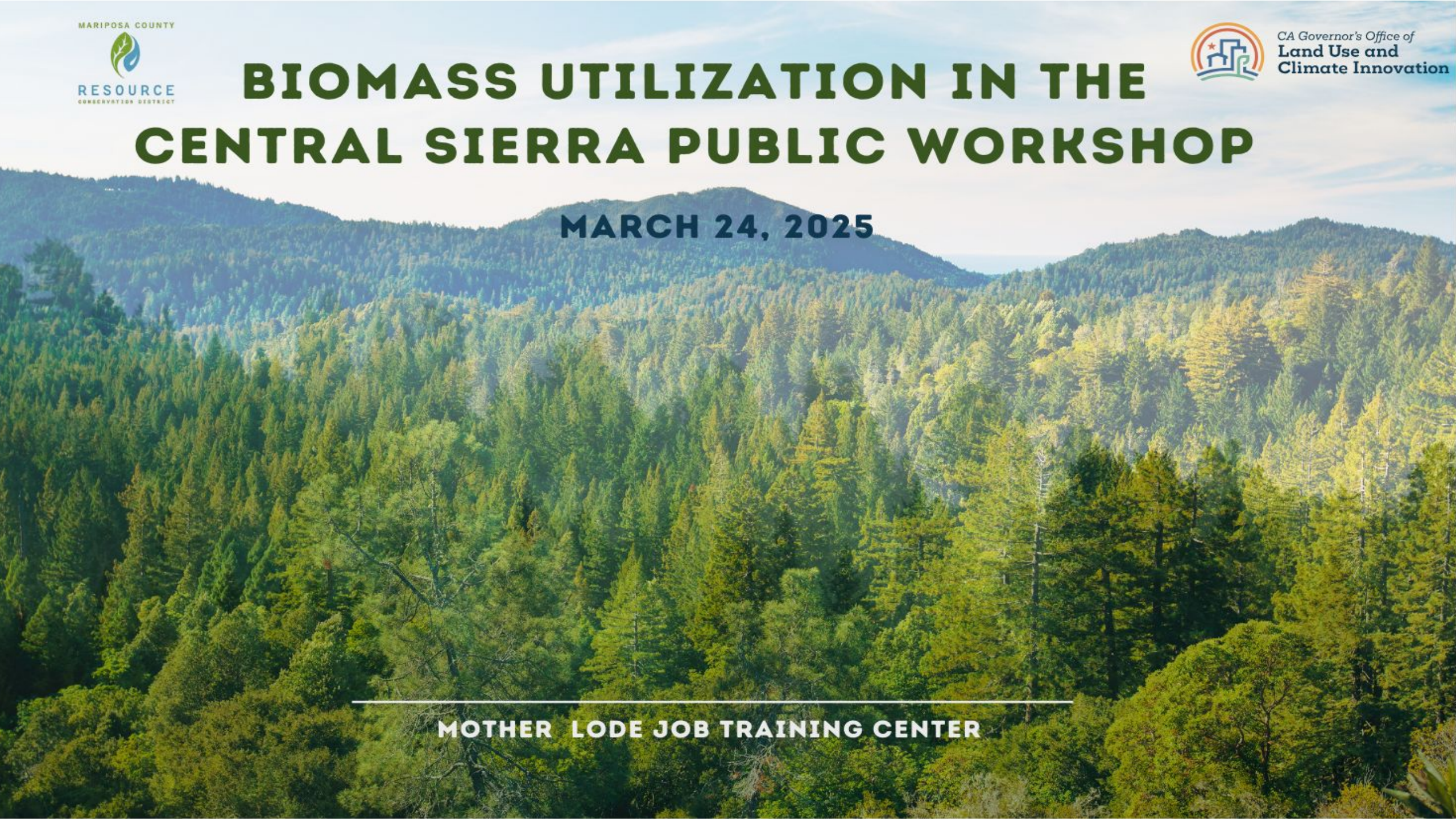
MARIPOSA COUNTY RESOURCE CONSERVATION DISTRICT

CA Governor's Office of Land Use and Climate Innovation

BIOMASS UTILIZATION IN THE CENTRAL SIERRA PUBLIC WORKSHOP



MARCH 24, 2025

MOTHER LODE JOB TRAINING CENTER

FEEDSTOCK SUPPLY AVAILABILITY ANALYSIS AND WORKFORCE REVIEW FOR THE CENTRAL SIERRA REGION

Biomass Utilization Workshop March 24, 2025

Tad Mason, CEO, TSS Consultants

Presentation Overview

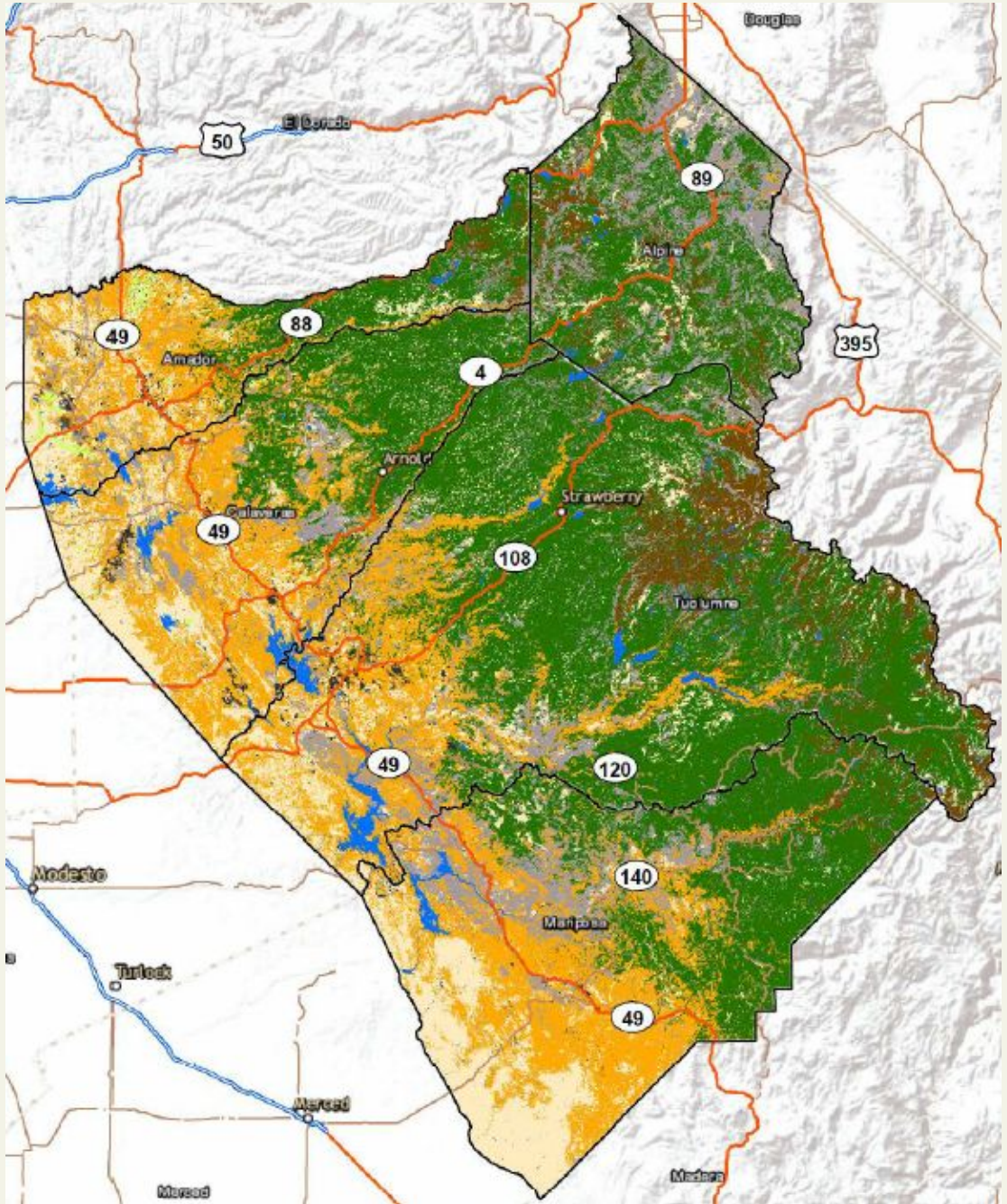
FEEDSTOCK SUPPLY

- Feedstock Study Area
  - Vegetation Cover Types
  - Land Ownership
  - Historic Wildfire Events
- Feedstock Types Considered
  - Timber Harvest Residuals
  - Fuels Reduction Activity Residuals
  - Sawmill Residuals
  - Urban Wood
- Findings
  - Feedstock Supply Availability
  - Current Competition
  - Feedstock Pricing

WORKFORCE REVIEW

- Challenges and Barriers to Maintaining or Growing the Forestry Services Workforce
- Options to Grow the Workforce

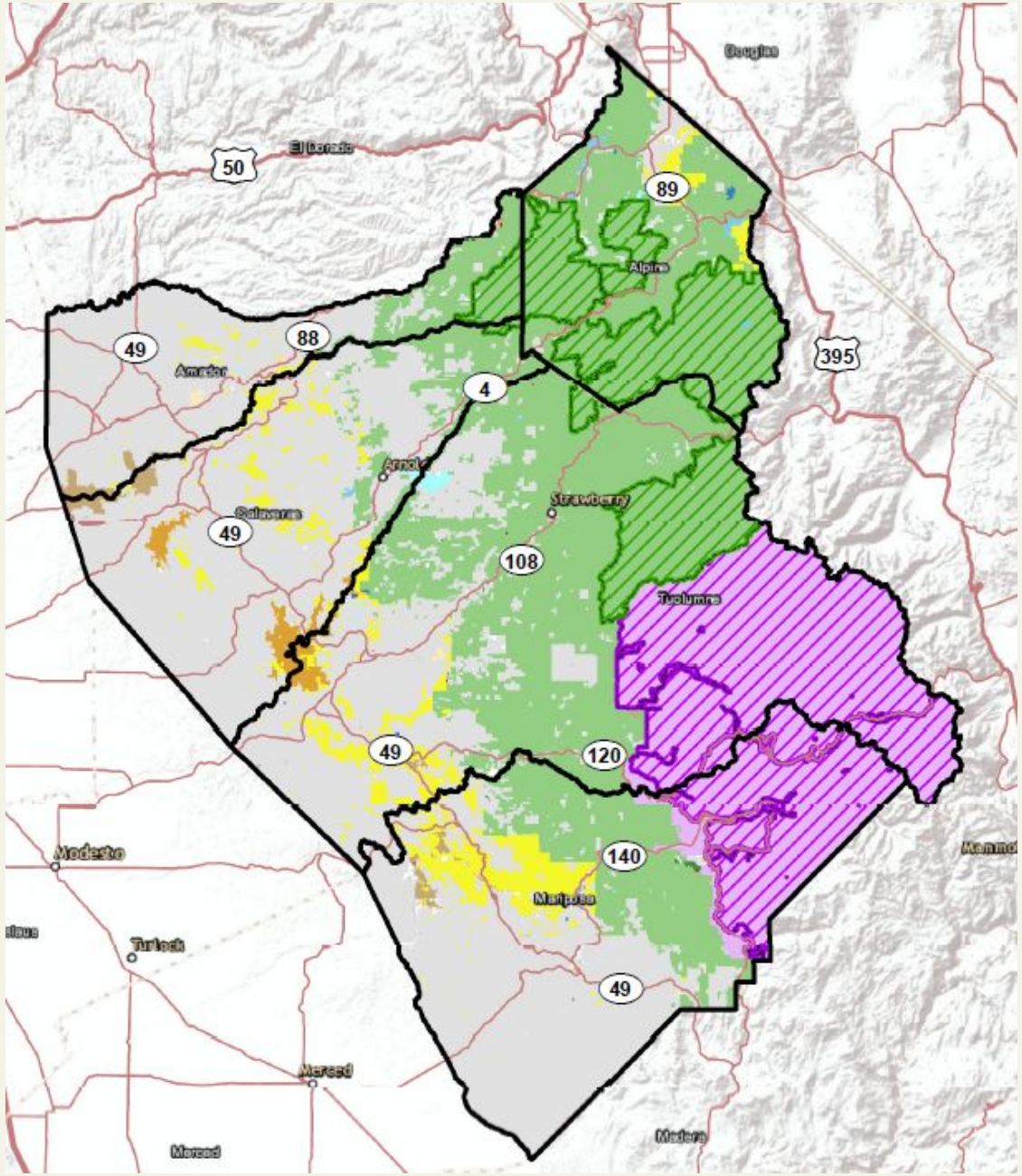
e-County Study Area Veg Cover Type



Vegetation & Land Cover Within the FSA

VEGETATION & LAND COVER	ACRES	PERCENT
Agriculture	14,027	<1%
Barren/Other	231,877	6%
Conifer	**1,558,803**	**40%**
Hardwood	**908,590**	**23%**
Herbaceous	576,211	15%
Shrub	514,268	13%
Urban	39,425	1%
Water	74,395	2%
Total	**3,917,596**	

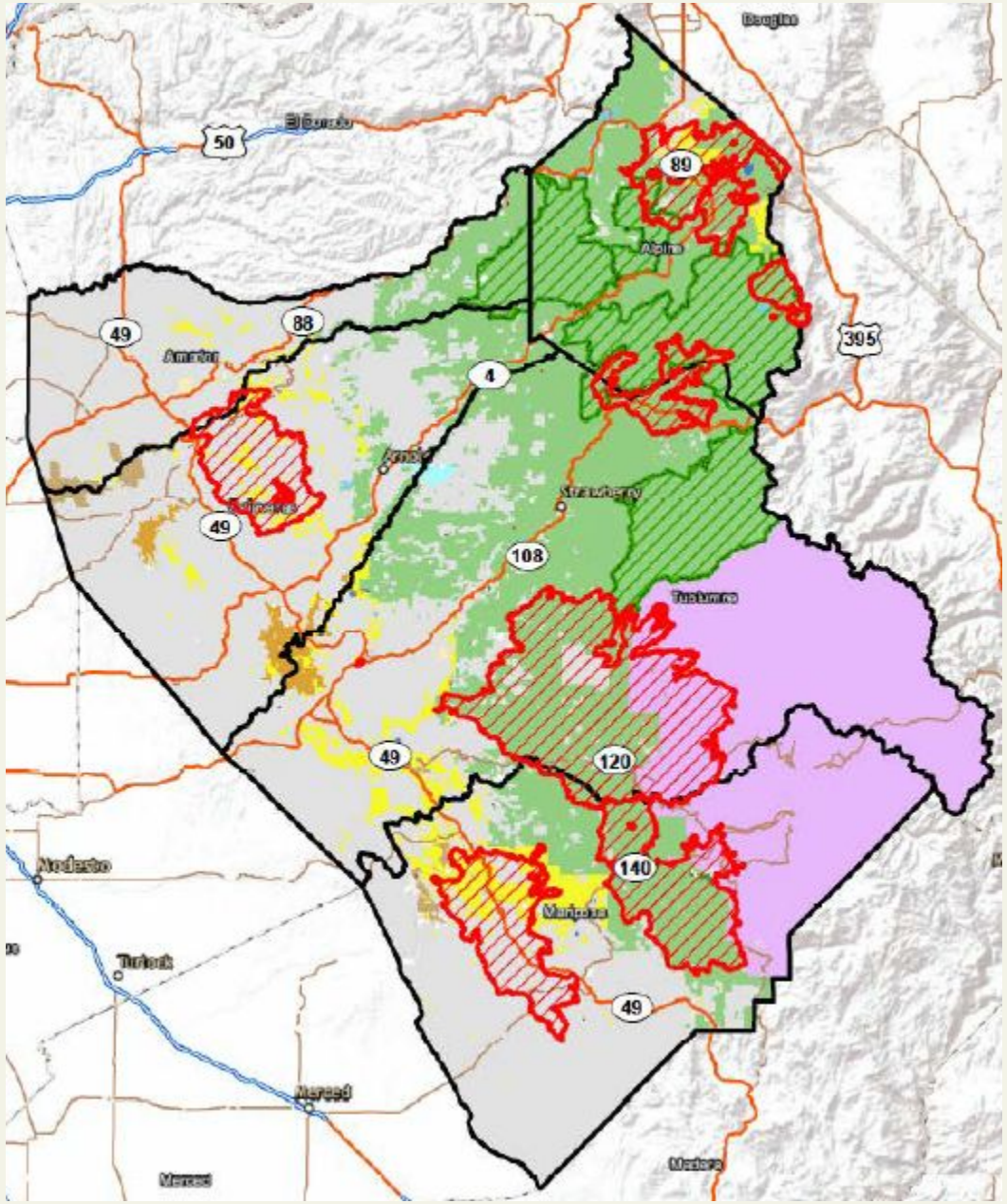
Land Ownership



Forestland and Woodland Ownership

OWNERSHIP	ACRES	PERCENT
Bureau of Land Mgmt	82,511	4%
Local Government	10,212	< 1%
National Park Service	58,586	3%
Non-Profit Conservancies	1,510	< 1%
Other Federal	14,150	1%
Other State	12,061	1%
Private	976,772	52%
USDA Forest Service	708,291	38%
TOTAL	**1,864,093**	

Historic Wildfire Events 2013 Thru 2022 (Over 10,000 Acres)



Historic Wildfires Within the FSA 2013 - 2022

Wildfire Name	Year	Acres Impacted
Rim	2013	256,176
Butte	2015	70,847
Washington	2015	17,915
Detwiler	2017	81,826
Donnell	2018	36,461
Ferguson	2018	96,831
Slink	2020	12,783
Tamarack	2021	52,269
	Total	**625,108**

Biomass Feedstocks Considered

- **Timber Harvest Residuals**
  - Tops, limbs
- **Fuels Reduction Activity Residuals**
  - Small sub merchantable stems
- **Sawmill Residuals**
  - Chips
  - Shavings
  - Bark
  - Sawdust
  - Hog fuel
- **Urban Wood**
  - Construction, demolition and industrial wood
  - Tree trimmings

Biomass Feedstocks Analysis Findings Part I

- **Timber Harvest Residuals**
  - Average of 109,737 MBF of timber harvest within the FSA between 2017 and 2021. Assuming 0.9 BDT/MBF then 79,116 BDT/yr potentially available. With about 65% of roads supporting chip trucks, about **51,425 BDT/yr practically available**.
- **Fuels Reduction Activity Residuals**
  - About 15,450 acres/yr of fuels treatments planned within the FSA (1/3 on private lands and 2/3 on federally managed land). About 7 BDT/ac removed on federal lands and 12 BDT/ac removed on private lands resulting in 96,352 BDT/yr potentially available and about **62,629 BDT/yr practically available** (65% of roads accommodate chip trucks).
- **Sawmill Residuals**
  - Two sawmills operating within the FSA producing total of **153,940 BDT/yr considered potentially and practically available**.
- **Urban Wood**
  - Construction, demolition and industrial wood as well as tree trimmings generated are population based calculations. Higher the population the more urban wood generated. About 24,552 BDT/yr potentially available and **17,039 BDT/yr practically available**.
  - Tree trimmings

Biomass Feedstocks Analysis Findings Part II

- **Current Competition:**
  - Pacific Ultrapower Chinese Station
  - SPI Standard
  - Rio Bravo Rocklin
  - Commercial firewood (including Tuolumne Biomass)
  - Landscape cover/Soil amendment
  - Livestock bedding
- **Seasonal Availability**
  - Timber harvest residuals and fuels reduction residuals typically available from April through November.
  - Sawmill residuals and urban wood available year round.

Feedstock Supply Availability Within the FSA (BDT/Yr)

Availability	Timber Harvest Residuals	Fuels Reduction Residuals	Sawmill Residuals	Urban Wood	Totals
Potentially Available	98,764	133,150	153,940	24,552	**410,406**
Practically Available	64,196	86,548	153,940	17,039	**321,722**
Current Competition	33,000	66,500	153,940	6,000	**259,440**
Economically Available	**31,196**	**20,048**	**0**	**11,039**	**62,282**

Current Delivered Prices for Feedstocks Produced Within the FSA ($/BDT)

Type	Low Range	High Range
Timber Harvest Residuals	$28.00	$48.00
Fuels Reduction Residuals	$40.00	$55.00
Sawmill Chips	$40.00	$55.00
Shavings	$45.00	$60.00
Bark	$35.00	$45.00
Sawdust	$35.00	$45.00
Hog Fuel	$35.00	$45.00
Urban Wood	$10	$16.00

Workforce Review – Part I

- TSS conducted a workforce review to confirm the primary barriers and challenges to growing the forestry workforce. Summarized below are the findings.
- Challenges and Barriers to Entry:
    - Lack of consistent workflow.
    - Understanding how to access federal bid opportunities.
    - Costs of equipment and financing.
    - High cost of transporting chips/logs and finished products.
    - Difficulties with worker recruitment:
        - Where to find trained workers.
        - Relatively low wages.
        - Losing skilled workers to other sectors.

Workforce Review – Part II

- Options to grow the workforce:
  - Utilize community college vocational education programs as a workforce training opportunity.
  - Access state and federal funding support for new or expanding forest sector enterprises.
  - Seek out small business loans or loan guarantees.
  - Have federal agencies (e.g., BLM, USFS) issue longer term service contracts or stewardship contracts (IRSC and IRTC). Thus providing assurance of work (which helps with financing new equipment).
  - Increase workforce compensation (payroll, medical benefits, retirement match) commensurate with skilled workers in other professional workforce sectors.

Reports can be accessed on the TSS Consultants website:
https://tssconsultants.com/reports-papers/

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Biomass Utilization in the Central Sierra
Public Workshop – March 24, 2025

MARIPOSA COUNTY RESOURCE CONSERVATION DISTRICT

Biomass Supply and Siting Optimization for the Central Sierra

W. David Featherman
Wildephor Consulting Services, LLC

Overview of Supplemental Analyses

- **Task 1** – Supply and Siting Optimization
  - Feedstock supply estimates (forest residues & orchards)
  - Geospatial analysis of economically recoverable feedstock
  - GHG emissions estimates from feedstock trucking
- **Task 2** – Cost Risk Analysis
  - Operating expenses for wood products campus
  - Sizing and capital expense for feedstock storage
- **Task 3** – Financial Sensitivity Analysis
  - Firewood business financial simulation model
  - Small-scale sawmill financial simulation model

Competition for Feedstock Supply

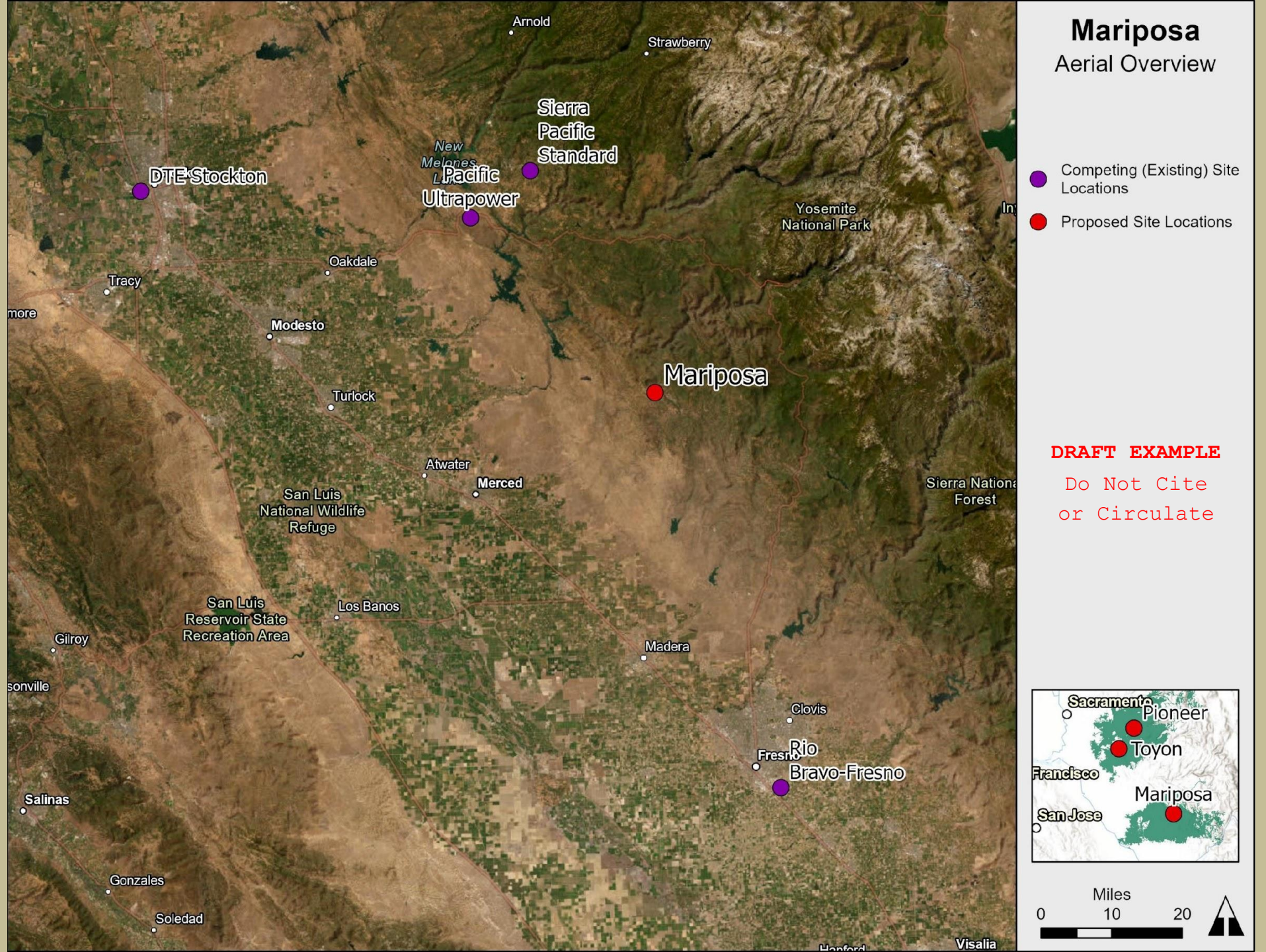
	Proposed Campus Sites	City	County	BDT/Year	Output	
1	Toyon Industrial	Vally Springs	Calaveras	-	-	-
2	P&M Cedar Sawmill *(former)*	Pioneer	Amador	-	-	-
3	Mariposa Biomass	Mariposa	Mariposa	30,000	3	MWe
	Current Utilization Sites			**1,069,000**	**148**	**MWe**
1	Pacific Ultrapower	Jamestown	Tuolumne	175,000	22	MWe
2	Sierra Pacific Standard	Sonora	Tuolumne	65,000	8	MWe
3	Rio Bravo-Fresno	Fresno	Fresno	192,000	24	MWe
4	Rio Bravo-Rocklin	Lincoln	Placer	192,000	24	MWe
5	DTE Stockton	Stockton	San Joaquin	360,000	45	MWe
6	DTE Woodland	Woodland	Yolo	85,000	25	MWe
	Planned Utilization Sites			**635,000**	**8**	**MWe**
1	Mariposa Biomass	Mariposa	Mariposa	30,000	3	MWe
2	Blue Mountain Electric Company	Wilseyville	Calaveras	25,000	3	MWe
3	Golden State Natural Resources	Jamestown	Tuolumne	420,000	-	-
4	Tuolumne Bioenergy	Sonora	Tuolumne	40,000	-	-
5	Tuolumne Biomass	Jamestown	Tuolumne	15,000	-	-
6	Yosemite Clean Energy	Jamestown	Tuolumne	90,000	50	MWth
7	North Fork Community Power	North Fork	Madera	15,000	2	MWe
8	Aemetis-Riverbank	Modesto	Stanislaus	-	-	-
				1,704,000	**156**	**MWe**
	Sites Within Central Sierra Study Area			860,000	36	MWe

Feedstock Supply Models

- Forest residues based on C-BREC 2025 data for thin from below 40% reduction scenario:
  - Less than 40% slope gradient
  - Within 1,000 feet of existing road
  - Area not burned in last 10 years
- Residues grouped into three size categories:
  - Small: <4” DBH
  - Medium: 4-9” DBH
  - Large: >9” DBH
- Orchard removals based on Statewide Crop Map, CA Department of Water Resources

Geospatial Analysis

Prepared by Tukman Geospatial LLC



Mariposa

Aerial Overview

- Competing (Existing) Site Locations
- Proposed Site Locations

DRAFT EXAMPLE

Do Not Cite or Circulate

Miles

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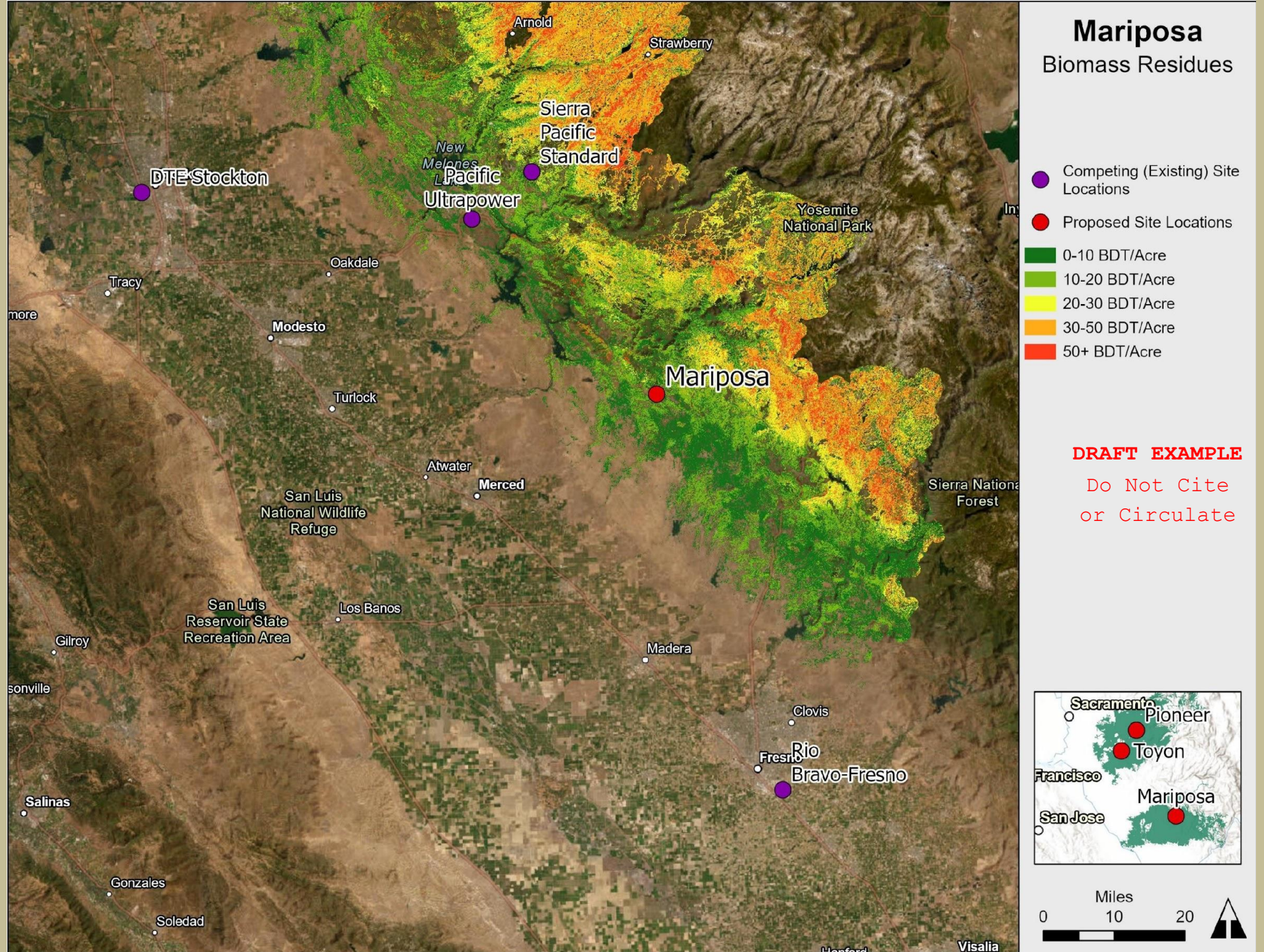
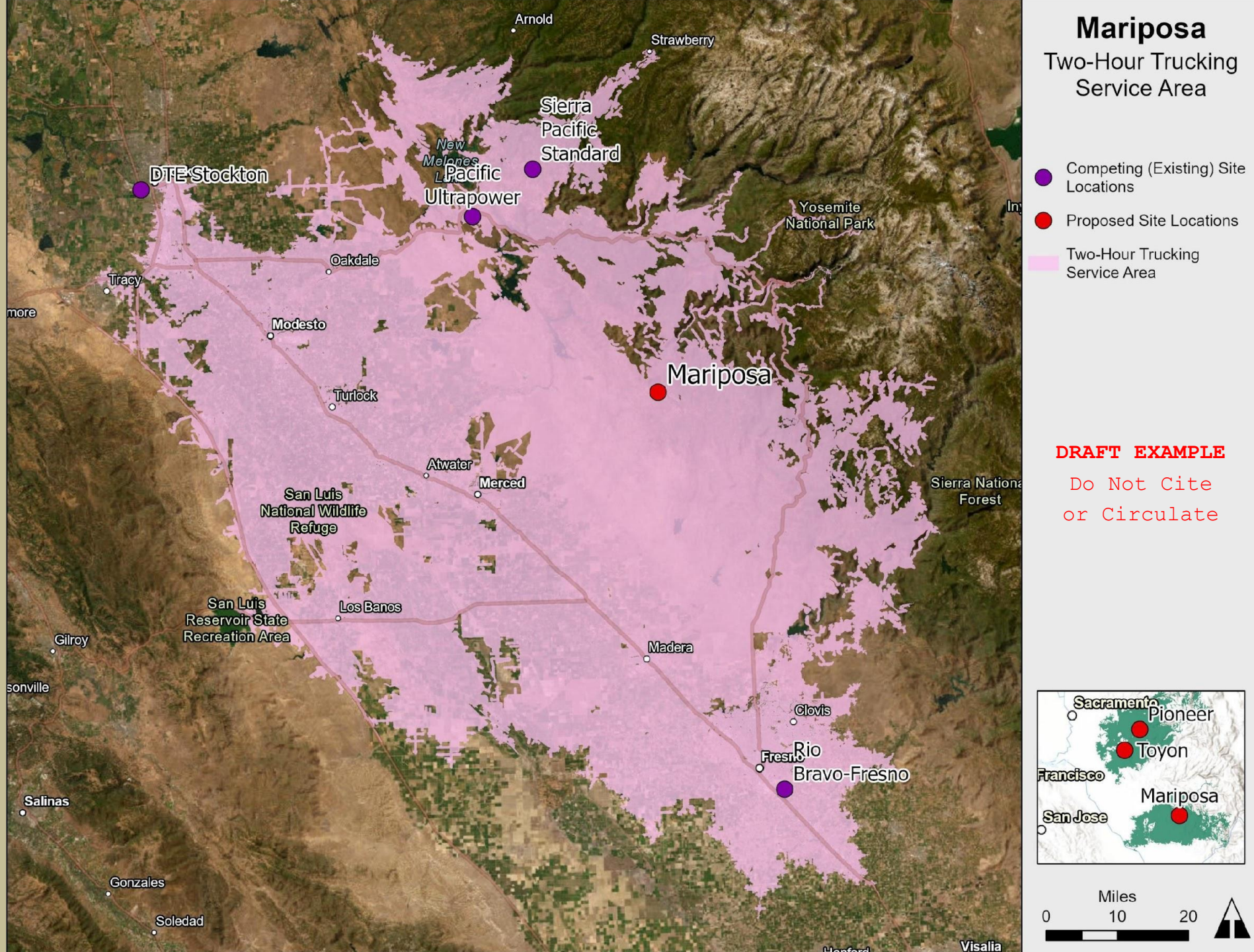

Arnold
Strawberry
Sierra Pacific Standard
New Melones L
Pacific Ultrapower
DTE Stockton
Yosemite National Park
Oakdale
Tracy
Modesto
Mariposa
Turlock
Atwater
Merced
San Luis National Wildlife Refuge
Sierra National Forest
San Luis Reservoir State Recreation Area
Los Banos
Gilroy
Madera
Clovis
Fresno
Rio Bravo-Fresno
Salinas
Gonzales
Soledad
Visalia
Mariposa
Biomass Residues
Competing (Existing) Site Locations
Proposed Site Locations
0-10 BDT/Acre
10-20 BDT/Acre
20-30 BDT/Acre
30-50 BDT/Acre
50+ BDT/Acre
DRAFT EXAMPLE
Do Not Cite or Circulate
Sacramento
Pioneer
Toyon
Francisco
Mariposa
San Jose
Miles
0
10
20



Mariposa

Two-Hour Trucking Service Area

- Competing (Existing) Site Locations
- Proposed Site Locations
- Two-Hour Trucking Service Area

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Do Not Cite or Circulate

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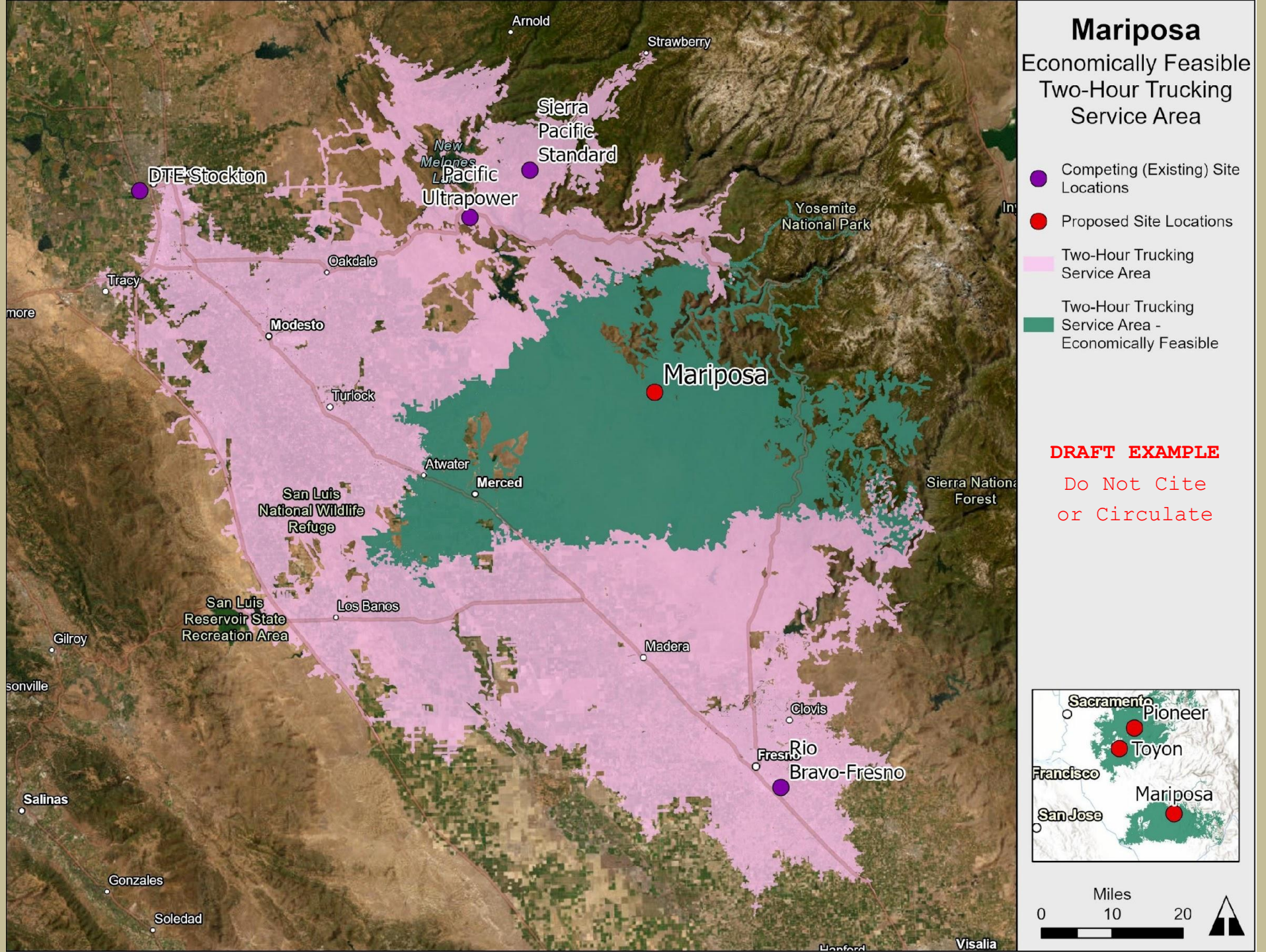

Mariposa

Economically Feasible Two-Hour Trucking Service Area

- Competing (Existing) Site Locations
- Proposed Site Locations
- Two-Hour Trucking Service Area
- Two-Hour Trucking Service Area - Economically Feasible

DRAFT EXAMPLE

Do Not Cite or Circulate

Miles

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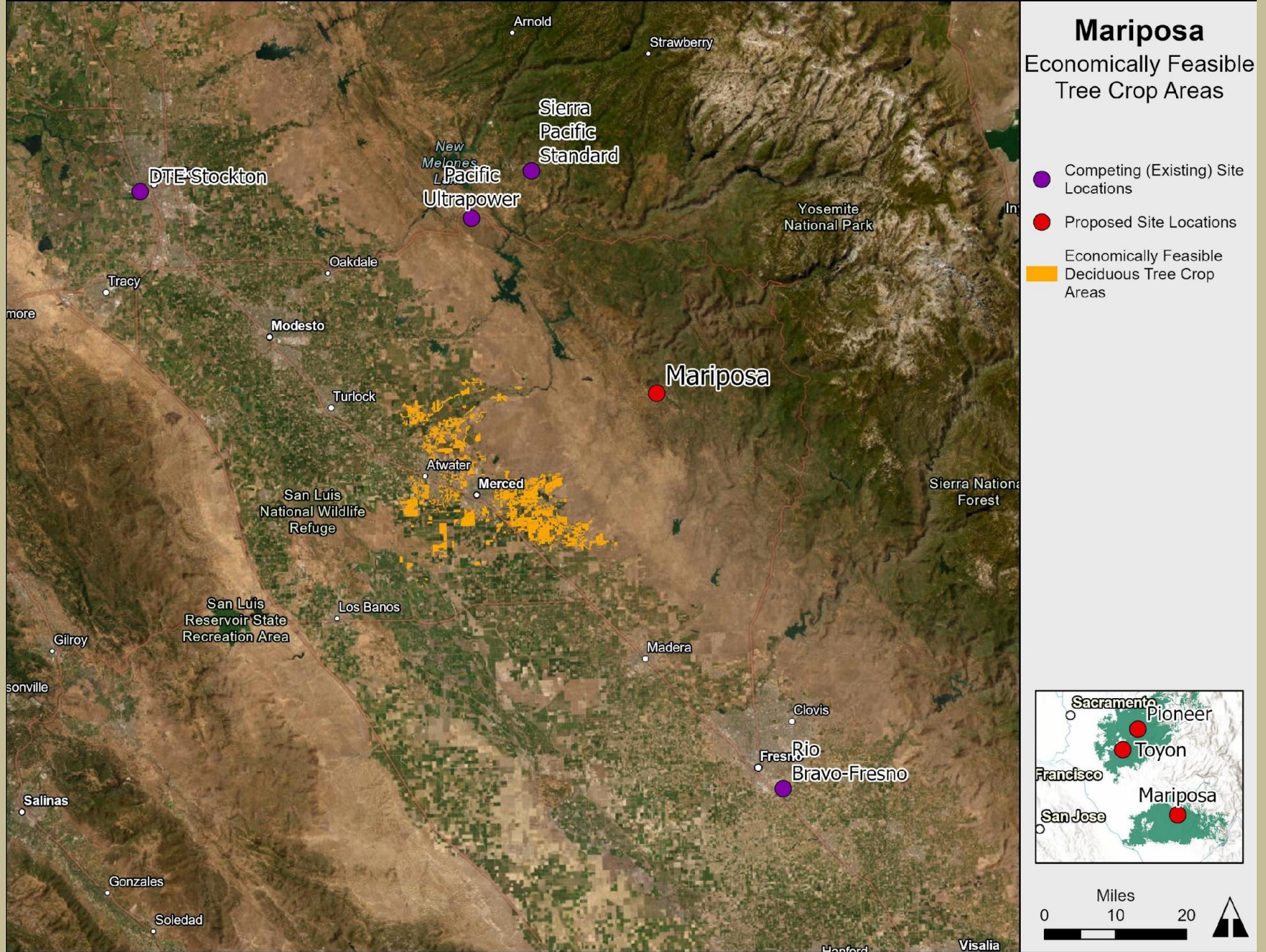
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Gilroy
Madera
Clovis
Fresno
Rio Bravo-Fresno
Salinas
Gonzales
Soledad
Visalia
Mariposa
Economically Feasible Tree Crop Areas
Competing (Existing) Site Locations
Proposed Site Locations
Economically Feasible Deciduous Tree Crop Areas
Sacramento
Pioneer
Toyon
Francisco
Mariposa
San Jose
Miles
0
10
20

Economically Feasible Supply

- Supply model constrained by two-hour drive time where there is not a closer competing biomass utilization site.
- Site-specific geospatial analysis shows a range of between 277,000 and 613,000 BDT/year (20-year removal interval).

FOREST RESIDUES (BDT)

Facility	Small DBH	Med DBH	Large DBH	Total	Annual	Orchard	Total
Toyon	3,423,774	2,845,005	5,040,234	**11,309,014**	565,451	16,490	**581,940**
Pioneer	3,720,144	3,030,296	5,497,656	**12,248,096**	612,405	910	**613,315**
Mariposa	1,207,507	969,868	1,787,739	**3,965,113**	198,256	79,066	**277,322**

GHG Impacts of Feedstock Trucking

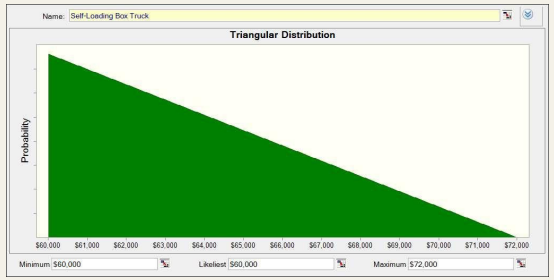
- Based on CBO emissions factor of 0.40 lbs CO2/ton-mile of feedstock transportation via diesel truck.
- Site-specific geospatial analysis shows a range of between 1,200 and 4,000 MTCO2/year (20-year removal interval).

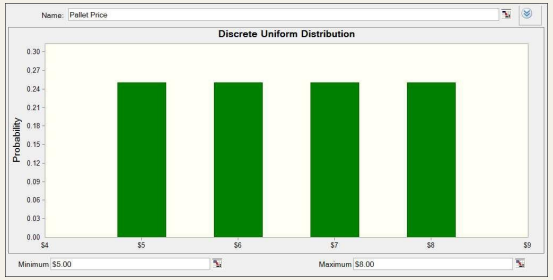
BIOMASS TRUCKING (TON-MILES)

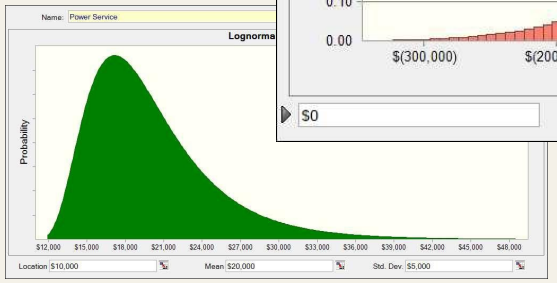
Facility	Small DBH	Med DBH	Large DBH	Total	MTCO2	MTCO2/yr
Toyon	129,581,132	103,499,922	203,586,072	**436,667,125**	79,214	**3,961**
Pioneer	107,964,530	83,856,631	162,045,539	**353,866,699**	64,194	**3,210**
Mariposa	38,250,400	30,169,600	62,557,601	**130,977,601**	23,760	**1,188**

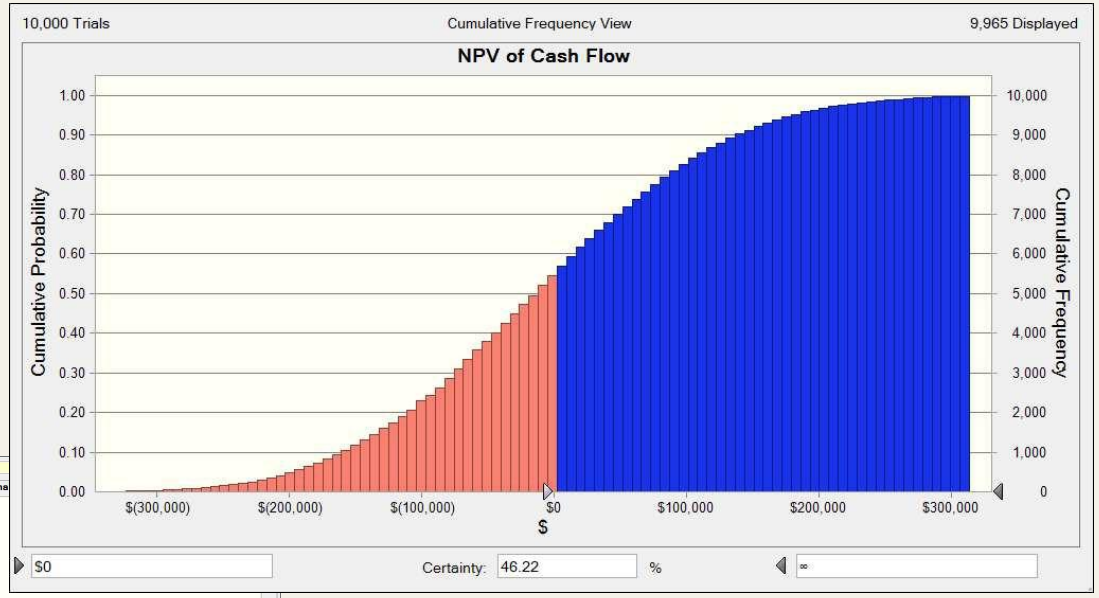
Financial Sensitivity Analysis

- Range estimating and Monte Carlo simulation used to enhance sensitivity analysis of pro forma financial models.









Conclusions

CHALLENGE

- Siting biomass utilization projects requires careful balance of many competing objectives.
- Reliable and economically feasible feedstock supply is a key driver of project viability.
- Uncertainty in operating expenses can reduce visibility into full range of potential financial outcomes.

OPPORTUNITY

- Modeling constraints can be used to limit the impact from competing utilization sites.
- Geospatial analysis that includes slope, road miles, and fire history can refine feedstock estimates.
- Financial sensitivity analysis can de-risk biomass utilization projects and improve economic outcomes.

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BIOENERGY - SUSTAINABILITY - PUBLIC POLICY - RISK ANALYSIS - PROJECT MANAGEMENT

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California Law Empowering Renewable Energy

FOREST BIOMASS MARKET ENCHANCEMENT

Presented by: Christiana Darlington

March 24, 2025

What we need in the Region?

- Support for new businesses to obtain feedstock contracts
- Support for existing businesses relating to business services, constancy in biomass pricing, insurance
- USFS lands
- Finding and managing grants and donations

PART ONE: LONG-TERM FEEDSTOCK CONTRACTS AND RISK MITIGATION

Key Components

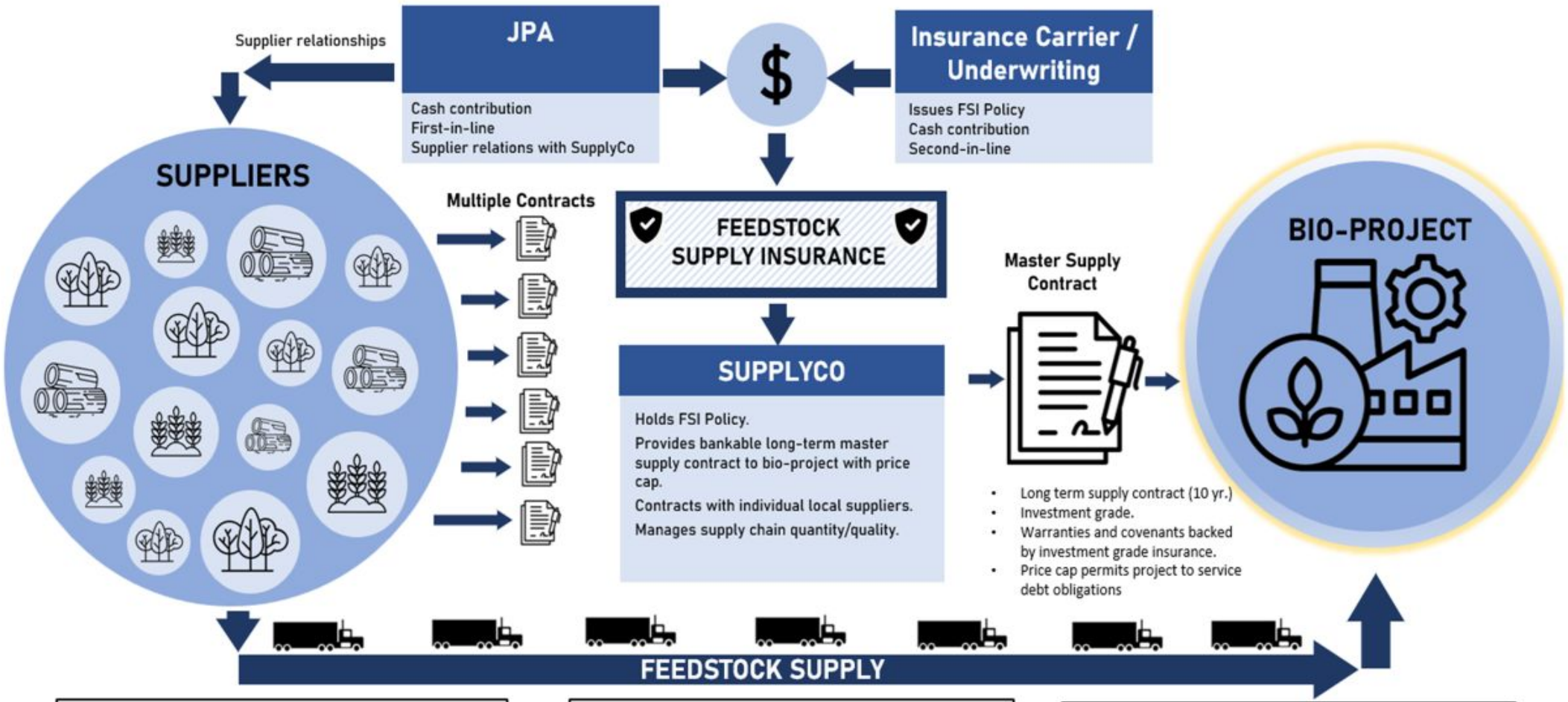
- Multi-year supply agreements
- Specified quantity, quality, and pricing terms
- Provisions for quantity/price adjustments

Risk Mitigation Tools

- Feedstock Supply Insurance (Caps Feedstock costs and secures long-term debt repayment obligations)
- Surety bonds (Guarantees contractual obligations will be met)
- Guarantee funds (provides financial backstop for supply agreements)

Benefits

- Enhances project bankability
- Transfers risk to insurance markets
- Facilitates access to capital
- Accelerates bioenergy project development



- Many small/medium size non-investment grade suppliers.
- Various contract lengths including spot.
- Firm supply contracts before financial close are difficult to obtain.
- Multiple supply contracts with no recourse make bio-project financing difficult.

- SupplyCo works with JPA to develop and contract with local suppliers.
- SupplyCo issues Master Supply Contract *before* financial close and with price cap on delivered feedstock cost.
- Master Supply Contract convents are backed by FSI/investment credit.

- Securing capital is faster, easier and less expensive.
- Bankable supply chain decreases project debt cost by 150 – 300 bpts.
- More bio-projects built in California.

PART 2: JPA MANAGEMENT OF GNA CONTRACTS FOR BIOMASS UTILIZATION

Oversee Federally Associated Funding	Contract Management	Financial Administration
Manage federal funds allocated for GNA projects	Issue RFPs and select qualified contractors	Track project expenses and revenues from biomass sales
Leverage additional state and local financial resources	Ensure compliance with federal, state, and local regulations	Manage cash flow and distribute payments to contractors
Coordinate multi-year budgeting for long-term projects	Monitor project progress and contractor performance	Reinvest proceeds into further forest management activities

PART 3: ATTRACT AND ADMINISTER NONGOVERNMENTAL FUNDING

- Many private funding sources are attracted to transparency and public accountability of JPA, they also like regional (large geographic area) of funding
- Philanthropic and foundations could put funding with the JPA
- Large federal grants could also be pursued
- A nonprofit subsidiary or a public benefit corporation development along side the JPA might be attractive possibility

PART 4: COMMUNITY SUPPORT & TECHNICAL SERVICES FOR BIOMASS MANAGEMENT

Insurance Assistance

- Support communities with homeowners insurance challenges
- Facilitate dialogue between residents and insurance providers
- Advocate for fair policies in high-risk wildfire areas

Environmental Compliance

- Provide environmental review assistance for fuel reduction projects
- Offer permitting guidance to streamline biomass removal initiatives
- Ensure projects meet local, state, and federal regulations

Local Biomass Initiatives

- Develop and manage green waste management projects
- Focus on forest biomass utilization within the community
- Create sustainable, closed-loop systems for biomass processing

Technical Support

- Offer business support services to local biomass enterprises
- Provide GIS mapping and analysis for project planning
- Deliver technical expertise for efficient biomass utilization methods

The Case for CSEDD Expansion

- CSEDD and the new national focus on working lands
- Constriction of federal funds and workforce
- State commitment to sector: upcoming Taskforce Plan and funding
- CSEDD can consider other items
- Upcoming CSEDD discussions and support
- Work plan for remainder of 2025

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Questions

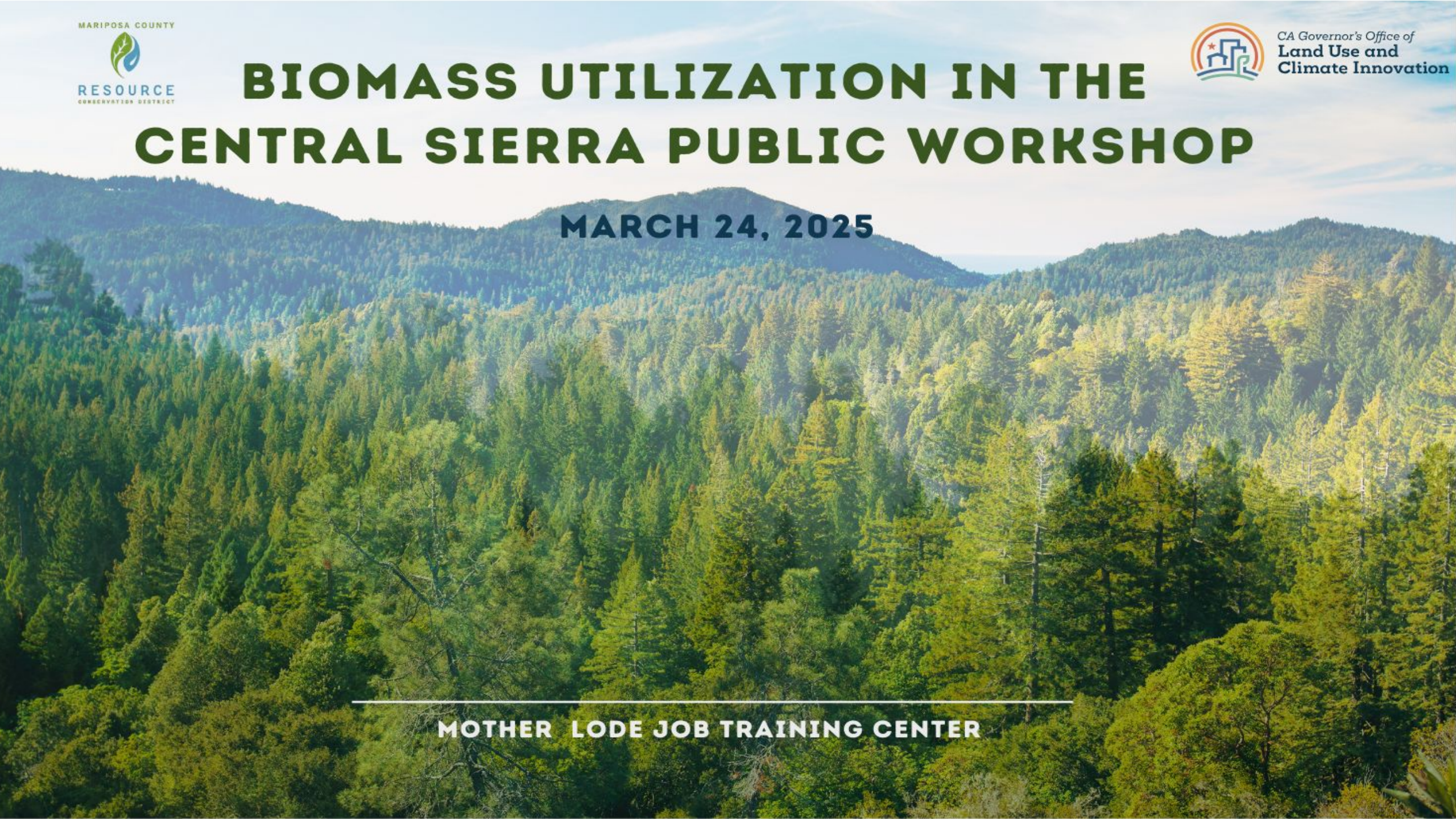
Connect with us.

christiana@clereinc.net

MARIPOSA COUNTY RESOURCE CONSERVATION DISTRICT

CA Governor's Office of Land Use and Climate Innovation

BIOMASS UTILIZATION IN THE CENTRAL SIERRA PUBLIC WORKSHOP



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