



MOUNTAINS RECREATION & CONSERVATION AUTHORITY

Los Angeles River Center & Gardens
570 West Avenue Twenty-Six, Suite 100
Los Angeles, California 90065
Phone (323) 221-9944 Fax (323) 221-9934

April 29, 2019

Chairperson Irma Muñoz
c/o Rorie Skei, Chief Deputy Executive Director
Santa Monica Mountains Conservancy
26800 Mulholland Highway
Calabasas, California 91302

Proposition 1 Competitive Grant Application – Fire Resilience, Prevention and Vegetation Management projects

Dear Chairperson Muñoz and Conservancy Members:

I am please to present the enclosed application for a grant to fund Fire Resilience, Prevention and Vegetation Management projects. The Mountains Recreation and Conservation Authority (MRCA) request a grant in the sum of \$2,000,000 from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1). The MRCA's Governing Board approved this application on March 6, 2019.

The proposed grant would fund the removal of hazardous flash fuel vegetation, along with other activities, to reduce wildfire risk, protect watersheds, and promote watershed health. MRCA operates and manages dozens of park sites, hundreds of individual APN locations, and thousands of acres of open space located through out Los Angeles and Ventura Counties. The systematic reduction of flash fuel vegetation at these sites directly reduces wildfire risks, protects watersheds, and promotes watershed health.

Please refer to the enclosed materials that describe the proposed grant and how it fits the Conservancy's Evaluation Criteria. If you have any questions regarding this, please contact me at (323) 221-9944, ext. 117.

Sincerely,

Cara Meyer
Deputy Executive Officer

Grant Application

Print Form



The Natural Resources Agency

Project Title:

Fire Resilience, Prevention and Vegetation Management Projects

Date: 2019/04/29

Funds:

Proposition 12

Amount: 2,000,000

Applicant Name:

Mountains Recreation & Conservation Authority

Match amount: 0.00

Address:

570 West Avenue 26, Suite 100

Match source: n/a

State/Province:

Los Angeles, CA

Total Project Cost:

Zip/Postal code:

90065

Phone:

323-221-9944

Brief Project Description:

Execution of activities to increase fire resilience and prevention, and perform vegetation management and fuel modification on MRCA managed property.

Fax:

323-221-9934

Santa Monica Mountains Conservancy

5750 Ramirez Canyon Road

Malibu, California 90265

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www.smmc.ca.gov

Grantee's Authorized Representative:

Cara Meyer, Deputy Executive Officer 323-221-9944, x117
cara.meyer@mrca.ca.gov

Name and Title

Phone Number

Email

Person with day-to-day responsibility:

Ken Nelson, Chief of Fire Division

Name and Title

Phone Number

Email

Project Objective:

The proposed grant would be used to systematically remove hazardous flash fuel vegetation to directly reduce wildfire risk and protect watersheds and promote watershed health. The task of protection and restoration will be performed by MRCA staff and contractors. Specialized materials and equipment to be purchased will include but not limited to chainsaws, trimmers, mowers, sprayers, and herbicides as well as fuel for the equipment and consumable parts. See attached for details.

*Attach additional pages as necessary

Project Address:

Various Locations on MRCA property

Latitude:

Acreage:

Trail Length:

Longitude:

APN's:

Stream Miles:

Congressional District:

State Senate District:

Assembly District:

Tasks / Milestones:

Budget:

Completion Date:

See attached budget

*Attach additional pages as necessary

I certify that the information contained in this Grant Application form, including required attachments, is accurate.

Signature of Authorized Representative

Date

4/29/2019

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SCOPE OF WORK / PROJECT DESCRIPTION

The Mountains Recreation and Conservation Authority (MRCA) operates and manages dozens of park sites, hundreds of individual APN locations and thousands of acres of open space located throughout Los Angeles and Ventura Counties. Prolonged drought and record-setting wet winters have set a new normal for a fire prone landscape, and there is now an elevated risk of wildfire year-round. Resilience to fire and its negative effects can be increased through thoughtful capital projects and proper vegetation management, and these measures also prevent damage from fires. These activities protect watersheds and promote watershed health.

The proposed \$2,000,000 grant would be used for projects that increase parkland resilience to the effects of fire, including activities to manage vegetation and reduce flash fuel loads to decrease wildfire risk and protect watersheds, protect habitat, improve air quality, and promote watershed health. This work is also necessary to protect homes, businesses, and other public and private structures from wildfire.

Proposition 1 and the California Water Action Plan (Water Action Plan) outline priorities and strategies to help protect our developed and natural resources from prolonged drought and to establish a water conservation ethic. The proposed project aims to conserve water and achieve greenhouse gas reduction targets. Wildfire prevention efforts help protect plant and animal species and their fragmented habitat found in urban and open space areas of Southern California. This project will result in the restoration and protection of important species and habitat throughout the region.

Much of the parkland managed by MRCA is on the wildland-urban interface, which results in a huge burden of fuel removal and vegetation management. Proper vegetation management gives firefighters space to defend structures and other resources, and can reduce the intensity of fires. Reducing the amount of available fuel and creating defensible space helps to protect developed structures and other resources.

Tasks include removal of weeds, dry and dead materials, invasive species, and other hazardous flammable vegetation. Invasive species are targeted for eradication due to their ability to dramatically increase fuel loads and degrade wildlife habitat. Fuel modification is executed through the removal of dense, highly flammable and dead vegetation or thinning of hazardous combustible vegetation. Plant diseases, insect infestations and invasive species all pose significant threats to native vegetation, water supplies, and wildlife habitats, and can contribute to a wildfire.

The rate and amount of fuel removal varies, depending on plant growth and other factors. Fuel modification costs have consistently risen during the last several years. This is in part due to mandated wage increases and other increased labor costs. Local prohibitions on the use of glyphosate have also had an effect, slowing down and consequently doubling or tripling the price of vegetation management. The use of goats for brush removal is appropriate on some lands, however a surge in popularity has made this method become twice as expensive as traditional labor. A trailing effect of the 2018

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Woolsey fire is a noticeable increase in wild mustard growth and vigor, which may cause increased eradication costs.

Local parklands also continue to have a large number of dead, diseased and failing trees that may require removal for fire prevention. In addition to trees affected by the Woolsey fire that are either not coming back or require major pruning for long-term health, many trees continue to be affected by the sustained drought. The extended years of dry conditions have exacerbated insect infestations and weakened root systems. The removal of these trees is costly, due to their size, maturity, and remote locations, but is necessary due to the fire hazard they pose, risks of injury to people and property, and the possibility of spreading infestations to nearby trees.

Steep hillsides, common in Southern California watersheds, require protection from erosion. Additional erosion control measures are required in areas that burned recently in the Woolsey Fire and other events. An increased rate of erosion is expected for at least five years. Reestablishing native plant communities that are better adapted to the ecology of the area is imperative as a means to provide ground cover for slope stabilization. Reducing wildfire risk provides multiple direct and indirect benefits including reducing sediment, ash, and organic matter from entering streams that drain into our watersheds thereby limiting creek sedimentation and erosion and encouraging ground water recharge.

The lands subject to vegetation management are located in undeveloped mountain areas and are generally not in or adjacent to a disadvantaged community. Reducing wildfire risks does benefit the entire Los Angeles metro area, including disadvantaged communities, by preventing air pollution from smoke and the water quality degradation that can follow a large fire. The protection and restoration of both natural and developed resources supports ongoing public safety efforts. Additionally, managing vegetation within trails and parks protects its continued use and enjoyment by the public. These management efforts avoid future emergency responses associated with higher costs than the proposed preventive measures.

California's efforts to meet goals mandated by the Global Warming Solutions Act ("AB 32") to reduce greenhouse gas emissions to 1990 levels by the year 2020 assumed no net emissions for wildland ecosystems by 2020, underestimating the potential of wildfires as a considerable greenhouse gas source. Findings are now indicating that burned, or dead, vegetation releases carbon into the atmosphere as net emitters and not the carbon sinks we rely on them to be. This may further exacerbate climate change and its impacts. Events such as the 2018 Woolsey fire that are stronger, more damaging, and compounded by current drought conditions, underscore the need to periodically perform vegetation management.

This grant would help to serve the approximately 70,000 acres of MRCA-managed property prone to wildfire risk. This in turn would effectively prevent approximately 10,549 metric tons of carbon dioxide (CO₂) from being released into the atmosphere. Fuel modification by brushing holds the CO₂ emissions within the carbon sinks of plant material

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and prevents their release into the atmosphere. Refer to Appendix A for carbon emissions calculations, including calculations for carbon monoxide, methane, nitrous oxide, and nitrogen dioxide.

Protection and restoration activities covered under this grant application will be performed by MRCA staff as well as outside contractors. Contractors are used where it is more cost efficient, considering difficult topography and the compressed window of time in which vegetation management must be performed. Specialized suppression equipment to be purchased at reasonable cost will include, but is not limited to, chainsaws, chippers, chemical spraying equipment, personal protection equipment, and safety gear. The funds may also be directed toward improvements to MRCA's Santa Monica Mountains Fire Division headquarters, ensuring greater longevity and usability for the existing structures. If budget allows, the purchase of semi-automated systems for fire suppression of buildings is also contemplated. Monitoring and reporting on the progress and effectiveness of the project will occur via written project status reports. After the project's completion, photographs will be provided upon request.

Increasing the resilience to fire on these parklands will be accomplished through a straightforward approach to vegetation management, paired with efficient equipment and materials. The activities under this grant will protect watersheds from devastating wildfire risk, ensure the safe enjoyment of trails and parks for public use, and reach long term goals for water conservation and greenhouse gas reduction.

BUDGET

See attached budget. No matching funds are available for this project.

TIMELINE

The proposed project will be completed approximately 1 year after approval. Timeline may vary depending on the amount of rainfall, erosion, any additional fire events, and vegetation growth.

RESPONSES TO EVALUATION CRITERIA

Project achieves the purposes of Proposition 1 per Water Code Section 79732(a).
The proposed grant achieves the following Prop 1 purposes:

- 1) Protect and increase the economic benefits arising from healthy watersheds, fishery resources, and instream flow. Through management of hazardous vegetation and preventive efforts towards fire fuel loads, this project will avoid future fires and emergency responses associated with higher costs than the proposed preventive measures. Improvements to the Fire Division

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headquarters would reduce operational costs, maintain healthy watersheds, and reduce wildfire risks.

- 2) Implement watershed adaptation projects in order to reduce the impacts of climate change on California's communities and ecosystems. The removal of hazardous flash fuel vegetation and invasive species and restoration of native plant communities directly reduces wildfire risk. Such preventative efforts help to mitigate the release of carbon emissions from burned and dead vegetation that would otherwise exacerbate climate change. The removal of dead and diseased trees will prevent the spread of infestations throughout natural areas, increasing resilience.
- 8) Implement fuel treatment projects to reduce wildfire risks, protect watersheds tributary to water storage facilities, and promote watershed health. The proposed grant is a fuel treatment and wildfire prevention project and will thereby help to protect watersheds and promote watershed health.
- 9) Protect and restore rural and urban watershed health to improve watershed storage capacity, forest health, protection of life and property, stormwater resource management, and greenhouse gas reduction. The systematic reduction of flash fuels and dead/dry vegetation directly reduces wildfire risks, protects watersheds, protects habitats, improves air quality, and promotes overall urban watershed health. This work also protects the existing network of fire roads, homes, businesses, and other public and private structures. The proposed project is mostly located on the wildland-urban interface, and the work will increase the resilience of adjacent developed lands.
- 11) Reduce pollution or contamination of rivers, lakes, streams, or coastal waters, prevent and remediate mercury contamination from legacy mines, and protect or restore natural system functions that contribute to water supply, water quality, or flood management. Actions under the proposed project will reduce sediment, ash, and organic matter that would otherwise run off compromised soils with a large potential to fill the local water supply, and contaminate streams draining into our watersheds. This in turn limits erosion and creek sedimentation and encourages ground water recharge. Restoration of native plant communities will help mitigate the long-term erosion effects from the 2018 Woolsey fire.
- 12) Assist in the recovery of endangered, threatened, or migratory species by improving watershed health, instream flows, fish passage, coastal or inland wetland restoration, or other means, such as natural community conservation plan and habitat conservation plan implementation. Wildfire prevention through vegetation management efforts directly helps to protect plant and animal species and their habitats found in fragmented urban interface and open space areas. Prevention of erosion directly benefits aquatic species.

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The project will provide multiple benefits related to water quality, water supply and/or watershed protection and restoration.

The systematic reduction of flash fuel vegetation provides multiple direct and indirect benefits: Vegetation management reduces sediment, ash, and organic matter from entering streams which drain into our local watersheds; limits erosion and creek sedimentation; encourages ground water recharge; and reduces the amount of invasive species in our environment thereby protecting native habitats.

The project results in more reliable water supplies pursuant to the California Water Action Plan.

To the extent that local communities depend in part on groundwater that is recharged through rainfall, the prevention of erosion into the system will contribute to more reliable water supplies.

The project results in restoration or protection of important species and habitat pursuant to the California Water Action Plan.

As mentioned, wildfire prevention efforts, such as the proposed project, protect plant and animal species and their habitats found in fragmented urban and open space areas of Southern California. The removal of invasive, nonnative species will result in the restoration and protection of important species and habitat.

The project results in more resilient and sustainably managed water infrastructure pursuant to the California Water Action Plan.

To the extent that local water infrastructure is affected by water quality in local streams and drainages, the prevention of erosion into the system will contribute to more resilient water infrastructure.

The project employs new or innovative technology or practices, including decision support tools that support the integration of multiple jurisdictions, including, but not limited to, water supply, flood control, land use, and sanitation.

MRCA is a member of the Santa Monica Mountains Fire Safe Alliance – a coalition of public agencies, departments, and members of the public to protect natural areas and communities. Its expert resource protection workforce maintains constant communication with Los Angeles County, City of Los Angeles, and Ventura County Fire Departments, and California State Parks and the National Park Service, utilizing the most up to date communication practices.

Our certified handlers complete regular training and can make use of new products, if applicable. The use of goats for vegetation management is also an option under consideration. Remote controlled-equipment for brush removal is a new technology that may also be feasible.

The project is located in or adjacent to communities defined no less than 81 percent disadvantaged as defined by the CalEnviroScreen 3.0 tool.

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The lands subject to vegetation management are located in undeveloped mountain areas and are generally not in or adjacent to a disadvantaged community.

Applicant has proven that implementation of the project is feasible.

MRCA has completed similar projects in past years, and the proposed project is feasible. The MRCA staff has many years of experience and expertise to undertake these tasks.

Applicant has financial capacity to perform project on a reimbursable basis.

MRCA has the financial capacity to perform this project on a reimbursable basis. MRCA has been implementing capital projects on a reimbursable basis for many years and anticipates reimbursable payments in our budgets. MRCA also maintains a line of credit that can be drawn upon in the event of an extended delay.

Applicant, or active project partner, has successfully completed multiple projects of similar size and scope.

MRCA has completed similar efforts annually since the agency was founded in 1985.

The project is a partnership between two or more organizations and each organization has committed to contributing toward project implementation.

MRCA is a local public agency exercising joint powers of the Santa Monica Mountains Conservancy, the Conejo Recreation & Park District, and the Rancho Simi Recreation & Park District pursuant to Section 6500 *et seq.* of the Government Code. These three entities each have a voting member on MRCA's Governing Board, which approved the grant application on March 6, 2019.

Completion of the project would assist a government agency in fulfilling a water resources protection, watershed ecosystem restoration, or multi-benefit river parkway plan.

The proposed project furthers the following Conservancy Strategic Objectives:

- Implement the *Santa Monica Mountains Comprehensive Plan*
- Implement the *Rim of the Valley Trails Corridor Master Plan*
- Implement the *Greater Los Angeles County Integrated Regional Watershed Management Plan*
- Develop long term capital improvement and maintenance plans

The *Santa Monica Mountains Comprehensive Plan* notes that fire is a natural and ecologically important part of the Santa Monica Mountains, and further notes that suppression efforts over a long period of time could increase the intensity of subsequent fires. By removing flammable vegetation around structures and other resources, the proposed project will eliminate ignition sources in areas where suppression is necessary.

A portion of the work will be completed within the boundaries of the Santa Monica Mountains National Recreation Area, which is jointly managed by the National Park Service, California State Parks, the Santa Monica Mountains Conservancy, and MRCA. The National Park Service's *General Management Plan for the Santa Monica Mountains National Recreation Area* states that a Mission Goal for Resource Condition is to

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“Manage fire throughout the recreation area to mimic natural fire regimes where feasible and reduce the threat of wildfires.” Actions that were common to all the alternatives studied in the plan include:

- Manage fire to minimize landscape disturbance; and
- Areas temporarily disturbed during construction would be recontoured and revegetated with appropriate native plant species by a qualified biologist, and appropriate fuel management and fire suppression zones would be maintained around developed structures.

The activities proposed for Fire Resilience, Prevention and Vegetation Management would contribute to accomplishing these goals and objectives in the *General Management Plan*. While not solely a water resources or watershed plan, the GMP is a holistic approach to parkland management and it does expressly consider protection of water resources in many ways.

Applicant, or project partner, has 1+ years’ experience maintaining and operating projects of similar size and scope.

MRCA has been performing fuel hazard reduction and vegetation management of these lands on an ongoing basis since its inception in 1985.

Applicant has identified maintenance funding for at least 2 years after completion.

MRCA will provide maintenance from our general fund.

The project substantially restores a site by reestablishment of native species to reduce wildfire risk and promote watershed health.

A primary goal of the project is to reestablish native species to increase fire resilience and prevention, which will promote watershed health. The vegetation management activities will remove competition created by exotic invasive plants, helping native plants to thrive.

The project upgrades an existing regional trail or river parkway to protect its continued use and enjoyment by the public.

Many regional trails traverse lands that will be affected by the proposed vegetation management grant. Wildfire prevention protects the continued use and enjoyment of these regional trails, and prevents damage to public resources.

The project includes improvements that would significantly reduce the amount of untreated runoff entering urban rivers, waterways, or coastal watersheds.

The restoration of native species on lands burned during the 2018 Woolsey fire will reduce erosion for at least five years. Erosion and watershed protection are also accomplished by restoration of native plant communities and the prevention of wildfires through the reduction of fuel loads. These actions also serve to reduce the potential of sediment, ash, and organic matter loading of the streams draining watersheds of the Los Angeles River and Santa Monica Bay.

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The project includes improvements that would improve or support regeneration of important native vegetative cover on slopes near a stream or river, which if substantially disturbed may contribute to flood, erosion, creek sedimentation, or reduced groundwater recharge.

A goal of the proposed project is to support native vegetative cover. A portion of the work proposed will occur on slopes near streams, on soil that would be prone to erosion without proper vegetative cover. The removal of invasive exotic species will help native vegetation thrive. By preventing wildfire, the proposed grant will also prevent the erosion of sediment, ash, and organic matter into streams.

The project implements public safety practices by reducing wildfire risk.

The primary goal of the proposed grant is to reduce wildfire risk. The protection and restoration of both natural and developed resources supports ongoing public safety efforts. Managing vegetation within trails and parks protects their continued use and enjoyment by the public and will increase fire resilience. The crews that will implement the project have regular safety trainings and briefings.

The project implements fuel treatment projects to reduce wildfire risks, protect watersheds tributary to water storage facilities, and promote watershed health.

The proposed grant is a fuel treatment project that will accomplish the stated goals. Benefits will accrue to the watersheds in general, and to all downstream water storage facilities that exist.

The project substantially restores a site by removal of exotic species to reduce wildfire risk and promote watershed health.

The primary activity proposed is the removal of exotic species to restore native vegetation and protect watershed health.

Applicant has conducted outreach to the affected communities.

MRCA staff maintains relationships with local community groups, homeowners associations, and other stakeholders to keep affected communities aware of the vegetation management activities. Posted signs provide contact information for the public, and all Governing Board meetings are public. Social media is used to keep the public informed of ongoing activities.

The project adds visitor-serving amenities, accessibility, and public safety improvements to public parkland with multiple ecosystem benefits.

Reducing wildfire risk is a public safety improvement for public parklands. Additionally, removing dead vegetation improves public safety by removing hazardous fuels that not only create a risk of wildfire, but risks of injury to people and property. Multiple ecosystem benefits include the reduction of invasive species, preventing erosion into surface waters, protecting tree canopy, improving air quality, restoring native habitat, and reduced risk of wildlife deaths due to wildfires.

Project will benefit specially protected species pursuant to the California Wildlife Protection Act of 1990.

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In June of 1990 voters of California approved Proposition 117, the California Wildlife Protection Act, prohibiting the sport hunting of the California Mountain Lion and declaring them to be a specially protected species. The local population of mountain lions requires large areas of undisturbed habitat to thrive. Vegetation management reduces the possibility of the destruction of this habitat due to wildfire or erosion.

Project has approval from all landowners to complete the project, or Applicant is the landowner.

The project will be performed on land owned or managed by MRCA.

QUANTIFIABLE CARBON REDUCTION CRITERIA

The project demonstrates a reduction in baseline greenhouse gas emissions through carbon sequestration or other innovative techniques or project designs, such as diverting organic material from landfills.

Fuel modification by brushing retains the CO₂ emissions within the carbon sinks of plant material and prevents their release in atmospheric concentrations during a wildfire. The proposed project will prevent an approximated 10,549 metric tons of CO₂ from being released into the atmosphere (see Appendix A for calculations). The removal of weedy invasive species benefits the long-term health of larger native trees, such as oaks, sycamores, and walnuts that sequester carbon. Organic matter removed during vegetation management is chipped and used as mulch, and not taken to landfills. All of these measures help to make California more resilient to the adverse impacts of global warming.

The project acquires, preserves, or restores natural areas at risk of development and quantifiably avoids emissions associated with development.

The project work will be conducted on land that is not at risk for development.

The project implements water saving technologies and techniques to yield quantifiable water and energy savings. Such techniques may include the use of drought-efficient landscaping, stormwater filtration, impervious surfaces and other forms of water capture and storage.

This criteria is not applicable.

The project contributes to tree canopy cover and/or greenways in urban areas to mitigate heat island effects and promote public health and recreation.

All areas affected by the proposed project are in the urban metropolis of Los Angeles. The project will benefit tree canopy health by removing invasive competition species, ensuring the ongoing public health benefits contributed by those trees. Additionally, through its protection of drought-tolerant native trees and shrubs, the project will protect and create additional habitat for local wildlife; ensure public enjoyment of this wildlife and habitat; provide shade to reduce Urban Heat Island effects; promote infiltration; generate oxygen; and sequester carbon and remove pollutants from the air thus helping to further promote and allow for public health and recreation.

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The project acquires and/or maintains wildlife corridors and linkages to provide connections between areas of undeveloped lands, particularly significant public lands and key habitat ecosystems.

The areas affected by the proposed grant include many major and minor wildlife corridors that will benefit from the reduction of wildfire risk.

The project develops or maintains multi-use trails that connect communities, provides access to public resources and reduces vehicle miles traveled.

The proposed project will benefit regional multi-use trails by reducing the risk of wildfire. These trails provide access to public lands, and can also be used as commute routes, reducing vehicle miles traveled.

The project engages local communities through outreach, education, and interpretation regarding long-term stewardship and climate change awareness.

Social media is used to keep the public informed about ongoing activities, and also to educate about the reasons behind these practices. MRCA staff maintain relationships with local community groups, homeowners associations, and other stakeholders to keep affected communities aware of our activities. Posted signs provide contact information for the public.

ADDITIONAL CRITERIA

Completion of the project would assist in fulfilling a Federal water resources protection or watershed ecosystem restoration plan.

As previously described, the proposed project would help accomplish goals and objectives laid out in the National Park Service's *General Management Plan for the Santa Monica Mountains National Recreation Area*.

Project utilizes a local job training entity for a portion of the work.

MRCA recruits staff for the Fire Division from a variety of sources, including job training entities such as the Los Angeles Conservation Corps and training programs such as the Rio Hondo Fire Academy. A portion of work will be conducted by contractors selected through a competitive bid process, and job training programs are eligible to bid.

Project has secured matching funds of at least 25 percent of total project costs.

There are no secured matching funds.

Project is within 1 mile of public transportation.

The lands subject to vegetation management are located in undeveloped mountain areas and are generally not within 1 mile of public transportation.

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Appendix A: Carbon Emissions Calculations

The benefits that would accrue from the subject grant are related to the amount of land upon which vegetation management is performed. It is assumed that this land would not burn in a wildfire during the following fire season, therefore greenhouse gas emissions will be avoided.

Methodology is taken from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, published by the Intergovernmental Panel on Climate Change. *Volume 4, Agriculture, Forestry and Other Land Use*¹. The amount of land proposed for vegetation management is approximately 400-450 acres.

EQUATION 2.27
ESTIMATION OF GREENHOUSE GAS EMISSIONS FROM FIRE

$$L_{fire} = A \cdot M_B \cdot C_f \cdot G_{ef} \cdot 10^{-3}$$

Where:

L_{fire} = amount of greenhouse gas emissions from fire, tonnes of each GHG e.g., CH₄, N₂O, etc.

A = area burnt, ha

M_B = mass of fuel available for combustion, tonnes ha⁻¹. This includes biomass, ground litter and dead wood. When Tier 1 methods are used then litter and dead wood pools are assumed zero, except where there is a land-use change (see Section 2.3.2.2).

C_f = combustion factor, dimensionless (default values in Table 2.6)

G_{ef} = emission factor, g kg⁻¹ dry matter burnt (default values in Table 2.5)

Note: Where data for M_B and C_f are not available, a default value for the amount of fuel actually burnt (the product of M_B and C_f) can be used (Table 2.4) under Tier 1 methodology.

$$A = 172 \text{ hectare (425 acres)}^2$$

$$M_B \cdot C_f = 38.55^3$$

$$G_{ef} = \text{CO}_2\text{-1591; CO-86; CH}_4\text{-3.5; N}_2\text{O-0.235; NO}_x\text{-3.45.}^4$$

By preventing this land from wildfire, the proposed project would prevent the following greenhouse gases from being emitted:

$$\text{CO}_2 - 10,549 \text{ metric tons } (172 \cdot 38.55 \cdot 1591 \cdot 0.001)$$

$$\text{CO} - 570 \text{ metric tons } (172 \cdot 38.55 \cdot 86 \cdot 0.001)$$

$$\text{CH}_4 - 23 \text{ metric tons } (172 \cdot 38.55 \cdot 3.5 \cdot 0.001)$$

$$\text{N}_2\text{O} - 1.6 \text{ metric tons } (172 \cdot 38.55 \cdot 0.235 \cdot 0.001)$$

¹ <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

² Source: Staff estimate of 2019 vegetation management work.

³ Source: *IPCC Guidelines*, Table 2.4 Fuel Biomass Consumption Values for Fires. Vegetation type = Assume land is a 50/50 mix of a) all "other" temperate forests (Mean-50.4) and b) Shrubland (general) (Mean-26.7); average value therefore = 32.35.

⁴ Source: *IPCC Guidelines*, Table 2.5 Emission Factors for Various Types of Burning. Vegetation Type = Assume land is a 50/50 mix of a) Savanna and grassland and b) Extra tropical forest (which includes all other forest types). Values used in calculation are an average of the two types.

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NO_x – 23 metric tons (172 * 38.55 * 3.45 * 0.001)

Some areas affected by the project are likely to see a return of weedy, grassy species. Therefore, to represent a 40-year benefit timeframe required by the Conservancy's Proposition 1 Guidelines, the formula result may be divided by 40. As amortized over 40 years, the benefits are:

CO₂ – 263.73 metric tons

CO – 14.26 metric tons

CH₄ – 0.58 metric tons

N₂O – 0.04 metric tons

NO_x – 0.57 metric tons