MONO COUNTY
PLANNING COMMISSION

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AGENDA

March 13, 2014 – 10 a.m.
Supervisors Chambers, County Courthouse, Bridgeport
*Videoconference: BOS Conference Room, third floor, Sierra Center Mall, Mammoth Lakes

Full agenda packets, plus associated materials distributed less than 72 hours prior to the meeting, will be available for public review at the Community Development offices in Bridgeport (Annex 1, 74 N. School St.) or Mammoth Lakes (Minaret Village Mall, above Giovanni's restaurant). Agenda packets are also posted online at www.monocounty.ca.gov / boards & commissions / planning commission. For inclusion on the e-mail distribution list, interested persons can subscribe on the website.

1. **CALL TO ORDER & PLEDGE OF ALLEGIANCE**

2. **PUBLIC COMMENT:** Opportunity to address the Planning Commission on items not on the agenda

3. **MEETING MINUTES:** Review and adopt minutes of February 13, 2014 ***– p. 1***

4. **ELECTION OF CHAIR & VICE-CHAIR**

5. **PUBLIC HEARING:** None

6. **WORKSHOPS**

10:10 A.M.

A. **BIOMASS FEASIBILITY STUDY FINAL REPORT.** *Staff: Wendy Sugimura* ***– p. 4***

10:30 A.M.

B. **INYO FOREST PLAN UPDATE.** *Debra Schweizer & Leeann Murphy, USFS/Inyo*

11:00 A.M.

C. **INTEGRATED WASTE MANAGEMENT PLAN:** Draft update, including proposed changes to Countywide Siting and Non-Disposal Facility elements. *Staff: Tony Dublino* ***– p. 72***

11:30 A.M.

D. **DEVELOPMENT STANDARDS, Part II.** *Staff: Brent Calloway* ***– p. 125***

7. **REPORTS**
   A. **DIRECTOR**
   B. **COMMISSIONERS**

8. **INFORMATIONAL**

9. **ADJOURN** to April 10, 2014

More on back...

In compliance with the Americans with Disabilities Act, anyone who needs special assistance to attend this meeting can contact the commission secretary at 760-924-1804 within 48 hours prior to the meeting in order to ensure accessibility (see 42 USCS 12132, 28CFR 35.130).

*****The public may participate in the meeting at the teleconference site, where attendees may address the commission directly. Please be advised that Mono County does its best to ensure the reliability of videoconferencing, but cannot guarantee that the system always works. If an agenda item is important to you, you might consider attending the meeting in Bridgeport.

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Interested persons may appear before the commission to present testimony for public hearings, or prior to or at the hearing file written correspondence with the commission secretary. Future court challenges to these items may be limited to those issues raised at the public hearing or provided in writing to the Mono County Planning Commission prior to or at the public hearing. Project proponents, agents or citizens who wish to speak are asked to be acknowledged by the Chair, print their names on the sign-in sheet, and address the commission from the podium.

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DRAFT MINUTES

February 13, 2014

COMMISSIONERS PRESENT: Scott Bush, Chris Lizza, Mary Pipersky, Dan Roberts, Rodger B. Thompson

STAFF PRESENT: Scott Burns, CDD director; Gerry Le Francois, principal planner, Courtney Weiche, associate planner, & Wendy Sugimura, associate analyst (teleconference); Brent Calloway, associate analyst; Stacey Simon, assistant county counsel; C.D. Ritter, commission secretary

1. **CALL TO ORDER & PLEDGE OF ALLEGIANCE:** Chair Dan Roberts called the meeting to order at 10:15 a.m. at the county courthouse in Bridgeport and led the pledge of allegiance.

2. **PUBLIC COMMENT:** None

3. **MEETING MINUTES:**

   MOTION: Adopt minutes of January 9, 2014, as submitted. (Pipersky/Thompson. Ayes: 5-0.)

4. **PUBLIC HEARING:** None

5. **WORKSHOP:**

   A. RESOURCE EFFICIENCY PLAN & COUNTY ENERGY PROGRAM PRIORITIES: Wendy Sugimura noted plan is in progress, not completed. Workshop is for commission to see what it is, where it's headed, give feedback. Scott Burns noted funding by Sustainable Communities grant.

   CEQA requires greenhouse gas (GHG) emissions, but few benefits to Mono County. Mono Supervisors (BOS) talk of reducing operating expenses, helping bottom line through energy efficiency. Four components: 1) inventory (based on standards throughout jurisdictions); 2) forecast/reduction target (reducing 15% GHG by 2020); 3) reduction policies (incorporate into General Plan update); and 4) monitoring/reporting tool (not in packet). Major goals are set forth in General Plan update. BOS wanted fuel reduction for vehicle fleet and utilities. BOS initiated PACE to provide capital for homeowners or commercial to make energy-efficient changes. Get zero net energy in county facilities.

   If GHG means human-produced, what about nature-produced (forest fire)? *Natural process was not considered in inventory.* Bush: CA could look into areas with a lot of fires, fine them. Punitive plans in background? *Not against communities, but endangering people in homes. Punitive risk is suing jurisdictions for not meeting targets. Not regulatory.* Bush: If worried about the world, who's producing GHG matters. Scott Burns noted public land agencies are dealing with climate change. Bush: Should not ignore it, act like it doesn't exist. *Mono's GHG = .031% of state's. Address in EIR document for CEQA. More practical approach is saving energy.* Bush: Any indication of punitive actions from federal government? *Just meeting existing state law. Most regulations are on utilities such as SCE.* Bush: What's baseline going to be used for? *Burns cited potential advantages for future funding opportunities.*

   When Commissioner Thompson was on a committee at state resources agency dealing with carbon credits, fire was a big topic. *Way ahead of the State, which is not that sophisticated on fees, laws, regulations. Bring in climate adaptation. No discussions on punitive measures.*

   Commissioner Pipersky noted building permit and environmental health fee waivers, but neither wind nor sustainable was mentioned. Discuss under policies. *Requested geothermal heat pumps.*

1) Inventory: Transportation is largest, then nonresidential and agricultural. Solid waste is actually deposited into landfill and generates methane. What about burning slash, back yards, agriculture fields? *Need to address it, so will look into it*. *Solid waste is huge for Mono, capture methane.* Bush: People aren't throwing as much away, not as much construction waste to generate fees. Being too efficient harms landfills. Benton is closing 2023. Solid waste is a complicated issue. Workshop on solid waste next month.

Thompson: Residential energy is based on kWh, generates CO_2. Who takes credit for solar system at his house? *Less energy used. Baseline is 2010 year. Any projects after that are counted for reduction of GHG toward achieving target. 32 metric tons at Thompson's residence. Mono gets credit for reducing community emissions.*

2) Target setting: Forecast is based on how much county and communities grow. If target is unreasonable, it can change.

3) Policies: Some may already fit into existing General Plan. Mono Supervisors do not want more regulatory measures such as requiring new construction to comply with Cal Green requirements.

Thompson: Would love to see Mono as lead agency in review of building permits, multidisciplinary review team on solar (include SCE in discussions). Edison lagged on his inspection, so maybe bring SCE along on final inspection. *Fits well with supporting private property owners in facilitating projects.*

Lizza: Mono Basin Visitor Center took about six months to get power. Bush: Making it easy takes business away from SCE.

Mono Supervisors do not support large-scale energy generation in county, but support distributed generation (rooftop solar). Stacey Simon: Narrow the goal so it's not misleading: Encourage generation for use throughout the county. Thompson: Wind energy is changing – vertical rooftop 3' windmills without blades. Scott Burns: Height up to 90' allowed.

Sugimura noted other forms could emerge, such as gray water: In set of best practices, but eliminated as impractical for PUDs. Only for individual systems, not communities. Pipersky: Other counties allow gray water systems, but Mono doesn't. *Mono allows via environmental health. See about streamlining.*

Simon: CA building standards code can become more restrictive due to local circumstances. Circulation Element is heavily weighted toward transit. Lizza: Include special districts that operate facilities. Make more general. Land Use Element: Mention June Lake Loop recreation area as well as June Mountain.

Lizza mentioned no section on renewable energy for Mono facilities, and commissioners Pipersky and Roberts agreed. *Implied in net zero energy and renewable energy generation. Larger-scale gray water system at PUD level; Mono coordinate with utility companies to streamline renewable energy process.*

Pipersky: Encourage energy for use throughout county. Deposit solid waste somewhere else besides Mono County? Simon: Considered for long term, especially with landfill closure. Acknowledge potential. Pipersky: How to encourage/promote energy efficiency in county? *Dedicated website for green tech assistance, rebates, etc. PACE program. HSEF coordinates Eastern Sierra Energy Initiative has outreach. Building Division offers workshops/seminars for contractors/public. Expand through mailers, RPAC newsletters in more organized fashion, not bits and pieces.*

Biomass? *Wrapping up feasibility study on biomass and composting*. Stacey Simon will look into it and follow up with Sugimura. Incorporate biomass more directly and bring back final draft in March.

B. **DEVELOPMENT STANDARDS:** Brent Calloway noted seven items of 30-40 on long list. 1) Snow load: Not strictly enforced everywhere, especially State-regulated mobile homes. 2) Structure height: Inconsistent. Allow approval by director, not Director Review permit. 3) Space between buildings: Let Building Code apply. 4) Manufactured home width: Eliminated single-wides. Now allow < 20' width. 5) Use permit: Allow two years, as one year doesn't really fit Mono County. Lots of pressure to loosen standards and permits. Burns indicated no need for new permit – operate under existing permit. 6) Home occupation: OK if it fits with other requirements. Stacey Simon suggested household instead of family. Scott Burns noted expanded home occupation permit goes to commission. People expect certain quality of life, and someone proposes a use. Consistent with land use designation? Burden on commission without any guidance. Side-yard setbacks: Takes staff time to clarify regulations.

Gerry Le Francois saw the biggest issue on substandard lots without width, depth, square-footage requirement. Could ask reduction from 10' to 5'. Unclear if it's on both sides, so it's interpreted differently.

If someone asked for 2.5' reduction on eave overhang, could end up with side yard at 2.5'. Biggest issue is Petersen Tract at June Lake, where owners try to build too large a home on too small a lot.

Stacey Simon indicated legal interpretation would be applicable to both sides of structure.

Burns asked: Why have setbacks? Aesthetics? Safety? Air and space? Character? Good neighbor issue (snow rail failure)? Clarity is important, so need commission input. Commissioner Lizza noted rear-yard setback to public land has less reason for setback. *Only for lots < one acre.* Roberts saw no reason for 10'; reduce to 5' including roof. Lizza noted snow has to shed somewhere. Le Francois described that as a tough one – people don't want to shed snow into driveway or backyard, so shed toward side yard. Commissioner Thompson saw emergency response space as huge. Radiant heat passes from one house to next when close. If put closer, lose that advantage. Commissioner Roberts saw issue as small lots.

Lizza thought setback applies to wall, not eave. Burns noted certain communities have smaller lots, may be consistent with their character.

Commissioner Pipersky asked if FPDs weigh in on setbacks. *No. Biggest issue is 30' state setback on acre parcels. Building Code takes into consideration how close neighbor can build without fire-rated wall.* Burns asked if 5' on both sides is OK. Intent was only one side; this is desired, but you could go smaller. Emergency response is valid issue to consider. Could go 5' on both sides if fire chief concurs. Calloway cited some existing houses < 5'. Pipersky's neighbor's house and garage sit a couple feet from property line and shed too much snow for her to landscape. Lizza noted snow pressure bows walls and roofs.

Commissioner Roberts noted snow sheds from huge house on small lot. Commissioner Bush: Structural reason? Burns: Rely on building code. Calloway: *30' setback for areas without urban fire protection. Mono has small lots without urban fire protection.* Thompson noted size closer to urban-size lots. Bush suggested input from FPDs. Burns: Survey FPDs. Lizza: Parcel abutting federal land? Bush: Land exchanges can change use. Le Francois: At Sunny Slopes and Swall Inyo National Forest found owners used public land for storage of wood piles, etc. for their own benefit. Burns: Commission does not have problems with 5' except emergency response. Survey FPDs, report back.

C. PLANNING COMMISSION RULES. C.D. Ritter reviewed updates and changes suggested by staff, and took comments from commissioners and Stacey Simon. Commission adopted 2014 update.

6. REPORTS:

A. DIRECTOR: 1) Sage grouse: Presented sage grouse comment letter opposing listing. Bi-State plan adequate. Next is economic study from USFWS. Mono took aggressive position. BOS took same position earlier. 2) Geothermal appeal: Stacey Simon indicated appeal went well. Diesel emission from construction equipment in building new plant. Temporary impact, no sensitive receptors within 1.5 mi of plant. Found case that came down 12.31 on exact issue: OSHA issue, not CEQA. Same attorneys for LIUNA. They knew when they filed, so accepted as late filing. Could be sanctioned. Labor union rep at hearing handed out card to Ormat. 3) Rock Creek Ranch: Local petition generated to challenge Cal Fire position, reconsidered. Working on fire safe. Continued BOS hearing to May 20. Advised applicant of risk without will-serve letter. 4) Tioga Inn SP: Hotel preapplication with proposed changes, applicant was losing interest. Wants 60 rooms instead of 120, taller structure.

B. COMMISSIONERS: Lizza: Conway Ranch transition away from Caltrans to ESLT easement. BOS, staff working on it. Groundwater concerns. Road closures on dry roads. Cell tower at June Lake PUD concern: not vetted before RPAC – if cell tower impacts a community, take to RPAC. Scott Burns indicated RPACs are not set up to review projects. Lizza reported a shredded rotator cuff; surgery next week. **Thompson:** California Emergency Drought Relief Act was submitted by our senators yesterday. President Obama will be heading to Fresno, announcing $100 million to Interior, $100 million to farmers, $25 million to upgrade community water systems, $25 million for community projects to reduce drought, $25 million for migrant seasonal farmworkers, $25 million for conservation efforts. **Pipersky:** Cargo container building in Long Valley? *Done for season.* Pipersky will miss March meeting due to longstanding appointment.

7. INFORMATIONAL: No items.

8. UPCOMING AGENDA ITEMS: Workshop on Waste Management Plan update

9. ADJOURN at 1:15 p.m. to March 13, 2014 *Prepared by C.D. Ritter, commission secretary*

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March 13, 2014

To: **Mono County Planning Commission**

From: **Wendy Sugimura, Associate Analyst**

Re: **Presentation of Biomass Feasibility Study Final Report**

Action Requested
None. Information only.

Background
Discussions have been ongoing for sometime about a better use of woody waste generated from forest fuel reduction and other projects than pile burning or chipping and landfilling. A group of agency and private business volunteers, consisting of Mono County, the US Forest Service and Bureau of Land Management, Mammoth Lakes Fire Protection District, Town of Mammoth Lakes, Sierra Nevada Conservancy, Southern California Edison, Great Basin Unified Air Pollution Control District (GBUAPCD), Mammoth Mountain Ski Area, and GC Forest Products, Inc., convened to further explore the issue. About a year ago, this group, called the Eastside Biomass Project Team (Project Team), secured funding from the Great Basin Unified Air Pollution Control District and the Sustainable Communities Planning Grant (State of California) to conduct a Biomass Utilization Feasibility Study.

After a very rigorous selection process, TSS Consultants was selected to complete the study. The final report is attached.

Discussion
The initial hope of the Project Team was that a combined heat and power (CHP) facility of up to 1 megawatt (MW) would be feasible, and would provide renewable energy and highly skilled jobs. A variety of sites in the county and the town were analyzed, with the key criteria being land use, space, access, and heat load. None of the identified sites contained the perfect mix of characteristics; however, these constraints became non-issues when the supply analysis determined thermal-only projects were the best fit given the sustainable annual yield of woody waste.

The feasibility analysis shifted gears to evaluate potential sites, environmental permitting requirements, and financial feasibility of thermal-only projects that displace other heating fuels such as propane or electricity. The main constraint on siting projects is the toxic risk assessment required for an air quality permit, which essentially eliminates locations near sensitive receptors such as schools, hospitals and residences.

Of the sites evaluated, Mammoth Mountain Ski Area's garage appeared to be a viable location with an interested private entity. Especially with the current winter, no commitments have been made, but the Project Team continues to work with MMSA on potential next steps forward. Grant funding may be

available for the plans, specifications, and engineering phase, and possibly for construction. In total, construction of a thermal-only project could be completed in one building season.

Please contact Wendy Sugimura at 760.924.1814 or wsugimura@mono.ca.gov with any questions.

Attachment

- Comprehensive Feasibility Study for a Heat and/or Power Biomass Facility and Expanded Forest Products Utilization in Mono County, California.

COMPREHENSIVE FEASIBILITY STUDY FOR A HEAT AND/OR POWER BIOMASS FACILITY AND EXPANDED FOREST PRODUCTS UTILIZATION IN MONO COUNTY, CALIFORNIA

Prepared for:
Mono County Community Development Department
Mammoth Lakes, California

Prepared by:
TSS Consultants
Rancho Cordova, California

February 28, 2014

Acknowledgments

The authors wish to thank several individuals and organizations for their significant efforts in support of this project, specifically, the Eastside Biomass Project Team, a collaborative group of representatives from the Mammoth Lakes area:

- Brent Harper, Mammoth Lakes Fire Department
- Byng Hunt, Mono County Supervisor
- Dan Brady, Southern California Edison
- Dan Lyster, Mono County Community Development Department
- Elissa Brown, Sierra Nevada Conservancy
- Greg Cook, GC Forest Products
- Jan Sudomier, Great Basin Unified Air Pollution Control District
- Lara Kirkner, The Sheet News
- Larry Johnston, Mono County Supervisor
- Peter Bernasconi, Town of Mammoth Lakes
- Scott Kusumoto, U.S. Forest Service, Inyo National Forest
- Steve McCabe, Mammoth Mountain Ski Area
- Tedi Duree, Southern California Edison
- Wendy Sugimura, Mono County Community Development Department

TSS would also like to thank the following individuals for their time and contributions:

- Annamaria Echeverria, U.S. Forest Service, Bridgeport Ranger District
- Brian Adkins, Bishop Paiute Tribe
- Dale Johnson, Bureau of Land Management
- Danna Stroud, Sierra Nevada Conservancy
- Deanna Campbell, Mammoth Community College
- Gary Myers, Mammoth Hospital
- Lois Klein, Mammoth Union School District
- Mandy Brinnand, U.S. Forest Service, Bridgeport Ranger District
- Paul McCahon, June Lake Fire District
- Steve Nelson, Bureau of Land Management
- Tony Dublino, Mono County Solid Waste Department

The TSS Consultants feasibility study team included:

- Tad Mason, Forester and CEO, Project Manager
- Frederick Tornatore, Chief Technical Officer
- Matt Hart, Renewable Energy Specialist

This study was made possible by generous grant funding from the State of California's Sustainable Communities Planning Grant and the Great Basin Unified Air Pollution Control District's Clean Air Project Program (CAPP) funding. Mono County contributed staff time to manage the project, and all Biomass Team agencies contributed staff time to participate.

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Abbreviations

Organizations

ARB	Air Resource Board
BLM	Bureau of Land Management
BOE	Board of Equalization
Biomass Team	Eastside Biomass Project Team
CARB	California Air Resources Board
EPA	Environmental Protection Agency
GBUAPCD	Great Basin Unified Air Pollution Control District
NDF	Nevada Division of Forestry
TSS	TSS Consultants
USDA	United States Department of Agriculture
USFS	United States Forest Service

Other Terms

ADC	Alternative Daily Cover
ATC	Authority to Construct
BDT	Bone Dry Ton
BTU, MMBTU	British Thermal Unit, Million BTU
C+D	Construction and Demolition
CCF	Hundred Cubic Feet
CEQA	California Environmental Quality Act
Core FSA	Core Feedstock Study Area
CHP	Combined Heat and Power
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CWPP	Community Wildfire Protection Plan
FPD	Fire Protection District
FSA	Feedstock Study Area
HVAC	Heating Ventilation and Air Conditioning
IOU	Investor Owned Utility
LRMP	Land Resource Management Plan
MBF	Thousand Board Feet
NF	National Forest
NO_x	Nitrogen Oxides
O&M	Operations and Maintenance
PM, PM_{10}, $PM_{2.5}$	Particulate Matter, PM (<10 micrometers), PM (<2.5 micrometers)
RFP	Request for Proposals
SB 1122	California State Senate Bill 1122
SB 32	California State Senate Bill 32
SO_2	Sulfur Dioxide
U.S.	United States
VOC	Volatile Organic Compounds
WBUG	Woody Biomass Utilization Grant
WUI	Wildland Urban Interface

EXECUTIVE SUMMARY

Background

The Eastside Biomass Project Team (Biomass Team) is evaluating the feasibility of a community-scale bioenergy facility (thermal only, combined heat and power, or electricity only) using local sustainably-available forest biomass waste and supporting local labor and the regional economy. The Biomass Team consists of representatives from the Bureau of Land Management, GC Forest Products, Inc., Inyo National Forest, Mammoth Lakes Fire Protection District, Mammoth Mountain Ski Area, Mono County, Sierra Nevada Conservancy, and the Town of Mammoth Lakes. The Great Basin Unified Air Pollution Control District and Southern California Edison participate regularly and provide technical assistance.

The Biomass Team retained TSS Consultants (TSS) to conduct a comprehensive feasibility study to evaluate the viability of siting a bioenergy facility within the central Mono County and Mammoth Lakes area. The feasibility study focuses on the utilization of sustainably-available forest biomass sourced as a byproduct of forest management and fuels treatment programs.

Site Review and Analysis

Seven sites for locating a biomass combined heat and power (CHP) facility and seven additional sites for locating a biomass thermal project were reviewed in the Mammoth Lakes area. TSS found that several locations could be suitable for a biomass CHP facility using the high-level screens of accessibility, site size, potential for heat load, and zoning. As an initial evaluation, electrical interconnection potential was not considered. The most significant challenge facing CHP project development was that projects with the potential for a heat offtake did not have sufficient size for winter feedstock storage, and projects with sufficient acreage did not have a heat load. Both heat offtake potential and onsite storage are critical factors that influence a project's economic performance.

Of the seven sites reviewed for a biomass thermal facility, five of the seven had sufficient heat demand and proper infrastructure for the installation of a biomass boiler to displace fossil fuel consumption. The preferred sites include the Mammoth Mountain garage, Mammoth Hospital, and Mammoth Middle School (part of the Mammoth Unified School District).

Biomass Feedstock Availability and Cost Analysis

Sustainably-available biomass feedstock is limited in the Mammoth Lakes area because of the challenges accessing feedstock in the eastern half of the study area and limited annual forest harvest activities on federally managed lands (the major land management entity in the area). Table 1 summarizes the volumes of sustainably available feedstocks by source.

Table 1. Biomass Feedstock Material Practically Available by Source

BIOMASS MATERIAL SOURCE	AVAILABILITY (BDT/YR)
Timber Harvest Residuals	2,864
Fuels Treatment Activity Residuals	225
Forest Products Manufacturing Residuals	285
Urban Wood Waste	1,945
TOTAL	**5,319**

Additional feedstock may be available in any given year based on episodic events such as wind events, wildfire, and insect kill; however, TSS does not consider these sources to be sustainable over the 20-year service life of a bioenergy project. Therefore, feedstock availably limits the potential for bioenergy development to a thermal project, as a 0.5 MW CHP project would require a minimum of 8,000 BDT per year to meet the recommended 2:1 feedstock coverage ratio. Feedstock pricing is illustrated in Table 2.

Table 2. Biomass Feedstock Material Delivered Costs

BIOMASS MATERIAL SOURCE	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)
Timber Harvest Residuals	$45	$60
Fuels Treatment Activity Residuals	$25	$30
Forest Products Manufacturing Residuals	$20	$25
Urban Wood Waste	$25	$30

Economic and Financial Feasibility Analysis

The economic and financial feasibility analysis utilized publically available data from the U.S. Department of Agriculture (USDA) Forest Service (USFS) Fuels for Schools and Beyond Program. Fuels for Schools is a program focused on developing small-scale biomass thermal projects at schools across Washington, Oregon, Idaho, Montana, Nevada, and Alaska. Utilizing actual financial costs (averages and ranges) from these projects and the biomass feedstock availability and cost analysis, TSS developed a financial pro forma to review the potential for a 2 MMBtu per hour biomass thermal project. Findings are displayed in Table 3.

Table 3. Biomass Thermal Financial Analysis Findings

	SCENARIO 1	SCENARIO 2	SCENARIO 3	SCENARIO 4
Total Project Cost ($)	$353,488	$548,396	$548,396	$700,000
Propane Displaced (gal/yr)	53,188	45,209	45,209	39,891
Cost of Propane ($/gal)	3.38	3.38	2.15	2.15
Price of Biomass ($/BDT)	$25	$30	$30	$35
Additional O&M Personnel Costs ($/yr)	$4,745	$9,490	$9,490	$14,235
Additional O&M Equipment Costs ($/yr)	$1,000	$4,500	$4,500	$7,000
IRR	46.6%	23.4%	12.8%	6.1%
Simple Payback Period (yr)	2.1	4.2	7.4	12.7

The financial feasibility of biomass thermal projects depends on the cost of the displaced fossil fuel (comparing scenarios 2 and 3) and the capital cost of the project (comparing scenarios 1 and 2 and scenarios 3 and 4). A financial assessment of each individual project should be conducted to better understand the viability of a specific project with a focus on the annual heat demand, capital cost, avoided fossil fuel costs, and the needs of the collocated enterprise.

Due to the relatively small feedstock demand and the low operational requirements, one biomass thermal installation is not expected to generate additional jobs in the local area in either the forestry sector or with the organization with which the unit is located; however, the installation is expected to support existing jobs and if scaled to multiple units in the region could create additional employment opportunities.

Renewable Energy Technology Selection Process

TSS recommends that any organization planning to install a biomass boiler select their preferred technology based on a competitive bid process. The feasibility report provides a list of technology vendors and developers that operate in the range appropriate for thermal applications in the Mammoth Lakes regions (Table 25). As with any capital investment, there are more factors that influence technology selection than strictly cost, and each organization should review and prioritize specific selection criteria (Table 26) before selecting a developer. TSS has developed a request for proposals template that can be used to initiate the competitive bid process (Appendix B).

Permitting Plan

The installation of a biomass thermal system to replace an existing heating system does not require any additional land use entitlements. Thus, it has been determined that the only environmental permit required for a biomass thermal system would be an air quality permit from the GBUAPCD.

It is expected that biomass-fueled boiler systems in the Mammoth Lakes area and at the preferred sites previously identified will have very low air pollutant emissions due to the relatively small size.

The direct combustion of woody biomass in a thermal boiler system will result in the potential release of toxic air contaminants. The release of toxic air contaminants is governed by GBUAPCD policy, which will present challenges to the siting of biomass thermal units at certain sites within the Mammoth Lakes area, particularly those near residential dwelling units. Based on a preliminary toxins analysis, the Mammoth Mountain garage is remote enough from sensitive receptors that the GBUAPCD Toxic Risk Assessment Policy has relatively little effect on siting a biomass thermal unit at that location.

Outreach and Communications Plan

Biomass thermal projects do not require the same level of community outreach as is recommended for a biomass CHP development project. The replacement and retrofit of a heating system does not trigger a California Environmental Quality Act (CEQA) review and therefore

does not open the project to public comment. However, TSS recommends that educational documentation be provided to interested stakeholders (Appendix F). The Biomass Team has presented the project concept to multiple community groups, and this final report was presented to the Mammoth Lakes Town Council.

Recommendations and Next Steps

This feasibility study found that a small-scale biomass thermal facility, co-located at the Mammoth Mountain garage, is a financially viable option to augment an existing propane fired boiler. Locally available biomass feedstocks are readily available, the project can be permitted, the biomass conversion technology is available, and the Mammoth Lakes community appears to be supportive. Critical next steps include beginning discussion with feedstock supply contractors and the Benton Crossing landfill, commencing the technology selection process (using RFP provided by TSS as a template), and strengthening outreach to others to identify options for additional use of thermal energy.

SITE REVIEW AND ANALYSIS

Site selection for a community-scale biomass facility requires in-depth analysis of a site and its attributes to determine the benefits and challenges that each unique site offers. To identify preferred sites, TSS utilized coarse filters to focus the search and to select a targeted list of preferred sites. Preliminary screens include three critical constraints and five secondary considerations that can be potentially mitigated.

TSS reviewed potential sites for biomass CHP and biomass thermal application. Sites were identified by the Biomass Team and through satellite imagery of Mammoth Lakes.

Siting Filters

Critical Constraints

1) *Land Use*: Land use refers to the designation of the potential site as determined by the 2013 Mono County General Plan and the Town of Mammoth Lakes Zoning. Land use designations identify the allowable uses for a particular site and indicate the appropriate steps to comply with the area's intended use. Based on the 2013 Land Use Designations, the designation types listed below would allow a biomass conversion facility with a Conditional Use Permit. Any other designation would require amendment to the General Plan, which can be a time-intensive and often costly endeavor. In addition, facilities located on public lands, such as USFS land, will need to coordinate special use permit conditions.
    a. *Allowable Designations*: Industrial.
    b. *Potential Designations*: Resource Extraction, Industrial Park, Public and Quasi-Public Facilities, Agriculture, Specific Plan.
    c. *Special Considerations:* USFS special use permit

2) *Space*: Biomass availability will be limited during parts of the year primarily due to inclement weather. To allow for the facility's footprint and feedstock storage, TSS recommends a minimum size of two acres for a site located in the Mammoth Lakes Region. For sites larger than two acres, TSS will further evaluate the location to identify a facility's maximum capacity based on technology type and feedstock storage requirements.

3) *Access*: Biomass facilities, at any scale, must allow for access by chip van to deliver feedstock. Chip vans are typically classified as California Legal Truck Tractor – Semitrailers and adhere to the STAA[1] Truck Tractor classifications. In the Mono Lakes Region, U.S. Highway 395, State Highway 182 and 167, and State Highway 120 west of U.S. Highway 395 are built to allow for all California Legal Truck Tractor – Semitrailers. State Highway 120 east of U.S. Highway 395 is a California Legal Advisory Route and has posted restrictions based on weight and length. Proximity to these major transportation networks is critical for feedstock delivery.

[1] Surface Transportation Assistance Act, 1982.

Secondary Considerations

1) *Heat Load*: The production of thermal energy using biomass material as a primary feedstock can be very cost effective. Displacing fossil fuel consumption can greatly enhance the economics of any biomass conversion project. Considerations include:
    a. How high is the current heat demand?
    b. What is the demand profile (the heat demand over time)?
    c. How far away (from the proposed biomass conversion facility) is the heat load?

2) *Power*: The availability of onsite load displacement will determine the net metering or excess power sales potential which may enhance the economics of biopower production. For projects that plan to export power, the existing utility infrastructure is important. Online tools are available for a cursory analysis of the local electric grid.

3) *Sensitive Receptors*: Nearby residential dwellings and businesses can be regarded as sensitive receptors and must be considered when examining the impacts of a biomass project.

4) *Water Availability*: What is the accessibility of water? If water is not available onsite, what are the options for bringing water to the site? Note that not all technologies require water, although all sites will require a domestic water supply.

5) *Water Discharge*: What are the options for domestic and industrial wastewater discharge? Note that some technologies produce minimal quantities of wastewater that can be trucked to an appropriate water treatment facility when necessary.

Findings

The Mammoth Lakes area has the potential to site a biomass CHP facility; however, siting will be challenging, as there are no sites that offer appropriate space, sufficient heat loads, and proper zoning. Of the sites reviewed, many provided two of these three major criteria with the trade-off typically consisting of sufficient space without a heat load or a heat load without sufficient space. Heat load and space are critical to a project's economic outlook because a heat load offers a market for waste heat and sufficient space (for onsite feedstock storage) allows the feedstock to be handled only once.

The potential for siting a biomass thermal facility is favorable in the Mammoth Lakes area where the temperature profile may require heating of buildings throughout the majority of the year. The Biomass Team and TSS identified seven potential sites for thermal applications and found that six of these sites have appropriate infrastructure for thermal energy retrofit.

The findings from the site analysis are shown in Table 4 and Table 5.

Table 4. Combined Heat and Power Siting Analysis

LOCATION	AERIAL IMAGE	ZONING	SPACE	INFRASTRUCTURE	OTHER
McFlex Parcels/ Mammoth Hospital		General Plan: Institutional Public Zoning: Public and Quasi Public	This site would require off-site feedstock storage.	None	The site is near several sensitive receptors including the hospital, schools, and a residential area.
Mammoth Unified School District		General Plan: Institutional Public Zoning: Public and Quasi Public	This site would allow for onsite feedstock storage.	Would need to identify an appropriate vehicle access route.	The site is near several potential sensitive receptors including the hospital, schools, residential area, and RV park. This site may have restricted use based on the ownership structure.
Sierra Business Park		General Plan: Industrial Zoning: Industrial	This site would allow for onsite feedstock storage.	None	There is limited potential for heat demand.
Old Sheriff Substation		General Plan: Public and Quasi Public Zoning: Public and Quasi Public	This site would allow for onsite feedstock storage.	None	There is no potential for heat demand.
Mammoth Disposal/Transfer Station		General Plan: Institutional Public Zoning: Industrial	This site would require off-site feedstock storage.	None	The site is currently occupied by tenants and there is not public support for further development of the site.
South Gateway Facilities		General Plan: Institutional Public Zoning: Public and Quasi Public	This site would allow for onsite feedstock storage.	None	There are already conceptual development plans for this site from the Community College. Additionally, a public biking and hiking path is nearby which may create public opposition.
Mammoth Ski Area		Operated under a Special Use Permit by the USFS	This site would allow for onsite feedstock storage.	None	The USFS requires that private sites be evaluated for this type of project before consideration for development on public lands.

Table 5. Thermal Only Siting Analysis

LOCATION	EXISTING SYSTEM	CURRENT FUEL DEMAND AND PRICE	POTENTIAL CONSTRAINTS
Mammoth Hospital	Two 1.6 MMBtu/hr units and two 4.0 MMBtu/hr units.	Some residential propane HVAC system while diesel boilers are the primary heat source. 122,000 gal/yr of diesel at $3.38/gal (~$412,000/yr).	Space constraints for adequate woodchip storage and for delivery truck traffic may be challenging. There may be additional criteria for air permitting as the hospital is considered a sensitive receptor.
Mammoth Unified School District: Elementary School	Two 850,000 Btu/hr boilers and one 660,000 Btu/hr boiler generating hot water.	The propane usage was an aggregated number for the district (~$286,000/yr) at $3.66/gal.	Space constraints for adequate woodchip storage and for delivery truck traffic may be challenging. There may be additional criteria for air permitting as the school is considered a sensitive receptor.
Mammoth Unified School District: Middle School	Two 2.05MMBtu/hr boilers generating hot water.	The propane usage was an aggregated number for the district (~$286,000/yr) at $3.66/gal.	Space constraints for adequate woodchip storage and for delivery truck traffic may be challenging. There may be additional criteria for air permitting as the school is considered a sensitive receptor.
Mammoth Unified School District: High School	Does not use a centralized boiler system.	N/A	N/A
Cerro Coso Community College: Mammoth Campus	Two Units: 630,000 Btu/hr to generate hot water.	The propane usage was approximately 8,900 gal/yr at $1.70-$3.55/gal (~$24,000/yr)	There are potential space constraints at the community college campus. Additionally, the boilers only service the college and not the surrounding student residences.
Mammoth Ski Area: Canyon Lodge	2 MMBtu/hr used for snowmelt.	The propane usage was approximately 20,000 gal/yr at $2.15/gal (~$43,000)	Space limitations at the lodge due to high customer traffic. Road access to the garage in the winter could be challenging with the increased snow loads compared to the town. Steep grade on the incoming roadway may be challenging.
Mammoth Ski Area: Garage	Two Units: 2.5 MMBtu/hr to generate hot water.	The propane usage was approximately 50,000-60,000 gal/yr at $2.15/gal (~$118,250/yr)	Road access to the garage in the winter could be challenging with the increased snow loads compared to the town. Steep grade on the incoming roadway may be challenging.

BIOMASS FEEDSTOCK AVAILABILITY AND COST ANALYSIS

The site review indicated the potential for CHP or thermal-only biomass development in the Mammoth Lakes region. The Biomass Feedstock Availability and Cost Analysis addressed the potential for sourcing biomass feedstock in areas tributary to Mammoth Lakes. Woody biomass material sources considered in this analysis include a range of forest and wood waste management activities:

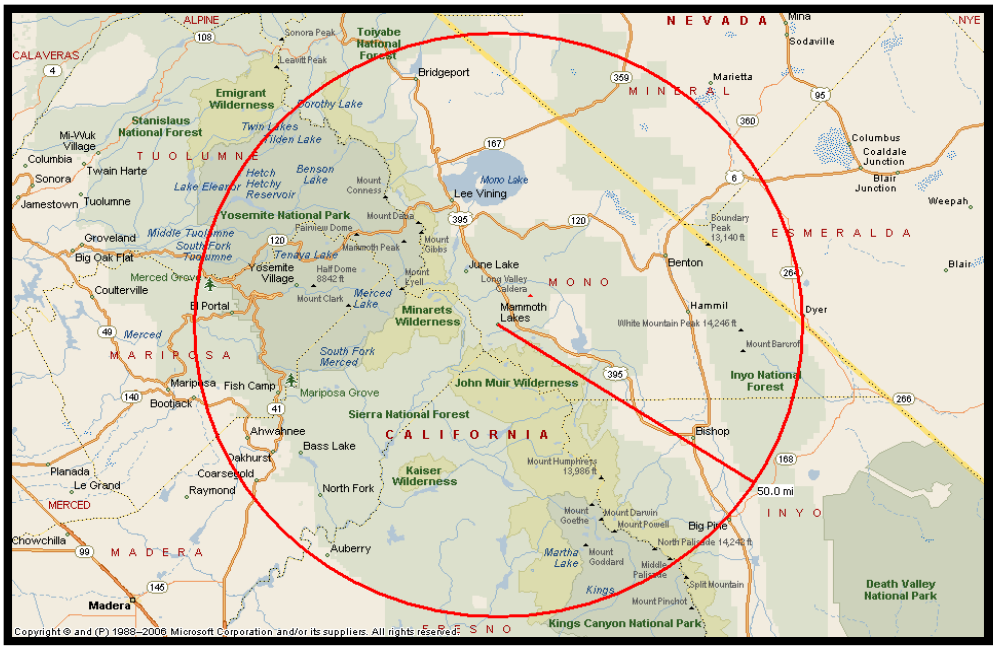
- Timber harvest residuals – limbs and treetops generated during commercial timber harvest activities;
- Fuels reduction and forest restoration residuals – ladder fuels such as limbs, brush, and small stems removed as a result of forest fuels reduction activities;
- Forest products manufacturing residuals – bark, sawdust, chips; and
- Urban or agricultural-sourced biomass potentially available for the proposed facility.

Feedstock Study Area

Consistent with the objectives of this biomass feedstock availability analysis, the forested landscapes and watersheds located within a logical haul distance of the Mammoth Lakes community were included in the Feedstock Study Area (FSA). Figure 1 highlights the FSA.[2]

Initially an FSA with a 30-mile radius was considered; however, due to relatively low availability of biomass feedstocks in the region, TSS recommended (and the Biomass Team agreed) to an expanded 50-mile radius.

Figure 1. Feedstock Study Area



[2] As defined by feasibility study project steering committee.

Vegetation Cover and Land Ownership/Jurisdiction

Woody biomass availability for any given region is heavily dependent on vegetation cover, land management objectives, and land ownership. Vegetation cover within the Mammoth Lakes FSA is predominantly shrub and non-forested (primarily desert) at 51%, coniferous at 25%, and pinyon juniper at about 10% of the landscape. The predominant vegetation cover types with the FSA are shown graphically in Figure 2 and in a map in Figure 3.

Figure 2. Vegetation Cover as a Percentage of Total Cover within the FSA

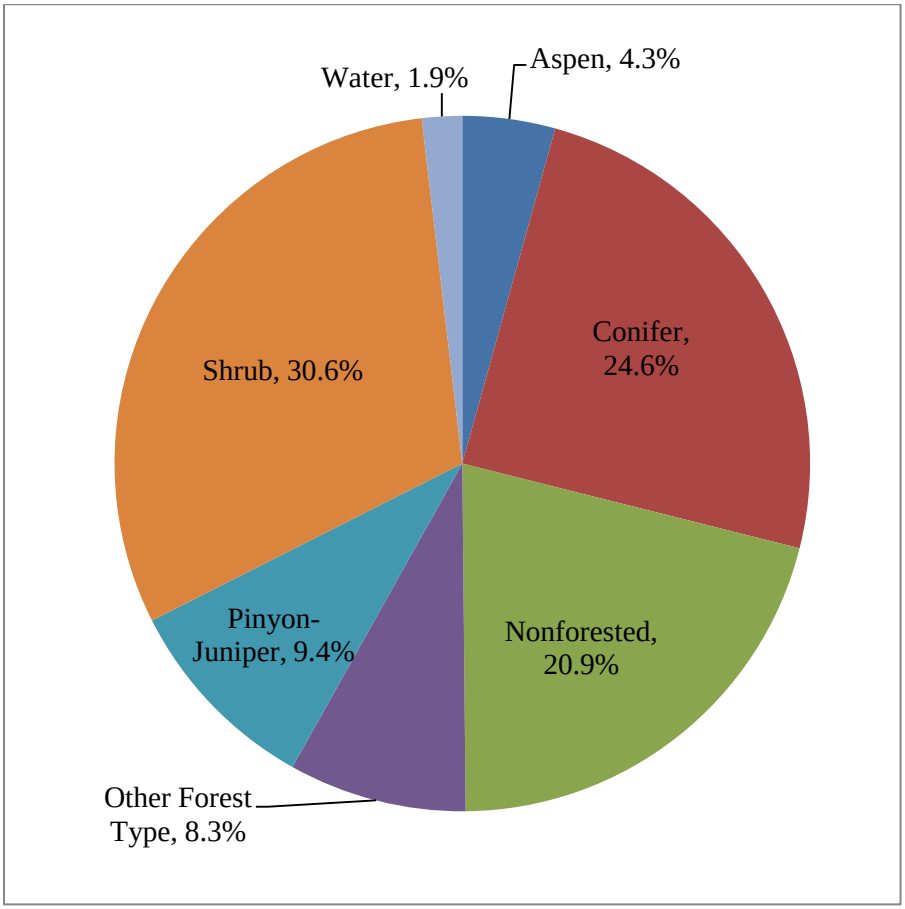
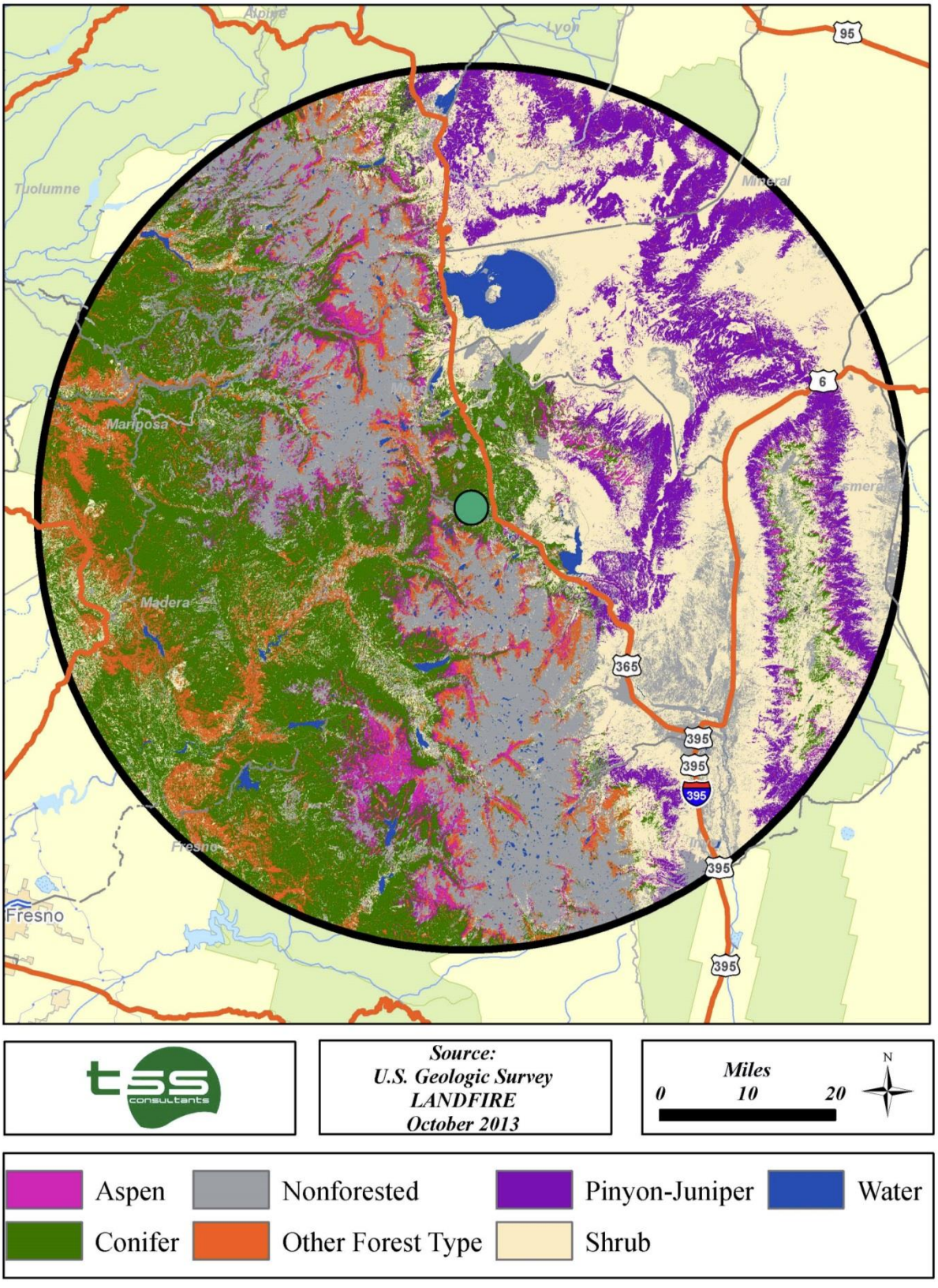


Figure 3. Vegetation Cover within the FSA



Vegetation cover types significantly influence woody biomass availability. Depending on management objectives, certain cover types could generate significant volumes of woody biomass material for use as feedstocks for value-added utilization. Table 6 summarizes vegetation cover by category within the FSA.

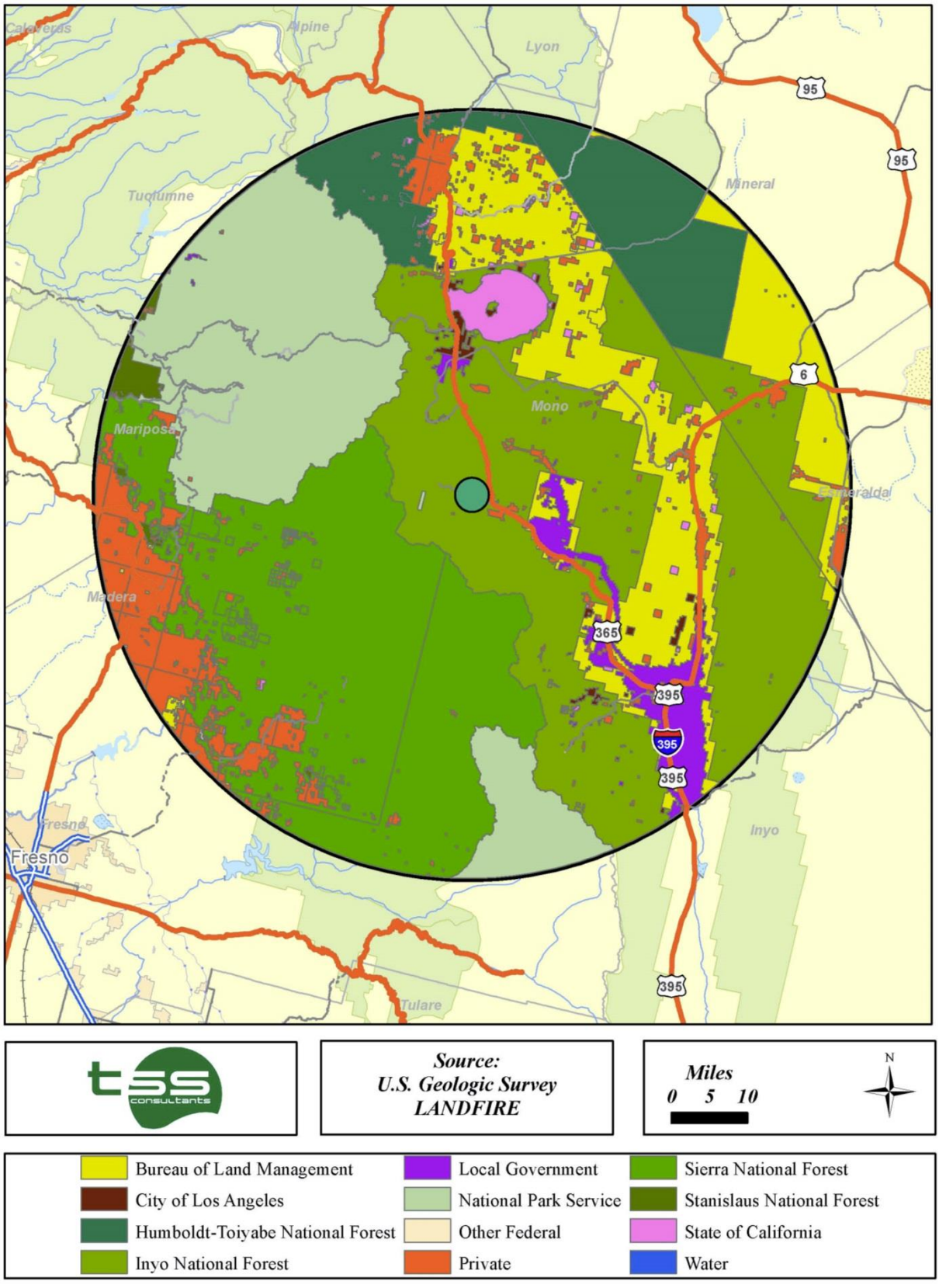
Table 6. Vegetation Cover Summary within the FSA

COVER CATEGORIES	ACRES	PERCENT OF TOTAL
Aspen	216,657	4.3%
Conifer	1,237,034	24.6%
Other Forest Type	415,924	8.4%
Pinyon Juniper	473,883	9.4%
Shrub	1,537,747	30.6%
Non-Forested	1,052,187	20.9%
Water	93,766	1.9%
TOTALS	**5,027,198**	**100.0%**

Land ownership influences vegetation management objectives and within the FSA, the USFS is the prevalent land manager with responsibility for approximately 57% of the landscape. Private land makes up about 7% and the Bureau of Land Management (BLM) makes up 14%. Federal land management agencies (USFS and BLM) together manage approximately 67% of the landscape. Federal jurisdiction and management objectives have a significant influence regarding woody biomass material availability within the FSA.

Figure 4 highlights the locations of the various ownerships and jurisdictions.

Figure 4. Land Ownership/Jurisdiction within the FSA



Due to transport logistics (e.g., topography, road systems) associated with the crest of the Sierra Nevada Range, much of the FSA is not economically accessible for the recovery and transport of woody biomass material. In addition, certain jurisidictions such as State Parks, National Parks and USFS wilderness areas will not be generating sustainable volumes of forest biomass material due to the fact that management objectives for these jurisdictions do not include active vegetation management.

Adjustments were made to the FSA base map (50-mile radius of Mammoth Lakes) to develop a Core Feedstock Study Area (Core FSA) map and database:

- Only include those counties that are within economic haul distance of Mammoth Lakes (Mono, Inyo, Mineral, Esmeralda); and
- Remove State Parks, National Parks and USFS wilderness areas.

TSS developed a Core FSA map and corresponding vegetation (Figure 5) and land ownership (Figure 6) data. Table 7 and
Conifer vegetation cover (6.8% or 182,610 acres) will likely provide the best opportunity for collection and processing of excess forest biomass material from timber harvest operations. Pinyon juniper cover (17.6% or 470,874 acres) could provide excess biomass but due to very limited road access, the opportunities to economically utilize this material are minimal (see Forest-Sourced Biomass section for more on this).
Table 8 summarize land ownership and jurisdiction within the Core FSA.

Figure 5. Core Feedstock Study Area Vegetation Cover

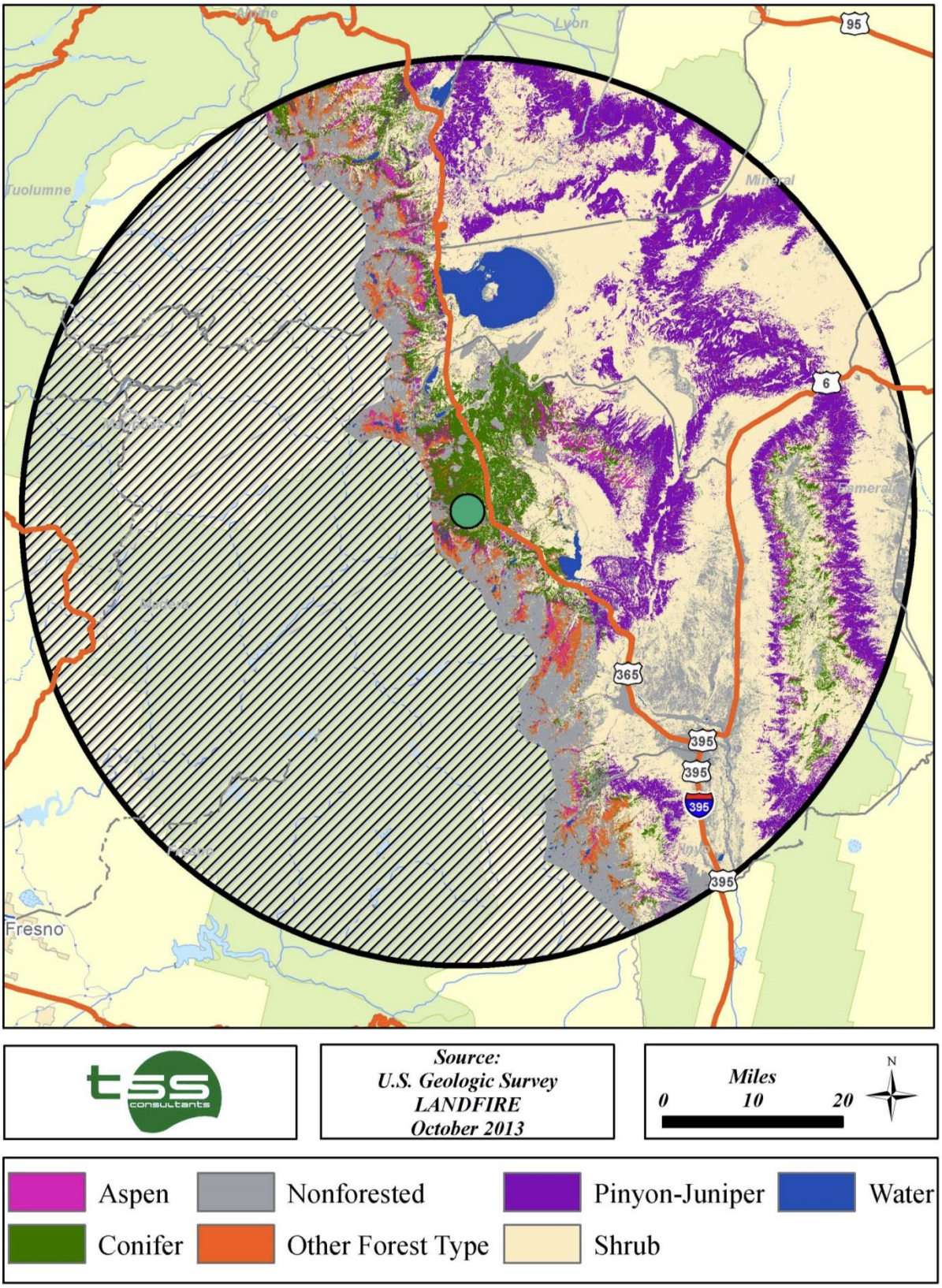


Figure 6. Core Feedstock Study Area Ownership Map

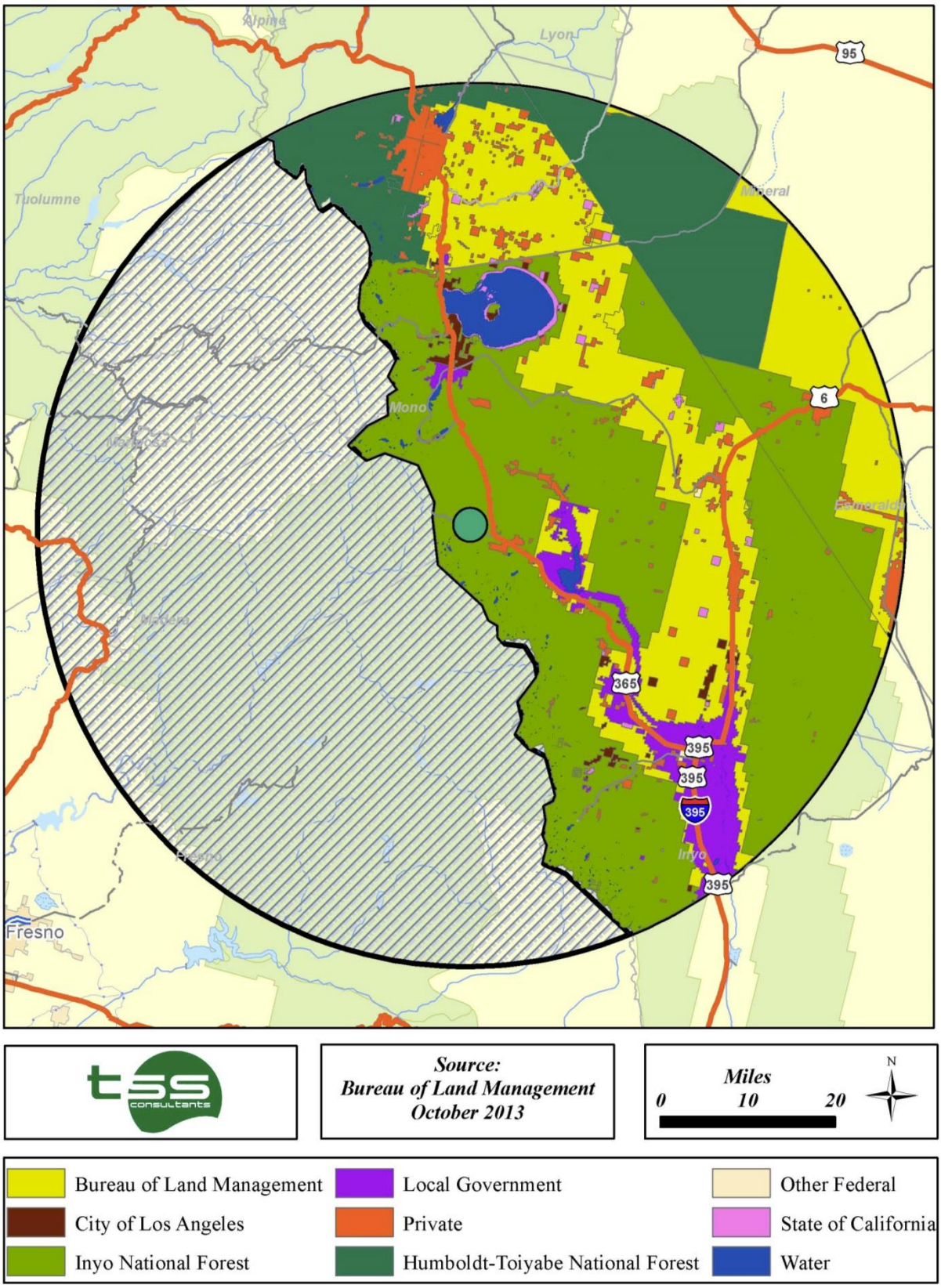


Table 7. Vegetation Cover Summary within the Core FSA

COVER CATEGORIES	ACRES	PERCENT OF TOTAL
Aspen	64,094	2.4%
Conifer	182,610	6.8%
Non-Forested	448,882	16.8%
Other Forest Type	78,784	2.9%
Pinyon Juniper	470,874	17.6%
Shrub	1,370,369	51.2%
Water	63,305	2.3%
TOTALS	**2,678,918**	**100.0%**

Conifer vegetation cover (6.8% or 182,610 acres) will likely provide the best opportunity for collection and processing of excess forest biomass material from timber harvest operations. Pinyon juniper cover (17.6% or 470,874 acres) could provide excess biomass but due to very limited road access, the opportunities to economically utilize this material are minimal (see Forest-Sourced Biomass section for more on this).

Table 8. Land Ownership/Jurisdiction Forest Vegetation Cover within the Core FSA

LAND OWNER/MANAGER	FORESTED ACRES	PERCENT OF TOTAL
BLM	84,677	10.6%
Humboldt-Toiyabe NF	201,286	25.3%
Inyo NF	462,895	58.1%
Other Public	13,677	1.7%
Private	33,826	4.3%
TOTALS	**796,362**	**100.0%**

Forest-Sourced Biomass

Timber Harvest Residuals

Timber harvest residuals can provide significant volumes of woody biomass material. Typically available as limbs, tops, and unmerchantable logs, these residuals are byproducts of commercial timber harvesting operations. As such, these residuals have no merchantable value but can be a relatively economic raw material feedstock supply for value-added woody biomass utilization. Once collected and processed using portable chippers or grinders, this material is an excellent biomass feedstock source for fuel or feedstock for compost/mulch.

Small, unmerchantable logs that do not meet sawlog or firewood specifications could also be recovered from timber harvest operations. In some cases the larger logs (e.g., 6" and larger diameter measured small end inside bark) command a higher market value, which could leave the smaller logs available (e.g., under 6" diameter) for value-added utilization. These smaller

logs could be diverted to value-added uses such as post/poles or as raw material feedstock for animal bedding, compost, or landscape cover.

Commercial timber harvest activity within the State of California is monitored by the State Board of Equalization (BOE). The BOE levies timber harvest taxes based on annual timber harvest levels. A review of the 2008 through 2012 timber harvest data was conducted to confirm historic timber harvest activities within the Core FSA. Table 9 provides the results.

Table 9. Timber Harvest Volume Produced within the Core FSA as Reported by the California Board of Equalization, 2008 to 2012

COUNTY	2008 (MBF/YR) [3]	2009 (MBF/YR)	2010 (MBF/YR)	2011 (MBF/YR)	2012 (MBF/YR)
Inyo	0	0	0	0	0
Mono	0	13	0	30	2,349
TOTALS	**0**	**13**	**0**	**30**	**2,349**

Results of the historic timber harvest figures confirm that commercial sawlog harvest levels over the last five years have only been conducted on public lands and have been minimal. Discussions with Inyo National Forest (NF) staff[4] confirmed that there have been very few sawlog removals from the Inyo NF in recent years. The BOE reporting of 2,349 MBF in 2012 is as a result of a wind event timber salvage project known as the Red Devil Stewardship Project. Wind storms are an episodic event and do not represent an historic trend that can be used to forecast forest biomass availability.

The primary market driver influencing active timber management for any given region typically is demand for sawlogs. Interviews with timber sale purchasers[5] active in the region (Inyo NF and Humboldt-Toiyabe NF) confirmed that sawlog markets are currently non-existent. Proximity to forest products manufacturing facilities is a major influence on sawlog pricing, and the closest sawmill to the Mammoth Lakes region is Sierra Forest Products at Terra Bella, California (300 road miles from Mammoth Lakes).

As noted in Table 3, the Inyo NF manages 58% of the forested vegetation within the Core FSA. Interviews with USFS and BLM staff[6,7] confirmed that all of the timber sale and harvest activities within the Core FSA are concentrated on the Inyo NF. These interviews also confirmed that almost all of the logs removed were utilized for firewood (both commercial use and personal use firewood) rather than commercial sawlogs; further explaining the BOE sawlog harvest figures.

USFS staff provided historic data regarding total log harvest trends for the last five years on the Inyo NF. Table 10 summarizes data provided.

[3] MBF = thousand board foot measure. One board foot is nominally 12" long by 12" wide and 1" thick.
[4] Scott Kusumoto, Inyo NF, BLM Interagency Vegetation Management Team.
[5] Greg Cook, owner, Greg Cook Forest Products. Dave Noble, owner, South Bay Timber.
[6] Scott Kusumoto, Inyo NF, BLM Interagency Vegetation Management Team.
[7] Dale Johnson, BLM, Supervisory Natural Resources Specialist.

Table 10. Inyo National Forest Timber Harvest Volume, 2008 to 2012

	2008 (CCF/YR) [8]	2009 (CCF/YR)	2010 (CCF/YR)	2011 (CCF/YR)	2012 (CCF/YR)	5 YEAR AVERAGE (CCF/YR)
Personal Use Firewood	3,488	4,602	4,749	5,147	2,518	**4,100**
Commercial Use Firewood	1,610	1,890	1,607	1,319	3,226	**1,930**
TOTALS	**5,098**	**6,492**	**6,356**	**6,466**	**5,744**	**6,030**

As shown in Table 10, the five-year average annual harvest volume is 6,030 CCF. It should be noted that harvest levels will fluctuate (as shown in Table 10) from year to year depending on a number of factors including:

- Timber management funding levels as set by Congress and allocated to each National Forest by USFS management team at the regional level;
- Local firewood market will fluctuate based on weather conditions and the price of propane; and
- General economic conditions in the region (e.g., if the economy is robust, the Mammoth Lakes region will witness more visitors, thus ramping up relative demand for firewood).

TSS's experience with forest biomass material collection and processing confirms that a recovery factor of 0.5 bone dry ton (BDT)[9] per CCF of timber harvested is consistent with the harvest of mixed conifer and pine stands in the Core FSA. The 0.5 BDT per CCF assumes that some volume of down woody material is left on site to provide habitat for cavity nesting bird species. The current Land and Resource Management Plan (LRMP) recommends that one log per acre remain on site, along with an average of 1.2 snags (dead standing trees) per acre. Assuming 0.5 BDT/CCF, a gross potential volume of 3,015 BDT per year of timber harvest residuals (limbs, tops, small stems) could be available.

All forest management activities conducted on the Inyo NF yield logs used primarily for the production of commercial and personal use firewood. Small logs are occasionally utilized for value-added products such as posts, poles and lumber, but most of the logs harvested are processed into firewood. Discussions with a local commercial firewood contractor[10] confirmed that current timber harvest procedures are to fall trees, de-limb the stems, and skid logs to a roadside landing for processing into firewood. All limbs are left in the woods with piling and burning as the primary disposal method.

In order to efficiently recover and utilize the timber harvest residuals (rather than pile and burn), the contractor would need to fall the trees and skid them (with limbs and tops attached) to the roadside landing. The trees would be de-limbed at the landing and a chipper or grinder could

[8] CCF = hundred cubic feet.
[9] BDT = two thousand pounds of dry wood waste material.
[10] Greg Cook, Owner, Greg Cook Forest Products.

then efficiently and cost-effectively process the accumulated limbs, tops, and small stems into chips. As the residuals are processed, they are blown into a chip van for delivery to an end-use facility (e.g., bioenergy facility or compost operation). Interviews with timber harvest contractors operating in the Lake Tahoe region confirmed that this procedure is a cost effective approach (see Cost to Collect, Process, and Transport Biomass Material section of this report for more information on costs). In addition, bringing the trees to the landing will facilitate efficient roadside processing of firewood.

The Inyo NF also provides local residents with the opportunity to source logs for personal use firewood. The Inyo NF arranges to have trees felled and de-limbed so that the public can process firewood on site (in the forest). Like the commercial firewood operations, harvest residuals in the form of limbs and tops remain on site where the trees are felled, with pile and burning as the primary disposal method. In order for these residuals to be efficiently recovered, the trees would need to be felled and skidded with limbs attached to a roadside landing where the stems could be de-limbed and the residuals processed into chips (very similar to the biomass sourcing method for commercial firewood operations described above).

The Inyo NF is currently in the process of updating its LRMP. Per the request of the Biomass Team, TSS provided comments (see Appendix A) on the LRMP revision.

Inyo NF staff[11] confirmed that not all topography or road systems will accommodate biomass collection, processing and transport operations. For the purposes of this feedstock forecast, it is assumed that 95% of the timber harvest operations within the Core FSA are located on topography and road systems that will support biomass recovery. Using this assumption then, approximately 2,864 BDT per year are projected to be practically available as timber harvest residuals from forested acres within the Core FSA.

In addition to the Inyo NF, the Humboldt-Toiyabe NF also has an active timber sale program. Discussions with Humboldt-Toiyabe staff[12] confirmed that the forest is conducting timber sales that yield primarily logs for commercial firewood operations. In addition, the forest is conducting sage grouse habitat restoration treatments in pinyon-juniper vegetation cover areas. Some removal of pinyon-juniper trees is being carried out in overly dense stands with most of the material being felled and left on site. In addition, some hazardous fuels treatments are being conducted in the pinyon-juniper[13] vegetation cover areas. Most of the pinyon-juniper treatment areas are located on acreage with very limited road access and sensitive soils, so recovery of biomass material is not considered practical.

Discussions with a timber sale purchaser[14] that has operated on the Humboldt-Toiyabe NF confirmed that projects on this forest are located too far from Mammoth Lakes to be considered economical. He also confirmed that sawlogs and firewood logs removed on the forest are typically transported north to markets in the Reno/Sparks region (firewood logs) and farther north into Oregon (sawlogs) using backhauls (empty lumber trucks returning to Oregon).

[11] Scott Kusumoto, Inyo NF, BLM Interagency Vegetation Management Team.
[12] Mandy Brinnard, Forest Silviculturist, Humboldt-Toiyabe NF.
[13] Discussions with Annamaria Echeverria, District Fuels Specialist, Bridgeport RD.
[14] Dave Noble, Owner, South Bay Timber.

Discussions with the Nevada Division of Forestry (NDF) staff[15] confirmed that NDF has an active forest fuels reduction program in the Lake Tahoe, Reno and Carson City areas. NDF is managing forest fuels reduction projects using a chipper, a Kohler yarder (steep terrain log transport system) and five roll-off bins. Currently chips produced are being transported using the roll-off bins and are utilized for landscape cover, compost, and erosion control. All logs removed are currently being processed into firewood. None of the NDF projects are located within economical haul distance of Mammoth Lakes.

Fuels Treatment/Forest Restoration

The Mammoth Lakes region is home to several communities with residential neighborhoods situated within the wildland urban interface (WUI). Due to high fire danger conditions within the WUI, there are concerted efforts across all forest ownerships (public and private) to proactively reduce hazardous forest fuels in support of wildfire defensible communities. Both Inyo County and Mono County have Community Wildfire Protection Plans (CWPP) (completed in April and May, 2009)[16] that provide recommendations regarding strategic hazardous fuels reduction activities that could mitigate wildfire behavior.

There are eight Fire Safe Councils and six Fire Protection Districts (FPD) active in Mono and Inyo counties.[17] Several of these entities have received grant funding to facilitate removal of hazardous fuels (typically brush and small tree removal) within the WUI. For example, the Mammoth Lakes Fire Protection District is managing a WUI fuels management program (funding provided by the USFS)[18] that provides 75% cost share (private landowners must provide 25% match) towards the cost of fuels reduction near homes. All material is chipped with most of the chips being utilized at the Mammoth Mountain Resort for landscape cover and erosion control. Fire District staff[19] estimate that approximately 100 cubic yards (about 15 BDT equivalents) are generated annually.

The June Lake Fire Protection District FPD has recently received a grant similar to the Mammoth Lakes FPD. Discussions with the June Lake FPD fuels coordinator[20] indicated that the June Lake Privatelands Fuels Reduction project will facilitate fuels treatment activities across 374 acres of private lands in the June Lake WUI. The project has a five-year implementation plan commencing in May 2013. The June Lake FPD is using the Mammoth Lakes FPD fuels treatment protocols and prescriptions, and is currently conducting an environmental review consistent with CEQA. Many of the treatment prescriptions call for the removal of brush and the pruning of trees (to reduce ladder fuels). Very few trees are targeted for removal (only two trees selected for removal in the first 60 acres inspected). Homeowners will be hiring fuels treatment contractors directly and will decide the ultimate destination for the biomass material removed. Much of the material removed will be used for firewood or may be transported to the local landfill located about 10 miles from June Lake (Mono County Landfill at Pumice Valley and homeowners pay no tip fee). Due to the preponderance of brush and limbs being generated and

[15] Eric Roussel, Forester, Nevada Division of Forestry.
[16] Inyo County CWPP, April 2009, Mono County CWPP, May 2009. Anchor Point Group, Boulder, Colorado.
[17] Discussions with Brent Harper, Chief, Mammoth Lakes Fire Protection District.
[18] Ibid.
[19] Ibid.
[20] Paul McCahon, Fuels Coordinator, June Lakes Fire Protection District.

the small residential parcel size, it will not be economical to collect, process, and transport biomass material to Mammoth Lakes.

The Inyo NF implements fuels treatment activities in concert with timber sales and personal use firewood removal. In addition, the forest utilizes broadcast burning techniques to conduct landscape level fuels treatment and re-introduce fire as an ecological tool.

The Pauite Tribe maintains a tribal enterprise that employs tribal members in fuels treatment and forest restoration projects on the Reservation and on federally managed lands. In past years, the Tribe has worked with the Bureau of Indian Affairs and the USFS to complete fuels treatment projects, sometimes using stewardship contracts. Discussions with tribal staff[21] confirm a strong interest for the tribal enterprise to collect, process, and transport forest biomass to a biomass utilization facility in Mammoth Lakes. At this time, there are no projects under contract, but the Tribe is applying for grant funding to support ongoing fuels treatment in the greater Bishop/Mammoth Lakes area.

Due to ongoing plans (Mono County and Inyo County CWPPs) to conduct fuels treatment projects in the WUI, it is assumed that some volume of forest biomass residuals generated as a byproduct will be sustainably available as feedstock on an annual basis. For the purpose of this biomass feedstock availability analysis, TSS finds that approximately 300 BDT per year of forest biomass material are practically available as a byproduct of fuels treatment projects in the WUI.

Forest Products Manufacturing Residuals

Forest products manufacturing residuals in the form of sawdust, bark, and chips represent a traditionally cost effective source of quality feedstock. Currently there are very few commercial forest products manufacturing operations in Mono County or Inyo County. The only facilities in the region that appear to be in consistent operation are a small sawmill and post/pole operation managed by GC Forest Products.

Interviews with the owner of GC Forest Products confirmed that approximately 90 to 100 cubic yards (about 15 BDT) of manufacturing residuals (primarily sawdust, bark, slabs, post/pole peelings) are generated weekly between May and October. Some of this material is sold as landscape cover and some is transported to the Benton Crossing landfill for disposal.
For the purpose of this biomass feedstock availability analysis, TSS finds that approximately 360 BDT per year of forest manufacturing residuals are practically available.

Urban-Sourced Biomass

Tree service companies, local residents, and businesses in the Mammoth Lakes area regularly generate wood waste in the form of tree trimmings, construction wood, and woody debris from demolition projects. Much of this wood waste is currently deposited at the Benton Crossing Landfill, which is managed by the Mono County Solid Waste Division. Discussions with Solid Waste Division staff[22] indicated that the landfill receives significant volumes of wood waste. In addition to Benton Crossing, the department manages six other transfer stations and landfills.

[21] Brian Adkins, Director, Environmental Management Office, Pauite Tribe.
[22] Tony Dublino, Supervisor, Solid Waste Department, Mono County.

Only Benton Crossing is considered to be located tributary (12-mile haul distance) to Mammoth Lakes. Table 11 provides historic data regarding quarterly deliveries of wood waste material into the Benton Crossing landfill.

Table 11. Wood Waste Receipts for Benton Crossing Landfill

WASTE TYPE	Q3 2011 (BDT)	Q4 2011 (BDT)	Q1 2012 (BDT)	Q2 2012 (BDT)	Q3 2012 (BDT)	Q4 2012 (BDT)	Q1 2013 (BDT)	Q2 2013 (BDT)	AVERAGE (BDT/YR)
Construction + Demolition Wood	2,129	1,910	578	1,778	2,007	1,082	701	1,312	**5,748**
Alternative Wood Sources	441	250	33	206	364	143	29	194	**830**
TOTALS	**2,570**	**2,159**	**611**	**1,985**	**2,371**	**1,225**	**731**	**1,506**	**6,578**

Benton Crossing Landfill monitors incoming waste material through the use of a gatekeeper that inspects deliveries and records material received at the landfill. Woody material is separated into two streams: organics (items that do not require processing such as sawdust, pine needles, and grass clippings) and clean wood waste (items including tree trimmings, logs, dimensional lumber, shrubs, twigs, plywood, composite panels, and painted wood).

Another source of wood waste is dimensional lumber and other clean wood that is delivered to the landfill as part of construction and demolition (C+D) waste. This wood waste would require separation from the existing C+D waste stream if used as feedstock.

The landfill is currently utilizing a grinder to process sorted C+D and wood into wood chips for use as alternative daily cover (ADC), landscape cover, and compost. Landfills traditionally utilize ADC as top cover material that is applied daily over the active landfill cell. ADC is helpful to control odor, fugitive dust emissions, and vermin. Solid Waste Division staff[23] confirmed that other waste material could be utilized as ADC if there were a value-added market (e.g., biomass fuel) for the C+D and wood waste material. Approximately 90% of the wood chips produced is used as ADC, with the balance (10%) used as landscape cover/compost material and made available to the public. A number of biomass power generation facilities utilize urban wood waste as fuel due to the fact that it is relatively dry (25% moisture content), is available year round, and is typically very cost effective (tip fees charged by the landfill pay for sorting and processing).

Not all of the C+D and wood waste material is recoverable for use as biomass fuel. Incompatible constituents such as wall board, paint, composite panels, resins, and metal debris (nails/hinges) will render some of the wood waste unusable as feedstock material. TSS experience and discussions with Solid Waste Division staff[24] confirm that only about 30% of the C+D material is considered recoverable, with about 70% of the general wood waste category being recoverable. Using these recovery factors, approximately 2,305 BDT of the C+D and wood waste is considered practically available per year. Subtracting the sawmill residuals at 360 BDT per year (to eliminate double counting) equates to 1,945 BDT/year.

[23] Ibid.
[24] Ibid.

The Benton Crossing Landfill is scheduled for closure by 2023. Solid Waste Division staff[25] confirmed that various sites (also tributary to Mammoth Lakes) are currently being considered for future waste processing services (including wood waste processing) to serve the region.

Agricultural Byproducts

As noted in the vegetation cover analysis, there is no landscape acreage dedicated to commercial agricultural operations. No agricultural byproducts are available for use as feedstock within the Core FSA.

Biomass Feedstock Competition Analysis

Current Competition

There are very limited existing markets for forest biomass, sawmill residuals, and urban wood waste material generated within the Core FSA. Currently, some sawmill residuals are sold to local residents for use as landscape cover or soil amendment. The fuels treatment biomass residuals are occasionally utilized at Mammoth Mountain Resort for landscape cover and erosion control.

For the purposes of this analysis, TSS assumes that approximately five truckloads (75 BDT) of sawmill residuals and five truckloads (75 BDT) of fuels treatment residuals are utilized annually as soil amendment or landscape cover.

Potential Competition

TSS is not aware of any new forest biomass processing or utilization facilities planned for locations within the Core FSA. Discussions with NDF indicated some interest in the use of forest biomass for the Fuels for Schools program, but there are no planned projects that are tributary to the Core FSA. For the purposes of this analysis, TSS assumes that there are currently no new facilities planned that might utilize woody biomass material sourced from the Core FSA.

Biomass Feedstock Availability – Current Forecast

Summarized in Table 12 are the results of biomass feedstock material recovery analysis from forest activities and urban wood waste within the Core FSA.

Table 12. Biomass Feedstock Material Practically Available by Source, 2013

BIOMASS MATERIAL SOURCE	AVAILABILITY (BDT/YR)
Timber Harvest Residuals	2,864
Fuels Treatment Activity Residuals	225
Forest Products Manufacturing Residuals	285
Urban Wood Waste	1,945
TOTAL	**5,319**

[25] Ibid.

Costs to Collect, Process, and Transport Biomass Material

Commercial contractors equipped to collect, process, and transport forest biomass material do not currently exist within the Core FSA. TSS relied on discussions with forest biomass contractors operating in the Lake Tahoe region in addition to TSS's past experience to analyze these costs. Table 13 provides results of the cost analysis.

Table 13. Biomass Feedstock Material Delivery Costs to Mammoth Lakes

BIOMASS MATERIAL SOURCE	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)
Timber Harvest Residuals	$45	$60
Fuels Treatment Activity Residuals	$25	$30
Forest Products Manufacturing Residuals	$20	$25
Urban Wood Waste	$25	$30

Assumptions used to calculate the range of costs:

- No service fees or cost share arrangement available from public agencies for timber harvest residuals;
- Some service fees or cost share (covers about 50% of collection, processing and transport costs) available from public agencies for fuel treatment activities;
- One-way transport averages 30 miles for forest biomass material;
- Forest biomass is collected and processed (chipped) into truck for $30 to $33/BDT;
- Haul costs are $100/hour for walking floor chip truck trailer;
- Urban wood chips are available from the Benton Crossing Landfill for loading costs[26] estimated at $5/GT or $7/BDT (at 25% moisture content);
- Urban wood chips average 17 BDT/load; and
- Forest biomass chips average 15 BDT/load.

Biomass Feedstock Supply Risks and Future Sources

Feedstock Supply Competition Risk Mitigation

There is currently very little demand for biomass chips within the Core FSA. Over time more demand may ramp up as the regional economy improves and the need for biomass chips for erosion control, landscape cover, or soil amendment improves.

The primary mitigation measure to minimize the impact of potential or current biomass supply competition is to concentrate feedstock procurement efforts in the development of suppliers located close-in and tributary to the biomass utilization facility. A project will have significant transport cost advantages when sourcing biomass feedstock as near as possible to its location. Development of urban wood feedstock material at the Benton Crossing Landfill (located 12 miles from Mammoth Lakes) will be critical to development of a local, year-round feedstock source.

[26] Per discussions with Tony Dublino, Supervisor, Solid Waste Department, Mono County.

Time of Year Availability

Discussions with local foresters indicate that the typical season for field operations is May through October. A variety of factors impact this, including snow depth and wet soil conditions (e.g., concerns regarding potential negative impacts to soil resources). Processed forest biomass (chips) used as feedstock may need to be stockpiled for winter delivery to a bioenergy project in Mammoth Lakes. Discussions with Solid Waste Department staff indicated potential availability of storage space at the Benton Crossing Landfill. This could be a key opportunity to provide winter storage for timber harvest and forest fuels treatment residuals.

Urban wood waste is typically generated year round with some seasonal fluctuation (downturn) during the winter (January through March) as shown in Table 11.

Transport Cost

The cost of transporting biomass feedstock represents the single most significant expense when procuring biomass. Variables such as diesel fuel cost (currently at $4.25/gallon),[27] workers compensation expense, and maintaining a workforce (locating qualified drivers) are all factors that significantly impact the cost to transport commodities such as biomass feedstock. Interviews with commercial transport companies indicate the current cost to transport a bulk commodity such as biomass feedstock is $2.00 to $2.20 per running mile, or $85 to $100 per hour. The $100 per hour rate addresses the cost of owning and operating self-unloading trailers which will be required to deliver feedstock to a site in Mammoth Lakes.

At this time, diesel fuel costs are the most significant variable impacting transport costs. Diesel fuel price escalation has had a major impact on biomass feedstock prices throughout the U.S. in recent years. Based on TSS's experience, the average forest-sourced biomass feedstock requires approximately 1.75 to 2 gallons of diesel to produce and transport a green ton of forest-sourced feedstock with an average round-trip haul distance of 60 to 90 miles. Therefore, a $1.00/gallon increase in diesel fuel equates to a $1.75 to $2.00 per green ton increase in the cost to produce and transport forest-sourced biomass feedstock. Assuming that forest-sourced feedstock has a moisture content of 50%, the $1.00/gallon increase in diesel fuel pricing equates to a $3.50 to $4.00 per BDT cost increase. Any significant increase in the price of diesel fuel presents a risk to the overall economics of producing forest-sourced biomass. Diesel fuel pricing volatility is primarily driven by the cost of crude oil. Figure 7 shows the volatility of diesel prices during the January 2007 through mid-September 2013 period.[28]

[27] California Diesel Prices; http://www.eia.gov/petroleum/gasdiesel/
[28] Ibid.

Figure 7. California On-Highway Diesel Prices, 2007 to 2013

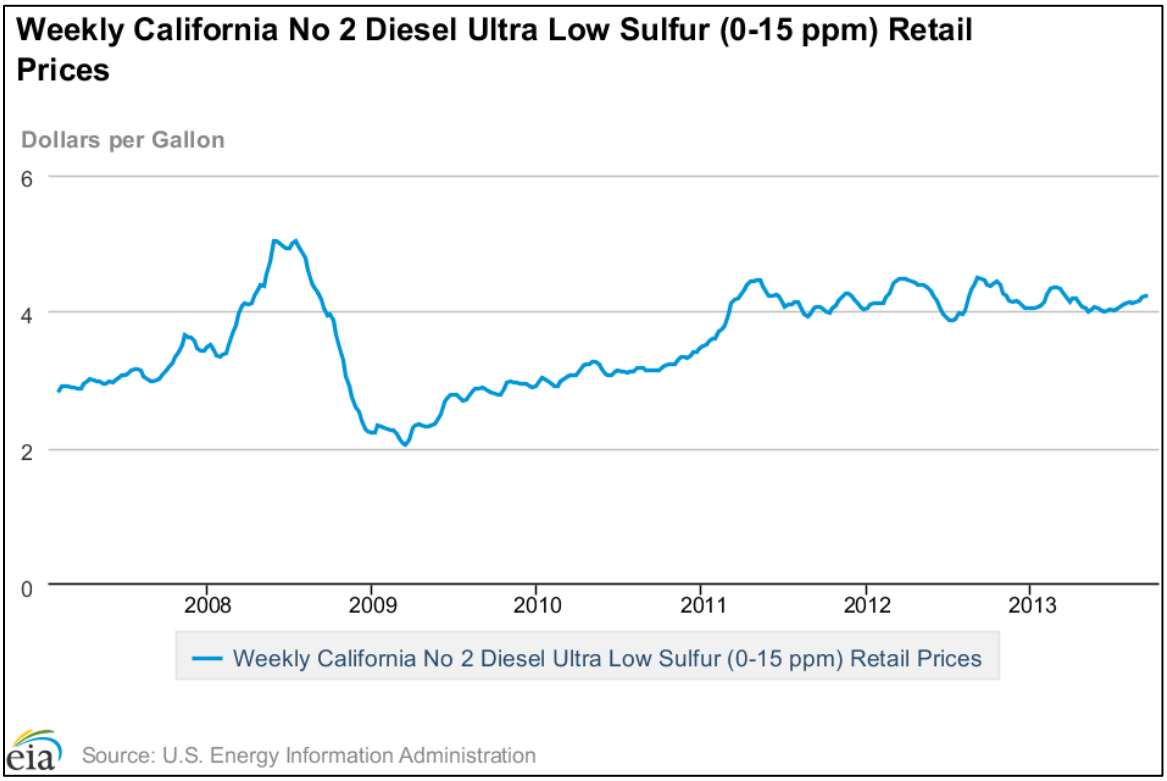


Figure 7 shows a seven-year trend of increasing prices with short-term volatility. Fluctuations in diesel prices have the potential to be the single most significant factor impacting delivered feedstock prices.

Housing and Construction

Improvements in the housing and construction sectors will result in an increase in volumes of urban wood from construction and demolition projects. Discussions with Solid Waste Department staff[29] confirmed that as local residential and industrial construction projects ramp up due to improved regional economic conditions, there will be a concomitant increase in C+D and wood waste deliveries to the Benton Crossing Landfill.

State and Federal Policies

Public policy can be a source of risk or can provide opportunity. An example of a potential risk includes possible changes in land management policies and regulations that could reduce fuel treatment and forest restoration activities on both private and public lands. However, public policy can also provide opportunity, as is the case with state Senate Bill 32 (SB 32) and state Senate Bill 1122 (SB 1122). These bills significantly improved the power sales opportunities for community-scale renewable energy projects strategically located within Investor Owned Utility service territories (Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric).

[29] Ibid.

Potential Value-Added Market Opportunities for Biomass Feedstock

Due to the relatively low volume of biomass feedstock found to be available within the Core FSA, there are limited opportunities to install commercial-scale value-added processing (e.g., soil amendment, compost, animal bedding, post/pole). In addition, due to the relatively low population in the region (Mono County population[30] is 14,350), there are very limited opportunities to grow the value-added markets locally. Current forest products manufacturing, post and pole, and firewood operations are meeting local demand.

Fuel Pellets as Biomass Feedstock

Some thermal energy facilities utilize wood fuel pellets as feedstock. There are several advantages when using pellets, including consistency of feedstock sizing, moisture content, and heating value. Due to consistent sizing, this feedstock has very good material handling and storage characteristics. The primary downside to fuel pellets is the delivered cost. The closest fuel pellet manufacturing facility is located in John Day, Oregon. Delivered cost is around $200/BDT.[31] This price is quite prohibitive and not financially attractive when considering the delivered cost of more locally sourced biomass feedstocks (see next section). Sourcing fuel pellets from John Day would be counter to the project objectives of sourcing locally available feedstocks.

Five-Year Biomass Feedstock Pricing Forecast

A thermal energy facility sited at the Mammoth Mountain garage will likely utilize a combination of biomass feedstocks to supply the 250 to 400 BDT per year annual feedstock usage. TSS recommends a diverse blend of feedstocks be considered for this facility. The recommended feedstock blend meets the Biomass Team's objectives of diverting forest biomass away from current pile and burn disposal techniques while utilizing a blend of underutilized biomass material, as summarized in Table 14.

Table 14. Biomass Feedstock Material Blend for a Thermal Energy Facility

BIOMASS MATERIAL SOURCE	DELIVERED COST ($/BDT)	PERCENT OF TOTAL	TOTAL VOLUME (BDT/YR)
Timber Harvest Residuals	$45	40%	120
Fuels Treatment Activity Residuals	$25	5%	15
Forest Products Manufacturing Residuals	$25	10%	30
Urban Wood Waste	$26	45%	135
TOTALS		**100%**	**300**

Table 15 provides a five-year biomass feedstock pricing forecast for a thermal energy facility that utilizes 300 BDT of biomass feedstock sourced from the Mammoth Lakes Core FSA. The base price of $33.45 per BDT is calculated using the optimized feedstock blend and delivered prices shown in Table 14.

[30] US Census Bureau data (http://quickfacts.census.gov/qfd/states/06/06051.html).
[31] Discussions with John Rowell, pellet sales manager, Malhuer Lumber Company.

Table 15. Five-Year Feedstock Pricing Forecast, 2013 to 2017

	2013	2014	2015	2016	2017
Feedstock Price Delivered to the City of Mammoth Lakes	$33.45	$33.95	$34.46	$34.98	$35.50

The feedstock price forecast presented in Table 15 is based on the following assumptions:

- Feedstock supply chain is fully developed with feedstock available from forest-based operations fuels treatment activities and the Benton Crossing Landfill;
- Diesel fuel prices remain near $4.25/gallon through 2013, then escalate slightly;
- Labor rates remain stable through 2013, then escalate slightly; and
- Biomass feedstock prices escalate at 1.5% annual rate due to increased diesel fuel and labor costs from 2014 through 2017.

Findings

The biomass feedstock availability and cost analysis indicates that there is not sufficient biomass sustainably available for a CHP or electricity-only bioenergy facility. A 0.5 MW bioenergy facility would require a minimum of 4,000 BDT annually. While 5,319 BDT per year are projected to be available, most financial institutions require a feedstock supply ratio of 2:1, indicating twice as much biomass availability as demanded by a facility. Due to the feedstock constraints, TSS recommends that the Biomass Team focus on thermal applications in the Mammoth Lakes region to promote the sustainable utilization of wood waste.

TSS acknowledges that for short time periods, additional feedstock will be available due to wildfires, high winds, and infestations such as beetle kill; however, TSS does not consider these sources to be sustainable over the 20-year life of a bioenergy facility.

ECONOMIC AND FINANCIAL FEASIBILITY ANALYSIS

A complete project budget includes anticipated costs associated with every aspect of the project. The largest components of the budget are operations and maintenance costs and upfront costs such as equipment capital and installation. For this analysis, TSS has utilized published information from the Fuels for Schools and Beyond Program,[32] a USFS initiative to facilitate the removal of hazardous fuels from local forests and promote the use of woody biomass as a renewable natural resource and as an energy source for heating systems in public and private buildings. This analysis reviews data and experience gained from 13 demonstration projects in Oregon, Montana, Alaska, Idaho, and Nevada.

Upfront Costs

Upfront costs include all of the costs associated with the development of the project that are not associated with recurring operations and maintenance. This includes capital cost of equipment, design and engineering, infrastructure upgrades, installation and integration, permitting, commissioning, and operator training. The average upfront costs for projects ranging from 1 MMBtu per hour to 4 MMBtu per hour are shown in Table 16. Projects that utilized performance contracts or pellets as their primary fuel source are excluded from Table 16. The average project costs are $274,198 per MMBtu per hour.

Table 16. Total Project Costs

PROJECT LOCATION	BOILER SIZE (MMBtu/hr)	TOTAL PROJECT COST	AVERAGE PROJECT COST ($/MMBtu/hr)
Thompson Falls, MT	1.6	$455,000	$284,375
Victor, MT	2.6	$615,000	$236,538
Philipsburg, MT	3.87	$684,000	$176,744
Darby, MT	3	$970,000	$323,333
Craig, AK	4	$1,400,000	$350,000
		AVERAGE:	**$274,198**

The total project cost information can be split into five major categories: 1) wood boiler system including feedstock storage and conveyance; 2) boiler building; 3) mechanical/electrical system within the boiler room; 4) mechanical integration; and 5) fees, permits and other non-capital costs. This breakdown is shown in Table 17. The total project statistics are shown in Table 18.

[32] http://www.fuelsforschools.info/pdf/Final_Report_Biomass_Boiler_Market_Assessment.pdf

Table 17. Project Cost Breakdown

	THOMPSON FALLS		VICTOR		PHILIPSBURG		DARBY		CRAIG		AVERAGE	
SIZE (MMBtu/hr)	**1.6**		**2.6**		**3.87**		**3**		**4**		**($/MMBtu/hr)**	**(%)**
Wood Boiler System	$136,000	30%	$240,000	39%	$264,000	39%	$261,000	27%	$319,000	23%	$82,455	31%
Building	$170,000	37%	$200,000	33%	$172,000	25%	$150,000	15%	$240,000	17%	$67,524	26%
Mechanical/Electrical	$100,000	22%	$134,000	22%	$100,000	15%	$100,000	10%	$200,000	14%	$44,642	17%
Mechanical Integration	$15,000	3%	$5,000	1%	$100,000	15%	$324,000	33%	$586,000	42%	$58,328	19%
Fees, Permits, Etc.	$34,000	7%	$36,000	6%	$48,000	7%	$135,000	14%	$55,000	4%	$21,250	8%
TOTALS	**$455,000**	**100%**	**$615,000**	**100%**	**$684,000**	**100%**	**$970,000**	**100%**	**$1,400,000**	**100%**	**$274,198**	**100%**

Table 18. Project Cost Breakdown Statistical Findings

	MINIMUM ($/MMBtu/hr)	AVERAGE ($/MMBtu/hr)	MAXIMUM ($/MMBtu/hr)
Wood Boiler System	$68,217	$82,455	$92,308
Building	$44,444	$67,524	$106,250
Mechanical/Electrical	$25,840	$44,642	$62,500
Mechanical Integration	$1,923	$58,328	$146,500
Fees, Permits, Etc.	$12,403	$21,250	$45,000
TOTALS[33]	**$176,744**	**$274,198**	**$350,000**

[33] Note that the "Totals" row does not equal the sum of the cells above, but instead displays the minimum, average, and maximum statistics for total project costs.

Maintenance

Wood biomass boilers require more maintenance than traditional fossil-fuel fired boilers. It is important to understand the personnel requirements to better estimate operations and maintenance costs, and to confirm if existing staff can manage the additional workload.

Daily Inspections and Tasks

- Clean boiler room;
- Inspect fuel inventory and water chemicals;
- Be attentive to odd sounds, smells, or vibrations during operations;
- Dispose of ash;
- Note water pressure and temperature;
- Blow down steam boilers and compressors (steam system); and
- Note feedwater temperature (steam system).

Tasks specific to steam boilers are clearly indicated above. Daily maintenance is focused on maintaining a clean boiler room and a visual inspection of the equipment. Ash removal can be manual or automated depending on the operator's preference. Daily maintenance is expected to take between half an hour and one hour. Some technology vendors offer remote operations and monitoring to ensure that the system is operating properly. This type of monitoring helps to minimize the risk of onsite operator error and provides a check for visual inspections.

Note that weekly feedstock delivery should be expected depending on the size of the boiler and the size of feedstock storage. Feedstock delivery into an automated system should be expected to take approximately half an hour of supervision.

Annual Inspection and Tasks

- Thorough inspection of the equipment;
- Each time the boiler is open for an internal inspection, clean buildup on any surface, including the boiler and the heat exchangers;
- Align and tension belt drives;
- Check gearbox lubrication levels;
- Lubricate bearings;
- Inspect seals, refractory, and conveyors; and
- Replace gaskets.

Annual maintenance can be done in house by trained staff or can be contracted to local boiler service companies. Performance contracts usually include annual maintenance as part of the package. Parts for typical annual maintenance average approximately $4,500 per year with TSS experience indicating ranges between $1,000 and $7,000 per year. Using a fully loaded rate of $26 per hour, the personnel costs for maintenance are expected to be $9,490 per year (for 1 hour per day) with a range of $4,745 to $14,235 per year (0.5 to 1.5 hours per day).

Market Feasibility: Avoided Fossil Fuel Costs

The market driver for biomass thermal energy is the cost of the alternative fuel. In the Mammoth Lakes area, propane is the primary fuel source for heating along with the occasional utilization of diesel fuel oil. To understand the potential annual savings from switching to biomass, the price of these fuel sources are illustrated in Table 19, which shows the energy source as a price per unit of energy delivered. This metric accounts for different system efficiencies. Boiler derating due to altitude does not affect the efficiency of the boiler but can affect the overall capital cost of a project because of the need to utilize larger boilers.

Table 19. Energy Cost Comparison

ENERGY SOURCE	UNIT PRICE	ENERGY CONTENT	CONVERSION EFFICIENCY	PRICE OF DELIVERED ENERGY
Electricity (SCE)	$0.085/kWh	3,412 Btu/kWh	100%	$24.91/MMBtu
Propane	$3.50/gal	91,500 Btu/gal	80%	$47.81/MMBtu
Propane	$2.15/gal	91,500 Btu/gal	80%	$29.37/MMBtu
Diesel Fuel Oil	$3.38/gal	140,000 Btu/gal	80%	$30.18/MMBtu
Wood Chips	$45/BDT	8,500 Btu/lb	70%	$2.65/MMBtu
Wood Chips	$25/BDT	8,500 Btu/lb	70%	$1.47/MMBtu

Table 19 indicates that fuel savings of a factor of 9.4 to 32.1 are possible by utilizing biomass energy. Therefore, a facility utilizing a 2 MMBtu per hour boiler at a 15% capacity factor could provide between $58,500 per year and $121,700 per year in fuel savings. The system payback therefore is dependent upon the current cost of fuel, the annual heat utilization (capacity factor), and the additional cost of a system.

The system payback can change drastically if the incremental capital cost is the entire system or just the marginal cost of the biomass boiler. The distinction here is based on whether a new fossil fuel boiler is expected to be purchased or if the investment in a biomass boiler represents a completely new investment. To be conservative, TSS will analyze the financial feasibility of a biomass boiler assuming that it is a completely new purchase that will increase the heating system's total redundancy.

Mammoth Mountain Ski Area: Garage

Using the factors described above, the TSS financial analysis model indicates the findings below (Table 20). Note these findings do not include the benefits from depreciation of the equipment and assumes that the money saved from avoided propane use is utilized elsewhere by Mammoth Mountain and is therefore not considered taxable income. The financial analysis is performed on a 2.0 MMBtu per hour facility with the expectation that the propane boilers would remain in place for use during high demand (peak use periods only). The analysis assumes that the project is financed without debt.

Table 20. Sensitivity Analysis for Mammoth Mountain Garage

	LOW SENSITIVITY	BASELINE SENSITIVITY	HIGH SENSITIVITY
Total Project Cost ($)	$353,488	$548,396	$700,000
Propane Displaced (gal/yr)	53,188	45,209	39,891
Cost of Propane ($/gal)	$2.15	$2.15	$2.15
Cost of Propane Displaced ($/yr)	$114,354	$97,199	$85,766
Price of Biomass ($/BDT)	$25	$30	$35
Additional O&M Personnel Costs ($/yr)	$4,745	$9,490	$14,235
Additional O&M Equipment Costs ($/yr)	$1,000	$4,500	$7,000
Average EBIDTA[34] Cash Flow ($/yr)	$95,837	$69,442	$49,645
IRR	28.0%	12.8%	6.1%
Simple Payback Period (yr)	3.5	7.4	12.7

The findings in Table 20 show a best case (low sensitivity) and a worst case (high sensitivity) scenario, indicating that the payback is expected to be between 3.5 and 12.7 years, depending on project specific criteria. Most of these factors can be controlled through feedstock contracts and a competitive request for proposals (RFP) process (targeting equipment vendors). Through these processes, an institution will be able to generate an expectation for financial return before committing funds. No economic value was assigned to the potential greenhouse gas offsets due to the challenges of compliance and proof of offsets for this small-scale project.

Non-Profit Institutions

The previous analysis reviews the financial model for a private institution planning to self-finance. Based on the Site Selection Matrix, the majority of the alternative sites were non-profit organizations including schools and hospitals. This analysis is focused on a non-profit organization (without tax liability) and paying higher rates for propane than Mammoth Mountain. The analysis results in Table 21 are also for a 2 MMBtu per hour boiler system.

Table 21. Sensitivity Analysis for Non-Profit Institution Installation

	LOW SENSITIVITY	BASELINE SENSITIVITY	HIGH SENSITIVITY
Total Project Cost	$353,488	$548,396	$700,000
Propane Displaced	53,188 gal/yr	45,209 gal/yr	39,891 gal/yr
Cost of Propane	$3.38/gal	$3.38/gal	$3.38/gal
Cost of Propane Displaced ($/yr)	$179,775	$152,806	$134,832
Price of Biomass	$25/BDT	$30/BDT	$35/BDT
Additional O&M Personnel Costs	$4,745/yr	$9,490/yr	$14,235/yr
Additional O&M Equipment Costs	$1,000/yr	$4,500/yr	$7,000/yr
Average EBIDTA Cash Flow	$161,258	$125,050	$98,710
IRR	46.6%	23.4%	14.3%
Simple Payback Period	2.1 yr	4.2 yr	6.7 yr

[34] Earnings Before Interest Taxation Depreciation and Amortization

The findings in Table 21 show a best case (low sensitivity) and a worst case (high sensitivity) scenario, indicating that the payback is expected to be between 2.1 and 6.7 years, depending on project specific criteria. The difference between these analyses findings is primarily due to the difference in propane pricing with the Ski Resort having significantly lower propane costs.

No economic value was assigned to the potential greenhouse gas offsets due to the challenges of compliance and proof of offsets for this small-scale project.

Cash Flow Projections

Cash flow projections will vary monthly based on thermal demand. Understanding cash flow is particularly important when using debt to finance a project, as monthly payments traditionally do not change annually, while energy savings will be concentrated during the winter months. Table 23 shows a projected annual cash flow based on the heat demand at the Mammoth Mountain garage between 2011 and 2013. TSS utilized this data because it was readily available; however, TSS acknowledges that the operating schedule for the maintenance garage will be different than other potential biomass thermal applications (e.g., the Mammoth Unified School District). The cash flow analysis anticipates that 80% of the total heat demand will be supplied by the biomass boiler reserving the additional 20% heat load for the propane boiler during start-up, peaking, and in the summer for low heat demand applications. A two MMBtu per hour boiler with this demand would be operating at an 18% capacity factor.

Table 23 includes the following assumptions:

- The fossil fuel boiler is fired on propane with a 1.0% annual inflation rate;
- Energy content of propane is 91,500 Btu per gallon;
- Woodchip feedstock costs of $33.45 with a 1.5% annual inflation rate (Table 15);
- Energy content of wood chips are 8,500 Btu per dry pound;
- Personnel time demand of 7 hours per week when operating the biomass boiler with a wage rate of $20 per hour with a 30% burden;
- Maintenance costs are concentrated in the summer months when the biomass boiler is not operational; and
- Debt financing accounts for 75% of the capital cost of $548,396 (Table 16) with a debt term of 10 years and an interest rate of 6%.

The EBITDA and net cash flow on an annual basis are shown in Table 22. Annually, the projected cash flow is expected to be positive, although the summer months' expenditures will exceed savings as the biomass boiler is not operating; however, maintenance and debt payment will still occur. Table 22 and Table 23 reflect the historical seasonal variation in heat demand.

Table 22. Annual Projected Cash Flow

		PROPANE PRICING	
		$2.15/gal	**$3.50/gal**
EBITDA ($/yr)	Year 1	$94,617	$167,484
	Year 2	$77,521	$138,452
	Year 3	$76,388	$136,472
	Average	**$82,842**	**$147,469**
Net Cash Flow ($/yr)	Year 1	$38,735	$111,602
	Year 2	$21,639	$82,570
	Year 3	$20,506	$80,590
	Average	**$26,960**	**$91,587**

Table 23. Projected Annual Cash Flow: 36 Months

	YEAR 1												YEAR 2					
	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL	AUG.	SEPT.	OCT	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.
Heat Demand (MMBtu)	802	892	859	602	349	106	0	0	0	0	661	668	633	525	702	498	289	88
Feedstock Costs ($)	-$1,803	-$2,007	-$1,932	-$1,353	-$784	-$238	$0	$0	$0	$0	-$1,487	-$1,503	-$1,423	-$1,181	-$1,579	-$1,119	-$649	-$197
Avoided Fuel: $2.15/gal ($)	$18,838	$20,967	$20,183	$14,136	$8,195	$2,487	$0	$0	$0	$0	$15,535	$15,707	$15,018	$12,463	$16,661	$11,811	$6,847	$2,078
Avoided Fuel: $3.50/gal ($)	$30,667	$34,132	$32,855	$23,012	$13,341	$4,048	$0	$0	$0	$0	$25,289	$25,569	$24,448	$20,289	$27,122	$19,227	$11,147	$3,382
O&M ($)	-$728	-$728	-$728	-$728	-$728	-$728	-$1,125	-$1,125	-$1,125	-$1,125	-$728	-$728	-$728	-$728	-$728	-$728	-$728	-$728
EBITDA: $2.15/gal ($)	$16,307	$18,232	$17,523	$12,055	$6,683	$1,521	-$1,125	-$1,125	-$1,125	-$1,125	$13,320	$13,476	$12,867	$10,555	$14,354	$9,964	$5,471	$1,153
EBITDA: $3.50/gal ($)	$28,136	$31,398	$30,196	$20,931	$11,829	$3,082	-$1,125	-$1,125	-$1,125	-$1,125	$23,074	$23,338	$22,297	$18,380	$24,816	$17,380	$9,770	$2,457
Debt PMT ($)	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657
Net Cash Flow: $2.15/gal ($)	$11,650	$13,576	$12,866	$7,398	$2,026	-$3,136	-$5,782	-$5,782	-$5,782	-$5,782	$8,663	$8,819	$8,210	$5,898	$9,697	$5,307	$814	-$3,504
Net Cash Flow: $3.50/gal ($)	$23,479	$26,741	$25,539	$16,274	$7,172	-$1,575	-$5,782	-$5,782	-$5,782	-$5,782	$18,418	$18,681	$17,640	$13,724	$20,159	$12,723	$5,113	-$2,199

	YEAR 2						YEAR 3											
	JUL	AUG.	SEPT.	OCT	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.
Heat Demand (MMBtu)	0	0	0	0	521	834	838	643	529	325	181	55	0	0	0	0	831	591
Feedstock Costs ($)	$0	$0	$0	$0	-$1,172	-$1,876	-$1,883	-$1,446	-$1,189	-$730	-$407	-$123	$0	$0	$0	$0	-$1,869	-$1,329
Avoided Fuel: $2.15/gal ($)	$0	$0	$0	$0	$12,366	$19,795	$20,075	$15,417	$12,673	$7,779	$4,341	$1,316	$0	$0	$0	$0	$19,920	$14,168
Avoided Fuel: $3.50/gal ($)	$0	$0	$0	$0	$20,131	$32,224	$32,680	$25,097	$20,630	$12,664	$7,067	$2,142	$0	$0	$0	$0	$32,428	$23,065
O&M ($)	-$1,125	-$1,125	-$1,125	-$1,125	-$728	-$728	-$728	-$728	-$728	-$728	-$728	-$728	-$1,125	-$1,125	-$1,125	-$1,125	-$728	-$728
EBITDA: $2.15/gal ($)	-$1,125	-$1,125	-$1,125	-$1,125	$10,466	$17,191	$17,464	$13,243	$10,756	$6,322	$3,206	$464	-$1,125	-$1,125	-$1,125	-$1,125	$17,323	$12,111
EBITDA: $3.50/gal ($)	-$1,125	-$1,125	-$1,125	-$1,125	$18,231	$29,620	$30,069	$22,923	$18,713	$11,206	$5,932	$1,291	-$1,125	-$1,125	-$1,125	-$1,125	$29,831	$21,008
Debt PMT ($)	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657	-$4,657
Net Cash Flow: $2.15/gal ($)	-$5,782	-$5,782	-$5,782	-$5,782	$5,810	$12,534	$12,807	$8,586	$6,099	$1,665	-$1,451	-$4,192	-$5,782	-$5,782	-$5,782	-$5,782	$12,666	$7,454
Net Cash Flow: $3.50/gal ($)	-$5,782	-$5,782	-$5,782	-$5,782	$13,574	$24,963	$25,412	$18,266	$14,056	$6,550	$1,275	-$3,366	-$5,782	-$5,782	-$5,782	-$5,782	$25,174	$16,351

Incentive Programs

Incentive programs for biomass thermal development are limited due to the maturity of the industry, favorable payback periods when appropriately sited, and the relatively low capital cost compared to biomass electricity production. Alternative funding sources are largely targeted at low-income areas in the form of USDA Rural Business Enterprise Grants and Economic Adjustment Funding. Mammoth Lakes does not qualify as a low-income area.

The USFS Woody Biomass Utilization Grant (WBUG) program is available for design and engineering assistance for projects utilizing forest-sourced biomass. The WBUG program can fund up to $250,000 of design and engineering work including civil, mechanical, and electrical engineering design. The WBUG program is an annual solicitation. Applications are typically due between February and April (depending on the date set by the USFS).

Renewable energy sources are eligible for a Modified Accelerated Cost Recovery System (MACRS) seven-year depreciation schedule, which can provide tax incentives for enterprises with a sufficient tax appetite to utilize this incentive. TSS did not incorporate MACRS tax credits in the financial analysis.

Employment and Job Creation

Biomass thermal applications will not create additional onsite employment. While there is additional work associated with operating a biomass boiler instead of a fossil fuel boiler, the time requirements do not necessitate additional labor and that work is expected to be performed by existing operations and maintenance staff.

Due to the relatively low feedstock demand, additional jobs within the forest are not expected to be generated from the addition of one biomass boiler. However, the additional demand for forest-sourced material will help support existing jobs. Additional boiler installations may ultimately generate more jobs in the forest-sector.

<u>Personnel Requirements</u>

A biomass boiler requires more staff oversight than a fossil fuel boiler because of the feedstock conveyance system. It is recommended that the principal operator of the biomass boiler have experience managing and operating fossil fuel boilers. The water or steam side of a biomass boiler is no different than that of a fossil fuel boiler. Properly managing the water or steam temperature and pressure, the chemical cleaning and softening agents, and top off water are all necessary for both a biomass boiler and a liquid-fueled boiler. An experienced boiler operator will be able to identify these operations and maintenance issues and can focus on learning the particulars that distinguish a biomass boiler from a traditional boiler. A biomass boiler operator does not need prior experience working with wood chips. However, experience and familiarity with mechanical systems like motors or heating, ventilation, and air conditioning (HVAC) systems are recommended.

In addition to the primary operator(s), personnel are recommended to help monitor the conveyance system and the feedstock delivery. It is recommended that these positions be filled by personnel who

have experience with mechanical systems. Experience handling wood products or experience operating a boiler is not required.

Experience shows that challenges in the biomass boiler operations are largely due to the feedstock conveyance system; the boiler itself is predictable and stable. It is important that there is one trained staff person available during all times of operation to be able to respond to any conveyance system impediments. Staff schedules will determine the number of personnel required to cover the typical operating hours for the unit.

Lastly, a protocol should be developed and staff personnel should be assigned the role of accepting and inspecting feedstock delivery to ensure feedstock quality. There are no prerequisites for this position.

Training Requirements

Operator training is one of the most crucial elements of implementing a successful biomass thermal energy project. Traditionally, facilities developing biomass boilers are switching from a fossil fuel boiler to a biomass boiler for both economic, environmental, and/or sustainability reasons. While there are many advantages to utilizing a biomass boiler, ease of operations can be challenging when compared to fossil fuel boilers. Fossil fuels are simple to deploy because they are easy to transport and convey. For the existing fossil fuel boilers, the fuel is delivered to the site and stored in tanks. The pressure differential developed by the boiler, when in operation, pulls the fuel through the in-feed system. Fossil fuel is efficiently combusted by specialized delivery systems optimized to ensure the proper air to fuel ratio to maximize energy production and minimize emissions.

A biomass boiler utilizes solid feedstock as fuel. Solid feedstocks are more challenging than fossil fuels because of their inability to conform to containers and their inability to easily alter physical geometry. Just as with fossil fuels, biomass boilers are more efficient with a uniform feedstock size because the in-feed system can be optimized for that particular geometry (e.g., chip size). An operator must know how to monitor the system to react to changes in feedstock sizing and quality (e.g., wood species, moisture content). Since fossil fuel boilers are always able to generate uniform in-feed characteristics, changing feedstock quality is not a challenge that boiler operators are accustomed to addressing. Additionally, the conveyance of solid feedstocks are mechanized and are therefore prone to more challenges than the passive in-feed system of a liquid fuel boiler that is driven by the unit's operational vacuum.

For each of these challenges, the common thread is feedstock size and quality. A detailed review of feedstock providers and their ability to consistently meet feedstock specifications is important to minimize the downtime from feedstock conveyance and maximize the combustion efficiency. However, the feedstock quality is not always within the control of the operator, and typical fuel contracts allow for tolerances with feedstock sizes and moisture content. It is therefore the operator's role to be able to manage and identify potential obstacles and proactively respond to minimize the impact of feedstock quality on the operation of the system.

For a new biomass boiler operator, the challenges facing the operations and maintenance staff are not particularly difficult, but it is important that operators are educated about the challenges before commencing operation of the unit. A proper training regime (e.g., technology vendor will provide

hands-on training) allows one-on-one time for each potential operator or maintenance staff member to ensure that they understand the system and the common challenges. The training regimen outlined in this section provides goals for each stage of the program. While a biomass boiler is not difficult to operate, it is important to understand the mechanics of the system to be able to properly react to any situation.

Findings

A biomass thermal facility in the Mammoth Lakes regions is economically viable based on current prices for propane. The most significant challenges facing the deployment of biomass thermal installations are uncertainty surrounding feedstock and capital equipment cost. The feedstock assessment indicates that there are sufficient feedstock sources in the area within the price ranges analyzed in this analysis. A competitive bid process for selecting the technology vendor will help ensure cost effective technology selection. While project financials are more attractive for non-profit institutions based on the findings in Table 21, the Mammoth Mountain garage case study also indicates that a biomass option may remain attractive for institutions that have advantageous propane prices.

TECHNOLOGY REVIEW AND SELECTION PROCESS

Technology Overview

There are several biomass thermal equipment providers that are active throughout the United States. Historically, biomass thermal providers are strategically located in areas with limited natural gas access and abundant forest resources. In recent years, biomass thermal technology providers have continued to expand throughout the U.S., particularly with the increased participation of European manufacturers that have recently entered into the U.S. market.

There are numerous biomass thermal technology types including underfeed, reciprocating grate, chain grate, and pneumatic grate systems, stoker and fluidized bed boiler configurations, and pellet and wood chip orientations. Boiler configurations are typically structured to fit different size and feedstock demands. Stoker boilers are the most simple boiler type with feedstock combustion occurring in one location in the boilers with various grate configurations to optimize air flow through the combustion zone. Fluidized bed boilers utilize a sand bed to allow feedstock to flow through the boiler. The sand is engineered to retain and distribute heat throughout the reaction vessel to increase the efficiency of combustion. Fluidized bed boilers are economically viable for large-scale applications and are rarely deployed with smaller commercial-scale boilers.

Underfeed, reciprocating grate, and chain grate are all different stoker boiler configurations to induce proper airflow throughout the feedstock. The underfeed system is the most basic system using air blowers to optimize air flow patterns. Reciprocating grate and chain grate move the feedstock within the combustion chamber and are typically used in large commercial and industrial applications. The capital cost of reciprocating grate and chain grate systems is often economically prohibitive in small stoker boilers, such as those under review for the Mammoth Lakes area.

Biomass thermal facilities may utilize pellets or wood chips. Pellets are used for their ease of conveyance and their energy dense properties. Feedstock conveyance is particularly important with small systems, as loading is required to be more precise in the small units. However, pellets are often significantly more expensive due to the pellet manufacturing process and this cost is further increased by transportation distance from the pellet facility. The biomass availability and cost analysis indicated wholesale pellet prices to cost approximately five times the price of delivered wood chips in the Mammoth Lakes area due to the high transportation costs from the nearest pellet facility (located in John Day, Oregon). Biomass thermal technology that utilizes wood chips is very limited for applications under one MMBtu per hour due to the challenges of conveying chipped material.

Project Greenhouse Gas Impacts

Biomass thermal projects contribute to the reduction of greenhouse gas emissions by displacing fossil fuel and avoiding landfill and pile and burn disposal methods for wood waste. While biomass thermal units are traditionally less efficient than fossil fuel alternatives (due to low energy density fuel), the savings from avoided business-as-usual practices and the long-term benefits of biogenic carbon indicate the biomass thermal energy production is beneficial to greenhouse gas reduction goals. Greenhouse gas accounting is shown in Table 24.

Table 24. Greenhouse Gas Accounting for Biomass Thermal Projects

EMISSIONS SOURCE	CO_2 EMISSIONS ($lb/MMBtu_{Delivered}$)	CH_4 EMISSIONS ($lb/MMBtu_{Delivered}$)	CO_2e EMISSIONS ($lb/MMBtu_{Delivered}$)
Biomass Boiler[35]	279	0.03	280
Biomass Processing and Transport[36]	5.3	0.003	5.4
Propane Boiler[37]	-171	-0.003	-171
Pile and Burn Avoided Emissions[38]	-133	-2	-189
Net Emissions	**-19.7**	**-2.0**	**-74.6**

Assumptions used in Table 24 include:

- 70% efficiency for biomass boilers;
- 80% efficiency for propane boilers;
- 8,500 Btu per dry pound (high heat value) for wood;
- 25 pounds of CO_2e for one pound of methane emissions;
- No carbon offset from future carbon uptake;
- No emissions associated with urban biomass feedstock sourced from the landfill;
- No emissions associated with the collection, processing, and transportation of propane; and
- Pile and burn avoided emissions reflect the feedstock blend of 45% urban wood and 55% forest wood as indicated in Table 14.

Total greenhouse gas emissions will vary slightly by technology; however, the most important means of reducing greenhouse gas emissions is average moisture content of the biomass feedstock. The higher the moisture content, the more energy must be utilized to evaporate the water and the less energy is delivered to heat the building. Therefore, lower moisture content fuel contributes to better greenhouse gas emission reduction.

Technology Vendors and Developers

TSS recommends that any technology selection take place through a competitive bid process. TSS has gathered a list of manufacturers and service providers that have developed biomass thermal projects sized at 2 MMBtu per hour (Table 25). TSS believes that these enterprises have the experience and ability to successfully develop a biomass thermal project in the Mammoth Lakes area.

[35] EPA AP-42 Table 1.6-3
[36] Springsteen, B., Christofk, T., Eubanks, S., Mason, T., Clavin, C., Storey, B. *Emissions Reductions from Woody Biomass Waste for Energy as an Alternative to Open Burning*. Journal of the Air and Waste Management Association, 2011.
[37] EPA AP-42 Table 1.5-1.
[38] Lee, C., Erickson, P., Lazarus, M., Smith, G. *Greenhouse Gas and Air Pollutant Emissions of Alternatives for Woody Biomass Residues.* Stockholm Environmental Institute. 2010.

Table 25. Biomass Thermal Technology Providers and Developers

VENDOR	LOCATION	UNIT SIZES
A3 Energy Partners www.a3energypartners.com	Portland, OR	Distributor of Viessmann Systems
Advanced Recycling Equipment www.advancedrecyclingequip.com	St. Mary's, PA	0.75 – 60 MMBtu/hr
Alternative Energy Solutions International (UniConfort Boiler) www.aesintl.net	Wichita, KS	0.3 – 20 MMBtu/hr
AFS Energy Systems www.asfenergy.com	Harrisburg, PA	1.2 – 40 MMBtu/hr
Chiptec www.chiptec.com	Williston, VT	1.5 – 60 MMBtu/hr
Decton Iron Works www.decton.com	Butler, WI	0.33 – 4 MMBtu/hr
Fink Machine www.finkmachine.com	Enderby, BC, CAN	Distributor of Viessmann Systems
Hurst www.hurstboiler.com	Coolidge, GA	1.2 – 20 MMBtu/hr
Viessmann (KÖB Boiler Line) www.viessmann-us.com	Warwick, RI	0.25 – 8.5 MMBtu/hr
McKinstry www.mckinstry.com	Portland, OR	Technology Agnostic Project Developer
Messersmith www.burnchips.com	Bark River, MI	2 – 20 MMBtu/hr
Precision Energy Service www.pes-world.com	Hayden, ID	Technology Agnostic Project Developer
Pro-Fab Industries www.profab.org	Arborg, MB, CAN	0.75 – 2.5 MMBtu/hr
SolaGen www.solageninc.info	St. Helens, OR	0.5 – 200 MMBtu/hr
Wood Master www.woodmaster.com	Red Lake Falls, MN	0.5 – 6.8 MMBtu/hr

Technology Selection Process

When conducting a competitive bid process, TSS finds it beneficial for an organization to prioritize critical selection criteria before receiving bids in order to better compare technology types and proposals. Table 26 outlines several critical considerations when selecting a technology provider. The list in Table 26 is shown in alphabetical order and is not prioritized.

Table 26. Selection Criteria

CRITERIA	CONSIDERATIONS
Company and Equipment Track Record	As with any contractor, company history is an important criterion that is an indicator of track record. This criterion is often best understood through interviews and discussions with references and focuses on the personal connection that a company makes with its clients.
Company Longevity and Total Installations	Company longevity is a surrogate measure for performance. The longer a company has been around, the more challenges it has faced and the more unexpected issues it has resolved. While each project is unique, company experience can be an important factor in project development.
Ease of Maintenance and O&M Time Requirements	Biomass thermal units require more operations and maintenance (O&M) and thus are more time intensive than natural gas, propane, fuel oil, or electric substitutes. Managing a solid fuel supply requires some additional oversight to ensure proper function. Options and add-ons such as automatic ash removal and remote monitoring can reduce O&M time and can ease the transition from fossil fuel to renewables.
Air Emissions	Small biomass thermal units typically do not run into air emissions challenges, but each air district is different. It is important to identify the emission criteria and permitting thresholds for your air district and ensure that any developer can meet those limits.
Feedstock Flexibility	Many small biomass units are designed to utilize pellets. While larger biomass units are typically more flexible with wood chips, small biomass units can require very specific feedstock sizing. It is important to understand the available wood feedstock characteristics in the area and the wood processing equipment constraints and ensure that there is a good match.
Local Installations	Local installation and local knowledge are important in project development. Biomass thermal units are not commonplace, making replacement parts and service an important consideration.
Low O&M Costs	Low O&M costs are important and are often overlooked through a bid process. O&M costs are typically dictated by the quality of the equipment and the availability of parts in the local area. In many cases, increased O&M costs and subsequent problems from challenging or frequent O&M issues do not outweigh the reduction in capital costs often associated with cheaper parts.
Price	Capital cost may vary significantly between manufacturers and all bids will not be equal in price or in quality. Managing costs and features is important to truly understand the best options.
Unit Size	While vendors may be able to provide equipment solutions, identifying a company's typical project size and their number of installations in a specific size range is important to understanding a company's experience.

TSS recommends that organizations review and prioritize these criteria based on the specific project goals. There are many factors involved in the selection of a technology vendor, and developer proposals may change depending on workload, seasonal constraints, geographic constraints, or business policy. TSS believes it is important to solicit bids from multiple vendors. Appendix B includes an RFP template that may be used for developing biomass thermal facilities in Mammoth Lakes.

In addition to a proposal, TSS strongly recommends communication with project client references. Project references can provide critical insight into the challenges that arise during the installation and operation of a biomass thermal facility. Additionally, client references can provide insight from the perspective of an organization new to bioenergy. This perspective can be very valuable before initiating the first biomass thermal installation.

TSS has found that client references often stress the importance of staff training. Biomass thermal systems, while relatively easy to use, still require more work than fossil fuel boilers. There is always a transition period for operations and maintenance staff, and dedication to proper training is important to ease this transition. Note that several manufacturers offer remote monitoring which allows representatives from the technology vendor to monitor the performance of the boiler and address potential issues.

ENVIRONMENTAL PERMITTING PLAN

The permitting plan identifies environmental and land use permits required (if any), provides key agency input, presents expected fees, and includes a recommended implementation schedule to secure permits. The permitting plan is based on application forms, prior experience of the project's consulting team, and communication with representatives from permitting agencies.

Land Use/Special Use

Per the findings in the Site Review and Analysis and the Biomass Feedstock Availability and Cost Analysis, biomass thermal systems are appropriate for the biomass resource in the Mammoth Lakes area. The installation of a biomass thermal system on non-federal lands to replace an existing heating system does not require any additional land use entitlements or water permits.

On federal lands, such as in the existing Mammoth Mountain Ski Area permit footprint, the USFS could amend the ski area permit to allow construction and operation of the biomass thermal unit. If a similar biomass thermal unit were proposed to be constructed on federal lands outside of areas already possessing an existing permit, a standalone special permit would be required from the appropriate federal land management agency.[39] Regarding environmental impact review of a proposed biomass thermal project, if the total area is less than five acres, a categorical exclusion could possibly be used. A decision memo would be the environmental decision documentation.[40]

Air Quality Permitting

Air quality permitting in the Mammoth Lakes region is under the jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD). The GBUAPCD enforces Federal, State, and local air quality regulations and to ensure that the federal and state air quality standards are met.

In consultation with the GBUAPCD, it has been determined that biomass thermal units operating within the District will require an air quality permit. There is an exemption in the GBUAPCD rules for steam generators, steam superheaters, water boilers, water heaters, and closed heat transfer systems that have a maximum heat input rate of less than 15 MMBtu per hour.[41] However, these units must be fired exclusively with natural gas or liquefied petroleum gas or any combination thereof. Thermal units utilizing woody biomass must apply for, and obtain, an air quality permit. There is no minimal size level in the GBUAPCD regulations.

Application Process

The GBUAPCD requires that before an air pollutant emitting system is installed within the district, an Authority to Construct (ATC) permit must be obtained.[42] The application process for a biomass fueled boiler system includes:

[39] Personal communication with Jon Regelbrugge, District Ranger, Mammoth and Mono Lake Ranger Districts, Inyo National Forest, February 6, 2014.
[40] Ibid
[41] GBUAPCD Rule 201 F
[42] GBUAPCD Rule 200

- Prepare GBUAPCD Authority to Construction Application – General Information Form (APCD – 004, see Appendix C) and the Fuel Burning Equipment Form (APCD – 008, see Appendix D). These application forms will require the following information:
  - Permittee information and location of project;
  - Type of application – a biomass boiler system at any location would be considered a new facility;
  - Detailed description of the facility and type of biomass fuel burning equipment; and
  - Description of process, configuration, emissions control equipment, and maximum air emissions quantity (such as PM, CO, VOCs, NO_x, and SO_x).
- The GBUAPCD will review application for completeness and either issue applicant a determination letter or request additional information.
- Upon application completeness determination, GBUAPCD will prepare an engineering evaluation and draft permit.
- The draft permit will be circulated for a 30-day public review.
- Comments will be addressed and permit will be issued.

It is expected that a biomass-fueled boiler systems located at the sites identified in the Site Review and Analysis will have very low air pollutant emissions due to the relatively small size. Table 27 shows the projected emissions form a 2.0 MMBtu per hour boiler operating at 70% efficiency and at an 18% capacity factor.

Table 27. Project Criteria Pollutant Emissions: 2.0 MMBtu/hr Biomass Boilers

	CO	NOx	SO_2	PM*	PM_{10}*	$PM_{2.5}$*	LEAD	VOC
Biomass Boiler[43] (lb/MMBtu)	0.6	0.22	0.025	0.22	0.20	0.12	0.00005	0.017
Annual Emissions (tons per year)	1.69	0.62	0.07	0.62	0.56	0.34	0.00014	0.05

*Emissions factor based on the use of a mechanical collector (e.g., multiclone) to reduce PM

The emissions levels in Table 27 would typically result in relatively easy air quality permitting; however, the air toxics policy of the GBUAPCD adds challenges to permitting even small biomass-fueled boiler systems.

Toxic Risk Assessment Policy

The GBUAPCD adopted a Toxic Risk Assessment Policy in 1987 that guides air quality permit issuance when the proposed source emits Toxic Air Contaminants, as defined and listed by the California Air Resources Board (CARB) and the U.S. EPA. The GBUAPCD Toxic Risk Assessment Policy[44] (Appendix E), states that:

1. Sources that emit Toxic Air Contaminants, as listed by the CARB or EPA must apply for a permit.

[43] Environmental Protection Agency, AP-42: Chapter 1, Section 6.
[44] Many of the other air districts in California have similar written policy

2. A screening risk assessment will be performed by the district. If the lifetime carcinogenic risk to the maximum exposed individual is less than or equal to one-in-one-million (1×10^{-6}), a permit will be granted. If the risk is greater than 1×10^{-6}, the proponent will be required to do a formal risk assessment and an Environmental Impact Report.
3. Proposed sources which result in a carcinogenic risk of greater than 10×10^{-6} would be denied permits. Proposed sources which result in a carcinogenic risk between 1×10^{-6} and 10×10^{-6} may be issued a permit if appropriate mitigations are incorporated into the project.

The direct combustion of woody biomass in a thermal boiler system will result in the potential release of toxic air contaminants (e.g., volatile and semi-volatile organic compounds such as benzene, acrolein, and naphthalene). To assess this potential, the GBUAPCD prepared a preliminary toxic risk assessment spreadsheet, which TSS has applied to the preferred sites in the Mammoth Lakes area where a biomass boiler system could be installed. The district's preliminary toxic risk assessment spreadsheet calculates the chronic and acute risk due to emissions of a selected number of organic compounds considered by the CARB and the California Office of Environmental Health Hazard Assessment (list of these compounds can be found in Appendix E). The purpose of this spreadsheet is to make a preliminary determination of what the carcinogenic risk to a maximum-exposed individual person might be. Distance to the receptor (typically a residence), size of the biomass boiler system, and emission factors for the organic compounds (referenced from EPA's AP-42 emission factors for wood combustion) are all factors used together to determine the potential carcinogenic risk.

TSS employed this preliminary risk assessment spreadsheet to the various preferred sites as indicated above, resulting in air permitting challenges. Examples include:

- At the Mammoth Mountain garage, an air permit would be required, and would limit the number of hours the biomass boiler could operate. The limitation on the number of hours is not expected to inhibit the boiler from meeting the load requirements.
- At potential sites in the town of Mammoth Lakes, such as the school and hospital, the immediate proximity of residences results in carcinogenic risk factor exceeding 10×10^{-6} even with low operating hours. It would likely be necessary to install an expensive emissions control system to lower the subject organic compounds concentration levels to below the 10×10^{-6} level. In addition, an Environmental Impact Report will be required unless the emission control system lowered the risk level to below the 1×10^{-6} GBUAPCD policy threshold, significantly increasing the cost of installing the biomass boiler system.

Alternatively, TSS updated the preliminary risk assessment spreadsheet provided by the GBUAPCD with emissions factors from a CARB database[45] generated by aggregating source test data (replacing some of the existing emission factors derived from EPA AP-42). Using these emission factors, when available, instead of the AP-42 emission factors resulted in a decreased carcinogenic risk factor such that some development within the Town of Mammoth Lakes could be permitted under the Toxic Risk Assessment Policy. TSS recommends that any organization considering a biomass thermal unit within the Town of Mammoth Lakes consider working with the GBUAPCD to determine if this set of CARB emission factors would be permissible under their policies.

[45] CARB California Air Toxics Emission Factors database (available at: http://www.arb.ca.gov/app/emsinv/catef_form.html). Search the database using inputs of System Type: Boiler and Material Type: Wood.

Air Permitting Fees

Rule 301, Permit Fee Schedule 2 - Fuel Burning Equipment Schedule: Any article, machine, equipment or other contrivance in which fuel is burned, with the exception of incinerators which are covered in Schedule 4, shall be assessed a permit fee based upon the design fuel consumption of the article, machine, equipment or other contrivance expressed in thousands of BTUs per hour, using gross heating values of the fuel, in accordance with the following schedule in Table 28.

Table 28. Air Permitting Fee Schedule[46]

UNIT SIZE (BTU/HR)	INITIAL ATC PERMIT FEE	ANNUAL ATC PERMIT FEE
Up to and including 150,000	$80.00	$65.00
Greater than 150,000 but less than 400,000	$157.00	$129.00
400,000 or greater but less than 650,000	$320.00	$129.00
650,000 or greater but less than 1.5 MM	$805.00	$383.00
1.5 MM or greater but less than 5 MM	$1,273.00	$517.00
5 MM or greater but less than 15 MM	$1,687.00	$779.00

At the Mammoth Mountain garage site, this project is expected to require costs of $1,273 for the initial permit, and $517 annually.

Permitting Schedule

Once an ATC application is submitted to the GBUAPCD, the district has 30 days to determine if the application is complete (all of the necessary information for the district to conduct an engineering evaluation is contained in the application package). If not, the district will request additional information to make their completeness determination. This additional information request will restart a 30-day review period. Once the application is deemed complete, the district has up to 180 days to issue the permit. However, the time to actually conduct the engineering evaluation and prepare the permit for issuance can be much less than 210 days.

Findings

The installation of a biomass thermal system to replace an existing heating system on non-federal does not require any additional land use entitlements. On federal lands, a special use permit from the appropriate federal land management agency is required. If one already exists, it can be amended to include the biomass thermal unit.

Since a biomass thermal unit will combust a solid fuel, it has been determined that an air quality permit from the GBUAPCD will be necessary.

[46] This fee schedule only includes units not exceeding 15 MMBtu per hour, as no single system in the Mammoth Lakes area is expected to exceed that size.

It is expected that a biomass-fueled boiler systems in the Mammoth Lakes area and at the preferred sites previously identified will have very low air pollutant emissions due to the relatively small size.

The direct combustion of woody biomass in a thermal boiler system will result in the potential release of toxic air contaminants. The release of toxic air contaminants is governed by GBUAPCD policy, which will present challenges to the siting of biomass thermal units at certain sites within the Mammoth Lakes area, particularly those near residential dwelling units. The Mammoth Mountain garage is remote enough from sensitive receptors and has limited enough operating hours that the GBUAPCD Toxic Risk Assessment Policy will have a minimal impact.

In addition to environmental permitting, building permits and grading permits may be necessary. The specifics of these permits were not reviewed as a part of this study.

OUTREACH AND COMMUNICATIONS PLAN

The outreach and communications necessary for the development of a biomass thermal facility are significantly reduced compared to the development of a biomass CHP facility. Analogous to fossil fuel development, the installation of a propane boiler at one facility does not require the same community outreach as the development of a one MW propane-fired power plant. TSS does not recommend broad community outreach and communications for the installation of a biomass thermal facility. However, outreach and communication may be important to immediate stakeholders (e.g., individuals and organizations that utilize the facility). Without the need for a land use entitlement or CEQA review for small-scale thermal applications, there is no period for public involvement with the project.

TSS does recommend the promotion of this renewable energy development through informational material that can be used to inform stakeholders of the benefits of biomass thermal facilities. TSS has developed a frequently asked questions (FAQ) document (Appendix F) that can be utilized by an organization to provide material to interested parties.

Additionally, TSS recommends that the Biomass Team conduct outreach to community members who are in a position to influence development decisions of their organization towards renewable energy. The findings of this feasibility analysis will provide valuable information to any organization in the Mammoth Lakes area that currently utilizes a fuel oil or propane boiler to provide heat to their facilities. At the time of this report, outreach had been made to:

- Lion's Club;
- Noon Rotary;
- Sunrise Rotary;
- Mammoth Lakes Town Council;
- Mammoth Community Water District;
- Mammoth Unified School District;
- Fire District;
- Mammoth Hospital; and
- Local newspapers and radio stations.

RECOMMENDATIONS AND NEXT STEPS

This feasibility study found that a small-scale biomass thermal facility, co-located at the Mammoth Mountain garage, is a financially viable option to augment an existing propane fired boiler. Locally available biomass feedstocks are readily available, the project can be permitted, the biomass conversion technology is available, and the Mammoth Lakes community appears to be supportive.

TSS recommends that Mammoth Mountain Ski Area and the Biomass Team consider proceeding with next steps as presented below.

For Mammoth Mountain Ski Area

- Present study findings to the key stakeholders (e.g., Mammoth Mountain management) and review plans for next steps. (TSS is planning to present findings to the Mammoth Lakes Town Council and Mammoth Mountain senior management team).
- With assistance from the Biomass Team, develop and implement a strategic plan to source grants/loan guarantees from targeted private foundations, federal and state agencies (e.g., USFS sponsored Woody Biomass Utilization Grant, CARB sponsored AB 32 Cap and Trade Revenue Investment Plan).
- Begin discussion with feedstock supply contractors and the Benton Crossing landfill.
- Commence technology selection process (using RFP provided by TSS as a template).
- Issue Request for Quotes from select engineering and construction firms.
- Update internal financial analysis based on latest data.
- Select and contract with technology/engineering and construction firm.
- Engineer, construct, and start up.

Figure 8. Project Timeline: Mammoth Mountain Garage

	SCHEDULE (MONTH)											
	1	2	3	4	5	6	7	8	9	10	11	12
Present Findings												
Strategic Funding												
Feedstock Procurement												
Technology Selection												
Engineering and Construction RFQ												
Update Financial Pro Forma												
Select Technology & EAPC												
Engineering												
Construction												
Commissioning												

For the Eastside Biomass Project Team

- Present findings to the key stakeholders (Mono County Board of Supervisors, Mammoth Lakes Town Council, USFS, Mammoth Mountain Ski Area management) and other stakeholders as well as review plans for next steps. (TSS is planning to present findings to the Mammoth Lakes Town Council and Mammoth Mountain senior management team).
- Continue to post key project and technology related documents on the Mono County Renewable Energy Project web page.
- Continue outreach to others to identify options for additional use of thermal energy (e.g., greenhouse for native plants, food drying processes, etc.).
- Support Mammoth Mountain Ski Resort through the initial process and document lessons learned for utilization with subsequent projects.

Appendix A. TSS Comments on the Inyo National Forest Land Resource Management Plan Revisions

Appendix B. Request for Proposals Template

Appendix C. Authority to Construct Application

Appendix D. Fuel Burning Equipment Form

Appendix E. Great Basin Unified Air Pollution Control District's Toxic Air Assessment Policy

Appendix F. Frequently Asked Questions

MONO COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION

POST OFFICE BOX 457 • 74 NORTH SCHOOL STREET • BRIDGEPORT, CALIFORNIA 93517
760.932.5440 • FAX 760.932.5441 • monopw@mono.ca.gov • www.monocounty.ca.gov

Date: April 13, 2014

To: Mono County Planning Commission

From: Tony Dublino, Solid Waste Superintendent

Subject: Workshop and Discussion of Integrated Waste Management Plan Update

Recommended Action:

Receive presentation and provide input and direction to staff as necessary.

Fiscal Impact:

None. Informational only.

Discussion:

It is anticipated that the management of solid waste within Mono County will undergo significant changes over the next 10 years. As the closure of Benton Crossing Landfill inches closer, the County must prepare itself far in advance to provide the infrastructure necessary to maintain those critical services after the closure of our regional landfill.

The County's Integrated Waste Management Plan (CIWMP) is the logical place to articulate the changes that will become necessary, and to lay the groundwork for future developments in this area. The state requires each county to have a Local Task Force assembled to assist in the development of waste management plans, and the Mono County Solid Waste Task Force (SWTF) has been meeting and discussing potential revisions to the plan. Most of this work is grounded in the *logistics* of waste management but facility *location* is an integral part of the discussion.

Due to the concurrent timing of the General Plan update, it has been suggested that an updated CIWMP would dovetail nicely into the General Plan and could replace the existing Hazardous Waste Element. It also presents an opportunity to develop appropriate land use regulations pertaining to the kind of infrastructure that the County should anticipate in the future, which might include transfer stations, recycling centers, wood waste processing centers, waste-to-energy facilities, composting facilities, and other projects.

As a result, the commission may wish to become involved earlier rather than later, to help guide the selection of areas where these kinds of facilities would be compatible. This workshop is meant to elicit such involvement, should the commission so desire.

The SWTF has discussed potential changes to the Countywide Siting Element and the Non-Disposal Facility Element. At this time, the proposed changes retain a lot of flexibility because there is not a clearly defined long-term partnership between the Town of Mammoth Lakes and the County. Considering that the Town generates the great majority of waste in Mono

County, its participation or lack thereof is a primary determining factor of what kind of infrastructure should be built, and where it should be.

Two Draft Elements of the CIWMP are attached to this report, and can be reviewed to gain a sense of the changes being contemplated at this time. Although it is unlikely these drafts will move forward prior to determining the Town's involvement, it should provide perspective on how they will help us define our direction in the future, whatever it might be.

If you have any questions regarding this item, please contact me at (760) 932-5453.

Respectfully submitted,

Tony Dublino
Solid Waste Superintendent

Attachments: DRAFT Countywide Siting Element
DRAFT Countywide Non-Disposal Facility Element

COUNTYWIDE SITING ELEMENT

of the

MONO COUNTY INTEGRATED WASTE MANAGEMENT PLAN

Mono County, California

DRAFT

September 2013

Prepared by the

Mono County Department of Public Works

Post Office Box 457

Bridgeport, California 93517

(760) 932-5252

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SECTION 1.0
INTRODUCTION

The following Countywide Siting Element has been prepared by the Mono County Department of Public Works in accordance with requirements established by Title 14, California Code of Regulations (CCR), Division 7, Chapter 9, Article 6.5. In addition to the Source Reduction and Recycling Element (SRRE), the Household Hazardous Waste Element (HHWE), the Non-Disposal Facility Element (NDFE), and the Summary Plan, this document is one of five parts that comprise the Countywide Integrated Waste Management Plan. The purpose of the Countywide Siting Element is to demonstrate that a minimum of 15 years of permitted disposal capacity is available through existing or planned facilities on a countywide or regional basis. To meet this requirement, this document describes the geographic context of the planning area, defines the goals and objectives of this element, provides an estimate of existing countywide disposal capacity, demonstrates that existing capacity exceeds 15 years, and presents general criteria for future siting of new facilities. This document has been developed with review and input from members of the Local Task Force (LTF) including ~~and~~ staff from the Town of Mammoth Lakes, the County of Mono, and the California Integrated Waste Management Board (CIWMB).

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SECTION 2.0
PROGRAM GOALS AND POLICIES

The Mono County Local Solid Waste Task Force (LTF) was originally established by the Mono County Board of Supervisors in January 1990 ~~-~~and ratified by the Town of Mammoth Lakes in April 1990, in accordance with the requirements set forth in section 40950 of the California Public Resources Code. Following a period of inactivity, the LTF was re-organized and re-authorized by the Board of Supervisors in November 1999 and the Town of Mammoth Lakes in December 1999. This group was responsible for developing the 2000 CIWMP which has guided the county's solid waste system until the present time. ~~The LTF was established to assist Mono County staff with the development and implementation of planning goals, policies, and procedures for the countywide solid waste program. The eight members of the LTF are drawn from County agencies, the Town of Mammoth Lakes, the local solid waste industry, and the public at large.~~ Membership was modified in May 2004 to replace those who had become inactive, and again in 2006 with the emergence of new stakeholders and staff changes within participating agencies.

By 2012, emerging diversion programs and proposed infrastructure, as well as the upcoming closure

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of the regional Benton Crossing Landfill, caused a need to formally update the CIWMP to reflect the inevitable transitions of the future planning period. In August 2012, in coordination with existing members, a change in membership as well as new bylaws were recommended and by late 2012 were approved by both the Mono County Board of Supervisors and the Town of Mammoth Lakes. The 2012 bylaws, as well as ~~A~~a list of current members ~~is~~are provided in Appendix A~~of this report~~; copies of the local authorizing actions ~~that re-established the LTF in 1999~~ are also included in ~~the a~~Appendix A.

The stated duties~~goals~~ of the LTF are as follows:

- Advise jurisdictions responsible for the Source Reduction and Recycling Element, Household Hazardous Waste Element and Non-Disposal Facility Element preparation, and review goals, policies, and procedures for jurisdictions, which, upon implementation, will aid in meeting the solid waste management needs of the county, as well as the mandated source reduction and recycling requirements of Public Resources Code section 41780.
- Assist jurisdictions in the implementation of the SRRE, HHWE, and NDFE.
- Provide technical guidance and information regarding source reduction, waste diversion, and recycling to local jurisdictions during preparation and revision of the SRRE, HHWE and NDFE. Such information may be presented to the general public at public hearings and upon request by members of local government and community organizations.
- Identify solid waste management issues of countywide or regional concern.
- Determine the need for solid waste collection and transfer systems, processing facilities, and marketing strategies that can serve more than one local jurisdiction within the region.
- Facilitate the development of multijurisdictional arrangements for the marketing of recyclable materials.
- To the extent possible, facilitate resolution of conflicts and inconsistencies between or among city and county source reduction and recycling elements.

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- The task force shall develop goals, policies, and procedures which are consistent with guidelines and regulations adopted by CalRecycle, to guide the development of the siting element of the countywide integrated waste management plan.

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- ~~Identify and address county solid waste management needs;~~
- ~~Determine the need for, and effectiveness of, solid waste collection systems;~~
- ~~Develop marketing strategies for recyclable materials;~~
- ~~Develop goals, policies, and procedures for the Countywide Siting Element; and,~~
- ~~Advise, review, and provide technical guidance and information for the Countywide Siting Element and for the Source Reduction and Recycling Elements (SRRE).~~

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2.1 Element Goals

In accordance with 14 CCR 18755.1, a set of general goals have been developed by the County and LTF to provide guidance for the countywide solid waste program. The goals defined by the LTF for this Countywide Siting Element are as follows:

- Develop and maintain a long-term waste management infrastructure that serves county residents with an efficient, economic, safe, and convenient system for the collection, processing, disposal and/or export of municipal solid waste generated within county boundaries;

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- Implement programs and policies identified in this element as a cooperative effort between the Town of Mammoth Lakes, the County of Mono, private industry, and other regional agencies as appropriate. New source reduction, recycling, composting, and special waste programs shall be coordinated or implemented on a multi-jurisdictional basis to the greatest extent feasible in order to ensure the least cost to ratepayers, to improve the potential for effective programs, and to avoid unnecessary duplication of programs, efforts, and administration.
- Encourage residents, businesses, organizations, and public agencies to maximize source reduction and minimize waste disposal;

- Develop convenient opportunities for residents and businesses to recycle waste materials;
- Encourage residents, businesses, organizations, and public agencies to buy recycled-content products;
- Maintain opportunities for the safe collection, storage, and shipment of household hazardous wastes for proper re-use, recycling, transformation, treatment, or disposal. Educate residents to prevent the inappropriate disposal of household hazardous wastes, motor oil, and other special wastes and;
- Ensure that long-term disposal capacity is available, whether in-county or outside the county, for waste that cannot be recycled or composted.
- Utilize Solid Waste Parcel Fees to fund environmentally appropriate closure and post-closure maintenance of existing landfills, and to invest in recycling infrastructure that increases the convenience and benefits of recycling for all county residents.
- Identify and implement programs that will provide feedstock to locally marketable recyclable products, including transformation and biomass, and assist private sector development of businesses that recycle and re-use these commodities.

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- ~~Develop and maintain a long-term waste management infrastructure that serves county residents with an efficient, economic, safe, and convenient system for the collection, processing, and disposal of municipal solid waste generated within county boundaries;~~
- ~~Implement programs and policies identified in this element as a cooperative effort between the Town of Mammoth Lakes, the County of Mono, and private industry. New source reduction, recycling, composting, and special waste programs shall be coordinated or implemented on a multi-jurisdictional basis to the greatest extent feasible in order to ensure the least cost to ratepayers, to improve the potential for effective programs, and to avoid unnecessary duplication of programs, efforts, and administration.~~
- ~~Encourage residents, businesses, organizations, and public agencies to maximize source reduction and minimize waste disposal;~~
- ~~Develop opportunities for residents and businesses to recycle waste materials;~~

- ~~Encourage residents, businesses, organizations, and public agencies to buy recycled-content products;~~
- ~~Discourage the use and disposal of household hazardous wastes, motor oil, and other special wastes and develop opportunities for the safe collection, storage, and shipment of such materials for proper re-use, recycling, transformation, treatment, or disposal; and,~~
- ~~Ensure that long-term disposal capacity is available for waste that cannot be recycled or composted.~~

2.2 Countywide Policies

The following ~~Various~~ policies and programs are being ~~have been developed and~~ implemented by the County in an effort to meet the goals stated above. Some of the policies have been fully implemented and are in a state of maintenance at this time. Other programs are concepts that are anticipated to be developed within the planning period of this document. ~~The County has primarily implemented public awareness and recycling programs as a means to attain its goals. Efforts to reduce waste generation, recycle waste materials, and develop adequate disposal capacity within Mono County include:~~

Safe Disposal Practices

1. Maintain compliance ~~Bring all county waste facilities into compliance~~ with state minimum operating standards at all county waste facilities, which includes providing site security and access control, daily compaction and cover of waste, and routine monitoring of landfill gas and ground water at each site.

2. Update the operations plan for each landfill as circumstances change, specifically describing the method of operation, the types of wastes that are accepted and those that are prohibited, the methods to control potential environmental nuisances (e.g., dust, litter, surface drainage), and other elements of site operation as required by Title 27, CCR.

3. Continue to provide ~~Establish permanent, temporary, or mobile~~ County facilities for the safe collection and storage of used motor oil and household hazardous wastes, as well as the ~~prior to shipping for~~ proper transformation or disposal of the materials. ~~.~~ Maintain~~Conduct~~ a public awareness program to promote the availability of such facilities and the importance of removing these materials from the waste stream.

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4. Prepare and implement Final Closure Plans for County landfills as circumstances dictate. Ensure adequate funding for the environmentally appropriate closure and post-closure activities.

~~3.~~

Minimize Waste Generation

~~4. Initiate a program to disseminate information to public agencies and local businesses to encourage waste reduction. Through this program, offer suggestions for the re-use of materials and discourage the use of disposable products in favor of goods intended to last longer~~E~~. For example, encourage the use of scrap paper when printing internal draft documents and the practice of double-sided copying for final documents, or promote the use of ceramic coffee mugs rather than styrofoam cups. Elimination of paper waste may be further achieved through the use of e-mail for document transmission and review.~~

5. ~~E~~stablish "reuse exchange" areas at county waste facilities for the segregation and storage of re-usable goods. These materials may be set aside by incoming public self-haul customers or salvaged from the waste stream by site personnel prior to disposal. ~~The stockpiles should have signs posted to inform the public that materials in the area may be freely removed for their personal use.~~

Conduct and Promote Recycling

~~5.~~ Continue to provide ~~Establish~~ collection facilities at County landfills and transfer stations that allow the public to deposit recyclable waste material prior to disposal, including ~~. Materials may include~~ scrap metal~~s~~, white goods, CRTs, e-waste, car batteries, used automotive tires, used motor oil, glass, tin cans, paper, plastics, and ~~and~~ cardboard. Wherever feasible, expand these opportunities to include additional materials such as mixed paper~~. Collection of some materials may vary depending on market economics.~~

6.

~~6.~~7. Establish collection receptacles at County parks and well-traveled community areas that enable tourists and the general public to deposit recyclable beverage containers. Provide for the collection and recycling of the materials.~~material for processing and marketing.~~

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~~Materials may include glass, aluminum cans, tin cans, or plastic bottles, depending upon market economies~~.

~~7.~~ Implement the County Mandatory Commercial Recycling Plan. Pursue grant opportunities and provide other assistance to enhance existing commercial recycling efforts. ~~Develop an outreach program to encourage and provide technical assistance for the implementation of "in-house" recyclable collection programs at local businesses and public agencies.~~

8. Assist and encourage the establishment of recyclable collection, storage, and processing systems, such as certified redemption centers or certified waste oil collection centers, by community organizations and businesses. Assist their promotion by including information of such programs in public education materials ~~distributed by the County or Town~~.

9. Develop and distribute information to raise public awareness regarding the availability of recycling facilities countywide and the importance of recycling waste materials. Program implementation should involve schools, public agencies, local businesses, community groups, and the general public.

~~10. Develop a glass crushing program to convert glass collected at County facilities into an aggregate material that may be used locally (e.g., construction industry, playgrounds, etc.).~~

10. Continue to ~~Establish a program for~~ stockpil~~ing~~e and ~~periodically~~ grind~~ing~~ wood waste materials at County waste facilities for re-use by the general public, as alternative daily cover, or feedstock for other processes. ~~. The program may include conducting an annual Christmas tree recycling event.~~ Provide re-use areas for ~~W~~useable wood waste materials ~~may be set aside by public self-haul customers or salvaged from the waste stream by site personnel and~~ for re-use by the general public, local businesses and public agencies.~~stored in a segregated drop-off area at County landfills and transfer stations. The material may then be ground into mulch for use as alternative daily cover at landfills or made available to the general public, local businesses, and public agencies for their use.~~

11. Continue to utilize equipment and staff to divert clean wood and scrap metal from the waste stream as time and safety permits.

~~11.~~12. Investigate the potential of, and if found to be feasible, develop a sorting line for single-stream recyclables collected within the county facilities to be operated through an

inmate work program. Such a program would either produce recyclable materials suitable for baling, or would include a baler and storage for materials.

13. ~~Investigate the potential for requiring on-site material salvaging and recycling of recoverable material from construction and demolition projects throughout the county and Town. Also, e~~Evaluate the potential for set-aside area requirements for recyclable collection and storage facilities in the design of large-scale developments. ~~Implement (e.g., through ordinance, building permit requirements, or other methods) to the greatest extent feasible.~~

14. Implement a diversion program for construction and demolition aggregate material at County Landfills by stockpiling, and crushing the material for beneficial re-use as alternative daily cover, road base, or classified fill.

15. Develop a Master Recycling Plan for all County facilities, and work with team members to achieve the highest diversion rate feasible from all County-owned facilities including offices, parks, campgrounds and community centers.

16. Consider the requirement of curbside recycling service ("Blue Bag" program) throughout Mono County within future franchise contracts, and/or separate Franchise Agreements pertaining to only recyclable materials.

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~~12.~~17. Encourage Caltrans and other jurisdictions to develop policies that would require recycled products such as glass cullet, crushed aggregate and asphalt in local road maintenance and development projects.

Conduct and Promote Recycled-Content Purchases

18. Continue to promote ~~Complete the loop and maintain a positive recycling awareness by promoting~~ the purchase of recycled-content goods by ~~. Establish a~~ implementing the County Recycled Product Procurement ~~p~~Policy.

~~13. to purchase recycled-content products when available and economically reasonable. For example, encourage the use of recycled-content office paper, re-refined motor oil in the County vehicle fleet, and plastic lumber for benches and picnic tables in County parks and campgrounds.~~

Ensure Long-Term Disposal Capacity

19. Develop engineered design plans for Pumice Valley and Walker Landfills ~~each landfill~~ that utilizes ~~maximize the~~ disposal capacity within the existing waste footprint.

~~14.~~20. As economics or capacity limits dictate, provide for Long Haul Transfer Infrastructure. Such infrastructure can be provided through public funding, private funding, or a public private partnership, which should be selected in an effort to achieve the least cost to ratepayers. Infrastructure should be located as close to population centers as possible without creating significant environmental impacts. ~~Final grading plans shall also provide a means for estimating the operational life of each landfill.~~

~~Prepare a Countywide Siting Element to determine the disposal capacity at each landfill and evaluate the aggregate capacity compared to countywide disposal practices and capacity needs over a 15-year period. If the existing system proves inadequate, develop strategies to locate additional disposal facilities or capacity.~~

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~~15.~~ Engage in transitional planning to ensure that safe and environmentally appropriate opportunities for the management of sludge are identified prior to such activities being discontinued at Benton Crossing Landfill.

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2.3 Implementation Schedule and Administration

All of the policies described in the preceding section have been, or are actively in the process of being, implemented by Mono County in its effort to reduce the quantity of waste disposed in its landfills. Some programs are completed and continuously implemented, others occur on a regularly-scheduled basis, some are currently in development or undergoing revision, and yet others are periodic based on public interest, effectiveness, budget, or staff availability. Landfill permit revisions are anticipated to be ~~formally~~ completed within the next two years. ~~sometime in the year 2000.~~ The status or scheduled frequency of the programs are described in Table 1, below. The policy numbers refer to those described in Section 2.2, above.

TABLE 1

Projected Program Implementation Schedule

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Policy No.	Status or Frequency	Completion Date	Policy No.	Status or Frequency	Completion Date
1	Continuous	n/a	10~~9~~	Con~~Periodic~~tinuous	n/a
2	Continuous	n/a	11~~10~~	Continuous~~Periodic~~	n/a
3	Continuous	n/a	12~~1~~	In Progress~~Continuous~~	~~n/a~~Spring 2014
4	Periodic	n/a	13~~2~~	In Progress~~On-Going~~	GP Update~~Summer, 2000~~
5	~~On-Going~~In progress	~~S~~Fall~~ummer,~~ 2000~~00~~13	14~~3~~	In Progress~~On-Going~~	~~Summer, 2000~~Fall 2013
6	Continuous	n/a	15~~4~~	~~On-Going~~In Progress	~~Summer~~Winter 2013~~, 2000~~
7	Continuous	n/a	16~~5~~	Continuous~~Completed~~	n/a
8	~~Periodic~~Continuous	n/a	17~~6~~	Continuous~~On-Going~~	~~March 15~~Summer 2014~~, 2000~~
9	Continuous	n/a	18	Monitoring	As Necessary

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The local agency responsible for administering the program and implementing the above policies established to meet diversion and disposal goals in the unincorporated area is the Mono County Department of Public Works, Solid Waste Division. When requested, the Local Task Force contributes general guidance, assists with policy-making decisions and the local approval process, and provides review of planning documents prior to final approval. The person responsible for managing the program on a day-to-day basis is the ~~Mr. Evan Nikirk, Assistant Public~~Solid Waste Superintendent for Mono County, who can be reached at: ~~Works Director. Mr. Nikirk can be reached as follows:~~

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~~Mr. Evan Nikirk, Assistant Director~~

Mono County Department of Public Works

P. O. Box 457 / 74 N. School Street

Bridgeport, California 93517

phone: (760) 932-5~~252~~453

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~~e-mail: monopw2en@qnet.com~~

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2.4 Solid Waste Program Funding

The Mono County Board of Supervisors ha~~ve~~s authorized the establishment of a solid waste enterprise fund through which the countywide program is operated. Revenues generated through ~~a~~ parcel fees and gate fees ~~structure~~ provide the annual operating budget for the program. Additional money for recycling efforts is pursued through grant programs periodically made available by CalRecycle~~the California Integrated Waste Management Board~~, the California Department of Conservation, or other sources. It is through these mechanisms that the County implements the policies and programs developed to meet the waste reduction, recycling, and disposal goals.

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SECTION 3.0
PLANNING CONTEXT

The following section establishes the context of the planning area for the Countywide Siting Element through a brief geographic and demographic overview of Mono County and a status summary of the solid waste management system that has been implemented in the county.

3.1 Geographic Setting

Primarily rural in nature, Mono County is located in central-eastern California, as indicated in Figure 1 on the following page. The county is bordered by the State of Nevada to the north and east, by Inyo County on the south, and by Alpine, Fresno, Madera, and Tuolumne counties on the west. Located in the high desert region on the eastern flank of the Sierra-Nevada Mountain range, Mono County can be geographically characterized as having rugged terrain with steep mountains, narrow valleys, and deserts. In addition, numerous rivers, streams, and lakes are scattered throughout the county. Generally speaking, topographic elevations range from 5,000 feet in the lower valleys and up to 14,000 feet in the White Mountains at the southeastern corner of the county. The county comprises 3,103 square miles of land space, with approximately 2,900 square miles, or 93.4 percent, owned by public entities, which include the federal government (Inyo National Forest, Toiyabe National Forest, Bureau of Land Management), the State of California, local government, and the City of Los Angeles (Department of Water and Power).

3.2 Population

The majority of population centers in the county are found along the Highway 395 corridor, which trends north-south in the western portion of the county. Communities in this area include, from north to south: Topaz, Coleville, Walker, Bridgeport, Mono City, Lee Vining, June Lake, Mammoth Lakes, Crowley Lake, Tom's Place, and Paradise Valley. Additional population areas include the communities of Benton and Chalfant along Highway 6 in the southeast corner of the county. The remainder of the county is largely uninhabited. The 2010 US Census determined the population of Mono County to be 14,202. The California Department of Finance estimates future annual growth at less than 1% per year for the next 50 years[i]. As of January 1, 2013, the estimate is 14,493 for the entire county. ~~estimates the Mono County population to have been 10,825 as of January 1, 1999.~~ At ~~3.5~~ 4.6 persons per square mile, the resulting population density is one of the lowest in the State. ~~The Department of Finance projects that countywide population growth will average 1.2 percent~~

~~annually over the next 41 years. Growth is expected to remain low in the future due to the extensive tracts of publicly held lands in the county, which will inhibit development into residential or commercial sectors.~~

INSERT "FIGURE 1 – LOCATION MAP" HERE

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The Town of Mammoth Lakes is the sole incorporated city established in Mono County. The 2010 Census determined the population of the Town of Mammoth Lakes to comprise 8,234 of Mono County's 14,202 residents. ~~California Department of Finance estimates that the population of Mammoth Lakes was 5,325 as of January 1, 1999.~~ With ~~This means that~~ approximately ~~49.2~~57 percent of the county's residents, and an even greater percentage of the County's annual visitor totals, ~~inhabitants~~the Town of Mammoth Lakes generates the vast majority of waste within the county. ~~reside in the Town of Mammoth Lakes, with the remainder in unincorporated Mono County. With the recent acquisition of both the Mammoth Mountain and June Mountain ski resorts by a large, nation-wide resort developer, short-term development plans for Mammoth Lakes and longer-term plans for June Lake present a potential growth rate in those communities that far exceeds projections by the Department of Finance.~~

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The population distribution throughout the county is presented in Table 2, below. Locations of the Town of Mammoth Lakes and other communities in the county are presented on the preceding Figure 1, Location Map.

TABLE 2[ii]

Population Centers in Mono County

Community	Population	Comments
Town of Mammoth Lakes	~~5,325~~8,234 [1]	Ski area; large 2nd residence/high tourist influx~~pop'n.~~
Unincorporated Areas		
Antelope Valley	1,265~~1,413~~ [2]	Coleville, Topaz, & Walker.
Bridgeport Valley	575~~896~~ [2]	Bridgeport & Twin Lakes.
Lee Vining/Mono City	394~~423~~ [2]	n/a
June Lake	629~~618~~ [2]	Ski area; large 2nd residence~~/tourist pop'n.~~
Long Valley/Swall	1,535~~1,193~~ [2]	Paradise, Sunny Slopes, Swall, Crowley~~n/a~~

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Tri-Valley	931~~957~~ [2]	Benton, Chalfant, & Hammil Valley.
Total, Unincorporated	5,963~~5,500~~ [1]	
Total, Countywide	14,202~~10,825~~ [1]	

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~~Notes:~~

~~(1) Population estimates developed by the California Department of Finance, as of January 1999.~~

~~(2) Population estimates modified from data presented in Table 6, *Mono County General Plan* (1993) to match Dept. of Finance projections for the County and Town.~~

SECTION 4.0
EXISTING SOLID WASTE DISPOSAL CONDITIONS

This section addresses the waste disposal conditions that currently exist within the borders of Mono County. A general description of existing waste facilities and waste haulers is included, as well as specific permit conditions currently in-place at each landfill. The requirements of 14 CCR 18755.5 are addressed by the discussions and data presented in this section.

4.1 Solid Waste and Recycling Services

Two ~~Three small, independent~~ commercial haulers provide residential and commercial waste collection services in Mono County. Mammoth Disposal, a subsidiary of Waste Connections, Inc., is the franchise hauler and service provide for the Town of Mammoth Lakes ~~for~~ mandated~~mandated~~ residential ~~curbside pick-up~~ and commercial service ~~in the Town of Mammoth Lakes~~.

~~-~~The unincorporated area~~s~~ of Mono County has two franchisees, including Mammoth Disposal and D&S Waste out of Yerington, NV. ~~do not have franchise arrangements, leaving waste disposal options open to personal preference.~~

Curbside recycling services are offered throughout the Town of Mammoth Lakes as well as certain parts of the County by Sierra Conservation Project. Other businesses such as Shred-Pro (mixed paper shredding service) and Mammoth Rock-n-Dirt (aggregate crushing) contribute to the available recycling services centering around the Town of Mammoth Lakes.

Self-hauling of waste and recyclable materials is available to all residents of Mono County, with seven Transfer Stations and/or landfills located near population centers. Three of the County's transfer stations now occupy land adjacent to closed landfills that are in a post-closure maintenance period.

~~Residents and businesses in unincorporated Mono County have the option of either subscribing to a commercial pick-up service or assuming the responsibility for transporting their waste to a county landfill or transfer station themselves. The area within which collection services are offered by commercial waste haulers in unincorporated Mono County is driven strictly by the economics of its customer base. At this time, Mammoth Disposal provides collection service to businesses and residents in communities along the Highway 395 corridor in an area generally defined by Bridgeport at the northern border and the Mono-Inyo county border at the south. Environmental Waste Management, Inc., serves customers in the same general service area as Mammoth Disposal, with~~

~~the exception of Mammoth Lakes, which is restricted through the franchise agreement. In addition, Environmental Waste Management provides the transportation for debris boxes utilized at the five County transfer stations. Waste hauled from the transfer stations is transported for disposal at one of the two regional landfills operated by Mono County, either the Benton Crossing Landfill or the Pumice Valley Landfill. B&B Disposal Services generally confines its service area to the Antelope Valley communities of Walker, Coleville, and Topaz.~~

~~Solid waste d~~Actual disposal of solid waste in Mono County is conducted at only 3 active landfills. Two of these, Pumice Valley and Walker, currently accept only inert C&D waste for burial, and transfer all municipal solid waste off-site for disposal. ~~currently managed through four "local" dual-function landfill/transfer station facilities, two regional landfills, and one "local" limited-volume transfer station;~~ The Benton Crossing Landfill has been the County's regional, and sole municipal solid waste landfill, for over 10 years and remains in use today. Figure 2 on the following page presents the locations of each facility.~~ The dual-function facilities are Class III municipal solid waste landfills that have been converted to "limited-volume" transfer~~

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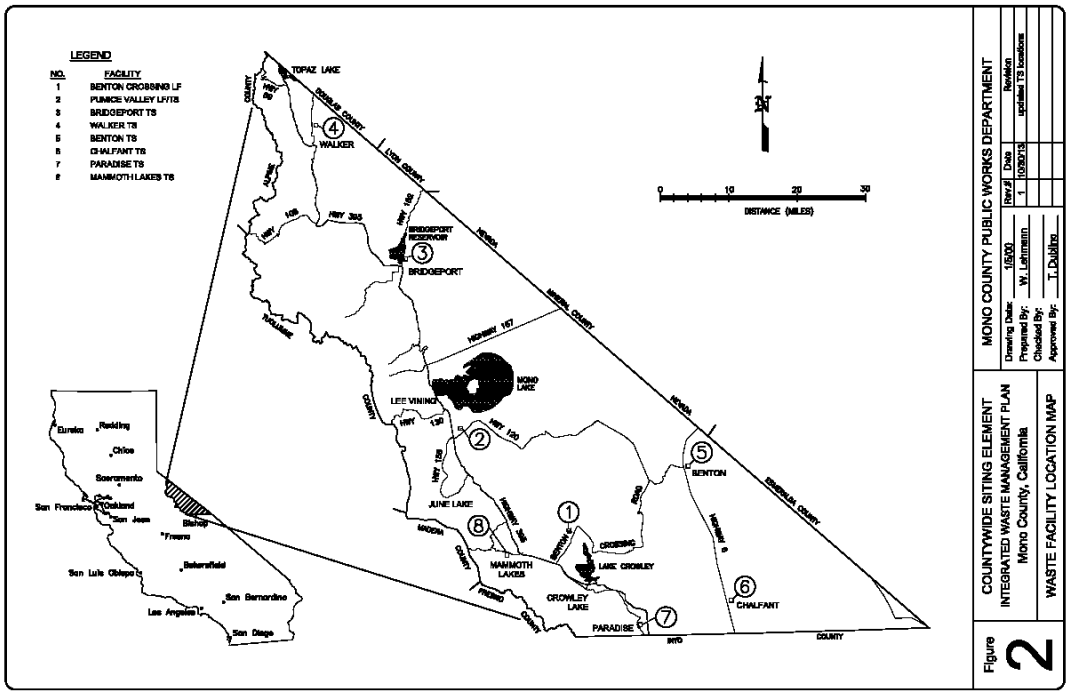
~~INSERT FIGURE 2 HERE~~



~~stations, with the majority of waste within their respective service areas transferred to one of the two regional landfills. A small portion of the waste stream at these sites, primarily green waste, C&D, and an occasional load of residential waste, is disposed in the active trench of the landfill. The Paradise Transfer Station functions solely for waste collection and transfer, as there is no associated landfill at the site.~~

~~The two regional landfills are the Pumice Valley Landfill, located approximately 7.6 miles southeast of Lee Vining by highway, and the Benton Crossing Landfill, located approximately 12.7 highway miles southeast of the Town of Mammoth Lakes. Generally, the Pumice Valley Landfill provides disposal capacity for residents and businesses in the June Lake, Lee Vining, and Mono City area, as well as for waste transported from the Walker and Bridgeport transfer stations. The Benton Crossing Landfill serves the Town of Mammoth Lakes and the surrounding unincorporated areas, including the community of Crowley Lake. In addition, the Benton Crossing Landfill is the disposal destination for waste transferred from the Paradise Transfer Station. Waste collected at the Benton and Chalfant transfer stations is hauled to either regional landfill, depending upon the route schedule for the tilt-frame truck on the day that debris box transfer is required.~~

4.2 Existing Landfill Permit Conditions

This section addresses the current permit status of County landfills, in accordance with the requirements of 14 CCR 18755.5. A discussion of disposal capacity for each landfill is presented in Section 5.0. Table 3 on the following page summarizes pertinent administrative and permitting information for each existing landfill, as specified in Title 14 CCR, section 18755.5(a)(1) & (a)(2).

Mono County has six landfills. Three of these sites, Benton, Chalfant, and Bridgeport, were closed in 2007-2009. The landfills are now in the post-closure maintenance period, with operating Transfer Stations onsite. All municipal solid waste, recycling and HHW is transported off-site to various destinations. These three facilities also accept clean wood waste and organics, which is chipped onsite and beneficially re-used for post-closure maintenance, or distributed to the public.

Two of the three remaining landfills are active, but are very low-volume C&D landfills where cover activities occur only once every 90 days. These two sites, Walker and Pumice Valley, also have onsite Transfer Stations that accept municipal solid waste, recycling and HHW for transport. The sites accept inert C&D in a separate area for quarterly burial and cover.

In accordance with 27 CCR Section 20220, the Benton Crossing Landfill accepts all putrescible and non-putrescible solid and semi-solid waste including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, construction and demolition wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded wastes, provided that such wastes do not contain waste which must be managed as a hazardous waste, wastes which contain soluble pollutants in concentrations that exceed applicable water pollution control objectives, or wastes that could cause degradation of waters of the state (designated waste). In addition to typical non-hazardous municipal solid waste as described above, the Benton Crossing Landfill also accepts source-separated waste for management through its waste diversion program, including wood waste, scrap metal, white goods and appliances, waste tires, non-hazardous seqage sludge, and CRTs, CEDs, HHW and used oil and filters.

~~The six active landfills permitted in Mono County are Class III municipal solid waste disposal facilities. Each site is permitted to accept general residential, commercial, and industrial refuse for disposal, including municipal solid waste, wood and vegetative waste, construction and demolition debris, and dead animals. Each landfill has segregated stockpile areas for the temporary storage of recyclable materials removed from the waste stream. These materials include tires, white goods, scrap metals, lead-acid batteries, waste oil, and wood waste. In addition, collection bins have been placed at each landfill for the collection and temporary storage of recyclable drop-off materials such as tin cans, glass, and cardboard. The actual material accepted for recycling may vary depending upon market economics. Waste oil is removed from on-site collection tanks by a certified waste hauler under contract with the County, then hauled off-site for recycling. Site topography, property boundaries, disposal areas, and stockpile locations for each landfill are presented on site maps enclosed in Appendix B of this report. The maps reflect site conditions at the time they were prepared.~~

TABLE 3

Landfill Administration and Permit Information

Landfill ~~-~~Name	Facility Permit No.	Property Owner	Facility Operator	Operational Status	~~Date[2] of Last~~ Permit Date

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Benton	26-AA-0006	Mono County	Mono County	Post-Closure	6/17/2013~~7/14/78~~
Benton Crossing	26-AA-0004	LADWP~~+~~	Mono County	Active	~~7/14/78~~3/8/2013
Bridgeport	26-AA-0002	Mono County	Mono County	Post-Closure	~~8/12/77~~6/17/2013
Chalfant	26-AA-0005	Mono County	Mono County	Post-Closure	~~12/27/78~~6/17/2013
Pumice Valley	26-AA-0003	LADWP~~+~~	Mono County	Active C&D	7/14/78
Walker	26-AA-0001	Mono County	Mono County	Active C&D	~~7/14/78~~5/22/07

~~Notes: (1) Los Angeles Department of Water and Power.~~

~~(2) Each landfill is currently undergoing the permit revision process, expected to be complete in year 2000.~~

Table 4 below ~~, following page,~~ provides a summary of average daily disposal rates and a characterization of wastes that each active landfill ~~site~~ is permitted to accept. ~~The average daily disposal rates identified in Table 4 are determined from gate-keeper estimates and transfer records from the one-year period for which information is most recently available (October 1, 1998 through September 30, 1999).~~ Daily rates are calculated based on the number of actual operating days.

~~In order to correlate this information with site disposal capacities discussed in subsequent sections of this report, the disposal rates represent in-place tons and cubic yards (i.e., after disposal and compaction).~~

~~The Mono County solid waste program is currently undergoing substantial change, including the initiation of permit revisions at each landfill site. Until the permit revision process is complete for each facility (anticipated in the year 2000), the current permit conditions at each site will be used for planning purposes. Table 5, following page, presents the annual disposal and average daily disposal rates that occurred in 1978, the year of permit issuance for each site, since permit conditions do not specify the maximum allowable daily and annual loading rates. These values are likely to change as a result of permit revisions to better reflect current disposal conditions.~~

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TABLE 4

Current Active Landfill Disposal Characteristics

Landfill	Avg. Disposal Rate[1] (cy/day) [2]	(tons/day)	Operating Days/Yr	~~Permitt~~Accepted Waste Types [3]
~~Benton~~	~~0.53~~	~~0.21~~	~~156~~	~~MSW (residential/commercial/industrial)~~
Benton Crossing	~~121~~204	~~72.7~~102	~~312~~312	MSW (residential/commercial/industrial)
~~Bridgeport~~	~~7.85~~	~~3.14~~	~~208~~	~~MSW (residential/commercial/industrial)~~
~~Chalfant~~	~~1.15~~	~~0.46~~	~~156~~	~~MSW (residential/commercial/industrial)~~
Pumice Valley	~~30.8~~21	~~18.5~~13	~~260~~104	Inert Construction and Demolition Waste~~MSW (residential/commercial/industrial)~~
Walker	~~6.38~~3	~~2.55~~1	~~156~~104	Inert Construction and Demolition Waste~~MSW (residential/commercial/industrial)~~
Totals	228~~168~~	~~97.6~~116		

Notes: Disposal rates taken from respective Joint Technical Documents BCLF August 2012 JTD; Pumice Valley Feb 16, 2013 JTD; Walker March 1, 2014 JTD

~~(1) Disposal rate for Oct. 1, 1998 through Sept. 30, 1999 calculated as an average over number of operating days. The majority of waste at the four "local" sites is transferred to either Benton Crossing or Pumice Valley.~~

~~(2) An in-place conversion rate of 1,200 lb/cy is used for the Benton Crossing and Pumice Valley landfills (compactor); 800 lb/cy for others (dozer).~~

~~(3) MSW = Class III non-hazardous municipal solid waste.~~

Annual Disposal Trends Countywide:

BCLF: 312 days * 204 CY/Day = 63,648 cy/yr

Pumice: 104*21= 2184 cy/yr

Walker: 104*3 = 312 cy/yr

Total CY/yr: (including Mammoth) = 66,144 cy/yr

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TABLE 5

Permitted Maximum Landfill Disposal Rates [1]

Landfill	Max. Daily Disposal [4]		Max. Annual Disposal [4]		~~1978 Daily and Annual Disposal Rates~~ [2]			
	(cy/day)	(t/day)	(cy/yr)	(ton/yr)	~~(cy/day)~~	~~(t/day)~~ [3]	~~(cy/yr)~~ [2]	~~(t/yr)~~ [3]
~~Benton~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~1.9~~	~~0.5~~	~~710~~ [2a]	~~178~~
Benton ~~X~~Crossing(1)	~~n/a~~	500~~n/a~~	~~n/a~~	156,000~~n/a~~	~~61.7~~	~~15.4~~	~~19,256~~ [2b]	~~4,814~~
~~Bridgeport~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~10.7~~	~~2.7~~	~~3,916~~ [2a]	~~980~~
~~Chalfant~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~4.5~~	~~1.1~~	~~1,630~~ [2b]	~~408~~
Pumice Valley(2)	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~14.1~~	~~3.5~~	~~5,148~~ [2b]	~~1,287~~
Walker	n/a	~~n/a~~80	n/a	~~n/a~~500	~~4.5~~	~~1.1~~	~~1,650~~ [2a]	~~412~~
Totals	n/a	n/a	n/a	n/a	~~97.4~~	~~24.3~~	~~32,310~~	~~8,079~~

Notes:

(1) Maximum permitted daily and annual disposal rates are ~~not~~ specified on permit documents for Benton Crossing and Walker.

~~(1)~~(2) ~~on current (1978) permit~~ The existing permit for Pumice Valley (1978) does not establish limits on daily tonnage or capacity. ~~documents~~.

~~(2) Disposal rates in year of permit issuance are from either: a) 1989 RDSI; or, b) 1985 County Solid Waste Mgmt Plan. Volumes discounted for 20% soil cover. Avg. over 312 days/yr at Benton Xing; 365 days/yr at all others.~~

~~(3) Assumed in-place conversion rate of 500 lb/cy for all sites, given operating practices at that time.~~

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SECTION 5.0
ESTIMATE OF COUNTY DISPOSAL CAPACITY

Pursuant to the requirements of 14 CCR 18755.3, this section presents information regarding existing disposal capacity available within the county and provides documentation of the disposal capacity that existed in the base year of 1990. In addition, this section presents current estimates of the site life at each landfill and provides a projection of the disposal capacity available ~~that~~for ~~will be required to~~future ~~handle~~ waste disposal within the county ~~for the next 15 years~~. ~~It should be noted that all discussions related to disposal capacity in this report specifically refer to total fill space, meaning that the quantity is an aggregate of solid waste and daily cover soil.~~

This information must be viewed within the context of a system that is in transition. Due to the economic challenges of operating low volume rural landfills, the County is currently in a position where the operation of our landfills exceeds the cost of available long-haul transfer opportunities. This is due to our relatively close proximity to available capacity in other jurisdictions where much larger scale, and more efficient landfill operations are underway.

The County intends on maintaining the current course at Benton Crossing Landfill until a point of closure, but following the closure of this site the County intends to pursue the most cost-effective options to meet future disposal needs. These options include the long-haul transfer of waste. While there is interest in maintaining landfill capacity and the flexibility it affords, by developing long-haul transfer infrastructure the County is assured of another competitive, and capacity-preserving option.

5.1 Base Year Disposal Capacity

As discussed in preceding sections of this report, ~~six~~three active ~~permitted~~ landfills provide disposal capacity for the residents of Mono County. In accordance with the requirements of 14 CCR 18755.3, Table 6, below, has been prepared to present the total permitted and remaining disposal capacities that were in place within the county in 1990.

TABLE 6

Base Year Disposal Capacity Conditions

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Landfill	Total Permitted Capacity [1]		Total Remaining Capacity [1] in 1990	
	(cu.yds.)	(tons) [2]	(cu.yds.)	(tons) [2]
Benton	109,520	27,380	92,920	23,230
Benton Crossing	1,307,990	327,000	822,340	205,585
Bridgeport	767,160	191,790	665,150	166,290
Chalfant	126,380	31,595	97,570	24,390
Pumice Valley	479,940	119,985	376,920	94,230
Walker	247,880	61,970	197,060	49,265
Totals	3,038,870	759,720	2,251,960	562,990

Notes:

(1) Total permitted capacity is not specified on 1978 permits. Data based on calculations in the site RDSI's (1989) and projected to Jan. 1, 1990 through disposal site survey records.

(2) Assumed in-place conversion of 500 lb/cy for all sites, given operating practices at that time.

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5.2 Current Disposal Capacity

There are existing SWFPs for Benton Crossing Landfill and Walker Landfill. The County is currently in the process of revising the solid waste facilities permit for Pumice Valley ~~in effect at each l~~Landfill. ~~This process involves development of an approved engineering design of the final landfill configuration and preparation of a *Report of Disposal Site Information* and a *Preliminary Closure and Postclosure Maintenance Plan* for each facility. In addition, environmental review documents that evaluate the potential impact that may result from vertical expansion have been prepared and circulated for public comment. The documents for each site are in various stages of review and approval.~~ The Joint Technical Documents (JTD) that have been approved for Benton Crossing and Walker, as well as the JTD developed in draft form for Pumice Valley, ~~Each engineered design proposed for a given location~~ define~~s~~ the final disposal capacity and provide~~s an~~ estimate~~s~~ of remaining site life. ~~Proposed final grading plans presented in the closure documents for each County landfill are attached to this report in Appendix B.~~

~~In general, f~~Future disposal operations at each site will be contained within the existing waste footprint, with disposal capacity provided through vertical fill over existing grades. ~~In some cases, this design represents disposal capacity that exceeds current permit conditions; at others, a reduction will occur. Differences between current and proposed capacities are due to a previous planning assumption that site operations would continue as a series of disposal trenches within the full permitted landfill boundaries. However, following promulgation of Subtitle D, fiscal constraints will essentially limit county landfills from expanding laterally and require that they remain within existing footprints. The sites did not previously have engineered final designs.~~

Table 7 on the following page presents the remaining disposal capacity and site life estimate for each site under current and proposed permit conditions. ~~Again, i~~It should be noted that capacity data represents the total fill space available, or the aggregate quantities of compacted solid waste and cover soil. ~~The values identified for the proposed permit conditions may be adjusted slightly during the technical review process, but significant changes are not expected. Permitting and final approval of facility documents for all county landfills is expected to be complete sometime in the year 2000.~~

As seen in Table 7, following page, the County currently has approximately 929,586~~1,653,490~~ cubic yards ~~(1,549,400 tons)~~ of remaining permitted waste disposal capacity. Should permit conditions at Pumice Valley be revised ~~in the near term~~ according to proposed site designs, the aggregate disposal capacity will be upgraded to ~~1,688,110~~1,442,726 cubic yards~~, or 1,546,360 tons~~. Under current ~~permitted~~ disposal consumption trends of approximately 66,144 (unadjusted for growth) cy per year of consumption, ~~capacity conditions~~, ~~the~~ site life expectancy~~ies~~ for all ~~range between a low of 9 years to a high of 156 years,~~ County landfill capacity would be approximately 21 years.

TABLE 7

Existing and Proposed Disposal Capacity Conditions

Landfill	Current Permit Conditions			Proposed Permit Conditions [4]		
	Remaining Capacity [1] (cu.yds.)	~~(tons)~~ [2]	Site Life [3] (years)	Remaining Capacity (cu.yds.)	~~(tons)~~ [2]	~~Site Life (years)~~
~~Benton~~	~~74,900~~	~~75,650~~	~~156~~	~~58,300~~	~~58,880~~	~~139~~

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Benton Crossing	~~477,980~~81 7,300	~~408,670~~	~~9~~until 2023	~~756,630~~	~~646,920~~	~~14~~
~~Bridgeport~~	~~599,940~~	~~605,940~~	~~95~~	~~253,150~~	~~255,680~~	~~55~~
~~Chalfant~~	~~64,160~~	~~64,800~~	~~95~~	~~73,200~~	~~73,930~~	~~103~~
Pumice Valley	~~300,240~~	~~256,710~~	~~24~~	~~266,730~~51 3,140	~~228,050~~	15~~22~~
Walker	~~136,270~~11 2,286	~~137,630~~	~~50~~+100	~~280,100~~	~~282,900~~	~~82~~
Totals	~~1,653,490~~9 29,586	~~1,549,400~~		513,140~~1,6 88,110~~	~~1,546,360~~	

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Notes:

~~(1) Remaining c~~Capacity data from JTDs. ~~as of September 30, 1999, based on County disposal records.~~

~~(2) Conversion accounts for waste-to-soil ratio & density difference between soil and waste. See Appendix C.~~

~~(3) Calculated from remaining capacity and projecting avg. disposal rates (Table 4) at 1.2% per year.~~

~~(4) From *Preliminary Closure and Postclosure Maintenance Plans* prepared for each site, less disposal quantity in interim through Sept. 30, 1999. Site life calculated at revised growth rate of 1.2% per year.~~

This differs from ~~whereas~~ site life expectancies for specific ~~proposed permit conditions~~landfills as they are based on existing volumes at the specific site, as opposed to the countywide view. ~~range between 14 and 139 years. The County currently plans to allow its landfills to revert back to open space following closure and completion of the 30-year post-closure maintenance period.~~

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~~Site life estimates were determined by projecting disposal rates into the future based on the following operational assumptions:~~

- ~~Average daily waste disposal rates as presented in Table 4;~~
- ~~Remaining disposal capacity at each site as presented in Table 7;~~
- ~~Waste compaction rate of 1,200 lb/cy at the Benton Crossing and Pumice Valley landfills, due to use of a landfill compactor, and 800 lb/cy at all other sites, which use bulldozers;~~

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- ~~County-wide population is projected to grow at an annual average of 1.2 percent; and,~~
- ~~Waste-to-soil ratios are estimated as 3:1 at the Benton Crossing and Pumice Valley regional landfills and 1:1 at the remaining four local landfills.~~

~~Loading rate calculations are enclosed in Appendix C of this report as supporting documentation for the site life values presented in Table 7. The operational assumptions and parameters identified above are used in the attached spreadsheets to project future disposal capacity consumption.~~

5.3 Projected Waste Disposal Requirements

State solid waste regulations require that the Countywide Siting Element develop a projection of waste disposal quantities and the resulting impact on remaining countywide landfill capacity over a 15-year period. Table 8 on the following page presents an annual volumetric accounting of the estimated disposal quantities over the next 15 years. The annual reduction in disposal capacity of existing facilities is calculated for the period under consideration, assuming that current permit conditions remain the same.

As one would expect after reviewing the site life projections addressed in the preceding section, Table 8 demonstrates that Mono County has sufficient capacity through existing disposal facilities to handle the quantity of waste expected to be collected over the next 15 years, whether current or proposed permit conditions apply.

Given current permit conditions, it is anticipated that Mono County will retain an estimated 548,515 cubic yards (589,850 tons) of waste disposal capacity 15 years from the date of this report preparation. Although weight-based data for remaining capacities is not presented in Table 8, this information may be viewed on the detailed spreadsheet enclosed in Appendix D. Table 8 does not account for waste exported out of the county since this amount, should it exist, accounts for a minute portion of the total county-wide waste stream. Additionally, no known waste is imported into Mono County for disposal at its landfills, so this was not addressed either.

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TABLE 8

15-Year Countywide Disposal Capacity Projections

Calendar Year	No. of Years	In-Place Disposal [1] (tons/yr)	In-Place Disposal [1] (cy/yr)	Cover Soil Required (tons/yr)	Cover Soil Required (cy/yr)	Total Annual Fill (tons/yr)	Total Annual Fill (cy/yr)	Remaining Capacity [2] (cu.yds.)
2000	1	28,992	49,294	29,776	18,380	58,767	67,674	1,585,816
2001	2	29,340	49,885	30,133	18,601	59,473	68,486	1,517,330
2002	3	29,692	50,484	30,495	18,824	60,186	69,308	1,448,022
2003	4	30,048	51,090	30,861	19,050	60,908	70,139	1,377,883
2004	5	30,408	51,703	31,231	19,278	61,639	70,981	1,306,902
2005	6	30,773	52,323	31,606	19,510	62,379	71,833	1,235,069
2006	7	31,143	52,951	31,985	19,744	63,128	72,695	1,162,374
2007	8	31,516	53,587	32,369	19,981	63,885	73,567	1,088,807
2008	9	31,895	54,230	32,757	20,221	64,652	74,450	1,014,356
2009	10	32,277	54,880	33,150	20,463	65,428	75,343	939,013
2010	11	32,665	55,539	33,548	20,709	66,213	76,248	862,765
2011	12	33,057	56,205	33,951	20,957	67,007	77,163	785,603
2012	13	33,453	56,880	34,358	21,209	67,811	78,089	707,514
2013	14	33,855	57,562	34,770	21,463	68,625	79,026	628,489
2014	15	34,261	58,253	35,188	21,721	69,449	79,974	548,515

Notes:

~~(1) Projected from 1998-1999 waste disposal records at a 1.2% annual growth rate. Refer to Appendix D for assumptions and parameters used in calculations.~~

~~(2) Remaining capacity projections shown only on a volume basis. Weight-based projections are presented on the detailed calculation spreadsheet included in Appendix D.~~

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SECTION 6.0
IDENTIFICATION OF ADDITIONAL DISPOSAL CAPACITY

Mono County does not currently have plans to establish any new solid waste disposal sites within its jurisdictional boundaries. Based on the data presented in this report, the County will not exhaust remaining disposal capacity within the next 15-year period. Identification of any new facilities in the future will require an amendment of this document and the approval of local governing bodies.

As stated in previous sections of this report, the County is nearing closure of its regional landfill at Benton Crossing. As a result, there is considerable interest in identifying future plans. While capacity remains at other County landfills, re-starting a municipal solid waste landfill at either of these sites may not prove to be the preferred economic, or environmental solution. As a result, numerous other strategies are being contemplated that include utilization of mining reclamation sites, as well as locating long-haul Transfer Stations that will enable the County to utilize capacity and disposal options outside of our jurisdiction. ~~currently in the process of revising the permits and supporting documents for each of its landfills. This process involves development of an approved engineering design of the final landfill configuration. In general, future disposal operations at each site will be confined to the existing waste footprint, with disposal capacity provided through a vertical expansion over existing grades; a lateral expansion is not proposed at this time. The permit and environmental review documents for each site are in various stages of technical review and regulatory approval. Proposed final grading plans are presented for each county landfill in Appendix B.~~

In accordance with the requirements set forth in 14 CCR 18756, the County has established a set of criteria for the future expansion of existing landfills or the siting of new disposal facilities. This criteria is divided into four major categories, as specified in 14 CCR 18756. The general criteria for each category is described below. Should the County pursue location of a new facility in the future, a detailed set of criteria with exclusionary and ranking considerations may be prepared by County staff and members of the Local Task Force.

Environmental Considerations

- Future disposal sites shall be located on parcels that are ~~previously undeveloped and~~ located no closer than 1,000 feet from any of the following: 1) residences; 2) major highways; and, 3) perennial bodies of surface water. In addition, the static ground water level from the uppermost aquifer shall be no closer than 25 feet from the base of the planned disposal unit.

- Potential disposal sites shall not pose significant impacts to any special status species. Sites with limited habitat value (disturbed sites, reclamation sites) shall be preferred over sites with native habitat values.

- Future landfills or lateral expansion~~-areas~~ of ~~an~~ existing sites shall be located no closer than (FAA Rules?) 5 miles~~10,000 feet~~ from the end of any airport runway used by a turbojet aircraft, nor closer than 5,000 feet from the end of any airport runway used only by piston-type aircraft.

- No future site or lateral expansion~~-areas~~ of ~~an~~ existing sites shall be placed in any of the following settings~~, unless mitigating measures are developed~~: 1) a 100-year floodplain; 2) wetlands; 3) within 200 feet of a fault that has experienced displacement in Holocene time; 4) any site that has unstable soils or soils susceptible to liquefaction; and, 5) ground water recharge zones.

- Future landfills or lateral expansion~~-areas~~ of ~~an~~ existing sites with ~~shall be required to have~~ workable soil on-site in a quantity sufficient to meet the daily cover needs of the planned disposal unit, and ~~. S~~sites with native low-permeable soil that is suitable for use in final cover construction will be ranked higher than those without.

- In an effort to reduce vehicle miles traveled and related GHG emissions, potential disposal sites shall be as close as possible (notwithstanding the above direction) to waste-generating sources.

- Future disposal sites shall be located in such a way that no operations are visible (within one mile) from any state highway, scenic vista or tourist destination.

Environmental Impacts

- An environmental review process will be initiated for evaluation of any parcel selected to receive a future disposal facility, in compliance with the requirements set forth by the California Environmental Quality Act (CEQA). Mitigating measures shall be implemented in the event that

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significant environmental impact is established. Sites with little or no mitigation requirements will be ranked higher than those with substantial measures.

- Any location selected in the future for establishment of a transformation facility (i.e., compost, bio-digestion, thermal biomass, waste-to-energy~~incinerator~~) shall be evaluated with respect to potential air quality impacts. ~~No f~~Potential locations ~~acility~~ shall minimize exposure to any adverse ~~be located where it will contribute to the degradation of ambient~~ air quality impacts.
- Any location selected to receive a future disposal facility shall take into consideration the potential impact on surrounding parcels as a result of site development, including the following: 1) storm water surface flows and channel discharge; 2) ground water; 3) soil erosion and sediment transport; 4) slope stability; 5) litter; 6) traffic; 7) noise; 8) visibility; and, 9) dust. Impact may require that mitigating measures be established.

Socio-Economic Considerations

- Any site under consideration for a future landfill shall be sufficient in size to ensure that it will provide a minimum of 15 years of disposal capacity for the proposed service area.
- Sites under consideration for a future disposal site shall be located as close as possible ~~within a reasonable distance from~~to the community(ies) it will serve.
- Sites under consideration for a future disposal site shall be located where the zoning designation of adjacent parcels is compatible with the intended use of the site.
- Sites under consideration for a future disposal site shall either be accessible by existing roads, or be located within a reasonable distance from existing roads such that development costs will not be excessive.
- Location of a future disposal facility shall be consistent with the County General Plan and other local planning considerations.

Legal Considerations

- Future disposal facilities shall be developed and operated in compliance with all applicable local, state, and federal solid waste regulations.

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- ~~Future waste disposal sites shall be required to install environmental sampling devices for the routine monitoring of ground water quality and landfill gas generation and migration. Other requirements may be specified by the CIWMB, the Regional Water Quality Control Board, or the Air Resources Control Board.~~

In the event that it becomes necessary for Mono County to establish a new disposal facility in the future, the Local Task Force will develop a detailed siting process. The process will be defined by a series of sequential steps that will gradually expand in detail and narrow in focus. The purpose of the effort will be to meet the needs of the community and goals of the County, as described in Section 2.0 of this report. The siting criteria summarized above will be expanded upon and a ranking hierarchy will be established. The geographic search for appropriate sites and the subsequent screening process will be managed by County personnel, with direction from the Mono County Board of Supervisors, and guidance from the Local Task Force~~. It is likely that an engineering consulting firm will be contracted to provide technical assistance and field investigation expertise.~~ Community workshops will be held at appropriate intervals in the process to educate the public and allow feedback to County managers. Once the selection process has narrowed its focus and a preferred site has been identified, a detailed site investigation will take place.

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SECTION 7.0
GENERAL PLAN CONSISTENCY

~~The locations identified in previous sections as potentially providing additional disposal capacity in the county involve the vertical expansion of existing permitted municipal solid waste landfills. Therefore, the siting criteria and locations are consistent with the Mono County General Plan.~~ All active landfill sites have a land use designation of Public Facilities in the Mono County General Plan. This land use designation permits Solid Waste infrastructure and Landfills subject to Use Permit. A copy of a letter from the Mono County Planning Department certifying that all existing County landfill sites are consistent with the Mono County General Plan is provided in Appendix E of this report.

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SECTION 8.0
LOCAL AGENCY APPROVAL

The 2014 update of the CSE began in the Summer of 2013, at the July meeting of the SWTF, where Goals and Objectives of the plan were presented and discussed. Comments and suggestions from that effort were incorporated into a Draft CSE, which was brought back to the SWTF for additional comments and feedback. A final draft was presented to the group on XXX

~~County staff distributed the preliminary draft Countywide Siting Element (CSE) to members of the Local Task Force and~~

CIWMB personnel for their review, comment, and/or concurrence.

Upon receipt of comments requesting corrections or clarifications, the document was modified and a final draft CSE was issued for public comment. Again, any comments received during the public review process were incorporated into the document, which was then assembled into a final report for consideration and adoption by the Mono County Board of Supervisors at a public hearing. Copies of comments received during document preparation and its approval process are presented in Appendix F of this report.

An Initial Study was prepared in accordance with CEQA requirements to evaluate the potential effects that implementation of the proposed Countywide Siting Element and its plans may have on the environment. In addition to a discussion presenting background information regarding the proposed project, an environmental checklist was incorporated into the Initial Study. Based on the findings of the Initial Study and environmental checklist, a Draft Mitigated Negative Declaration was then prepared for circulation to the Local Task Force, the State Clearinghouse, the Town of Mammoth Lakes, the Mono County Planning Department, the CIWMB, and affected local agencies. A public notice of availability was also posted at selected locations in the county to inform the general public. Copies of the Draft Mitigated Negative Declaration and the Initial Study are provided in Appendix G of this report.

Notice of the availability for public review of the final draft CSE and environmental review documents were also published in the local newspaper and posted at the north and south county

offices of the Planning Department, at the Mono County Clerk-Recorder's Office, and at community post offices. Copies of the documents were made available for review at public libraries throughout the county. Copies of public hearing notices, appropriate local approvals, and adoption of CEQA documentation are enclosed in Appendix H.

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SECTION 9.0
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[i] State of California, Department of Finance, *E-4 Population Estimates for Cities, Counties, and the State, 2011-2013, with 2010 Census Benchmark*. Sacramento, California, May 2013

[ii] 2010 US Census Bureau; 2010 Demographic Profile Summary, California

NON-DISPOSAL FACILITY ELEMENT

of the

MONO COUNTY INTEGRATED WASTE MANAGEMENT PLAN

Mono County, California

DRAFT

Updated with SWTF Comments 11.7.2013

Prepared by the

Mono County Department of Public Works

Post Office Box 457

Bridgeport, California 93517

(760) 932-5453

1.0 INTRODUCTION

The County of Mono is pleased to present this updated Non-Disposal Facility Element *(NDFE)* to CalRecycle per CCR, Title 14, and guidelines pursuant to AB341. This document outlines the County's geographic area, provides relevant information on the County's solid waste disposal infrastructure on non-disposal facilities. The document includes descriptions of non-disposal facilities that are considered part of the regional system, though are not within the jurisdiction of Mono County. The document includes a brief description of proposed non-disposal facilities that have been discussed in recent years as the region anticipates transition from the current system to one based upon diversion and long haul transfer. The NDFE presented herewith is incorporated into and made a part of the Mono County Integrated Waste Management Plan.

2.0 REGIONAL DESCRIPTION

2.1 Geographic Setting

Primarily rural in nature, Mono County is located in central-eastern California. The county is bordered by the State of Nevada to the north and east, by Inyo County on the south, and by Alpine, Fresno, Madera, and Tuolumne counties on the west. Located in the high desert region on the eastern flank of the Sierra-Nevada Mountain range, Mono County can be geographically characterized as having rugged terrain with steep mountains, narrow valleys, and deserts. In addition, numerous rivers, streams, and lakes are scattered throughout the county. Generally speaking, topographic elevations range from 5,000 feet in the lower valleys and up to 14,000 feet in the White Mountains at the southeastern corner of the county. The county comprises 3,103 square miles of land space, with approximately 2,900 square miles, or 93.4 percent, owned by public entities, which include the federal government (Inyo National Forest, Toiyabe National Forest, Bureau of Land Management), the State of California, local government, and the City of Los Angeles (Department of Water and Power).

2.2 Population

The majority of population centers in the county are found along the Highway 395 corridor, which trends north-south in the western portion of the county. Communities in this area include, from north to south: Topaz, Coleville, Walker, Bridgeport, Mono City, Lee Vining, June Lake, Mammoth Lakes, Crowley Lake, Tom's Place, and Paradise Valley. Additional population areas include the

communities of Benton and Chalfant along Highway 6 in the southeast corner of the county. The remainder of the county is largely uninhabited.

The 2010 US Census determined the population of Mono County to be 14,202. Approximately 60% of those residents reside within the Town of Mammoth Lakes, which is not a part of the County's jurisdiction. The Town also experiences significant transient occupancy, which stretches the occupancy of the Town to well over 30,000 people at one time.

The California Department of Finance estimates future annual growth at less than 1% per year for the next 50 years[i]. As of January 1, 2013, the estimate is 14,493 for the entire county. At 4.6 persons per square mile, the resulting population density is one of the lowest in the State.

3.0 SOLID WASTE SERVICES

Two commercial haulers provide residential and commercial waste collection services in Mono County. Mammoth Disposal, a subsidiary of Waste Connections, Inc., is the franchise hauler and service provide for the Town of Mammoth Lakes mandated residential and commercial service. The unincorporated area of Mono County has two franchisees, including Mammoth Disposal and D&S Waste out of Yerington, NV.

Curbside recycling services are offered throughout the Town of Mammoth Lakes as well as certain parts of the County by Sierra Conservation Project. Other businesses such as Shred-Pro (mixed paper shredding service) and Mammoth Rock-n-Dirt (aggregate crushing) contribute to the available recycling services centering around the Town of Mammoth Lakes.

Self-hauling of waste and recyclable materials is available to all residents of Mono County, with eight Transfer Stations and landfills located near population centers.

3.1 DISPOSAL FACILITIES

Disposal of solid waste in Mono County is conducted at 3 active landfills. Two of these, Pumice Valley and Walker, currently accept only inert C&D waste for burial, and transfer all municipal solid waste off-site for disposal. The Benton Crossing Landfill has been the County's regional, and sole municipal solid waste landfill for over 10 years, and remains in use today.

In addition to being the regional landfill, Benton Crossing Landfill also performs vital non-disposal functions as part of normal operations. This includes the processing and diversion of clean wood waste, as well as the processing and sorting of certain C&D waste. These efforts include the periodic crushing of C&D aggregate material as well as the sorting of mixed C&D to reduce the amount of metal and clean wood within the mixed loads. The landfill also provides sludge management and diversion services for biosolid waste originating primarily in the Town of Mammoth Lakes, through the Mammoth Community Water District.

3.2 NON-DISPOSAL FACILITIES

Transfer Stations

Mono County maintains 6 low volume Transfer Stations in various communities throughout the county. The Transfer Stations are operated under contract (currently by D&S Waste of Yerington, NV). These facilities accept municipal solid waste for transfer to a disposal site, as well as accept materials for recycling, including glass, aluminum, plastic, HHW, metal and wood waste. The percentage of diverted waste received at the Transfer Stations averages approximately 30%. Additional details on diversion rates by site can be found in Appendix A below.

From Transfer Stations south of Conway Summit (Pumice Valley, Chalfant, Benton, Paradise), waste is currently transported to Benton Crossing Landfill for disposal. From sites north of Conway Summit (Bridgeport, Walker) waste is currently transported to Lockwood regional landfill in Sparks, NV, via the D&S Waste Transfer Station in Yerington.

At all facilities except Paradise, wood waste is processed on site by County personnel, and beneficially re-used for ADC or post-closure maintenance. Chipped wood waste is also offered to the general public for use in landscaping applications.

Recyclable material from the transfer stations is transported to a variety of other facilities for future processing. In some cases, materials are consolidated at Benton Crossing Landfill where they await on-site processing and/or pickup (metal, HHW). Aluminum, glass and plastic are hauled to other recycling centers where they are processed and eventually transported to market.

Outside of the County's jurisdiction but playing a significant role in the overall system is the Transfer Station and Recycling Center located in the Town of Mammoth Lakes. This facility is owned and operated by Mammoth Disposal, and currently accepts municipal solid waste for transfer to Benton Crossing Landfill, as well as HHW, metal, and other recyclable materials for transport to market.

CRV Buyback Centers

There are two CRV buyback centers located in the County. One is located at the Walker Senior Center in the north end of the County, and the Mammoth Lakes Recycling Center mentioned above.

Proposed Non-Disposal Facilities

As the County and the Town of Mammoth Lakes move toward increased diversion goals and the closure of the regional landfill approaches, planning for Non-Disposal Facilities has been steadily increasing.

The Town of Mammoth Lakes, in partnership with Mammoth Disposal, has planned for the expansion of the Transfer Station that may include a long haul transfer station, a MRF, and a permanent HHW facility.

D&S Waste has proposed a Non-Disposal facility in the Mono Basin that may include long-haul transfer capability for County waste, as well as necessary recycling capabilities.

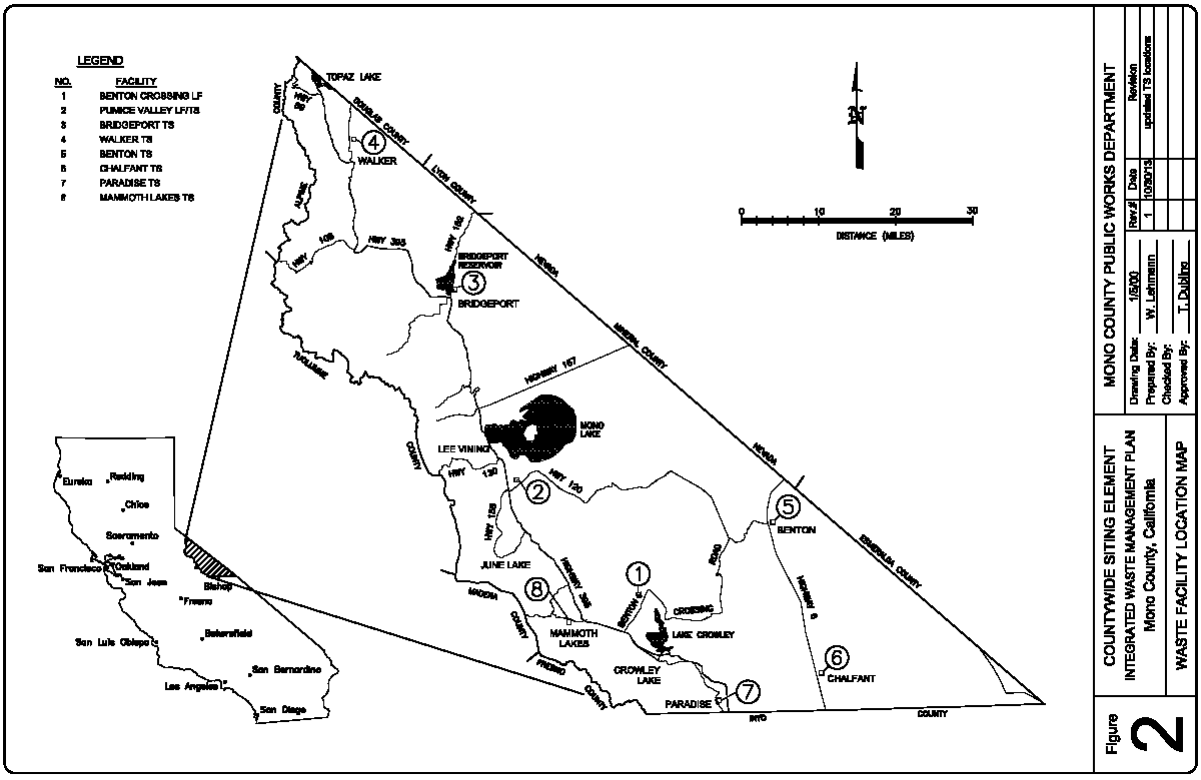
There are many other concepts being explored at this time, including a small scale sorting and baling facility located on County land to be run by inmate labor. Another concept is the early closure of Benton Crossing Landfill, coupled with the development of a Regional Recycling Center and Transfer Station. Yet another is the siting of a similar facility within close proximity to the Town of Mammoth Lakes, through a federal land exchange.

Additionally, alternative technologies are emerging such as composting, transformation technology, thermal biomass and others that, if developed, would require non-disposal facilities capable of providing feedstock to their operations. The possibility for this future need is an important factor when considering potential sited and capacities for non-disposal facilities in the region.

One or more of these proposals may come to fruition in the coming years. The County is committed to working with stakeholders to determine the most cost-effective waste management solutions.

Can we develop some criteria or preferences?
Proximity to waste generating sources
Cost-effectiveness
Competitive bidding
Diversion and transformation
Benefitting Local markets for recyclables?
Separation from parks and recreation
Utilizing pre-disturbed lands
Ability to store materials
Ability to pack and ship materials

Exhibit 1—Existing Waste Facilities within Mono County



Appendix A-Facility Descriptions[ii]

<u>Nondisposal Facilities Within Mono County (at least 5% recovery of total volume)</u>

Name of Facility: Benton Crossing Landfill (SWIS 26-AA-0004)

Type of facility: Solid Waste Disposal Site

Facility Capacity: 500 tons per day

Anticipated Diversion Rate : 25%

Participating Jurisdictions: Mono County, Town of Mammoth Lakes

Location of Facility: 899 Pit Road, Crowley Lake, CA 93546

Name of Facility: Benton Transfer Station (SWIS 26-AA-0015)

Type of facility: Transfer Station

Facility Capacity: 15 tons per day

Anticipated Diversion Rate : 45%

Participating Jurisdictions: Mono County

Location of Facility: 400 Christie Lane, Benton CA 93512

Name of Facility: Bridgeport Transfer Station (SWIS 26-AA-0009)
Type of facility: Transfer Station
Facility Capacity: 25 tons per day
Anticipated Diversion Rate : 38%
Participating Jurisdictions: Mono County
Location of Facility: 50 Garbage Pit Road, Bridgeport, CA 93517

Name of Facility: Chalfant Transfer Station (SWIS 26-AA-0010)
Type of facility: Transfer Station
Facility Capacity: 15 tons per day
Anticipated Diversion Rate : 49%
Participating Jurisdictions: Mono County
Location of Facility: 500 Locust Street, Chalfant, CA 93514

Name of Facility: Paradise Transfer Station (SWIS 26-AA-0007)
Type of facility: Transfer Station
Facility Capacity: 15 tons per day
Anticipated Diversion Rate : 8%
Participating Jurisdictions: Mono County
Location of Facility: 9479 Lower Rock Creek Road, Paradise, CA 93514

Name of Facility: Pumice Valley Transfer Station (SWIS 26-AA-0017)
Type of facility: Transfer Station
Facility Capacity: 15 tons per day
Anticipated Diversion Rate : 25%
Participating Jurisdictions: Mono County
Location of Facility: 200 Dross Road, Lee Vining, CA 93517

Name of Facility: Walker Transfer Station (SWIS 26-AA-0012)
Type of facility: Transfer Station
Facility Capacity: 25 tons per day

Anticipated Diversion Rate : 49%

Participating Jurisdictions: Mono County

Location of Facility: 280 Offal Road, Coleville, CA 96107

<u>Nondisposal Facilities Outside Mono County Jurisdiction (at least 5% recovery of total volume)</u>

Name of Facility: Mammoth Transfer Station and Recycling Center

Type of Facility: Transfer Station

Estimated Amount of Waste Mono will transport to facility: Negligible.

Location of Facility: Mammoth Lakes

<u>Transfer Stations Outside Mono County (less than 5% recovery of total volume)</u>

Name of Facility: D&S Waste Transfer Station

Location of Facility: Smith Valley, NV

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[i] State of California, Department of Finance, *E-4 Population Estimates for Cities, Counties, and the State, 2011-2013, with 2010 Census Benchmark*. Sacramento, California, May 2013

[ii] Anticipated Diversion based on 2012 calendar year diversion of total waste received.

Mono County
Community Development Department

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Mammoth Lakes, CA 93546
(760) 924-1800, fax 924-1801
www.monocounty.ca.gov

P.O. Box 8
Bridgeport, CA 93517
(760) 932-5420, fax 932-5431
www.monocounty.ca.gov

March 13, 2014

TO: Planning Commission

RE: Development Standards Workshop

RECOMMENDATION
Conduct workshop and provide any desired direction to staff.

BACKGROUND
As a part of the General Plan update, adjustments to existing development standards and requirements are under consideration. As you may recall, the General Plan has received periodic amendments every year or so to clarify and update sections, such as development standards, to correct errors and/or streamline permitting processes. Workshop items include:

- **Decks included in lot coverage calculations**
  Consider adding language to lot coverage definition that clarifies all decks shall be included in the lot coverage calculation. The definition already includes language to include all "structures."

- **Height exemptions – commercial and industrial clarification**
  Consider clarification of this section by replacing the reference to Floor Area Ratio with a simple formula allowing for increased height with increased setbacks. Also, expand the provisions from the Commercial (C) and Industrial (I) Land Use Designations (LUD) to all permitted commercial or industrial uses regardless of LUD.

- **Driveway and impervious surface stream setback**
  Consider clarification that while impervious surfaces shall not be allowed within the 30' stream setback, there is an exception for primary access ways.

- **Permitted/DR/Use Permit triggers in Commercial and Mixed Use LUDs**
  Consider reduced Use Permit trigger in the Commercial (C) LUD to make consistent with the Mixed Use (MU) LUD. Amend "structural alteration" trigger to specify increased intensity or change in footprint, allowing for health and safety structural alterations without discretionary permit. Consider DR findings for commercial uses within primarily residential neighborhoods.

- **Limited-Scale Lodging**
  Consider parameters for limited-scale lodging allowed with a Use Permit within Resource Management (RM) LUDs.

- **Use, Establishment of**
  Consider adding a definition in Land Use Element Chapter 4 of "Use, Establishment of" for uses that do not require building or other permits to act as establishment triggers.

- **Side-yard setbacks**
  Review input from fire chiefs meeting regarding 5' side-yard setbacks.