FULL PROPOSAL SUBMITTED FOR EFFECTIVENESS MONITORING PROGRAM GRANT FISCAL YEAR 2023–2024 RFP

PROJECT TITLE: "Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and riparian areas of California"

Full Proposal Submitted July 5th, 2023, Revised October 6th, 2023

Submitted to:
State of California Natural Resources Agency
Effectiveness Monitoring Committee
State Board of Forestry and Protection

Submitted by
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I Project Description

The project will conduct several assessments on past fire history, current fire hazard, and county level vegetation recovery for WLPZ areas of California. Fire history will include an assessment of total acres burned by severity for all fires back to 1984 using available vegetation burn severity data. Current fire hazard (flame length and fire type) will be assessed using statewide fire hazard data updated for 2022. Within Plumas County, the dominant vegetation cover of all WLPZ areas will be assessed using a time series analysis to compare changes or no changes in forest, shrub, herbaceous, and barren cover types across all land ownerships and burn severities. The project will answer the following questions:

- What is the extent of total acres burned and acres burned by severity class (low, moderate, high) for all WLPZ areas in California since 1984?
- At the HUC 12 level, which individual watersheds have experienced the greatest percentage of high severity fire since 1984?
- What is the current fire hazard in all WLPZ areas, including potential flame length and fire type (surface fire, passive crown fire, active crown fire)?
- Within Plumas County, what are the trends in forest, shrub, grassland, and barren cover for all WLPZ areas since 1984?
- How is current vegetation cover type influenced by past fire severity, pre-wildfire management actions (fuels reduction), and post wildfire reforestation and recovery?

The project is anticipated to start onJanuary 1, 2024 and be completed by June 30, 2025.

Deliverables will include:

- A statewide geospatial assessment of past wildfire severity in WLPZ areas from 1984-2022 (2023 will be included if available at project start), including acres burned by severity type (low, moderate, high) and reburned in subsequent fires, as applicable.

- A statewide geospatial assessment of total acres burned in WLPZ areas from 1970-2022 (2023 will be included if available at project start)

- A statewide geospatial assessment of current fire hazard, including potential flame length and fire type (surface, passive crown fire, active crown fire) from datasets current through 2022 (2023 if available at time of project start)

- A Plumas County wide assessment of vegetation cover change in WLPZ areas from 1984-2023, including changes in the cover of forest, shrub, grassland, and barren cover types for WLPZ areas by HUC 12 watershed.

- Unmanned Aerial Vehicle (UAV) images of example stream reaches burned at different severity classes with different levels of post wildfire reforestation and post wildfire dead tree management

- Public online GIS data showing all analysis outputs (fire history, fire hazard, vegetation change, UAV overview imagery)

- Report summarizing the project, methods, data, and key findings

Research Themes to Be Addressed (note individual critical questions addressed in section VI)

Theme 1 - Watercourse and Lake Protection Zone Riparian Function

Theme 6 - Wildfire Hazard

Theme 12 - Resilience to Disturbance in a Changing Climate

Project Duration (Years/Months)

We anticipate this project will take 1 year and 6 months (January 2024-June 2025).

Background and Justification

Lakes, rivers, streams, and surrounding riparian vegetation on forest lands are critical for maintaining biodiversity while providing aquatic habitat, clean water, and flood control. They are also prized as recreation destinations. California's network of streams and lakes are home to a diverse range of plant and animal species, many unique to the state. They are also critical water sources for California's cities, farms, and energy sector. Stream and lake habitats can mitigate flooding by absorbing and slowing down floodwaters and protecting downstream communities. Lakes and streams provide many recreation opportunities, including fishing, boating, swimming, and sightseeing. The communities surrounding these bodies of water benefit economically from their proximity based on the tourism they attract. Several regions of California have had extensive portions of these lake and stream networks burned at high severity in several recent wildfires.

Over the past 20 years (1993-2023), hundreds of thousands of acres forested lands on both public and private lands have been directly impacted by wildfire, including recent large wildfires such as the Dixie Fire, North Complex, and Camp Fire, as well as older fires, including the Moonlight and Storrie Fires. Within these previous fires, a range of active management activities including tree removal and reforestation have occurred. In addition, large areas have

been left “untreated” post wildfire.

The intersections of public and private lands within these fire footprints provide a unique opportunity to assess past, current, and future conditions of WLPZ areas under various management regimes ranging from inaction to high-cost mitigation programs.

Under the Forest Practice Rules, management of these stream zones are governed by 14 CCR 916.4, 936.4, 956.4 Watercourse and Lake Protection [All Districts] and 14 CCR 916.2, 936.2, 956.2 Protection of the Beneficial Uses of Water and Riparian Functions [All Districts], which generally limit use of mechanical harvesting equipment within fixed stream zone buffers (*Figures 1-3*) and specify tree retention requirements within Watercourse and Lake Protection Zones (“WLPZ”).

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures[1]

Water Class Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and or 2) Fish always or seasonally present onsite, includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, Watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of Timber Operations.		Man-made Watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150[2]	ADG	100[3]	BEI	See CFH		See CFI	

1 - See Section 916.5(e) for letter designations application to this table.
2 – Subtract 50 feet width for cable Yarding operations.
3 – Subtract 25 feet width for cable Yarding operations.

Figure 1 – Procedures for determining water zone and lake protection zone widths and protective measures

Pursuant to 14 CCR 916.9[936.9,956.9](f)(2)						
Zone Designation	**Zone width (ft.)**	**Overstory Canopy Cover**		**Large Tree Retention**	**Silviculture Requirements**	**Operational Requirements**
Channel Zone	Variable	Retain all trees except per 916.9 [936.9, 956.9](e)(1) A-F or 916.9 [936.9 956.9] (v)		Retain all trees except per 916.9 [936.9, 956.9](e) (1) A-F or 916.9 [936.9 956.9] (v)	Retain all trees except per 916.9 [936.9, 956.9] (e) (1) A-F or 916.9 [936.9, 956.9](v)	No Timber Operations except per 916.9 [936.9, 956.9] (e) (1)A-F or 916.9 [936.9, 956.9](v);
Core Zone per 916.9 [936.9 956.9] (f)(2)(A)	30 ft.	Retain all trees except per 916.9 [936.9, 956.9](e) (1)A-F or 916.9 [936.9 956.9] (v)		Retain all trees except per 916.9 [936.9, 956.9](e)(1) A-F or 916.9 [936.9 956.9] (v)	Retain all trees except per 916.9 [936.9, 956.9] (e) (1) A-F or 916.9 [936.9, 956.9](v); no sanitation salvage except 916.9 (s)(t)and (u).	No Timber Operations except per 916.9 [936.9, 956.9] (e) (1) A-F or 916.9 [936.9, 956.9](v);
Inner Zone per 916.9 [936.9 956.9] (f)(2)(B)	70 ft.	80% Coast and Southern Forest District of Coastal Anadromy Zone per 916.9 [936.9 956.9] (f)(2)(B)3.	70% in Northern Forest District of Coastal Anadromy Zone per 916.9 [936.9 956.9] (f)(2)(B)3.	13 largest trees /ac. per 916.9 [936.9 956.9] (f)(2)(B)4.	Increase QMD; No sanitation salvage except 916.9 (s)(t)and (u); commercial thinning or single tree selection only.	Preferred Management Practices in 916.9 [936.9, 956.9] (f)(2)(D)
Outer Zone per 916.9 [936.9 956.9] (f)(2)(C) Outer Zone applicable only where even-aged regeneration used adjacent to the WLPZ	50 ft.	50% per 916.9 [936.9 956.9] (f)(2)(C).1.		NA	Commercial thinning or single tree selection only; Retain wind firm trees.	Preferred Management Practices in 916.9 [936.9, 956.9] (f)(2)(D)
Special Operating Zone per 916.9 [936.9 956.9] (f)(2)(E)	50 ft.	NA		NA	SOZ applicable only where even-aged regeneration used adjacent to the WLPZ. Retain understory and midstory trees per 916.9 [936.9, 956.9] (f)(2)(E)	All other Forest Practice Rules

Figure 2 – Procedures for determining WLPZ widths and protective measures – Class I WLPZs – confined channels-Coastal anadromy zone

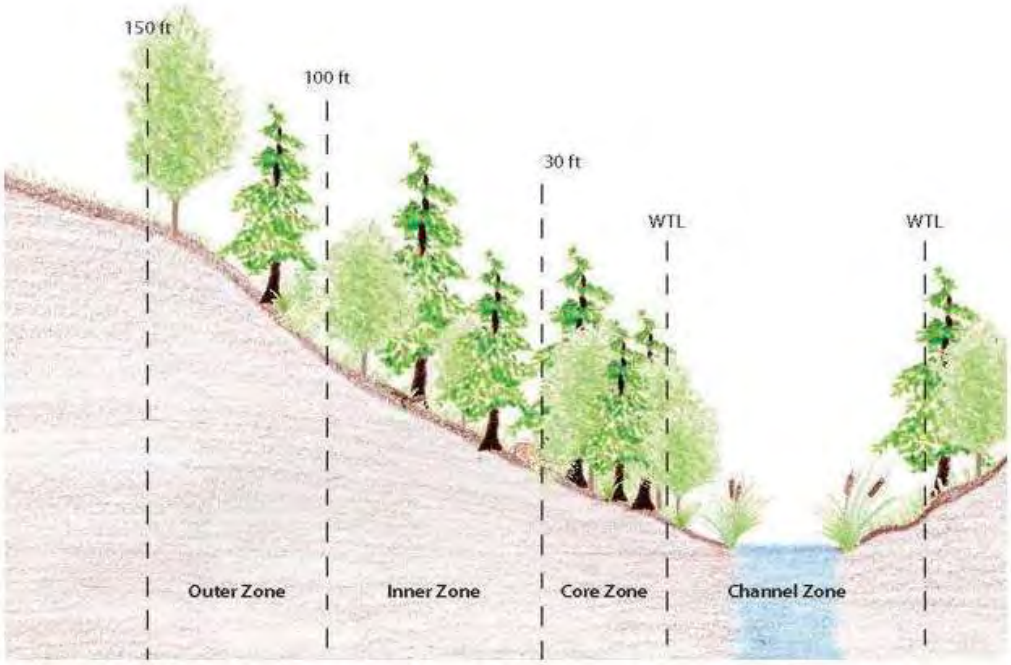

Figure 3 - Graphic profile of view of Class I WLPZ with confined channels in watersheds in the coastal anadromy zone (not to scale)

II Objectives and Scope

The objectives of this project are to assess past wildfire activity and severity, quantify current fire hazard and risk, and document current condition for WLPZ areas. The current condition assessment will focus on WLPZ areas and will be conducted in Plumas County, a region of the state with a long history of wildfires affecting aquatic ecosystems on both private and public lands. The scope is focused on 5 analysis tasks, described below.

Task 1: Evaluate current fire hazard and risk for all lake, river, and stream (WLPZ) areas across regions of California contained within the Northern, Southern, Coast, and High Use Forest Districts.

Task 2: Quantify the acres burned per year by county and severity type (low, moderate, high) for all forested lands of California (excluding central valley) from 1984-2022 (MTBS and RAVG) as well as total acreage of stream zones burned per year from 1970-2022

Task 3: Use current imagery in Plumas County to represent current conditions of several WLPZs that cross public and private lands, focusing on WLPZ that have had various management actions (tree removal, reforestation) with unmanaged adjacent areas.

Task 4: Evaluate trends in vegetation cover (shrub, forest, grass, and bare and barren soil) for all

riparian areas within Plumas County, using the existing Post WildFire Monitoring System funded by NASA ()https://sig-gis.com/post-fire-vegetation-monitoring-system/.

Task 5: Summarize current fire hazard, fire history (severity), and case study findings to assess post fire riparian conditions.

Research Methods

Step 1-Locate WLPZ Areas using The National Hydrography Dataset (NHD): NHDPlus is a suite of geospatial products that build upon and extend the capabilities of the National Hydrography Dataset (NHD). The NHD is the most up-to-date and comprehensive hydrography dataset for the Nation. To assess potential WLPZ for current fire hazard, risk, and ecological condition, all watercourses will be buffered to a distance of 300 feet on each side of NHD mapped watercourses (600 feet total) and assessed. Additional riparian buffers representing perennial and ephemeral stream buffers consistent with distances prescribed by the California Forest Practice Rules (Figure 1) will be added if these stream classes are distinguishable in the NHD data. The NHD represents the water drainage network of the United States with features such as a comprehensive set of digital spatial data that encodes information about naturally occurring and constructed bodies of surface water (lakes, ponds, and reservoirs), paths through which water flows (canals, ditches, streams, and rivers), and related entities such as point features (springs, wells, stream gages, and dams). The information encoded about these features includes classification and other characteristics, delineation, geographic name, position and related measures, and the direction of water flow. (NDH Dataset https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fhydro.nationalmap.gov%2Farcgis%2Frest%2Fservices%2Fnhd%2FMapServer&source=sd)

Step 2-Determine Fire History and Severity of All Areas Delineated in Step 1: For all buffered areas created in step 1, the area burned by year will be estimated using GIS from 1970 to the present. In addition, all buffered stream areas will be assessed for total acres burned per year by burn severity (low, moderate, high) since 1984, the earliest available year for fire severity data. This information will be used to examine and analyze trends in fire extent and severity across all riparian areas. Rapid Assessment of Vegetation Condition after Wildfire (RAVG) and Monitoring Trends in Burn Severity (MTBS) provide 30-meter resolution, fire severity (vegetation) data. RAVG data is available 30-45 days after containment and is used by silviculturists to determine reforestation needs. RAVG has categories like % Change in Basal area layer and % Change in Canopy cover layer while MTBS uses the 6-class thematic thresholded dNBR, unburned, low, moderate, high, increased veg, unvegetated, MTBS 1984-2021, and RAVG 2007-present. Both are 30-meter resolution (Fire Severity Data https://gis.data.ca.gov/datasets/CALFIRE-Forestry::california-fire-perimeters-all-1/about or

https://databasin.org/datasets/bf8db57ee6e0420c8ecce3c6395aceeb/).

Step 3-Determine Current Fire Hazard: Using contemporary fire hazard and risk data, existing hazard (flame length) and risk data (probability of burning) available **at no cost to SIG** from both the Pyregence (https://pyregence.org/) and First Street Fire Factor Project (https://firststreet.org/risk-factor/fire-factor/) for California will be summarized for all buffered stream areas within all Forest Districts of California.

Step 4- Plumas County Case Study, Determine Post-Fire Vegetation Recovery Dynamics by Employing LandTrendr to Conduct a Time Series Analysis for All Buffered Areas of Plumas County: Partnering with NASA, SIG has developed a Post Wildfire Vegetation Monitoring System. This system uses Landsat imagery within the Google Earth Engine Framework to provide near real time maps of forest, shrub, grassland, hardwood, and "barren" cover types (Figure 4). These are predicted with an accuracy of at least 80% and can be used to create retrospective vegetation maps back to 1984. Within Plumas County, this system will be used to estimate the percent cover of forest, shrub, grassland, and barren cover types over all stream areas over time, including assessing changes in conditions within the Storrie, Moonlight, Dixie, North Complex, Camp, and others fires. Changes in vegetation can be detected across property lines (Figure 5)(Post (Wildfire Vegetation Monitoring System **https://sig-gis.com/post-fire-vegetation-monitoring-system/)**

The first step for conducting a time series analysis includes loading publicly available data via the Google Earth Engine data catalog. We will access long-term satellite imagery from missions, such as the Landsat and Sentinel-2, which cover a temporal range of 1984 to the present. These missions provide a spatial resolution of 30 meters in the visible, near infrared, and shortwave infrared spectral range. Prior to analysis, standard preprocessing steps such as shadow/cloud removal and radiometric/atmospheric corrections are applied to ensure data quality.

Next, a calculation of relevant metrics, such as the NDVI (Normalized Difference Vegetation Index), NBR (Normalized Burn Ratio) and EVI (Enhanced Vegetation Index) will be made. These metrics serve as indicators of vegetation health and condition. Once these metrics are derived from the imagery, we will apply the LandTrendr algorithm.

LandTrendr is a powerful time-series analysis method that identifies changes in environmental conditions by establishing a historical baseline. This algorithm allows us to track and quantify the spatial extent of regrowth by identifying areas that exhibit improved biophysical conditions through increased vegetation cover over time. By comparing the established baseline with more recent satellite images, we can detect areas of vegetation gain and loss.

Using this methodology, we can classify areas where the metrics assessing biophysical

conditions have improved and measure the extent of regrowth by calculating the number of acres displaying vegetation cover gain or loss within areas of interest, such as WLPZs. This comprehensive approach facilitates the evaluation of restoration efforts and provides valuable insights into post-fire vegetation recovery dynamics

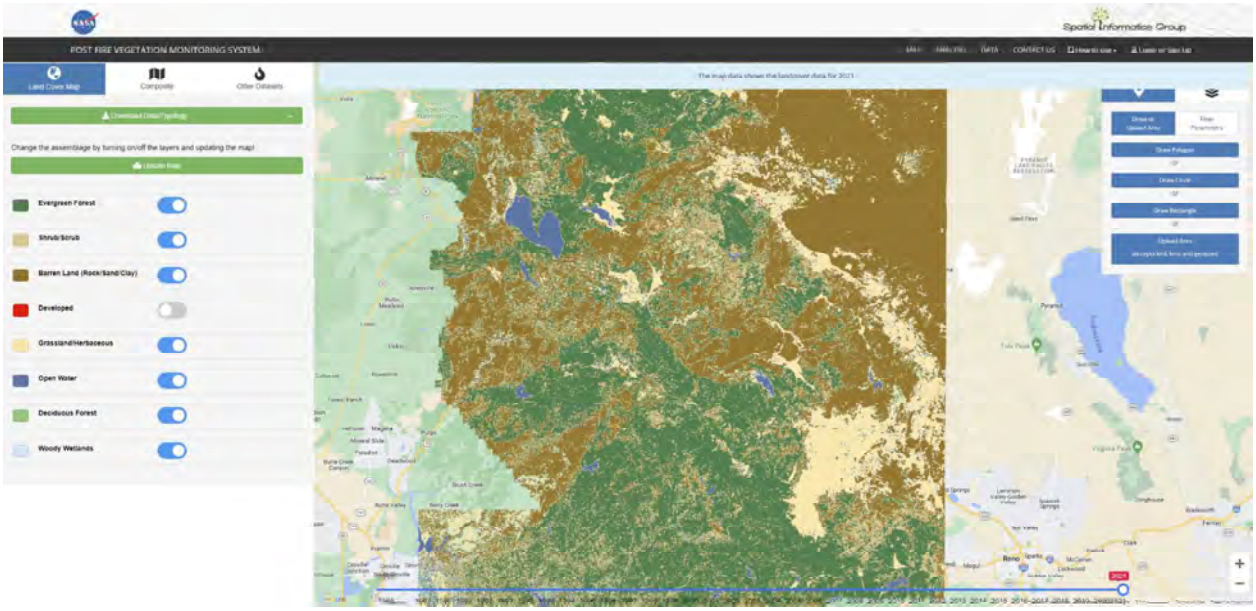

Figure 4 - Screenshot from the Post Fire Vegetation Monitoring System showing current cover of forest, shrub, barren, grassland, and other types of vegetation for all of Plumas County. The map reflects conditions of the 2021 Dixie Fire, including areas of the 2007 Moonlight Fire, which was reburned in the Dixie Fire.

Figure 5 - USFS (right of road) and private land (left of road) boundary. The change from forest to shrub can be detected by the existing Post Wildfire Vegetation Monitoring System.

Step 5-Plumas County Field Case Study of Stream Vegetation Condition Overview: Within Plumas County, within at least 3 wildfires (2021 Dixie Fire, 2020 North Complex, and 2007 Moonlight Fires), stream vegetation conditions will be imaged using a UAV. Within these fires, at least 9 perennial and 9 ephemeral streams will have additional aerial 360 images taken to assess current condition of riparian zones in burned areas along private and public land boundaries (Figure 6). Use of a UAV allows crews to view and assess stream areas without entering potentially hazardous burned forests or disturb potentially fragile ecosystems. These 360 view images can be embedded in a map, allowing users to view current aerial imagery, vegetation type, and ground conditions via the UAV image. SIG has used Mavic Pro Quadcopter UAVs in this area on past projects to map vegetation at high resolution;an example of imagery collected is available here (UAV Image Data
Example:
https://gsal.sig-gis.com/portal/apps/webappviewer/index.html?id=7cddcb5ee30d4c3e86f1463156eec8dc). Example 360 degree images of fuel treatments and areas burned by wildfire can be found at the links below and Figure 5, and can be integrated with ground based photos (Figure 6) where access to the site is safe and feasible.

Figure 6 - East Branch of Lights Creek within the footprint of the 2021 Dixie Fire. This area also burned in the 2007 Moonlight Fire.

Step 6-Fire History, Fire Hazard, CurrentVegetation Cover Type (Plumas County) by Ownership Type and, Where Available, Past Management Report. The fire history (burn severity since 1984), fire hazard (flame length and fire type), and current vegetation type derived from Steps 1-5 will be summarized by ownership type (private, public, state, other) using the current available California Protected Areas Database (https://www.calands.org/). Where geospatial data is available via FACTS, Calfire Timber Harvest Plans, and other publicly available treatment datasets, these data will also be summarized by vegetation treatment type (prescribed fire, fuel treatment, post fire tree removal, or other vegetation management) and, if available, inside and outside of areas reforested after wildfire. As a contributor to the Million Acre Strategy, SIG is currently working with the Forest Management TaskForce to aggregate all treatment data. If this data is publically available at the start of the project, we will utilize it for the treatment analysis. It should be noted that this dataset is aggregated back to 2018. As such, we will primarily focus on effects of recent treatments. Rob York (2017) completed the EMC Project

"Fuel treatment alternatives in riparian zones of the Sierra Nevada" which covers additional treatment alternative studying in riparian areas (chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://bof.fire.ca.gov/media/epfpnupb/8-emc-2017-006-r-york-presentation_ada.pdf). These works will complement each other once complete.

Statistical Analysis

The statistical learning component of step 6 will be conducted by Dr. Greg Fanslow. The analysis will consist of two parts, each taking advantage of GIS work in other steps that will associate fire extent and severity history with a host of watershed-level environmental factors such as burn history, vegetation type, management history, slope, aspect, elevation, the Palmer Drought Severity Index, etc.

1. A regression analysis will be used to explicitly quantify how fire extent and severity are linked with watershed-level environmental factors (mentioned above). The resulting regression model will be thoroughly tested and refined through a process of cross validation against held out data samples that account for spatial and temporal autocorrelation.

2. To provide managers with actionable risk forecasts, machine-learning will be used to forecast fire risks based on environmental factors. This model will be used to generate watershed-level risk forecasts for 1-year and possibly 2-years beyond the last year of data inputs. Given the extensive history of burn data and other inputs this model will be validated using "walk-forward validation", which steps through time-series data year-by-year training on previous data, generating predictions and testing errors on the following time periods.

The resulting machine learning model will be used to produce year-ahead forecasts simulating ranges of environmental factors that vary from year to year, such as drought and potentially management activity.

Step 7-Report: Data and spatial information will be summarized in report form with online maps. All geospatial data will be provided electronically in ESRI compatible format.

IV Scientific Uncertainty and Geographic Application

The project findings will apply generally to vegetation common to forest communities across the Northern, Southern, Coastal, and High Use Forest Districts of California. Detailed case studies for Plumas County will apply broadly to similar vegetation types in the Northern Sierra Nevada. These include Sierran Mixed Conifer, East Side Pine, black oak woodland, sagebrush, and montane chaparral. A detailed analysis of post wildfire vegetation cover in these vegetation types at the county (Plumas) level will have broad application to similar vegetation types within

the greater Northern and Southern Forest Districts. Monitoring findings will be generally applicable to similar vegetation types, soil types, and climate zones within both the Northern and Southern Forest Districts. While Coastal Region Forest Practice Rules (FPRs) are included, comparisons between districts will be limited due to dissimilar vegetation types, climate, and treatment practices.

V Roles, Collaborations and Project Feasibility

Ryan Tompkins, Registered Professional Forester (RPF), UC Cooperative Extension Advisor for Plumas County, will join the project as a local Principal Investigator. Ryan will provide advisory review and local forest context for the project. The project will be managed by Jason Moghaddas (RPF) with David Saah (PhD) serving as the PI for SIG. Project findings and updates will be presented to local Plumas County Foresters, private landowners, and Fire Management Staff via presentations at local Fire Safe Council, RCD, and Collaborative Group meetings as requested.

VI Theme and Critical Questions for Each Theme and Forest Practice Rules or Regulations Addressed

The project will cover fire history, severity, and current fire risk for all WLPZ areas as defined in the forest practice rules below.

- 916.4, 936.4, 956.4 Watercourse and Lake Protection [All Districts]
- 916.5, 936.5, 956.5 Procedure for Determining Watercourse and Lake Protection Zone (WLPZ) Widths and Protective Measures [All Districts]
- 916.2, 936.2, 956.2 Protection of the Beneficial Uses of Water and Riparian Functions [All Districts]

In addition, within Plumas County, the assessment will quantify the acres of WLPZ areas by cover type (forest, shrub, grassland, barren) since 1984, on both public and private lands. Specifically, the project will address aspects of the critical questions for Theme 1, 6, and 12 per below. The study will not specifically research the effects of a single forest practice rule but at a statewide scale, assess the condition of WLPZ areas managed under those rules over decades, allowing comparison with areas managed under NEPA guidelines on public (i.e. USFS) lands.

Theme 1-Watercourse and Lake Protection Zone Riparian Function

The study will determine WLPZ areas that have lost or gained forest cover since 1984 for all of Plumas County. Understanding landscape and local change (gain or loss) of forest cover across all WLPZ areas will improve understanding of WLPZ function. Specifically, we will be able to determine how many acres of WLPZ was classified as forest as far back as 1984, how many acres are classified as forest in 2023, and the potential direct results of that loss or gain due to wildfire and reforestation efforts. Field assessments will provide fine grained appraisal of cover

and structure using both field and UAV data of select WLPZ areas that cross both private and public lands.

A. Maintaining and restoring canopy closure to provide sufficient shade on watercourses necessary to meet Basin Plan temperature objectives?

B. Maintaining and restoring stream water temperature?

C. Retaining predominant conifers in WLPZs and large woody debris input to watercourse channels?

D. Retaining conifer and deciduous species to maintain or restore riparian shade, water temperature, and primary productivity?

E. Maintaining and restoring riparian function of Class II-L watercourses in the Northern District?

H. Managing WLPZs to reduce or minimize potential fire behavior and rate of spread?

Theme 6 - Wildfire Hazard

The project will address Theme 6 (wildfire hazard), questions D, E, and F by providing historical analysis of acres burned by severity class (low, moderate, high) for all WLPZ areas of the Northern, Southern, Coastal, and High Use Forest Districts. In addition, the project will identify current fire hazard and risk for all WLPZ areas vegetation cover, and provide a county-level analysis of the change in forest cover for all WLPZs areas within Plumas County.

D. Managing forest structure and stocking standards to promote wildfire resilience?

E. Achieving post-fire recovery and restoration?

F. Mitigating or reducing the cumulative impacts of post-fire recovery and management actions in affected watersheds?

Theme 12 - Resilience to Disturbance in a Changing Climate

We will address project theme 12 by investigating vegetative response to past wildfires and post fire recovery actions (tree removal, reforestation) as well as current risk of WLPZ to potential future crown fire, likely to result in high severity in forest types.

A. Improving overall forest wildfire resilience and the ability of forests to respond to climate change (e.g., in response to drought or bark beetle; reducing plant water stress) and variability, and extreme weather events (evaluate ecosystem functional response to fuel reduction and forest health treatments)?

B. Maintaining conifer and broadleaf stands which are well adapted to climate in order to facilitate riparian functions (e.g., shade, temperatures, primary productivity, stream flow)?

C. Meeting ecological objectives and adaptation to future climate (e.g., resilience of wildlife

habitats; variable retention silviculture as it relates to wildlife habitat structures)?

D. Maintaining or recruiting adequate amounts of early– and mid-seral wildlife habitats which are well adapted to future climate?

VII Requested Funding

Requested and contributed funding will cover all labor, fringe, travel, and indirect costs needed to complete the project. Ryan Tompkins, UC Cooperative Extension and local Principal Investigator is not requesting additional funding for the project and has time included as contributed labor.

Category	**Description**	**Year 1 (01/01/2024-06/30/2024)**	**Year 2 (07/01/2024-06/30/2025)**	**Total**
Personal Salaries and Wages	Staff Salary	$18,000	$27,000	$38,000
Fringe Benefits (25%)	Staff Fringe Benefits-25% rate	$4,500	$6,750	$16,250
Contractual Expenses	Blue Tree Analytics (Dr. Greg Fanslow)	$12,500	$12,500	$25,000
Operating Expenses	None	$0	$0	$0
Travel (Please see Match row; this is NOT counted twice)	$500/year-contributed below	$500	$500	$1,000
Other	None	$0	$0	$0
Indirect Costs	Indirect Rate 15%	$2,625	$4,500	$7,125
EMC FUNDING*	Year 1 and 2 requested funding	$20,125	$34,500	$54,625
Match or In-Kind Contributions	Contributed Labor ($1,000 per year) and Travel ($500/year)	$1,500 (Includes Travel)	$1,500 (Includes Travel)	$3,000 (Includes Travel)
Total Budgets	-	$38,125	$51,250	$87,375

*REQUIRED

Justification of Costs

All EMC funding will be used to cover staff labor costs for GIS, UAV, and other field work for FY23-24 and FY24-25. Ryan Tompkins, UC Cooperative Extension is not requesting additional funds from the project.

Personnel *(Resumes available upon request)*: $18,000 in FY23-24 and $27,000 in FY24-25

Project staff will include two Registered Professional Foresters: Project lead, Jason Moghaddas (#2774) and Field lead Gary Roller (#2899); two licensed UAV Pilots with GIS expertise: Jarrett Barbuto (Remote Pilot Certificate #3951206) and Travis Freed (Remote Pilot Certificate #3996768); one Fire Ecologist: Ian Moore, and one Forest Ecologist, Nick Miley.

Billing Rates: Billing rates for staff will be $45-$65/hour plus fringe and indirect rates (below). At these rates and with contributed labor, at least 750 hours of staff labor time will be available for the project, which is adequate funding to complete all deliverables.

Fringe (payroll taxes, health, dental, and vision): 25 % totaling $16,250 for the project

Contractual Expenses: Contract work by Dr. Greg Fanslow will include statistical and predictive analysis as described. Total cost is $25,000 for this work, with no overhead charged and all funds being used for work completion. Dr. Fanslows bio is below:

“Greg Fanslow, a data scientist with deep environmental experience, brings decades of expertise in deploying statistical algorithms, leveraging big data (particularly GIS data), and implementing innovative, data-driven solutions across various real-world scenarios. Holding a graduate degree in environmental science from UC Berkeley, he has conducted numerous landscape-scale studies and analyses of riparian and forested systems in California, aiming to understand the effectiveness of fire management practices and other anthropogenic landscape effects, such as changes in surface water temperature regimes and sediment budgets. This expertise dovetails with, and benefits from, his extensive private-sector experience as a data science consultant, where he has developed machine learning and time-series forecasting approaches for precise geographic targeting and forecasting algorithms, thereby providing clients with predictive customer engagement and more efficient logistical frameworks. His versatile proficiency merges environmental insights with sophisticated data analytics, presenting a multifaceted approach to addressing challenges in both environmental and commercial sectors.”

Travel: $0 All travel will be contributed

Contributed Funds: Travel costs will be covered as an in-kind contribution from SIG. SIG will be

contributing $1,500 in FY23-24 and $1,500 in FY24-25 for travel and labor costs. The Post Wildfire Vegetation Mapping System was funded by NASA at a cost of $125,000; while not considered "contributed," the tool will be used for this analysis.

Equipment and Other Direct Costs: $0 All equipment and other direct costs will be contributed

All field equipment, UAVs, software, and data will be provided by SIG at no additional cost to the project.

Indirect Costs: 15 % totaling $7,125 for the project

VIII Project Deliverables and VIIII Project Timeline

The project deliverables are listed below with their start and end dates highlighted in gray on the table below. Deliverables will include:

Deliverable 1: A statewide geospatial assessment of past wildfire severity in WLPZ areas from 1984-2022 (2023 will be included if available at project start), including acres burned by severity type (low, moderate, high) and reburned in subsequent fires, as applicable.

Deliverable 2: A statewide geospatial assessment of total acres burned in WLPZ areas from 1970-2022 (2023 will be included if available at project start)

Deliverable 3: A statewide geospatial assessment of current fire hazard, including potential flame length and fire type (surface, passive crown fire, active crown fire) from datasets current through 2022 (2023 if available at time of project start)

Deliverable 4: A Plumas County wide assessment of vegetation cover change in WLPZ areas from 1984-2023, including changes in the cover of forest, shrub, grassland, and barren cover types for WLPZ areas by HUC 12 watershed.

Deliverable 5 : UAV images of example stream reaches burned at different severity classes with different levels of post wildfire reforestation and post wildfire dead tree management

Deliverable 6: Public online GIS data showing all analysis outputs (fire history, fire hazard, vegetation change, UAV overview imagery)

Deliverable 7: Report summarizing the project, methods, data, and key findings

Deliverable 8: Up to 4 virtual (Zoom based) Project presentations to collaborators and funders

ACTIVITY OR DELIVERABLE	TYPE		YEAR 1 01/01/2024 – 06/30/2024				YEAR 2 07/01/2024 – 06/30/2025			
	Act.	Del.	A	B	C	D	A	B	C	D
Deliverable 1: WLPZ Fire Severity Assessment	X	X								
Deliverable 2: WLPZ Acres Burned Assessment	X	X								
Deliverable 3: WLPZ Fire Hazard Assessment	X	X								
Deliverable 4: Plumas County WLPZ Vegetation Cover	X	X								
Deliverable 5: Plumas County UAV Imagery	X	X								
Deliverable 6: Online GIS Project Map and Statistical Analysis of Data	X	X								
Deliverable 7: Draft and Final Report	X	X								
Project Update to Funders/collaborators*	X									
Project Presentation to funders/collaborators*	X									
Final Project Presentation funders/collaborators*	X									
Completed Research Assessment (CRA) presentation to EMC*	X									
CRA presentation to the Board*	X									
Key: A = Fiscal Year (FY) Quarter 1 (Jul 1 -- Sept 30); B = FY Quarter 2 (Oct 1 - Dec 31); C = FY Quarter 3 (Jan 1--Mar 31); D = FY Quarter 4 (Apr 1--Jun 30)										
Act - Activity; D - Deliverable										
Include Month in the cell if known; Identify months as numbers 1-12, Jan-Dec.										
*REQUIRED CATEGORIES										

IX Other Items Requested in EMC Letter Dated June 09, 2023

After review of our pre-proposal, the following clarifications were requested. How this proposal addresses each of these clarifications is included under each numbered point.

1) Investigate options to collaborate with local land managers and consider the addition of a Principal Investigator not associated with the private company.

Ryan Tompkins, UC Cooperative Extension Forester for Plumas County has agreed to serve as local Co-PI on the project.

2) Provide details to clarify how the relatively low amount of funding will accomplish all research objective and consider requesting additional funds if needed to ensure project success. The FPP requires inclusion of a detailed timeline of deliverables and line-item budget, and some of the additional requested details may clarify how the research goals may be accomplished within the timeline and budget requested.

The budget was increased by $17,625 and the field work component reduced to limit worker exposure to snag hazards in previously burned riparian areas. UAV assessments will be flown from areas where worker safety is not compromised. Based on further discussions, the budget was increased by $29,750 to increase the scope of the statistical and predictive analysis of data described in Task 6.

3) Include a research focus on the variety of management practices within Watercourse and Lake Protection Zones (WLPZs) and their resultant impacts.

The work on local level management practices on WLPZ and their impacts has been assessed by Dr. Rob York. Rob York (2017) completed an EMC Project "Fuel treatment alternatives in riparian zones of the Sierra Nevada" that covers additional treatment alternative studying in riparian areas (https://bof.fire.ca.gov/media/epfpnupb/8-emc-2017-006-r-york-presentation_ada.pdf). The proposed project will be able to assess potential effects of private and public land treatments (fuel treatments, reforestation, post fire tree management) where that data exists, is accurate, and available in public datasets.

4) Provide additional detail on the project nexus to the Forest Practice Rules (FPRs) and adaptive management.

The condition of riparian areas, particularly those under the authority of the California Forest Practice Rules, is highly dependent on the land management practices allowed in these areas under the Forest Practice Rules over time. This project will assess the contemporary conditions in terms of fire hazard and vegetation cover type (Plumas County) on WLPZ areas that fall under the Forest Practice Rules along with all other riparian areas on public and other private lands, allowing comparisons between the three.

5) Clarify how the field work is linked to the GIS work.

UAV flights are used to validate a subset of satellite image derived vegetation cover (forest, shrub, grassland, barren) on WLPZ areas in Plumas County.

End of Proposal
(Attachments with Requested Documents and Letters of Support to Follow)

Attachment A:
EIN & SAM Registration

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
FRESNO CA 93888

DATE OF THIS NOTICE: 01-05-1999
NUMBER OF THIS NOTICE: CP 575 D
EMPLOYER IDENTIFICATION NUMBER: 94-3316211
FORM: SS-4
8916722040 B

FOR ASSISTANCE CALL US AT:
839-1040 LOCAL SF/OAKLAND
1-800-829-1040 OTHER CA

OR WRITE TO THE ADDRESS
SHOWN AT THE TOP LEFT.

IF YOU WRITE, ATTACH THE
STUB OF THIS NOTICE.

SPATIAL INFORMATICS GROUP
% DAVID S SAAH
535 PIERCE ST 3103
ALBANY CA 94706

WE ASSIGNED YOU AN EMPLOYER IDENTIFICATION NUMBER (EIN)

Thank you for your Form SS-4, Application for Employer Identification Number (EIN). We assigned you EIN 94-3316211. This EIN will identify your business account, tax returns, and documents, even if you have no employees. Please keep this notice in your permanent records.

Use your complete name and EIN shown above on all federal tax forms, payments, and related correspondence. If you use any variation in your name or EIN, it may cause a delay in processing, incorrect information in your account, or cause you to be assigned more than one EIN.

Based on the information shown on your Form SS-4, you must file the following forms(s) by the date we show.

Form 1065 04/15/2000

If the due date has passed please complete the form and send it to us by 01-20-1999. If we don't receive the form by that date additional penalties and interest will be charged. If you weren't in business or didn't hire employees for the tax period shown, please file the form showing that you have no liability.

If you need help in determining what your tax year is, you can get Publication 538, Accounting Periods and Methods, at your local IRS office.

If you have any questions about the forms shown or the date they are due, you may call us at 1-800-829-1040 or write to us at the address shown above.

Please use the label IRS provided when filing tax documents. If that isn't possible, you should use your EIN and complete name and address as shown below to identify your account and to avoid delays in processing.

SPATIAL INFORMATICS GROUP
% DAVID S SAAH
TROY AUSTIN R GEN PTR
535 PIERCE ST 3103
ALBANY CA 94706

If this information isn't correct, please correct it using page 2 of this notice. Return it to us at the address shown so we can correct your account.

Thank you for your cooperation.

SAM.GOV

SPATIAL INFORMATICS GROUP LLC

Unique Entity ID	CAGE / NCAGE	Purpose of Registration
VTC4RJ86D2X6	**4S5Q3**	**All Awards**
Registration Status	Expiration Date	
Active Registration	**Nov 4, 2023**	
Physical Address	Mailing Address	
2529 Yolanda CT **Pleasanton, California 94566-7513** **United States**	**2529 Yolanda CT.** **Pleasanton, California 94566-7513** **United States**	

Business Information

Doing Business as	Division Name	Division Number
(blank)	**(blank)**	**(blank)**
Congressional District	State / Country of Incorporation	URL
California 15	**California / United States**	**http://www.sig-gis.com**

Registration Dates

Activation Date	Submission Date	Initial Registration Date
Nov 8, 2022	**Nov 4, 2022**	**Jun 2, 2007**

Entity Dates

Entity Start Date	Fiscal Year End Close Date
Nov 1, 1998	**Dec 31**

Immediate Owner

CAGE	Legal Business Name
(blank)	**(blank)**

Highest Level Owner

CAGE	Legal Business Name
(blank)	**(blank)**

Executive Compensation

In your business or organization's preceding completed fiscal year, did your business or organization (the legal entity to which this specific SAM record, represented by a Unique Entity ID, belongs) receive both of the following: 1. 80 percent or more of your annual gross revenues in U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements and 2. $25,000,000 or more in annual gross revenues from U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements?

No

Does the public have access to information about the compensation of the senior executives in your business or organization (the legal entity to which this specific SAM record, represented by a Unique Entity ID, belongs) through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986?

Not Selected

Proceedings Questions

Is your business or organization, as represented by the Unique Entity ID on this entity registration, responding to a Federal procurement opportunity that contains the provision at FAR 52.209-7, subject to the clause in FAR 52.209-9 in a current Federal contract, or applying for a Federal grant opportunity which contains the award term and condition described in 2 C.F.R. 200 Appendix XII?

No

Does your business or organization, as represented by the Unique Entity ID on this specific SAM record, have current active Federal contracts and/or grants with total value (including any exercised/unexercised options) greater than $10,000,000?

Not Selected

Within the last five years, had the business or organization (represented by the Unique Entity ID on this specific SAM record) and/or any of its principals, in connection with the award to or performance by the business or organization of a Federal contract or grant, been the subject of a Federal or State (1) criminal proceeding resulting in a conviction or other acknowledgment of fault; (2) civil proceeding resulting in a finding of fault with a monetary fine, penalty, reimbursement, restitution, and/or damages greater than $5,000, or other acknowledgment of fault; and/or (3) administrative proceeding resulting in a finding of fault with either a monetary fine or penalty greater than $5,000 or reimbursement, restitution, or damages greater than $100,000, or other acknowledgment of fault?

Not Selected

Exclusion Summary

Active Exclusions Records?

No

SAM Search Authorization

I authorize my entity's non-sensitive information to be displayed in SAM public search results:

Yes

Entity Types

Business Types

Entity Structure
Corporate Entity (Not Tax Exempt)

Entity Type
Business or Organization

Organization Factors
Limited Liability Company

Profit Structure
For Profit Organization

Socio-Economic Types

Check the registrant's Reps & Certs, if present, under FAR 52.212-3 or FAR 52.219-1 to determine if the entity is an SBA-certified HUBZone small business concern. Additional small business information may be found in the SBA's Dynamic Small Business Search if the entity completed the SBA supplemental pages during registration.

Financial Information

Accepts Credit Card Payments
Yes

Debt Subject To Offset
No

EFT Indicator
0000

CAGE Code
4S5Q3

Electronic Funds Transfer

Account Type
Checking

Routing Number
*******2882**

Lock Box Number
(blank)

Financial Institution
WELLS FARGO BANK NA

Account Number
*******28940**

Automated Clearing House

Phone (U.S.)
5104273571

Email
dsaah@sig-gis.com

Phone (non-U.S.)
(blank)

Fax
(blank)

Remittance Address

DAVID SAAH
Spatial Informatics Group
2529 Yolanda CT.
Pleasanton, California 94566
United States

Taxpayer Information

EIN
*******6211**

Type of Tax
Applicable Federal Tax

Taxpayer Name
SPATIAL INFORMATICS GROUP

Tax Year (Most Recent Tax Year)
2021

Name/Title of Individual Executing Consent
Principal

TIN Consent Date
Nov 4, 2022

Address
2529 Yolanda CT.
Pleasanton, California 94566

Signature
DAVID SAAH

Points of Contact

Accounts Receivable POC

David S Saah, Dr.
dsaah@sig-gis.com
5104273571

Electronic Business

David S Saah, Dr.
dsaah@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Jason Moghaddas, Mr.
jmoghaddas@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Government Business

David S Saah, Dr.
dsaah@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Jason Moghaddas, Mr.
jmoghaddas@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Past Performance

David S Saah, Dr.
dsaah@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Jason Moghaddas, Mr.
jmoghaddas@sig-gis.com
5104273571

2529 Yolanda CT.
Pleasanton, California 94566
United States

Service Classifications

NAICS Codes

Primary	NAICS Codes	NAICS Title
Yes	**541620**	**Environmental Consulting Services**
	115310	**Support Activities For Forestry**
	541360	**Geophysical Surveying And Mapping Services**
	541370	**Surveying And Mapping (Except Geophysical) Services**
	541611	**Administrative Management And General Management Consulting Services**
	541715	**Research And Development In The Physical, Engineering, And Life Sciences (Except Nanotechnology And Biotechnology)**
	813312	**Environment, Conservation And Wildlife Organizations**

Product and Service Codes

PSC	PSC Name
B510	**Special Studies/Analysis- Environmental Assessments**
F003	**Natural Resources/Conservation- Forest-Range Fire Suppression/Presuppression**
F004	**Natural Resources/Conservation- Forest/Range Fire Rehabilitation (Non-Construction)**
F005	**Natural Resources/Conservation- Forest Tree Planting**
F018	**Natural Resources/Conservation- Other Forest/Range Improvements (Non-Construction)**
F110	**Environmental Systems Protection- Development Of Environmental Impact Statements And Assessments, Technical Analysis And Environmental Audits**
F999	**Other Environmental Services**

Size Metrics

IGT Size Metrics

Annual Revenue (from all IGTs)

(blank)

Worldwide

Annual Receipts (in accordance with 13 CFR 121)	Number of Employees (in accordance with 13 CFR 121)
$4,218,131.00	**40**

Location

Annual Receipts (in accordance with 13 CFR 121)	Number of Employees (in accordance with 13 CFR 121)
(blank)	**(blank)**

Industry-Specific

Barrels Capacity	Megawatt Hours	Total Assets
(blank)	**(blank)**	**(blank)**

Electronic Data Interchange (EDI) Information

This entity did not enter the EDI information

Disaster Response

Yes, this entity appears in the disaster response registry.

Bonding Levels	Dollars
(blank)	**(blank)**

States	Counties	Metropolitan Statistical Areas
California	**(blank)**	**(blank)**
Oregon		
Vermont		

Attachment B:
Letters of Support

FEATHER RIVER
RESOURCE CONSERVATION DISTRICT

PO BOX 3562
422 N. MILL CREEK RD.
QUINCY, CA 95971

530.927.5299
ADMIN@FRRCD.ORG
FFRCD.ORG

June 26th, 2023

Re: Support for Spatial Informatics Group's proposal to address the California Board of Forestry Effectiveness Monitoring Committee's Program Grant

To the State of California Natural Resources Agency Effectiveness Monitoring Committee,

I write to express our commitment to supporting the project entitled "Assessing Fire Hazard, Risk, and Post Fire Recovery for Riparian (WLPZ) areas of California" to be proposed to California Board of Forestry Effectiveness Monitoring Committee's Program Grant.
Spatial Informatics Group's (SIG) proposal responds directly to the California Board of Forestry Effectiveness Monitoring Committee's Program Grant by providing an improved understanding of fire hazard and vegetation cover type within riparian both burned and un-burned riparian areas.
Our company has worked with SIG on prior projects focused on forest management, fuels treatment, and vegetation cover assessments. This proposal will inform our organizations fire recovery work and provide data to help dictate restoration practices.

Thank you for your consideration and acceptance of this letter of support.

Sincerely,

Michael Hall
District Manager

University of California
Agriculture and Natural Resources
Cooperative Extension: Plumas, Sierra, & Lassen Counties

June 30, 2022

Calif. Board of Forestry, Effectiveness Monitoring Committee
Dr. Kristina Wolf, Environmental Scientist
Kristina.wolf@bof.ca.gov

Re: Letter of Collaboration and Support for Spatial Informatics Group's proposal to address the California Board of Forestry Effectiveness Monitoring Committee's Program Grant

Dear Effectiveness Monitoring Committee,

I am writing to confirm my collaborative role and support for the Spatial Informatics Group (SIG) proposal, entitled "Assessing Fire Hazard, Risk, and Post Fire Recovery for Riparian (WLPZ) areas of California" submitted to the California Board of Forestry Effectiveness Monitoring Committee's Program Grant. Spatial Informatics Group's proposal responds directly to the California Board of Forestry Effectiveness Monitoring Committee's Program Grant by providing an improved understanding of fire hazard and vegetation cover type within riparian both burned and un-burned riparian areas. As a University of California Cooperative Extension Forester serving communities impacted by the 2020 North Complex Fires and the 2021 Dixie Fire, I can substantiate the need for understanding fire hazard and impacts to riparian areas due to their potential impacts on watershed health.

The University of California Cooperative Extension has collaborated with SIG on past project focused on post-fire vegetation recovery and forest and fuels management. This proposal build on our past collaboration, and not only serves northern Sierran Counties but would have positive impact statewide.

I am committed as a collaborator on all aspects of the project including conceptual design, implementation, project deliverables, and extension of results to pertinent forest management clientele. Thank you for considering this letter of collaboration and support. Should you have any questions or need for more information, please don't hesitate to contact me.

Sincerely,

Ryan Tompkins
Cooperative Extension Forester and Natural Resources Advisor, Registered Professional Forester #3108
University of California Agriculture & Natural Resources, Cooperative Extension
Plumas, Sierra, and Lassen Counties
208 Fairground Rd.
Quincy, CA 95971
retompkins@ucanr.edu
530-258-9402

Attachment C:
Requested Documents

Print Form

DocuSign Envelope ID: B2C54955-80ED-45B9-B075-A81782BE52DE

PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)

STD 204 (Rev. 03/2021)

NAME (This is required. Do not leave this line blank. Must match the payee's federal tax return)

David Saah

BUSINESS NAME, DBA NAME or DISREGARDED SINGLE MEMBER LLC NAME (If different from above)

Spatial Informatics Group, LLC.

MAILING ADDRESS (number, street, apt. or suite no.) (See instructions on Page 2)

2529 Yolanda Ct.

CITY, STATE, ZIP CODE	**E-MAIL ADDRESS**
Pleasanton, CA 94566	dsaah@sig-gis.com

Check one (1) box only that matches the entity type of the Payee listed in Section 1 above. (See instructions on page 2)

- ☐ **SOLE PROPRIETOR / INDIVIDUAL**
- ☐ **SINGLE MEMBER LLC** *Disregarded Entity owned by an individual*
- ☒ **PARTNERSHIP**
- ☐ **ESTATE OR TRUST**

CORPORATION (see instructions on page 2)

- ☐ **MEDICAL** *(e.g., dentistry, chiropractic, etc.)*
- ☐ **LEGAL** *(e.g., attorney services)*
- ☐ **EXEMPT** *(e.g., nonprofit)*
- ☐ **ALL OTHERS**

Enter your Tax Identification Number (TIN) in the appropriate box. The TIN must **match** the name given in Section 1 of this form. Do not provide more than one (1) TIN. The TIN is a 9-digit number. **Note:** Payment will not be processed without a TIN.

- For **Individuals**, enter SSN.
- If you are a **Resident Alien**, and you do not have and are not eligible to get an SSN, enter your ITIN.
- Grantor Trusts (such as a Revocable Living Trust while the grantors are alive) may not have a separate FEIN. Those trusts must enter the individual grantor's SSN.
- For **Sole Proprietor or Single Member LLC (disregarded entity), in which the sole member is an individual**, enter SSN (ITIN if applicable) or FEIN (FTB prefers SSN).
- For **Single Member LLC (disregarded entity), in which the sole member is a business entity**, enter the owner entity's FEIN. Do not use the disregarded entity's FEIN.
- For all other entities including LLC that is taxed as a corporation or partnership, estates/trusts (with FEINs), enter the entity's FEIN.

Social Security Number (SSN) or Individual Tax Identification Number (ITIN)

___ ___ ___ -___ ___ - ___ ___ ___ ___

OR

Federal Employer Identification Number (FEIN)

9 4 - 3 3 1 6 2 1 1

Section 4 – Payee Residency Status (See instructions)

☒ **CALIFORNIA RESIDENT** – Qualified to do business in California or maintains a permanent place of business in California.

☐ **CALIFORNIA NONRESIDENT** – Payments to nonresidents for services may be subject to state income tax withholding.

☐ No services performed in California

☐ Copy of Franchise Tax Board waiver of state withholding is attached.

I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the state agency below.

NAME OF AUTHORIZED PAYEE REPRESENTATIVE	**TITLE**	**E-MAIL ADDRESS**
David Saah	Managing Prinicipal	dsaah@sig-gis.com

SIGNATURE	**DATE**	**TELEPHONE** *(include area code)*
DocuSigned by: David Saah 70E0B0877TB8428...	06/20/2023	510-427-3571

Section 6 – Paying State Agency

Please return completed form to:

STATE AGENCY/DEPARTMENT OFFICE	**UNIT/SECTION**	
MAILING ADDRESS	**FAX**	**TELEPHONE** *(include area code)*

CITY	**STATE**	**ZIP CODE**	**E-MAIL ADDRESS**

PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)
STD 204 (Rev. 03/2021)

GENERAL INSTRUCTIONS

Type or print the information on the Payee Data Record, STD 204 form. Sign, date, and return to the state agency/department office address shown in Section 6. Prompt return of this fully completed form will prevent delays when processing payments.

Information provided in this form will be used by California state agencies/departments to prepare Information Returns (Form1099).
NOTE: Completion of this form is optional for Government entities, i.e. federal, state, local, and special districts.

A completed Payee Data Record, STD 204 form, is required for all payees (non-governmental entities or individuals) entering into a transaction that may lead to a payment from the state. Each state agency requires a completed, signed, and dated STD 204 on file; therefore, it is possible for you to receive this form from multiple state agencies with which you do business.

Payees who do not wish to complete the STD 204 may elect not to do business with the state. If the payee does not complete the STD 204 and the required payee data is not otherwise provided, payment may be reduced for federal and state backup withholding. Amounts reported on Information Returns (Form 1099) are in accordance with the Internal Revenue Code (IRC) and the California Revenue and Taxation Code (R&TC).

Section 1 – Payee Information

Name – Enter the name that appears on the payee's federal tax return. The name provided shall be the tax liable party and is subject to IRS TIN matching (when applicable).

- Sole Proprietor/Individual/Revocable Trusts – enter the name shown on your federal tax return.
- Single Member Limited Liability Companies (LLCs) that is disregarded as an entity separate from its owner for federal tax purposes - enter the name of the individual or business entity that is tax liable for the business in section 1. Enter the DBA, LLC name, trade, or fictitious name under Business Name.
- Note: for the State of California tax purposes, a Single Member LLC is not disregarded from its owner, even if they may be disregarded at the Federal level.
- Partnerships, Estates/Trusts, or Corporations – enter the entity name as shown on the entity's federal tax return. The name provided in Section 1 must match to the TIN provided in section 3. Enter any DBA, trade, or fictitious business names under Business Name.

Business Name – Enter the business name, DBA name, trade or fictitious name, or disregarded LLC name.
Mailing Address – The mailing address is the address where the payee will receive information returns. Use form STD 205, Payee Data Record Supplement to provide a remittance address if different from the mailing address for information returns, or make subsequent changes to the remittance address.

Section 2 – Entity Type

If the Payee in Section 1 is a(n)…	THEN Select the Box for…
Individual ● Sole Proprietorship ● Grantor (Revocable Living) Trust disregarded for federal tax purposes	Sole Proprietor/Individual
Limited Liability Company (LLC) owned by an individual and is disregarded for federal tax purposes	Single Member LLC-owned by an individual
Partnerships ● Limited Liability Partnerships (LLP) ● and, LLC treated as a Partnership	Partnerships
Estate ● Trust (other than disregarded Grantor Trust)	Estate or Trust
Corporation that is medical in nature (e.g., medical and healthcare services, physician care, nursery care, dentistry, etc. ● LLC that is to be taxed like a Corporation and is medical in nature	Corporation-Medical
Corporation that is legal in nature (e.g., services of attorneys, arbitrators, notary publics involving legal or law related matters, etc.) ● LLC that is to be taxed like a Corporation and is legal in nature	Corporation-Legal
Corporation that qualifies for an Exempt status, including 501(c) 3 and domestic non-profit corporations.	Corporation-Exempt
Corporation that does not meet the qualifications of any of the other corporation types listed above ● LLC that is to be taxed as a Corporation and does not meet any of the other corporation types listed above	Corporation-All Other

Section 3 – Tax Identification Number

The State of California requires that all parties entering into business transactions that may lead to payment(s) from the state provide their Taxpayer Identification Number (TIN). The TIN is required by R&TC sections 18646 and 18661 to facilitate tax compliance enforcement activities and preparation of Form 1099 and other information returns as required by the IRC section 6109(a) and R&TC section 18662 and its regulations.

Section 4 – Payee Residency Status

Are you a California resident or nonresident?

- A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.
- A partnership is considered a resident partnership if it has a permanent place of business in California.
- An estate is a resident if the decedent was a California resident at time of death.
- A trust is a resident if at least one trustee is a California resident.
  - For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.

For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below:

Withholding Services and Compliance Section: 1-888-792-4900 E-mail address: wscs.gen@ftb.ca.gov
For hearing impaired with TDD, call: 1-800-822-6268 Website: www.ftb.ca.gov

Section 5 – Certification

Provide the name, title, email address, signature, and telephone number of individual completing this form and date completed. In the event that a SSN or ITIN is provided, the individual identified as the tax liable party must certify the form. Note: the signee may differ from the tax liable party in this situation if the signe e can provide a power of attorney documented for the individual.

Section 6 – Paying State Agency

This section must be completed by the state agency/department requesting the STD 204.

Privacy Statement

Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, state, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it. It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and state law imposes noncompliance penalties of up to $20,000. You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the state agency(ies) with which you transact that business.

All questions should be referred to the requesting state agency listed on the bottom front of this form.

STATE OF CALIFORNIA

NONDISCRIMINATION COMPLIANCE STATEMENT

STD. 19 (Rev. 10/2019)

COMPANY NAME

Spatial Informatics Group, LLC

The company named above (herinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), medical condition (cancer), age (over 40), marital status, denial of family care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.

OFFICIAL'S NAME

David Saah

DATE EXECUTED	EXECUTED IN THE COUNTY OF
06/20/2023	Alameda County, CA

DocuSigned by:

PROSPECTIVE CONTRACTOR'S SIGNATURE

David Saah

73E6B8377D3426...

PROSPECTIVE CONTRACTOR'S TITLE

Managing Principal

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

Spatial Informatics Group, LLC.

STATE OF CALIFORNIA

DRUG-FREE WORKPLACE CERTIFICATION

STD. 21 (Rev. 10/2019)

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized legally to bind the contractor or grant recipient to the certification described below. I am fully aware that this certification, executed on the date below, is made under penalty of perjury under the laws of the State of California.

CONTRACTOR/BIDDER FIRM NAME	FEDERAL ID NUMBER
Spatial Informatics Group, LLC.	94-3316211
BY *(Authorized Signature)* DocuSigned by: David Saah 73E6B83777D3426...	DATE EXECUTED 06/20/2023
PRINTED NAME AND TITLE OF PERSON SIGNING David Saah, Managing Principal	TELEPHONE NUMBER *(Include Area Code)* (510) 427-3571
TITLE Managing Principal/ Co-Founder	
CONTRACTOR/BIDDER FIRM'S MAILING ADDRESS dsaah@sig-gis.com	

The contractor or grant recipient named above hereby certifies compliance with Government Code Section 8355 in matters relating to providing a drug-free workplace. The above named contractor or grant recipient will:

1. Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations, as required by Government Code Section 8355(a).

2. Establish a Drug-Free Awareness Program as required by Government Code Section 8355(b), to inform employees about all of the following:

   (a) The dangers of drug abuse in the workplace,

   (b) The person's or organization's policy of maintaining a drug-free workplace,

   (c) Any available counseling, rehabilitation and employee assistance programs, and

   (d) Penalties that may be imposed upon employees for drug abuse violations.

3. Provide as required by Government Code Section 8355(c), that every employee who works on the proposed contract or grant:

   (a) Will receive a copy of the company's drug-free workplace policy statement, and

   (b) Will agree to abide by the terms of the company's statement as a condition of employment on the contract or grant.

4. At the election of the contractor or grantee, from and after the "Date Executed" and until 12/20/2024 (DATE) (NOT TO EXCEED 36 MONTHS), the state will regard this certificate as valid for all contracts or grants entered into between the contractor or grantee and this state agency without requiring the contractor or grantee to provide a new and individual certificate for each contract or grant. If the contractor or grantee elects to fill in the blank date, then the terms and conditions of this certificate shall have the same force, meaning, effect and enforceability as if a certificate were separately, specifically, and individually provided for each contract or grant between the contractor or grantee and this state agency.