Materials (plants, cage and irrigation materials, seed, amendments, etc.)	$1,500	$1,000	$1,000	**$3,500**
Transportation (for truck rentals to haul tools/materials and staff mileage)	$200			**$200**
Food to Feed Volunteers ($7/day/vol)	$700			**$700**
Professional Services (invasive tree removal) - 2 person-days with chain saws a large chipper			$1,500	**$1,500**
Project Implementation - volunteers (1100 hours @ $20.85 Independent Sector Rate)			$22,935	**$22,935**
Tools and Equipment	$300	$300	$1,500	**$2,100**
Training for volunteer leaders (crew leadership, project leadership, riparian and wetland restoration skills, project support, first aid, etc.)--12 essential trainings and mentorship for over 250 volunteer leaders, many directly engaged with this project	$1,000	$1,800		**$2,800**
Volunteer Appreciation (awards program, celebrations)	$300	$300		**$600**
Accident Insurance for Volunteers	$200	$200		**$400**
Postage, printing and misc. office costs		$150		**$150**
TOTAL	**$8,200**	**$7,200**	**$32,435**	**$47,835**

Project Task Match Cost

Sources of Matching Funding

City of Boulder Open Space and Mountain Parks	$3,000
EPA Environmental Education Grant	$2,700
Adopt Site Sponsors (e.g. Eco-Products)	$1,500
TOTAL	**$7,200**

Project Planning:

Once specific projects are selected and scheduled, a leadership team is assembled to plan and implement the project, typically including a project leader, technical advisor(s), project support cooks, crew leaders, agency liaison, staff liaison, tool manager, and a project medic. WRV staff collaborates with many skilled volunteers who have professional backgrounds in ecology, botany, hydrology, and civil engineering in the planning and design process. Teams typically meet twice in the months before a volunteer project and conduct a couple of field visits to complete technical designs and logistical plans. Detailed technical specifications are prepared and reviewed by the public land agency partner(s). The site is flagged and staked, as appropriate for hand labor or equipment operators. Crew leaders and other project leadership staff meet in the weeks before the volunteer event to finalize logistical plans to help ensure a safe, smooth project implementation phase. After completion, the team evaluates each project in logistical and ecological categories.

Project Summary:

WRV implemented this project in order to improve riparian habitat on Middle Boulder Creek, near the intersection of 55th Street and Pearl Parkway in west Boulder, between June and November, 2011. The project continued the restoration and enhancement of 6 acres of riparian habitat bordering 1,700 linear feet of Middle Boulder Creek. WRV staff and pro bono consultants (volunteers) worked with City of Boulder Open Space and Mountain Parks (OSMP) to carry out technical design and implementation. WRV assisted in restoration design, recruited the volunteers, trained volunteer leaders, planned and executed volunteer work at the site, and provided on-site environmental educational programs. OSMP conducted monitoring.

The site was composed of mostly non-native riparian forest, which more closely resembled an eastern U.S. forest than a native Colorado Front Range riparian forest, with a native plains riparian community. In 2010 and 2011 previous to the grant performance period, OSMP and WRV had worked to remove many non-native woody trees and shrubs and some selected understory noxious herbaceous weeds. The primary woody species which were removed include Russian olive, crack willow, eastern box elder, and green ash. An estimated 300 trees per acre will eventually be removed. A minimally treated buffer was left near bike paths and along Pearl Parkway to reduce near-term public concern about tree and shrub removal.

In 2011 with the help of Colorado Water Conservation Board's Watershed Restoration Program, WRV continued a project with the following objectives: 1) Restoration of 6 acres of native riparian habitat along 1,700 feet of stream; 2) Conversion of a non-native-plant dominated system to a native plant dominated system; 3) Six exotic species removed from 6 acres. During this specific period, approximately 555 native trees & shrubs were planted during approximately 82 volunteer days, yielding 738 volunteer hours valued at $15,955 were contributed. Eric Fairlee represented OSMP at the project.

Background:

The Boulder Creek watershed encompasses approximately 447 square miles in the geographic center of the upper reaches of the South Platte Watershed, and includes the quickly-growing communities of Boulder, Erie, Lafayette, Louisville, Nederland, Superior and parts of Arvada, Broomfield, and Frederick. Stream flow has been monitored on Boulder Creek at the Orodell gauging station since 1906. After flowing through St. Vrain Creek, the water influenced by the Boulder Creek Watershed finally reaches the South Platte. The flow of Boulder Creek is driven by the snow pack near the continental divide, and so varies substantially from one season to the next. Peak flows typically occur in June and low flows occur between October and March.

Some segments of Boulder Creek have been put on the 303(d) list (impaired stream) for E. coli and ammonia, and some have been put on the M&E list for aquatic life because of those contaminants as well as selenium and chromium VI. Surrounded in the proposed work-site by urban development, contaminants from human activities gather on impervious surfaces until a storm washes them into nearby storm drains, and then, untreated, into Boulder Creek. While all of Boulder Creek is considered safe for swimming, contaminant levels peak right after storms.

In this area, historic wetlands had been degraded or eliminated and much of the historic native plains riparian community had been replaced by a non-native mixture of trees, with substantially reduced value to wildlife. The non-native tree canopy was unnaturally dense, overly shading the ground and preventing native understory shrubs, grasses and wildlife from thriving (see picture at left). About 50 fish species, 18 of which are non-native, inhabited Boulder Creek as of 2006. Unfortunately, rainbow trout, brown trout, and brook trout were stocked in Boulder Creek and out-compete the native greenback cutthroat trout (a Threatened species) inside the city of Boulder. Additionally, two introduced species, the New Zealand mudsnail, and the Eurasian watermilfoil, threaten ecosystems in Boulder Creek, and diatomaceous blooms have resulted from human alteration of its natural flow.

WRV's agreement with the City of Boulder to formally "adopt" this section of Boulder Creek and provide a certain amount of work each year is the first of its kind in the area. It is hoped that this type of agreement can be replicated by other organizations, and since WRV encourages collaboration with multiple partnerships with other groups our efforts will create more opportunities to participate in active stewardship.

The creek will benefit from volunteers' creation of a natural and sustainable streamside plant community that will increase wildlife diversity.

Methodology:

Work was planned and implemented by WRV using a collaborative approach to watershed conservation. Educational talks were given at each event, and tool bundles, gloves and other safety gear were prepared by project teams for each crew prior to each event. Crews were apportioned throughout the site in accordance with numbers and types of work. Two day projects were held in July of 2011 and one day project in October. In July, volunteer activities mostly involved continued exotic species removal, both trees and biennial weeds, and in October volunteers planted more native plains cottonwood, western snowberry, wood's rose, wild plum, western chokecherry, sandbar willow, golden currant, and native graminoid seeding.

Boulder Creek #2 & #3 Map

Boulder Creek 2011 Projects #2 & #3
July 20 & 21, 2011
Volunteers cut and bagged flowering heads of teasel, houndstongue, musk thistle, Scotch thistle, and perennial pepperweed, and chopped down plants at base, cutting all basal leaves, and leaving non-flowering material on the ground. Volunteers hand pulled young green ash and box elder using weed wrenches in order to minimize herbicide use. They used loppers and hand saws to limb larger branches and drug them to chippers from recent felling of tree species. Volunteers also planted 20 willows and 125 container plants previously laid out by City staff.

Boulder Creek #4 Map

Boulder Creek 2011 Project #4
October 13
The City of Boulder flagged areas for work in color coordination with the map provided to crew leaders, augured holes for cottonwood trees, and scraped some areas for seeding with heavy machinery in advance of the project day. One group of volunteers hand-watered 1,100 plants that had been planted on the southern edge of the site in 2010 and 2011. Another group planted approximately 570 native trees, shrubs, and plants in a low-lying area of the site, including 150 American plum (*Prunus americana*), 15 cottonwood trees, and 140 native graminoid plugs provided by the City of Boulder. Another group prepared and seeded 1.2 acres around the perimeter of the site with 11.6 pounds of native grass-seed mix. Another group drug wood and concrete debris (totaling ~5 tons) to a truck for disposal by City staff.






Results:

Objective 1)	Restoration of 6 acres of native riparian habitat along 1,700 feet of stream.
Achievement 1)	Six acres along 1,700 feet of stream received some form of treatment, whether transplanting, cutting, or watering. This project was one in the continuation of a process to restore these 6 acres.
Objective 2)	Conversion of a non-native plant dominated system to a native plant dominated system.
Achievement 2)	Planted species include; plains cottonwood, peach-leaf willow, sandbar willow, American plum (*Prunus americana*), chokecherry, golden currant, Wood's rose (*Rosa woodsii*), snowberry (also volunteering throughout the site from seed and root-stock), prairie cordgrass (*Spartina pectinata*), woolly sedge (*Carex lanuginosa*), clustered-field sedge (*Carex praegracilis*), spikerush (*Eleocharis palustris*), and blue verbena (*Verbena hastata*). In addition, the area was seeded with mixed-grass or mesic tallgrass prairie mixes. Hand-watering of approximately 1,100 native plants from a WRV project in 2010 continued the process of converting an exotics-dominated system to a native-dominated system.
Objective 3)	Eight exotic species removed from 6 acres.
Achievement 3)	Preparing over two acres for planting and seeding by dragging cut branches of crack willow, green ash and Russian olive to be chipped for mulch, and bagging of flower heads of teasel, musk thistle, Scotch thistle, houndstongue, and perennial pepperweed over two acres continuing a process to remove eight exotics targeted over 6 acres. WRV will continue to work to achieve this objective in future years.
Objective 4)	Approximately 2,000 native trees/shrubs planted.
Achievement 4)	Approximately 555 native trees and shrubs were planted
Objective 5)	Completion of approximately 105 volunteer days, yielding 950 volunteer hours valued at $20,539.
Achievement 5)	Completion of approximately 82 volunteer days, yielding 738 volunteer hours, valued at $15,955. Included is the participation of New Vista High School, but not included are 10 Colorado Youth Program participants, yielding 20 volunteer hours valued at $432. Total in-kind labor and expertise valued at $16,387.

Due to a Cooper's hawk pair sighting earlier in the Spring, chainsaw work was prevented through August 15, and volunteer numbers were reduced to avoid disturbing the hawks. Planting and watering went forward in a smaller zone. Some watering was done by hand instead of using more vehicles with tanks. A group of Cummins Rocky Mountain, Inc.

employees joined us at the fourth Boulder Creek event in October, making it a 60-person event and expediting work that couldn't be done in the July projects.

Follow-up actions planned include four events in 2012, including two youth-group events. Tentative dates are June 20, July 20, July 21, and October 6.

Monitoring:

Six GPS photo points were created at the Boulder Creek site during 2010 for before-after sequences and general visual qualitative estimates of plant community makeup. As of June, 2011, Eric Fairlee of OSMP visually estimated installed plant survival rates at 90%, however a 20-year flood event ensued, and photos taken in June of 2012 will likely show some of the immediate stream-side plantings to be lost. Repeated plantings throughout 2011 helped replace some of what was lost.

Continued long-term monitoring will be necessary to accurately evaluate the effectiveness of restoration treatments. The following information will be gathered in the future:

- Plant survival rates will be visually estimated to determine the success of the planting plan, and vegetation response to existing hydrologic, climatic, and soil conditions. The diversity and abundance of specific shrubs and trees established will be used to project future structural diversity (i.e., the diversity of high, mid, and low canopy layers) along the restored riparian areas, based on known heights and architectures of the established species. This monitoring will be undertaken by agency staff, and subsequent plantings scheduled if survival rates are not up to par.

- City staff will visit the site to qualitatively estimate need for future weed management, which would be implemented by WRV on a maintenance basis.

Photopoint 1 looking north at the dense box elder community, 2010.

Photopoint 1 looking north following clearing, June 2011.

Photopoint 2 looking SW into a dense crack willow grove, June 2010.

Photopoint 2 looking SW prior to completion of clearing, June 2011. Area completed in 2011.

Photopoint 2 looking SE, into a dense crack willow grove, June 2010.

Photopoint 2 looking SE, clearing was completed in December 2011, June 2011. Several crack willow were left dead standing.

Photopoint 3 looking NE along Boulder Creek at a cottonwood-crack willow community, June 2010.

Photoopint 3 lookng NE prior to clearing, June, 2011. clearing was completed in December, 2011.

Photopoint 4 looking NW into a dense crack willow grove, June 2010.

Photopoint 4 looking NW following clearing, June, 2011
Note several crack willow left dead standing.

Photopoint 5 looking east at a clump of box elder under a canopy of cottonwood trees, June 2010.

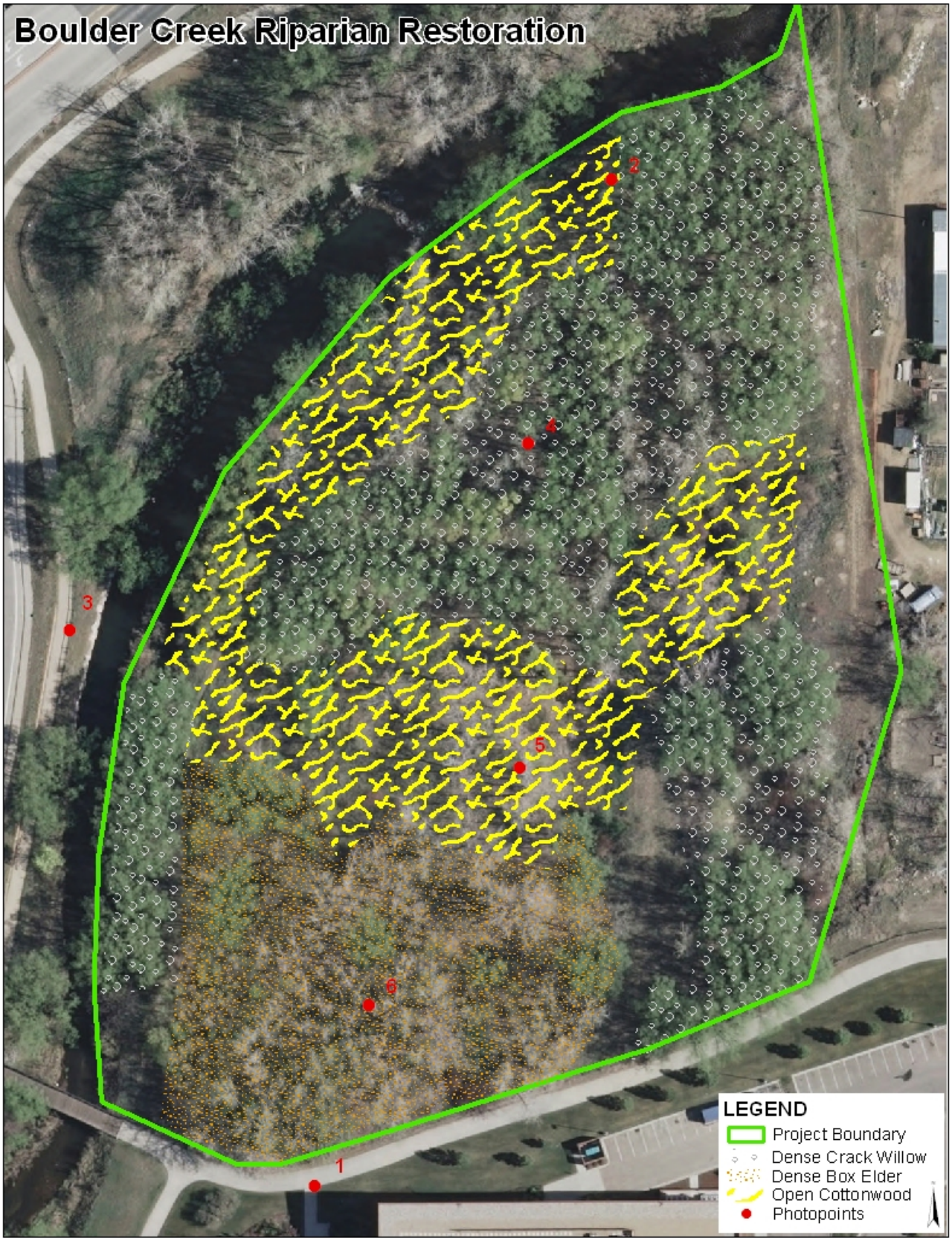
Photopoint 5 looking east following clearing, June, 2011.

Photopoint 5 looking south at the dense box elder community, June, 2010.

Photostation 5 looking south following clearing, June, 2011.

Photopoint 6 looking NE in the dense box elder community, June 2010.

Photopoint 6 looking NE following clearing, June, 2011.



Photopoint locations.