

**FOR DNRC USE ONLY**

Maximum amount under this Subaward Agreement: **\$5,000.00**

**Source of Funds**

USDA FS Grant # 18-DG-11010000-017; CFDA # 10.664

Subaward #	<b>UCF-19-105</b>
Amendment #	<b>N/A</b>
<b>Approved by</b>	
FD - Fiscal	<b>LP</b>
Legal	<b>MP</b>
Project Manager	<b>KS</b>

<u>Fund</u>	<u>Subclass</u>	<u>Org</u>	<u>Percent</u>	<u>Amount</u>	<u>Expiration</u>	<u>Amendment</u>
03493	555YJ	5114619	100%	\$5,000.00	See Sect. 2	N/A

Workers Comp:  N/A     Attached     Exempt     Will be forwarded

**2019 URBAN AND COMMUNITY FORESTRY SUBAWARD AGREEMENT  
CITY OF BILLINGS PROGRAM DEVELOPMENT PROJECT**

This Subaward Agreement (Subaward) is accepted by City of Billings, hereinafter referred to as the "Subrecipient," Federal ID No. 81-6001237, DUNS# 069161174, and represented by Steve McConnell, Urban Forester, 390 N 23<sup>rd</sup> Street, Billings, Montana 59101-1306, telephone (406) 237-6227, according to the following terms and conditions.

This Subaward, awarded and administered by the Montana Department of Natural Resources and Conservation (DNRC), is consistent with the policies, procedures and objectives of the Cooperative Forestry Assistance Act of 1978, Public Law 95-313, as amended. This Subaward is awarded under federal grant #18-DG-11010000-017, Consolidated Payments Grant, executed on 07/06/2018, from the United States Department of Agriculture – Forest Service (USFS) and Catalog of Federal Domestic Assistance (CFDA) number 10.664, "Cooperative Forestry Assistance."

**SECTION 1. PURPOSE.** The purpose of this Subaward is to establish mutually agreeable terms and conditions, specifications, and requirements to grant funds to the Subrecipient for an Urban and Community Forestry (UCF) Program Development project in or near, the City of Billings, Montana. Basis for this subaward is the UCF Program, which is administered through a partnership with the United States Department of Agriculture, Forest Service (USFS) and the DNRC. The Program Development Project Proposal and the addendum to the Program Development Project Proposal for this Subaward to the Subrecipient are attached hereto as Appendix B and Appendix C respectively, and are incorporated herein by reference.

**SECTION 2. TERM.** This Subaward is effective on the date of last signature. The Subrecipient shall have until **October 31, 2019**, to complete the project and work described in Section 4, Project Scope. The DNRC may, pursuant to Section 18, Agreement Extension, grant an extension for completion upon request and showing of good cause by the Subrecipient. Good cause is defined as external factors preventing the Subrecipient from completing the work, including but not limited to, inadequate staff, construction, hazard trees or other barriers on project site(s), and extensive and prolonged inoperable weather conditions. A request for extension must be submitted in writing no less than thirty (30) days prior to the termination date if an extension is to be considered by DNRC.

**SECTION 3. DNRC's ROLE.** The DNRC is administering grant funds awarded by the USFS to ensure that the funds are used according to the intent and procedures of the UCF Program Development Grant Program. The DNRC will monitor project expenditures to assure payment eligibility. DNRC assumes no responsibility for the Subrecipient's obligation to faithfully perform the tasks and activities required by this Subaward. The technical specialist for the project will be Jeff Hermanns, DNRC Southern Land Office, (406) 247-4403. The Subrecipient may contact the DNRC's liaison Jamie Kirby, at (406) 542-4288, [jamiikirby@mt.gov](mailto:jamiikirby@mt.gov), 2705 Spurgin Road, Missoula, Montana 59804 for guidance related to administration of the terms of this Subaward. All requests for information and assistance shall be submitted to the DNRC liaison or her designee, or the technical specialist.

**SECTION 4. PROJECT SCOPE.** (a) The Subrecipient must use the proceeds provided pursuant to this Subaward to perform allowable activities under the Program. ***The key outcomes of the project are to 1) remove invasive tree/brush species providing space for cottonwood regeneration; 2) inventory park trees; and 3) provide public education on riverfront forest ecosystem benefits.*** (b) Supporting Documents/attachments. The Program Development Project Proposal submitted by the Subrecipient, attached hereto as Appendix B and the Application Addendum, attached hereto as Appendix C, describe the projects and activities to be performed upon municipal lands by Subrecipient and the required dates of completion. In the event content in Appendix B, the original proposal, or Appendix C, the addendum, differs from or is in conflict with terms presented elsewhere in the subaward, the subaward text takes precedence. Funding will not be provided if the requirements outlined in Appendices B and C are not fulfilled.

**SECTION 5. PROJECT BUDGET.** Subaward funds are allocated to the following budget categories:

<b><i>Project Funding Summary:</i></b>	
<b>Direct Costs</b>	
<b>Subrecipient salary/wages/benefits</b>	\$1,200
<b>Operating Expenses</b>	\$110
<b>Contracted Services</b>	\$3,690
<b>Subtotal – Direct Costs</b>	\$5,000
<b>Indirect Costs (0.0%)</b>	\$0
<b>Total Subaward Amount</b>	\$5,000
<b>Match Required (1:1)</b>	\$5,000
<b><i>Total Project Funding:</i></b>	<b>\$10,000</b>

This Subaward requires a match of 1:1 of federal to non-federal funds. No federal funds may be used to satisfy the match requirement of this Subaward.

Match required will be provided in the categories of salaries, wages, benefits; and operating expenses in the form of cash-contributions and in-kind goods or services related to the approved project. Claimed match must be sufficiently documented to show compliance with federal requirements and to demonstrate how it supports the subaward project. DNRC will determine whether match documentation submitted is adequate and may require additional documentation before approval.

The indirect cost rate is shown above, expressed as a percentage of indirect costs to direct costs. Unless the rate has been formalized in a Negotiated Indirect Cost Rate Agreement (NICRA) between the Subrecipient and its cognizant federal agency, the rate shown above is hereby approved by DNRC for the term of this Subaward and may not be changed except via written amendment.

Subrecipient may transfer up to twenty percent (20%) of the total Subaward amount between Direct Costs budget categories as needed to complete the project. The Subrecipient must notify DNRC of such transfers. Transfers between budget categories in excess of twenty percent (20%) of the Subaward amount must be requested by the Subrecipient, approved by DNRC, and documented in an amendment to the Subaward.

Total payment for all purposes under this Subaward shall not exceed Five Thousand and no/100 Dollars (\$5,000.00).

Subrecipient shall follow all applicable procurement procedures as required in Section 12, Compliance with Applicable Laws, and the applicable OMB Circular 2 CFR 200 §§ 200.317 – 200.326.

**SECTION 6. AVAILABILITY OF SUBAWARD FUNDS.** The Subrecipient acknowledges and understands that Subaward funds become available based on federal awards to DNRC. Costs incurred by the Subrecipient as of January 1, 2019 may be, upon approval by the DNRC, eligible for reimbursement or may be counted as match funds.

The commitment by DNRC to expend money is contingent upon the DNRC receiving funds under the Cooperative Forestry Assistance Act of 1978, Public Law 95-313, as amended. No liability shall accrue to the DNRC or its officials in the event such funds are not appropriated or issued as authorized under this legislation. DNRC may, at its sole discretion, issue a temporary stop-work order, reduce the scope of project activities, or terminate this Subaward if appropriated funding is reduced or unavailable for any reason. DNRC will provide Subrecipient at least 10 days' notice for a stop-work order and at least 30 days' notice if a reduction in scope or termination is determined to be necessary due to unavailability of funds. Until DNRC notifies Subrecipient that obligated funds are unavailable, DNRC will continue to comply with the terms of this Subaward, including the disbursement of funds for eligible expenses incurred by Subrecipient up to the specified date and time provided in a written notice.

**SECTION 7. DISBURSEMENTS.** The Subrecipient shall submit claims for disbursement of Subaward funds to the DNRC liaison. Documentation of reimbursable costs incurred must be submitted with the disbursement requests. Documentation may include but is not limited to itemized receipts, vendor invoices, inspection certificates, financial reports that clearly show expenditures, payroll records, copies of checks, bank statements, or other forms of proof of

payment. DNRC will determine whether documentation submitted adequately supports the disbursement request and may require additional documentation before approving payment. The DNRC will verify the claims and check them against the Reports required in Section 8 and the Project Budget provided in Section 5. The DNRC will disburse Subaward funds to the Subrecipient only upon DNRC's review and approval of the documentation submitted by the Subrecipient. DNRC may withhold reimbursement for costs that are not allowed under this Subaward and may require Subrecipient to provide adequate documentation to substantiate the expenditures as allowable costs. Reimbursement of Subrecipient's expenditures will only be made for expenses included in the Project Budget provided in Section 5 that are clearly and accurately supported by the Subrecipient's records.

Request for final disbursement of Subaward funds is due 30 days following the subaward termination date. Before final disbursement will be made by the DNRC to the Subrecipient, the DNRC Regional Urban Forester or designee must inspect and approve the completed project. The Subrecipient shall notify the DNRC when the project is ready for inspection. A completed Project Inspection Form must accompany the final disbursement request.

The DNRC may withhold ten percent (10%) of the total authorized subaward amount until both the project tasks outlined in Section 4, Project Scope and the Final Report required by Section 8 are completed by the Subrecipient and approved by the DNRC.

**SECTION 8. REPORTS.** A midterm progress report must be submitted to the DNRC during the term of this Subaward. The report will provide status information for project implementation objective(s). Project status information will include, at a minimum, progress completed, costs incurred, funds remaining, and projected completion date. Significant problems encountered must be noted and necessary scope and/or timeline modifications should be requested as provided for below in Section 16, Assignment and Amendment. **The midterm report is due on May 31, 2019.** The DNRC will review the report for completeness and accuracy and will notify the Subrecipient if changes are necessary.

A Final Report that details the project status, results, accomplishments and financial status will be submitted to DNRC liaison by the Subrecipient for approval upon project completion. Final disbursement of Subaward funds is contingent upon DNRC's receipt and approval of the following documents: 1) Final Report, 2) DNRC Regional Urban Forester Project Inspection Form, and 3) Completed Project Report Form, which is available to download from the DNRC Urban Forestry website.

The deadline for submitting the Project Report Form is **thirty (30)** days after the termination date provided for in Section 2, Term. Subrecipient understands that if the Project Report Form is not provided to DNRC within **thirty (30)** days after the termination date provided in Section 2, Term, that DNRC may elect to not make payment under the terms of this Subaward. Furthermore, failure by Subrecipient to provide the Project Report Form(s) to the DNRC liaison as required herein may cause the DNRC to terminate this Subaward.

The DNRC shall, if necessary, provide the Subrecipient with further instructions regarding the required reporting format and other specific reporting requirements when such requirements are mandated by the Federal and/or State government(s). Any new reporting requirements will be provided in writing to Subrecipient and will be added to the terms of this Subaward via an amendment should Subrecipient and the DNRC agree to those terms. The foregoing

notwithstanding, Subrecipient must comply with the terms of any future reporting requirements that do not differ materially from those required by this Subaward.

**SECTION 9. RECORDS AND AUDITS.** The Subrecipient must maintain appropriate and adequate records showing complete entries of all receipts, disbursements, and other transactions relating to this Subaward for three (3) years after the later of either the final Subaward payment or the termination or expiration of this Subaward. The DNRC, the Montana Legislative Audit Division, or the Montana Legislative Fiscal Division may, at any reasonable time, audit all records, reports, and other documents that the Subrecipient maintains under or during the course of this Subaward to ensure compliance with its terms and conditions.

**SECTION 10. PROJECT MONITORING AND ACCESS FOR INSPECTION AND MONITORING.** The DNRC or its agents may monitor and inspect all phases and aspects of the Subrecipient's performance to determine compliance with this Subaward, including the adequacy of records and accounts. The Subrecipient shall accommodate requests for DNRC access to the site and records with due consideration for safety, private property rights, and convenience of everyone involved.

**SECTION 11. EMPLOYMENT STATUS AND WORKER'S COMPENSATION.** The DNRC is not an owner or general contractor for the project. The DNRC does not control the work activities or worksite of the Subrecipient or any contractors that might be engaged by the Subrecipient for completion of the project. The Subrecipient is independent from and is not an employee, officer, or agent of the DNRC. The Subrecipient, its employees and contractors, are not covered by the DNRC's Workers' Compensation Insurance. The Subrecipient is responsible for making sure that it and its employees are covered by Workers' Compensation Insurance and that its contractors are in compliance with the coverage provisions of the Workers' Compensation Act.

**SECTION 12. COMPLIANCE WITH APPLICABLE LAWS.** The Subrecipient must comply with the requirements of the Federal Office of Management and Budget (OMB) guidance in subparts A through F of Circular 2 CFR 200 *Uniform Administrative Requirements, Cost Principles, And Audit Requirements For Federal Awards* as adopted and supplemented by the USDA in 2 CFR part 400. These regulations are available online at the following website: [www.ecfr.gov](http://www.ecfr.gov).

Subrecipient certifies that it will abide by all certifications and assurances set forth in Federal Form AD-1048, "Certification Regarding Debarment, Suspension, Ineligibility & Voluntary Exclusion – Lower Tier Covered Transactions," this form having been signed, attached hereto as Appendix A, and incorporated herein by reference. Per the terms of the federal award, the Subrecipient shall also require all second-tier subrecipients and contractors who will be paid with subaward funds to sign form AD-1048, and subrecipient shall keep completed forms on file.

If the amount of this contract, sub-contract, or sub-grant is in excess of \$100,000, the Subrecipient will comply with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15).

All work performed under this Subaward must fully comply with all applicable federal, state, and local laws, rules, and regulations, including but not limited to, the Montana Human Rights Act, the Civil Rights Act of 1964, the Age Discrimination Act of 1975, the Americans with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973. Any subletting or subcontracting by the Subrecipient subjects subcontractors to the same provision. In accordance with 49-3-

207, MCA, the Subrecipient agrees that the hiring of persons to perform this Subaward will be made on the basis of merit and qualifications and without discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin of the persons performing this Subaward. It shall be the Subrecipient's responsibility to obtain all permits, licenses, or authorizations that might be required from government authorities for completion of the project. Procurement of labor, services, supplies, materials and equipment shall be conducted according to applicable federal, state, and local statutes. DNRC's signature on this Subaward does not guarantee the approval or issuance of any permits, licenses, or any other form of authorization to take action for which Subrecipient must apply with DNRC or any other government entity and submit to DNRC to fulfill the terms of this Subaward.

**TRAFFICKING IN PERSONS.** Subrecipients under this award and the Subrecipient's employees may not: (1) Engage in severe forms of trafficking in persons during the period of time that the award is in effect; (2) Procure a commercial sex act during the period of time that the award is in effect; or (3) Use forced labor in performance of the award or subawards under the award.

**NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL.** The Subrecipient shall include the following statement, in full, in any printed audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

*In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.)*

*To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.*

If the material is too small to permit the full statement to be included, the material must at minimum, include the following statement, in print size no smaller than the text:

*"This institution is an equal opportunity provider."*

### **SECTION 13. AGENCY RECOGNITION REQUIREMENTS**

**Use of Agency Insignia.** Subrecipient shall request in writing permission from the USFS Northern Region and receive written permission from the USFS before using the USFS insignia on any published media, such as a webpage, printed publication, or audiovisual production. Subrecipient shall request in writing and receive written permission from DNRC before using the DNRC insignia on any published media, such as a webpage, printed publication, or audiovisual production.

**Public Notices.** Subrecipient is encouraged to give public notice of the receipt of this subaward of federal grant funds and, from time to time, to announce progress and accomplishments. Press releases or other public notices should include a statement substantially as follows: "The funding for this project is derived in full or in part from a federal award of the U.S. Forest Service, Department of Agriculture, subawarded by the Montana Department of Natural Resources and Conservation, Forestry Division."

Acknowledgment in Publications, Audiovisuals, and Electronic Media. Subrecipient shall acknowledge USFS and DNRC support as appropriate in any publications, audiovisuals, and electronic media developed as a result of this subaward of USFS grant funds. Follow direction in USDA Supplemental 2 CFR 415.2.

**SECTION 14. COPYRIGHTING AND GOVERNMENT RIGHT TO USE.** Subrecipient is granted sole and exclusive right to copyright any publications developed as a result of this award. The State of Montana and the USFS reserve a royalty-free, nonexclusive, and irrevocable right to reproduce, publish, or otherwise use, and to authorize others to use the work for government purposes. This provision includes any right of copyright to which Subrecipient purchases ownership with any federal contributions. No original text or graphics produced by the State of Montana or the USFS shall be copyrighted.

**SECTION 15. FAILURE TO COMPLY.** If the Subrecipient fails to comply with the terms and conditions of this Subaward, the DNRC may terminate this Subaward and refuse additional disbursements of subaward funds and take legal action to recover disbursed subaward funds. Such termination will become a consideration in DNRC's evaluation of future applications for subawards.

**SECTION 16. ASSIGNMENT AND AMENDMENT.** The Subrecipient may not assign or transfer any portion of this Subaward without DNRC's express written consent. Amendments will be in writing, signed by both parties, and attached as an integral component of this Subaward. This Subaward may be terminated by the mutual written consent of both parties. If this Subaward is terminated, the Subrecipient may not submit claims for reimbursement for costs incurred beyond the mutually agreed to termination date.

**SECTION 17. MONTANA LAW AND VENUE.** Any action or judicial proceeding for enforcement of the terms of this Subaward shall be instituted only in the courts of Montana and shall be governed by the laws of Montana. Venue shall be in the First Judicial District, Lewis and Clark County, Montana.

**SECTION 18. AGREEMENT EXTENSION.** This Subaward may, upon mutual written agreement between the parties and according to its terms, be extended.

**SECTION 19. INDEMNITY AND LIABILITY (HOLD HARMLESS / INDEMNIFICATION).** Subrecipient agrees to be financially responsible for any audit exception or other financial loss to the DNRC and the State of Montana which occurs due to the negligence, intentional acts, or failure by Subrecipient and/or its agents, employees, subcontractors, or representatives to comply with the terms of this Subaward.

Subrecipient hereby agrees to defend, indemnify, and hold harmless the DNRC and the State of Montana and its agents from and against any and all claims, demands, or actions for damages to property or injury to persons or other damage to persons or entities arising out of, or resulting from the performance of this Subaward or the results of this Subaward, provided such damage to property or injury to persons is due to the negligent act or omission, recklessness, or intentional misconduct of Subrecipient or any of its employees. This Subaward is not intended to relieve a liable party of financial or legal responsibility.

**SECTION 20. INSURANCE REQUIREMENTS. General Requirements.** The Subrecipient shall maintain for the duration of this Subaward, at its cost and expense, insurance against claims for

injuries to persons or damages to property, including liability, which may arise from or in connection with the performance of the work by the Subrecipient, agents, employees, representatives, assigns, or contractors. This insurance shall cover such claims as may be caused by any negligent act or omission.

Specific Requirements for Commercial General Liability. The Subrecipient shall purchase and maintain occurrence coverage with combined single limits for bodily injury, personal injury, and property damage of \$750,000 per occurrence and \$1,500,000 aggregate per year to cover such claims as may be caused by any act, omission, or negligence of the Subrecipient or its officers, agents, representatives, assigns or contractors.

This Subaward consists of pages 1 – 8, plus the following appendices:

- Appendix A [Form AD-1048]
- Appendix B [Program Development Project Proposal]
- Appendix C [Addendum to the Program Development Project Proposal].

The Subrecipient hereby accepts this Subaward according to the above terms and conditions.

\_\_\_\_\_ By: \_\_\_\_\_  
Date Subrecipient or Subrecipient's Authorized Representative

\_\_\_\_\_  
Printed Name

\_\_\_\_\_ By: \_\_\_\_\_  
Date DNRC Authorized Representative

\_\_\_\_\_  
Printed Name



## United States Department of Agriculture

AD-1048

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion  
Lower Tier Covered Transactions**

*The following statement is made in accordance with the Privacy Act of 1974 (5 U.S.C. § 552(a), as amended). This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, and 2 C.F.R. §§ 180.300, 180.355, Participants' responsibilities. The regulations were amended and published on August 31, 2005, in 70 Fed. Reg. 51865-51880. Copies of the regulations may be obtained by contacting the Department of Agriculture agency offering the proposed covered transaction.*

*According to the Paperwork Reduction Act of 1995 an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0505-0027. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The provisions of appropriate criminal and civil fraud privacy, and other statutes may be applicable to the information provided.*

***(Read Instructions On Page Two Before Completing Certification)***

- A. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency;
- B. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

ORGANIZATION NAME

PR/AWARD NUMBER OR PROJECT NAME

NAME(S) AND TITLE(S) OF AUTHORIZED REPRESENTATIVE(S)

SIGNATURE(S)

DATE

*The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632-9992 (English) or (800) 877-8339 (TDD) or (866) 377-8642 (English Federal-relay) or (800) 845-6136 (Spanish Federal-relay). USDA is an equal opportunity provider and employer.*

## Appendix A

### Instructions for Certification

- (1) By signing and submitting this form, the prospective lower tier participant is providing the certification set out on page 1 in accordance with these instructions.
- (2) The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension or debarment.
- (3) The prospective lower tier participant shall provide immediate written notice to the person(s) to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- (4) The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549, at 2 C.F.R. Parts 180 and 417. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
- (5) The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- (6) The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- (7) A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the System for Award Management (SAM) database.
- (8) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- (9) Except for transactions authorized under paragraph (5) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

**Montana Department of Natural Resources and Conservation (DNRC)**  
**2019 Urban Forestry Grant Application**

APPLICANT NAME (i.e. City of Lumberton) City of Billings		DUNS NUMBER 069161174	FEDERAL TAX ID NUMBER 81-60001237
APPLICANT ADDRESS 4848 Midland Rd		CITY/TOWN Billings	STATE MT ZIP 59102
PRINCIPAL REPRESENTATIVE (person DNRC will use as primary contact) Steve McConnell		TITLE City Forester	
PRINCIPAL REP ADDRESS (if same as above, leave blank) 390 N 23 <sup>rd</sup> ST		CITY/TOWN Billings	STATE MT ZIP 59101
PHONE (DAYTIME) 406-237-6227	FAX	EMAIL mconnells@ci.billings.mt.us	
OTHER IMPORTANT CONTACTS: Provide name, title, and contact information (phone, email)  Mike Pigg, Parks Superintendent, 406-657-8373, piggm@ci.billings.mt.us			
TOTAL REQUEST AMOUNT (maximum request \$15,000) \$15,000		ARE YOU A CURRENT TREE CITY USA? (Y/N) Yes INDICATE IF INDIRECT COSTS ARE INCLUDED OR WAIVED: Waived	

Use this page as the cover sheet and include separate pages for the Project Proposal. Please use the Budget Calculation sheets provided. This document must be signed and dated by an individual who is legally authorized to act on the applicant's behalf. Please answer clearly and concisely and include all required attachments.

**PROJECT PROPOSAL**

All the following elements must be addressed in application, in the order given. Limit responses to 400 words per section.

- FEDERAL & STATE PROGRAM GOALS (4 pts):** Explain how the project meets federal and state program goals for the Urban Forestry Grant Program.
- PROJECT SUMMARY (4 pts):** Describe the type of project and clearly outline its purpose and goals.
- 2019 RENEWAL THEME (4 pts):** How are you focusing on renewal? Does the project draw from existing resources (i.e. inventory or management plan)? If so, identify any existing products and directly tie these resources to the project. Supporting documentation (pictures and maps) is encouraged.
- PROJECT PERSONNEL (3 pts):** Personnel should possess the necessary qualifications or expertise to carry out the project and meet program goals. Please include each person's name, title/qualification, project role, and level of involvement.
- LEVERAGING LOCAL SUPPORT & OUTREACH (3 pts):** Please include any planned activities with partners or volunteers, as well as any public education related to this project. Identify any other agencies or groups that will be involved.
- PROJECT WORK PLAN AND SCHEDULE (4 pts):** Provide a work plan/schedule for completing each activity and timetable for completion with start and finish dates. Assume that tree planting and maintenance projects have a deadline of June 15, 2019; other projects must be completed by September 30, 2019.
- PROJECT MONITORING & EFFECTIVENESS (4 pts):** Describe how you will measure your project's success and accomplishments. Describe whether you will make updates to your inventory, if applicable. Note that tree planting and maintenance projects require a 3-year establishment plan. (See the [example](#) at UCF webpage).

*I certify that the community/organization listed above has the approval of the local government to conduct this project.*

APPLICANT PRINCIPAL REPRESENTATIVE: Name, Signature

Steven P McConnell 

AUTHORIZED APPLICANT OFFICIAL: Name, Title, Signature

KORY THOMPSON   
 BILLINGS PARKS + REC. SUPERINTENDENT

Appendix B

**BUDGET FOR BILLINGS RIPARIAN RESTORATION PROJECT**

PROJECT EXPENSES	QUANTITY/HOURLY RATE	GRANT FUNDS REQUESTED (A)	CASH MATCH (B)	\$ VALUE OF IN-KIND MATCH (C)	TOTAL A+B+C
<b>PERSONNEL EXPENSES (SALARIES/WAGES/BENEFITS)</b>					
<i>Requested grant funds cannot be used for regular personnel costs of city/town employees. However, the cost of forestry student interns or seasonal employees can be included as grant funds.</i>					
Park Superintendent	20 hours @ \$32.00 per hour	-	\$640.00	-	\$640.00
City Forester	160 hours @ \$26.00 per hour	-	\$4160.00		\$4,160.00
City Arborist (1) Riley	80 hours @ \$25.00		\$6000.00		\$6,000.00
City Arborist (2) Gordon	80 hours @ \$23.00 per hour	-	\$5,520.00		\$5,520.00
Forest Technician (1) Means	240 hours @ \$12.50 per hour	\$3,000.00			\$3,000.00
Forest Technician (2) TBD	240 hours @ 12.50 per hour	\$3,000.00			\$3,000.00
<b>TOTAL PERSONNEL EXPENSES</b>		<b>\$6,000.00</b>	<b>\$16,320.00</b>		<b>\$22,320.00</b>
<b>OPERATING EXPENDITURES (TRAVEL, SUPPLIES, RENTALS, ETC.)</b>					
Mileage – city pickup trucks	140 miles @ \$.535 per mile	\$78.00	-	-	\$78.00
Purchase of 5 gallons Garlon IV herbicide	2 @ \$132.00 per 2 ½ gallons	\$264.00	-	-	\$264.00
Purchase of 15 gallons of Loveland bark oil	6 @ \$24.60 per 2 ½ gallons	\$144.00	-	-	\$144.00
Aerial Lift Truck	\$52.00 per hour * 80 hours		\$4160.00		\$4160.00
Chipper	\$25.00 per hour * 80 hours		\$2000.00		\$2000.00
Loader to transport merchantable wood	\$60 per hour * 6 hours		\$360.00		\$360.00
<b>TOTAL OPERATING EXPENSES</b>		<b>\$486.00</b>	<b>\$6520.00</b>	-	<b>\$7006.00</b>
<b>CONTRACTED PROFESSIONAL SERVICES<sup>1</sup></b>					
Brush Cutting and Herbicide Application	4 person crew @ \$120.00 per hour * 70.95 hours	\$8514.00	-	-	\$8514.00
<b>TOTAL CONTRACTED SERVICES</b>		-	-	-	-
<b>TOTAL PROJECT EXPENDITURES</b>		<b>\$15,000</b>	<b>\$22,840.00</b>	-	<b>\$37,840.00</b>
<b>INDIRECT COSTS</b>	NICRA* of 8.0%	<b>Waived</b>			
<b>TOTAL PROJECT FUNDING</b>		<b>\$15,000.00</b>	<b>\$22,840.00</b>	-	<b>\$37,840.00</b>

**IMPORTANT NOTES:**

ALL MATCH EXPENDITURES (BOTH CASH AND IN-KIND CONTRIBUTIONS) MUST BE SUBSTANTIATED WITH DOCUMENTATION TO BE APPLIED TO THE 100% MATCH REQUIREMENT.

FEDERAL FUNDS MAY NOT BE USED AS MATCH (NO FEDERAL CASH, DONATED AND/OR IN-KIND CONTRIBUTIONS).

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### Project Proposal

1. **Federal and State Program Goals** – This project supports all five goals identified by the USFS and DNRC for 2019. In order:

1) In this project we will collect inventory data for cottonwood trees along high-use, asphalt footpaths that extend into the Natural Area portion of Riverfront Park. We will assess tree condition, add these data to our formal city-wide tree inventory and then prune trees to make trees as safe as possible along these high-use pathways. We do not yet have inventory data for trees in the “Natural Areas” portion of Riverfront Park so this will significantly improve our ability to manage these trees.

2) The focus of our project is to restore a riparian cottonwood forest to historical conditions that will make these riparian cottonwood-dominated riparian forests healthy and resilient. In particular we plan to remove invasive small trees and shrubs that now dominate the understory of cottonwood trees, obstructing the establishment and growth of cottonwood trees that once resulted from natural disturbance processes (e.g. spring flooding followed by low water and summer heat and sunlight) that shaped these forests over millennia.

3) Our project will call attention to invasive species, in particular Russian olive and buckthorn, and the changes they render to ecological processes at small and large scales. We will focus attention on the Yellowstone River, the largest unregulated river in the Continental United States and the effect its seasonal hydrologic cycle has on the ecology of streamside forests, clearing away debris and creating space for the continual renewal of cottonwood seeds as older trees senesce and die. We will work with partners to provide public education about this unique resource - a more or less intact riparian cottonwood forest alongside a large, unregulated river - and make maximal effort to promote ecosystem understanding of this now-unique system to the public.

4) We have already established a periodic “wood auction” in Billings at which wood from trees removed from parks is made available to local woodworkers through a competitive bidding process. We will utilize all merchantable Russian olive wood removed in this project for one of these sales. Russian olive is highly prized by local woodworkers and their work with this wood supports their livelihood and positively contributes to the Billings area economy.

5) We will work collaboratively on this project with partners with aligned interests, including the Montana Audubon Center and the Yellowstone River Parks Association (YRPA). We are eager to work with underserved groups but have yet to identify such a group interested in this project.

### 2. Project Summary

This project is aimed at actively managing a natural-origin, mature cottonwood forest for public safety and restoration of ecosystem processes. The primary objective of this project as it relates to mature forests is to ensure that trees along high-use pathways are as safe as they can be. To do this we will assess tree condition, collect inventory and treat as per the needs of each individual tree, prioritizing such that trees with the greatest need are treated first. Our pool of trees will be all trees that could potentially interact with paved trails, but NOT trees in the natural area portions of the park. Trees will be treated primarily by pruning to remove dead wood from tree crowns, but also doing additional arboricultural work on them if needed.

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This project is also focused on the renewing cottonwood forests which we will do by restoring ecological processes. The Yellowstone River bordering Riverfront Park is the largest undammed river in the Continental United States. As such, its hydrological cycle is minimally impacted by human activity and the river-driven ecological processes by which cottonwood forests renewed, flooding to carry dead wood away and open up the (riparian) forest floor for seed establishment and growth, remains available and can once again be harness to do this work.

The key factor preventing natural river function and cottonwood forest renewal at Riverfront Park is the presence of invasive tree/shrub species, Russian olive (*Elaeagnus angustifolia*) and buckthorn (*Rhamnus cathartica*). These highly invasive woody plants form dense thickets that shade out other plants and obstruct river flow, preventing wood movement and the understory "cleaning" that once occurred.

We will cut Russian olive at ground level with chainsaws, removing merchantable wood for sale at wood auction, chipping the rest. Buckthorn will also be cut at ground and then chipped. We will apply herbicides to the stems of both plants immediately after cutting to prevent re-sprouting using an appropriate herbicide such as Remedy Ultra, Garlon IV or 10-12% solution of glyphosate. Cutting will occur in the fall when plant carbohydrates are in roots and herbicides are most effective.

The final piece of this project will be public education about the rational, scope and benefits of this project and the extraordinary, under-appreciated and unique ecosystem we strive to restore. We will partner with the Montana Audubon Center and the YRPA among others to provide education about this project.

### **3. 2019 Renewal Theme**

This project focuses on "renewal" in that is a focused effort to restore ecosystem processes to an exceptional example of an ecosystem type that has been dramatically altered across most of the northern Rockies and Great Plains. Regulated rivers no longer serve as the agent of ecosystem change and renewal they were historically, and along free-flowing rivers, invasive species have made dramatic changes to flora and hence ecosystem function, such that flood-origin regeneration rarely occurs. As a result of both factors, stream-side cottonwood forests are in decline.

As described above, we plan to return these areas to their historic condition by clearing away invasive Russian olive and buckthorn, opening up the understory so that when flood waters come, down wood will be carried downstream and planting spaces free of overtopping brush will be created. With historic disturbance processes renewed and invasive plant species controlled, a landscape setting will be restored in which cottonwood forest trees can senesce and regenerate through natural the natural ecosystem disturbance processes that have always "managed" these forests.

The existing resources upon which this project relies are threefold. First, for its conceptual approach, we rely on scientific literature that describes how these ecosystems historically functioned and point out that across the region, this once omnipresent ecosystem type is danger of being lost. This scientific literature provides hypotheses about what it would take to restore historical processes with the one most difficult to attain, having a free-flowing river at your disposal, something we in fact have. The second factor thwarting ecosystem renewal is the preponderance of

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ecologically impactful invasive species, something that it is a challenge to remove but for which we do in fact have the technology to accomplish, given resources to put in the necessary work.

Second, we make a renewed commitment to prioritize public safety in Natural Areas into which we have inserted “unnatural” features such as footpaths. We have not had the resources to do this before and this informs the part of our plan that goes to assessing, collecting inventory data for, and pruning or felling trees with an emphasis on removing dead wood from tree crowns.

Thirdly, Riverfront Park is listed as a birding “hotspot” in Montana, is the site of ecological study by faculty at Rocky Mountain College and is the site of extensive “citizen science” in Billings. We hope this work will “renew” interest in managing this extraordinary resource.

#### 4. Project Personnel

Name and Credentials: Steve McConnell, PhD, Certified Arborist (RM-8155 A)

Title: City Forester/Natural Areas Ecologist, 2017 to present

Role: Project Coordinator, Co-lead on collecting inventory data

Name and Credentials: Steve Riley, ISA Certified Arborist (Mw5073atml), ISA Certified Tree Worker Climber Specialist, ISA Certified Arborist Municipal Specialist, ISA Certified Tree Worker Aerial Lift Specialist, ISA Tree Risk Assessment Qualification, State of Montana Pesticide Applicators License

Title: City Arborist, 2012 to present

Role: Co-lead on collecting inventory data, lead on doing tree risk assessments, and person responsible for pruning trees unless we opt to contract this out.

Name and Credentials: Josh Gordon, BS in Natural Resources, ISA Certified Arborist (RM 7725A), ISA Certified Tree Worker Aerial Lift Specialist, State of Montana Pesticide Applicators License.

Title: Arborist (November to May), 2013 to present

Role: Crew person for inventory, assessment, pruning. Lead on cutting Russian olive and buckthorn and treating with herbicides.

Name and Credentials: Eric Means

Title: Forestry Technician, seasonal, 2015 to present

Role: On-ground crew person for pruning. Crew person for cutting Russian olive and buckthorn and applying pesticides.

- Everyone listed is at the same work address: 848 Midland Road, Parks, Recreation and Public Lands Department, Forestry Division, Billings, MT 59102
- We will contract out some of the brush cutting and piling, and herbicide application. City Forest Technicians will run the chipper. We will use the Forestry Division Aerial Lift Truck, Chipper and Loader (to haul merchantable wood to sorting area) for this project (see budget).

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### **5. Leveraging Local Support and Outreach**

We will definitely do public education with this project. I recently gave a presentation to the Yellowstone Valley Audubon Society on City of Billings plans for developing our Natural Areas. I am on a committee planning a Native Plant Symposium, scheduled for March 23, 2019 and, if this proposal is improved, we would center this symposium around the work to be done at Riverfront Park. The Montana Audubon Center, the planned site for the Native Plant Symposium, has property adjoining Riverfront Park making field tours easy to accommodate and providing attendees an excellent opportunity to learn about both native and invasive species in this ecosystem and learn the ecology of riparian cottonwood forests "hands on."

The City of Billings is already engaged with numerous area educators and this is most prominently evident at the annual Arbor Day we sponsor. As City Forester I am one of the lead coordinators for Arbor Day and have specific responsibility for recruiting approximately 20 Arbor Day/Natural Resource related educational booths each year bringing me into contact with almost every Natural Resource organization with an education emphasis in the region.

I have also worked with faculty at Rocky Mountain College (RMC), giving presentations in their classes about urban forestry. One Professor at RMC studies turtles and has sampled at Josephine Lake in Riverfront Park for years, gaining significant insights into the ecology of the area. I will definitely develop these connections to make programming available to college students both at RMC and MSUB in regards to this work.

I have specific ties to the Montana Audubon Center, whose entire mission is centered around education, and the PRPL is already discussion with them on a project related to a Native Plants garden to be established in one of our Parks and for joint education opportunities we will pursue as we further develop our Natural Areas programs.

We do not have specific educational plans and programs developed for this project but are in agreement that, should funding come through, there will be a wealth of material to develop and opportunities to provide key programming on a multitude of topics.

### **6. Project Work Plan and Schedule**

The listed work plan schedule is problematic for our project as it is biologically infeasible, so we begin by respectfully requesting an extension through November 30, 2019.

The first phase of this work will be to assess the condition of, collect inventory data for and then prune or remove trees according to the outcome of the assessment made. This work will be done in the winter, beginning in January as condition allow and will be completed by the end of March, 2019.

Removing Russian olive and buckthorn cannot be done until at least mid-fall as treatments on these done at any other time of the year are ineffective. While removal could be accomplished over the summer, this would waste resources as trees treated at this time of year are known to re-sprout, requiring staff to go back to these trees again to complete the job. To control Russian olive and buckthorn, it is critical that the cut stump be treated with an herbicide within one half hour of the

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stem being cut as both plants can build up a layer of tissue that will prevent herbicide infiltration in that short amount of time. An alternative treatment approach that could be used, if necessary, is to leave some stem left above ground and then cut into that in the fall, reestablishing a clean surface upon which to apply herbicides. This treatment is effective, but inefficient as a given area must be treated twice to achieve effective control. But this approach could be used if it is not possible to modify the schedule of activities to accommodate what is known about the biological response of our target species.

Our proposed timeline is:

January 1 – March 31, 2019

- 1) Assess condition of, and collect inventory data for, cottonwood trees within a tree height of the asphalt pathway through Riverfront Park.
- 2) Enter data collected into TreeWorks.
- 3) Evaluate tree conditions and determine trees that are a priority for crown cleaning or felling. Note: As this is a Natural Area, felled trees may be left on site depending on the volume of material generated and the ease with which a chipper could reach the site. Leaving wood on site will decrease costs and enable us to treat more trees.
- 4) Enter (or update) post-treatment inventory data in TreeWorks.
- 5) Phase 1 of project completed!!

April 1 – June 1

- 1) Plan educational programs with partners to include Montana Audubon Center, Yellowstone Valley Audubon Society (YVAS), Yellowstone County Weed District, the Yellowstone River Parks Association (YRPA) and Rocky Mountain College among others.
- 2) Plan at least one “before” treatment field trip to the site
- 3) Plan at least one “after” treatment field trip to the site
- 4) Work with our volunteer Coordinator, Chris Waite, to find volunteers for long-term monitoring of this site and follow-up treatment, in particular to control buckthorn sprouts by hand picking as they are well known to continue to germinate and grow from seeds stored in the soil for up to four years after removal.
- 5) Encourage YVAS to get members to collect bird data from area to be treated to be compared against data to be collected from the same sites next year to determine the effect of tree/shrub removal to bird presence in the treatment area.

June 1 – August 31, 2019

- 1) Map out specific boundaries of areas to be treated, estimate the abundance of tree/shrubs to be treated and the time that will be required to fell, haul, chip wood and treat stumps with herbicides. Note: As there is way more area to be treated at Riverfront Park than we will have budget for, our objective will be to identify a unit with natural boundaries that make sense as a first step in a progression of (hopefully) getting additional funding in the future to continue treating remaining untreated areas. We will also have as a goal making a boundary that makes logical sense and will make the project look like a “finished” Phase 1,

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rather than having a boundary that looks like the spot at which we ran out of money and went home.

- 2) Calculate the quantity of herbicides that will be required.
- 3) Purchase herbicides (we already own application equipment)
- 4) Determine if we will implement this project in-house or will contract for various parts of cutting shrubs, dragging shrubs to the chipper, chipping material, applying herbicides, hauling merchantable Russian olive to a landing, and transporting merchantable logs to our sorting area.

September 1 - October 31, 2019

- 1) Cut brush in area designated
- 2) Haul merchantable logs to sorting area at Wilson Nursery
- 3) Drag woody material to central location for chipping
- 4) Chip wood and haul to designated dumping area
- 5) Treat stumps with herbicides as they are cut
- 6) Phase II Completed!!

### **7. Project Monitoring and Effectiveness**

One metric we will track is tree condition. Did pro-active crown cleaning keep trees healthy and minimize the reactive work we had to do in the area to keep the area safe for recreational users?

Another metric is educational. For this we will ask, did we provide meaningful field tours and presentations about this project, attracting the interest of area citizens? Our metric will be the number of programs we put on and evaluation scores we receive from these.

Another metric we will use is how much we learned. Buckthorn is only beginning to be recognized as a significant problem in eastern Montana and the control methods we rely on were obtained from work done in the Missoula area. We will monitor sites for at least four years after treatment and collect data on the extent of buckthorn sprouting that results. We will also try to get before and after data on avian use of treated areas. We hope to get at least "grey literature" articles about the response of buckthorn to cutting and herbicide treatment and what it takes over years to obtain complete control. We also hope to get information on avian response to brush removal and find a source for publishing what we learn.

Another metric we will use is community response. Did we get favorable feedback from the public on this work? Josephine Lake is a heavily used area for which we presume public sensitivity to changes, even positive changes, will be high. Consequently, we will advertise our intention to implement this project and offer field trips ahead of time at which we can receive public input. We will track comments made before, during and after it is completed. One example, Riverfront Park is used extensively in the fall, when leaves are turning color, by local photographers as a setting for High School photographs. Any activities that affect this popular "setting" could result in negative feedback that we will try to preemptively assuage.

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We will measure success by whether it appears that by removing brush we have created conditions that will again enable cottonwood succession by historical processes. Many years of monitoring would be required to determine the actual success of this work and outcomes will also depend on the extent of spring time floods that occur there so we do not expect a definitive result for this.

Please see the following 3-year Riparian Cottonwood Forest Long Term Maintenance Plan

**Riparian Cottonwood Forest Long Term Maintenance Plan**

Year 1

Goal: Evaluate Efficacy of Shrub Control and Pull Newly Established Plants as Needed

Activity	Description of Service/Frequency	Materials	J	F	M	A	M	J	J	A	S	O	N	D
Seek and Destroy Newly Emerged Shrubs	Pull newly emerged sprouts of buckthorn as needed. 20 hours @ \$12.50 / hour	\$50 Gloves								X				
Education (Tours, Educational Programs, Publications)	Provide Tours of the Site to explain the ecology of riparian forests. Intermittent.	\$100 – brochures, handouts, etc.	X	X	X	X	X	X	X	X	X	X	X	X
Inspect cottonwood trees	Do a level 1 inspection of cottonwood trees within a tree length of asphalt path. More intense inspection if needed. Quarterly	Forestry Department has all needed equipment and expertise.		X						X			X	

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Year 2

Goal: Evaluate Efficacy of Shrub Control and Pull Newly Established Plants as Needed

Activity	Description of Service/Frequency	Materials	J	F	M	A	M	J	J	A	S	O	N	D
Seek and Destroy Newly Emerged Shrubs	Pull newly emerged sprouts of buckthorn as needed. 20 hours @ \$12.50 / hour	\$50 Gloves					X			X				
Education (Tours, Educational Programs, Publications)	Provide Tours of the Site to explain the ecology of riparian forests. Intermittent.	\$100 – brochures, handouts, etc.	X	X	X	X	X	X	X	X	X	X	X	X
Inspect cottonwood trees	Do a level 1 inspection of cottonwood trees within a tree length of asphalt path. More intense inspection if needed. Quarterly	Forestry Department has all needed equipment and expertise.		X						X			X	

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Year 3

Goal: Evaluate Efficacy of Shrub Control and Pull Newly Established Plants as Needed

Activity	Description of Service/Frequency	Materials	J	F	M	A	M	J	J	A	S	O	N	D
Seek and Destroy Newly Emerged Shrubs	Pull newly emerged sprouts of buckthorn as needed. 20 hours @ \$12.50 / hour	\$50 Gloves					X			X				
Education (Tours, Educational Programs, Publications)	Provide Tours of the Site to explain the ecology of riparian forests. Intermittent.	\$100 – brochures, handouts, etc.	X	X	X	X	X	X	X	X	X	X	X	X
Inspect cottonwood trees	Do a level 1 inspection of cottonwood trees within a tree length of asphalt path. More intense inspection if needed. Quarterly	Forestry Department has all needed equipment and expertise.		X						X			X	



# Cottonwood Management: Ecology, Rehabilitation, Wildfire and Other Considerations

Adapted to thrive on Colorado's Eastern Plains, in mountain valleys and along riparian areas throughout the state, cottonwoods represent the largest native broadleaf trees in the state, and the most pervasive deciduous trees found at lower elevations. Colorado cottonwoods can grow to more than 80 feet in height, flourishing in wetter soils near rivers, lakes, irrigation ditches and other lowland areas. Managing these natives can help ensure numerous benefits that include wildlife habitat, recreation, stream bank stabilization and stormwater uptake.

## Cottonwood Ecology

Groves of cottonwood trees, or bosques, are located in riparian zones – areas adjacent to rivers and streams – in Colorado and throughout the western United States. These ecosystems are usually a patchy mosaic of plains cottonwood trees (*Populus deltoides*), narrowleaf cottonwood trees (*Populus angustifolia*) and/or Rio Grande cottonwood trees (*Populus deltoides* ssp. *wislizenii*) that grow in conjunction with shrubs, such as willows, and various grasses and forbs. Narrowleaf cottonwoods grow at the highest elevations, between 5,000 and 8,000 feet, while plains cottonwoods grow from approximately 3,500 to 6,500 feet. Rio Grande cottonwoods grow on the West Slope of the Continental Divide between 4,000 and 6,000 feet.

In the riparian zones where cottonwoods are found, the vegetation is influenced by shallow groundwater and is different from the vegetation found in adjacent, more arid upland zones. Typical riparian zones are very diverse in species and many plants within them require a consistent supply of water to survive. These zones provide high-quality fish and wildlife habitat, offer shade to lower water and soil temperatures and have vegetation that absorbs flood waters and improves water quality by filtering out pollutants.

Modern watershed management has reduced occurrences of seasonal floods, while variables such as drought and changes in land use have left many riparian forest floors littered with large amounts of dead branches, logs and leaf layers. Historically, cottonwood groves present in floodplains relied on periodic flooding to wash away debris and promote tree regeneration. A lack of naturally occurring, regular flooding thus reduces cottonwood reproductive success.



Figure 1. Cottonwoods near the South Platte River. Photo: William M. Ciesla (WVIC)

This Quick Guide was produced by the Colorado State Forest Service to promote knowledge transfer.

June 2015  
www.csfs.colostate.edu

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When dry, the accumulation of debris in these areas also can become hazardous fuel for wildfire, lacking flooding events that can bury flammable forest floor debris with sediment and make it less likely to carry fire.

Many cottonwoods located in riparian areas with altered stream flows are mature and/or in decline. Due to changing factors in these ecosystems, including drought, water management and extensive wildlife browsing or overgrazing by livestock, cottonwoods are not surviving in some areas where they historically thrived.

## Benefits of Cottonwoods and Riparian Vegetation

Riparian ecosystems associated with cottonwood groves contain numerous smaller native shrub and tree species. These species vary depending on elevation, with higher-elevation species that include coyote willow, black willow, red osier dogwood, river birch, rocky mountain maple and thin leaf alder; and lower-elevation species that include boxelder, silver buffaloberry, hoptree, skunkbush sumac, woods' rose, fourwing saltbush and golden currant. Benefits of cottonwoods and other riparian trees/shrubs include:

- reducing erosion, with roots that hold soil in place;
- capturing and filtering sediment;
- providing wildlife habitat;
- slowing floodwater runoff; and
- increasing water infiltration.



Figure 2. A CSIS volunteer sawyer removes a Russian olive in Barr Lake State Park. Photo: CSIS

## Competition from Invasive Species

In the past, many tree species were introduced to the western United States. While most of these species were beneficial for erosion control and thrived under irrigation, a few escaped cultivation and became invasive. Trees are considered invasive if they are exotic or non-indigenous species that grow aggressively and replace native vegetation in environments in which they did not evolve. Invasive plants often have no natural enemies to limit their reproduction (e.g., insects that feed on them), and thus displace native vegetation and can cause environmental damage. In Colorado, the most prominent invasive tree species in riparian areas are Russian-olive and tamarisk.

Russian-olive, a medium-sized tree native to portions of Europe and Asia, was introduced into North America as a shelterbelt and windbreak tree during the late 1800s. Russian-olives have silvery-green foliage and tiny yellow flowers in spring, and produce olive-like fruit in late summer or early fall. This tree proved to be especially suitable for the harsh growing conditions of the Great Plains, and ultimately escaped cultivation. Russian-olive has invaded riparian areas, fields and open areas, where it competes with and displaces native vegetation, including cottonwoods. Due to extensive historical

planting and the dispersion of seed by birds, this invasive tree has become widely distributed across Colorado and other Western states, and is now on the noxious plant list for Colorado.

Tamarisk, or salt cedar, is a species of small- to medium-sized trees native to southern Europe, northern Africa and central Asia. Like Russian-olive, tamarisk was originally introduced to North America during the late 1800s as an ornamental tree and for use in shelterbelts, windbreaks and stream-bank stabilization. Tamarisk readily adapted to the semi-arid climate of the West, invaded riparian areas – especially in the Great Plains and Great Basin regions – and displaced native forests of cottonwood and willow. Tamarisk thickets alter the ecology and hydrology of riparian areas. These trees have a high evapotranspiration rate, creating excess water loss. Sites invaded by tamarisk can potentially dry out over time, resulting in reduced stream flows.

When considering any treatment for invasive tree or shrub species, including Russian-olive and tamarisk, choose an option that best meets individual management objectives. Options may include tree removal, use of chemical treatments and replanting native species. Chemical treatments such as herbicides can be effective if product directions are carefully followed, but they can be time-consuming and costly, may not be practical or effective for all situations, and may be of concern if used near bodies of water. It is essential to research the best possible treatments for a specific area before taking action, and assess the site's potential for native re-vegetation. If adequate stands of native vegetation already exist on a site, it may not be necessary to actively re-vegetate.

### Role of Wildfire in Riparian Zones

Historically, flooding was the major natural disturbance in riparian zones. With human-structured flood controls that allow for the build-up of vegetative fuels, wildland fire is becoming much more prevalent as another form of disturbance in these ecosystems, which evolved with very little fire influence.

Cottonwood trees are not a highly fire-resistant species. They can survive low-intensity wildfires, but moderate- to high-intensity fires have the potential to kill cottonwood trees. Yet in many cottonwood-dominated riparian ecosystems, wildfires have replaced periodic flooding as the main disturbance. Although after a wildland fire severely burned cottonwoods sprout new suckers from the root system that could become next-generation trees; these suckers often lack hardiness and do not survive. As a result, Colorado cottonwood stands are being replaced by ecosystems dominated by non-native, invasive shrubs.

The accumulation of branches and leaf litter in these invasive-dominated systems creates large amounts of hazardous fuels. Woody invasive plants, such as tamarisk and Russian-olive, reproduce prolifically from roots following fire, and thrive with repeated fires on the landscape. As excess fuels from shrubs in riparian areas increase, so do the frequency and intensity of riparian wildfires, creating a spiraling condition that is increasingly hostile to native cottonwoods. Woody invasive plants also add ladder fuels, or lower fuels beneath larger trees that allow fire to spread to the upper tree canopy, which increases the chance of a high-intensity fire.



Figure 3. A riparian ecosystem, invaded with tamarisk. Photo: Sheila Szymanski, C2ES



Figure 4. A healthy riparian ecosystem along Chiquaque Creek in southeast Colorado. Photo: Sheila Szymanski, C2ES

## Fuels Management Recommendations to Reduce Fire Risk in Cottonwood Groves

1. Create defensible space around structures, such as homes, bridges, diversion sloughs or designated recreation access areas. See the CSFS Quick Guide *Protecting Your Home from Wildfire: Creating Wildfire-Defensible Zones (FIRE 2012-1)*, available online at [www.csfs.colostate.edu](http://www.csfs.colostate.edu).
2. Do not stack branches or woody material under trees or large shrubs. This increases wildfire intensity near the trees, which can damage or kill them.
3. Remove invasive woody plants from underneath cottonwoods. These can be non-native plants, such as tamarisk or Russian-olive, or drier upland shrubs, such as juniper or fourwing saltbush, that have become invasive in the absence of regular flood conditions. (Note: Native cottonwood shrub communities should be preserved where the understory is New Mexico olive, buffaloberry or willow. These species are critical for wildlife.)
4. Remove ladder fuels by pruning off tree branches from ground level up to a height of 10 feet above ground, or up to one-third the height of the tree, whichever is less. Consult with a forester to determine the best pruning practices for different tree species.
5. Remove dead branches from shrubs annually and excess leaf litter buildup underneath trees as needed.
6. Move dead and downed woody debris in the cottonwood groves to beyond the farthest reaching branches of the trees, or to a minimum of 10 feet away from desirable trees.
7. Thin less-desirable trees to decrease competition and increase vigor of remaining trees in the stand. Groups or clumps of desirable trees may be left standing, but retain 30 feet of spacing between clumps and surrounding trees.
8. Leave enough young cottonwood growth for habitat and tree regeneration.
9. Create a mosaic of open areas, such as fuelbreaks interspersed with denser stands of trees, to simulate areas historically created by floods.



Figure 5. Defensible space around structures can help prevent a wildfire from traveling toward a structure. Photo: CSFS



Figure 6. Dead and down debris can offer fuel for a wildfire. Photo: CSFS



Figure 7. Dead branches can act as ladder fuels, which would help a wildfire travel into tree canopies. Photo: CSFS



Figure 8. Volunteers removing hazardous cottonwood debris. Photo: Adam Moore, CSFS

## Livestock Grazing Considerations

Overgrazing of livestock in a riparian area can negatively impact the survival and reproduction of vegetation. It also can have other negative effects, such as soil compaction, reduced water infiltration, and increased runoff and erosion. And livestock can introduce seeds of invasive species into riparian areas.

If livestock are present in a riparian area, consider a controlled grazing plan, which includes providing rested areas in order to allow adequate regeneration of tree seedlings. Also, offer an alternative drinking water system for the livestock. Fencing off areas of cottonwood regeneration will protect them from livestock and browsing wildlife.



Figure 9. The fenced area protects regeneration from browsing wildlife and livestock. Photo: U.S. Fish and Wildlife Service.

## Wildlife Management Considerations

Riparian zones provide critical habitat for wildlife because they offer food, water and shelter. This is especially true in the arid Southwest, where rivers and streams may be the only sources of water. To maintain critical riparian wildlife habitat, consider the following recommendations:

- Logs diverting the flow of water into the streambank and accelerating erosion should be removed. However, other downed logs on the riverbank and in the water should not be removed.
- Unless wildfire fuel loading is extreme, downed cottonwood and willow logs larger than 6 inches in diameter should not be removed. Keep these larger logs and relocate additional dead and down debris to a minimum of 10 feet from one another.
- Standing dead trees can provide homes for cavity-nesting birds and squirrels. Retain trees with existing cavities.
- When thinning trees, leave two to five stumps per acre. These provide posts for raptor feeding and lookouts for small rodents. For safety reasons, cut stumps should be between 12 and 30 inches in height.
- Check for listings of endangered species that live in riparian habitats. For example, the Southwestern willow flycatcher depends on riparian areas to forage, and is listed on the federal and state endangered species lists.



Figure 10. Wildlife is an important component in riparian ecosystem management. Photo: CSFS.

## Cottonwood Regeneration and Streambank Stabilization Recommendations

To restore a cottonwood grove to a healthy, more natural state, the CSFS recommends the following management actions:

- Leave a buffer strip of grass and shrubs along the river/stream for bank stabilization.
- Retain pockets of dense native vegetation, including cottonwoods and shrubs, for forest regeneration and wildlife habitat.
  - Remove dead and down trees next to these pockets to reduce the

## Appendix B

risk of wildfires spreading in either direction.

- Fence off an area as tall as the tallest trees in the pocket to encourage regeneration.
- Remove dense pockets of trees and shrubs near bridges or other critical infrastructure, as they pose wildfire concerns.
- Fence off regeneration for protection from browsing game and livestock.
- Promote narrowleaf cottonwood regeneration by cutting down one healthy cottonwood tree. The intact root system will sprout suckers. Dying or dead cottonwoods will not have the healthy root systems to sprout new trees.
- Create or retain occasional small brush piles for wildlife habitat. These also will encourage seedling regeneration.
  - Be sure to locate these piles outside of defensible spaces around structures.
- Check for management restrictions if the area is located in a U.S. Army Corps of Engineers-delineated wetland.



Figure 11. Russian olive trees in Larimer County. Photo: WMC

## Site Rehabilitation Planning Checklist

Prior to the implementation of a cottonwood-focused rehabilitation project, property owners/managers should create a strategy for the site that will result in a range of long-lasting benefits. Use the following checklist prior to the implementation of a cottonwood rehabilitation project to help ensure that the project is well-planned and will make the best use of available resources.

### Gather baseline resource data for the site.

This will be key to inform project implementation strategies, so know the site and conditions as well as possible. Speak to neighboring property owners, the

local resource conservation district, and/or the local CSFS district office to try to assemble a history of the property. Other data that could be valuable prior to implementing a cottonwood stand rehabilitation project include:

- **Soil testing.** This is critical for making initial re-vegetation plant selections and for choosing plants that will survive local soil conditions.
- **Climate conditions.** By knowing annual precipitation, soil moisture, humidity and other climatic data averages, land managers are able to choose appropriate plants.
- **Depth to ground water, and seasonal depth fluctuations.** These data are crucial for successfully establishing and sustaining woody natives as pole plantings or as long-pot planted stock.
- **Site inventory of native and nonnative plants.** What natives are growing on the site and doing well?
- **Water availability.** Is there the possibility to water new plants if necessary?
- **Feasibility of providing protection from wildlife.** Is it realistic to obtain and provide animal protection for new plants, if necessary?

## Evaluate site goals and generate a project strategy.

Common project goals could include:

- Reducing wildfire risk
- Improving growing conditions for cottonwood trees
- Improving wetland habitat
- Establishing native plant cover and removing invasive species

## Create a detailed budget for the project.

How much funding is available for the total rehabilitation project? Is there a particular area that requires a higher level of funding? Create a detailed budget including labor, materials and any other necessary expenditures.

## Plan priority treatment areas.

Identify the priority treatment areas and why they are designated as such, and develop a comprehensive strategy to address these areas first. Often, it makes the most sense to choose the areas that will provide the highest return on investment – not necessarily the areas that are the most infested with invasive species.

## For More Information

For more information on cottonwood management, contact a local Colorado State Forest Service district office or visit the CSFS website at [www.cfs.colostate.edu](http://www.cfs.colostate.edu).

## References and Additional Resources

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Figure 12. Consult a forester or other professional when planning a riparian management project. Photo: CSFS



Figure 13. Rio Grande cottonwood trees are found on the West Slope of Colorado between 4,000 and 6,000 feet. Photo: Vince Urbina, CSFS