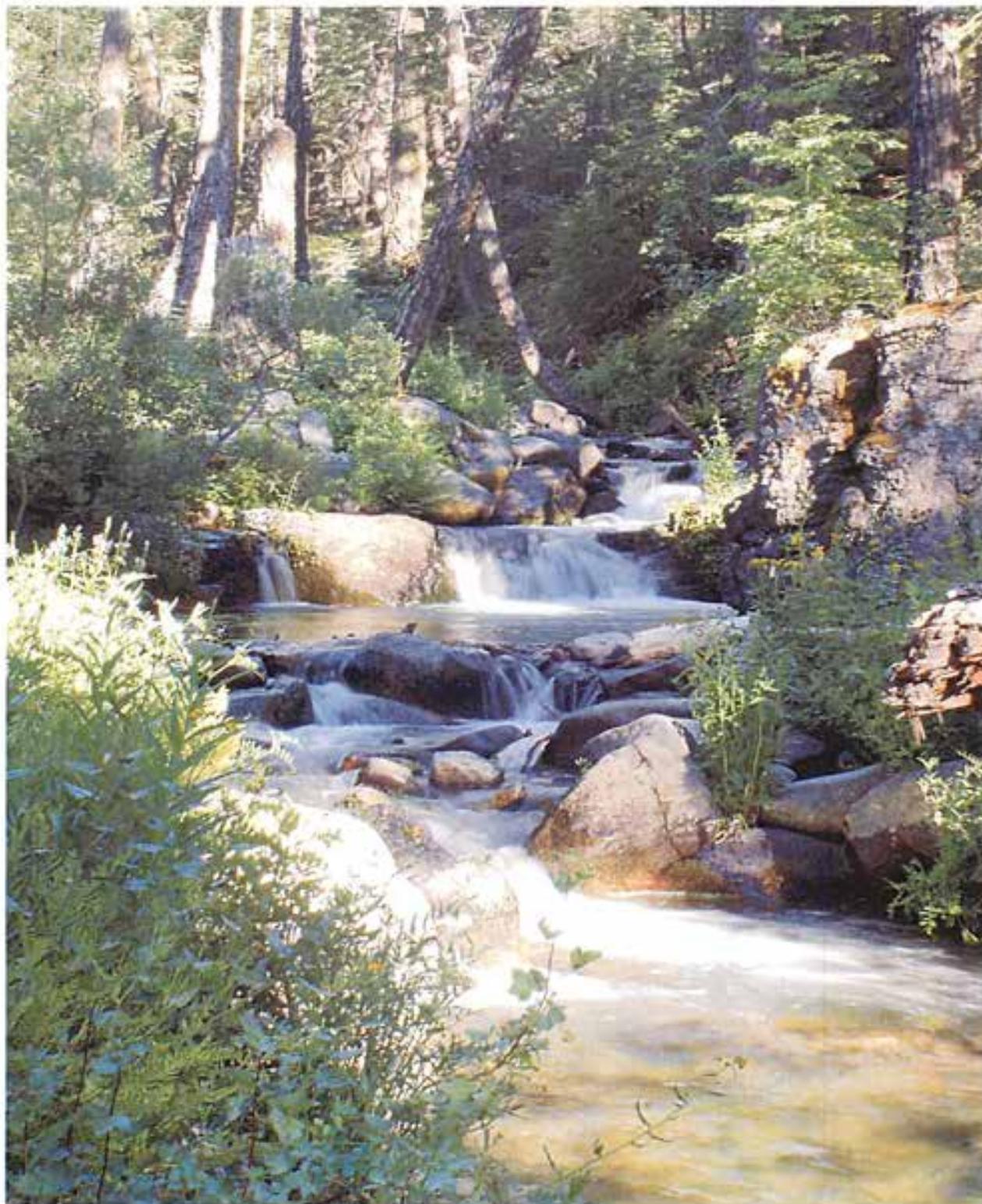


**Shasta-Trinity Unit
LaTour Demonstration State Forest
Board of Forestry and Fire Protection Tour
June 4th, 2013**



**Shasta-Trinity Unit
LaTour Demonstration State Forest
Board of Forestry and Fire Protection Tour
June 4th, 2013**

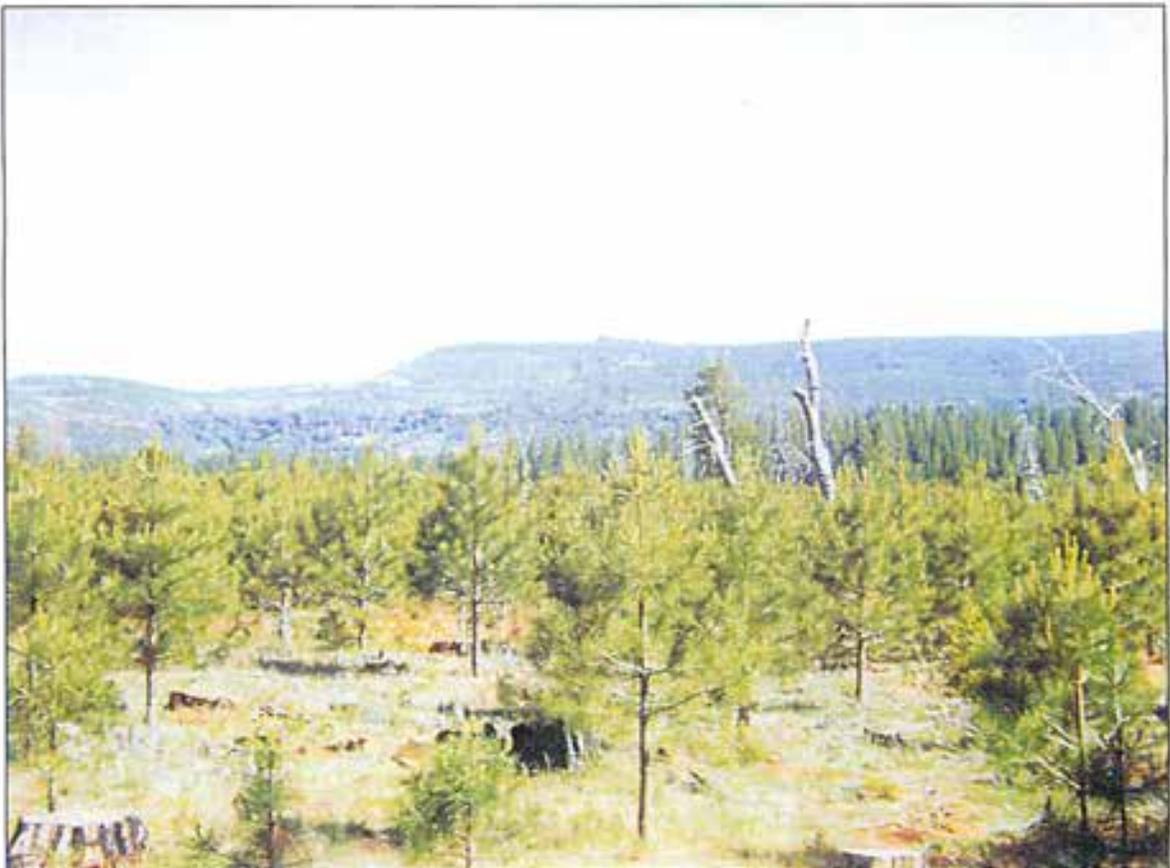
AGENDA

- 08:00 Depart Red Lion parking lot
1. 08:45 – 09:05 Downslope (Whitmore) Fire 2003, Bateman Road - Fire history in the area, 2002 Squirrel Fire, the 68' & 78' Whitmore Fires, and the 1987 Fern (Glendenning) Fire, plantation development, recent thinnings, snag/oak retention & recruitment.
 2. 09:30 – 10:00 Valley View Point, Bateman Road (Bathroom available) – LaTour History, Management Overview, South Cow Creek I-III Timber S, Cabled Cow THP.
 3. 10:30 – 11:45 VTAC Project (South Cow Creek Road/Beaver Creek) - Proposed treatments within the Water and Lake Protection Zone (WLPZ) designed to reduce the potential fire risk as per Forest Practice Rules, Title 14 CCR §936.9 (v)(3).
 4. 12:00 – 13:00 Lunch at South Cow Creek Campground (Bathroom available) - South Cow Creek Meadow downcutting (future restoration project).
 5. 13:15 – 13:45 Rim Road *Cytospora abietis* - Canker in true fir stands and proposed treatments.
 6. 14:00 – 14:30 Rim Road VR – Both dispersed and aggregated Variable Retention prescription demonstration.
 7. 14:40 – 15:00 Huckleberry Road – Huckleberry Meadow Restoration, Sierra Nevada Conservancy Fuelbreak/Biomass Grant Project.
 8. 15:15 – 15:30 LaTour Headquarters (Bathrooms available) – Projects List, Shasta College MOU. Depart for Redding.

LaTour Demonstration State Forest
Whitmore Burns & Plantations



Whitmore Fire 2003 (Downslope Fire)



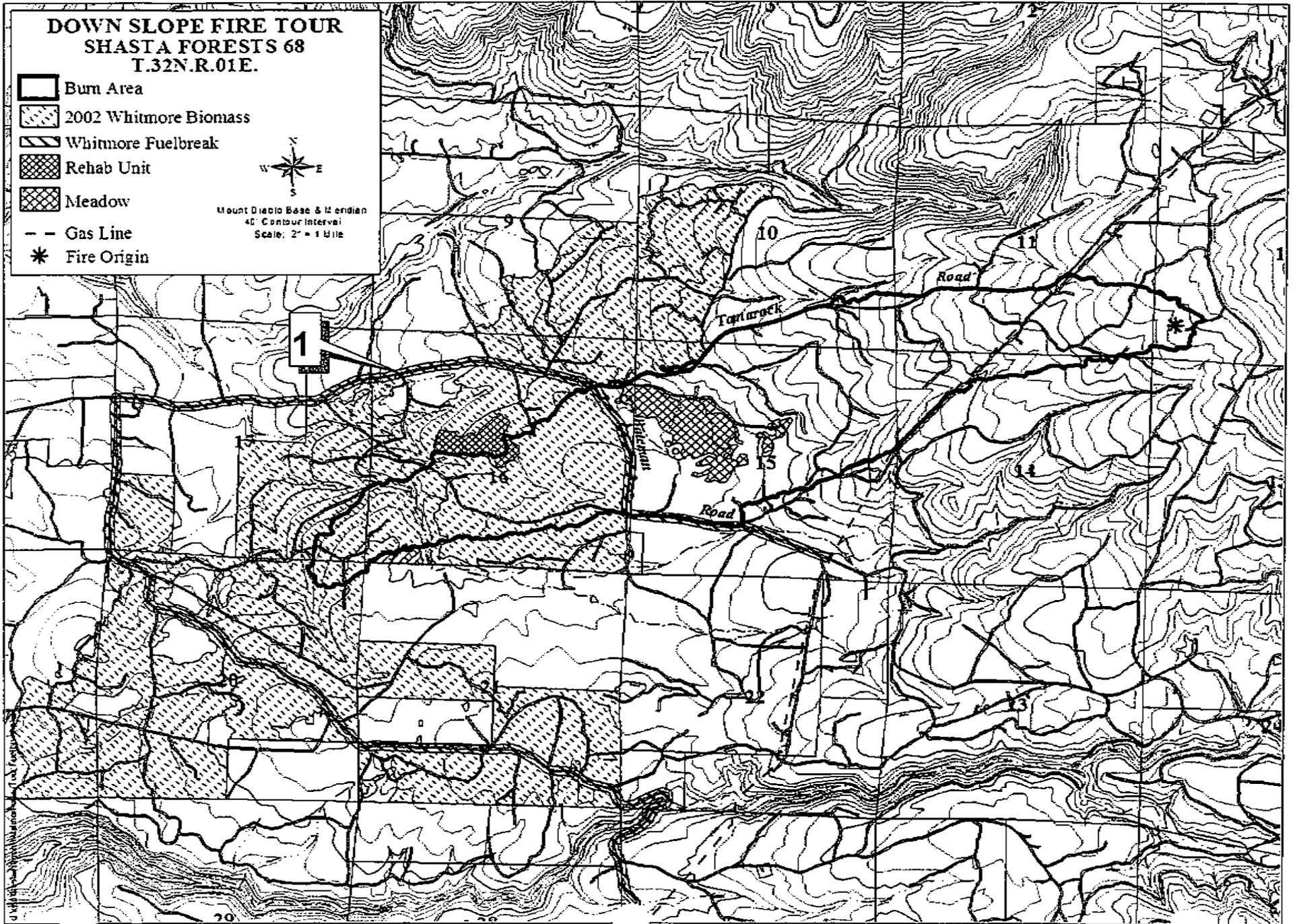
Whitmore Fire 2003 (Foreground) & Squirrel Fire 2002 (Background)

DOWN SLOPE FIRE TOUR
SHASTA FORESTS 68
T.32N.R.01E.

-  Burn Area
-  2002 Whitmore Biomass
-  Whitmore Fuelbreak
-  Rehab Unit
-  Meadow
-  Gas Line
-  Fire Origin

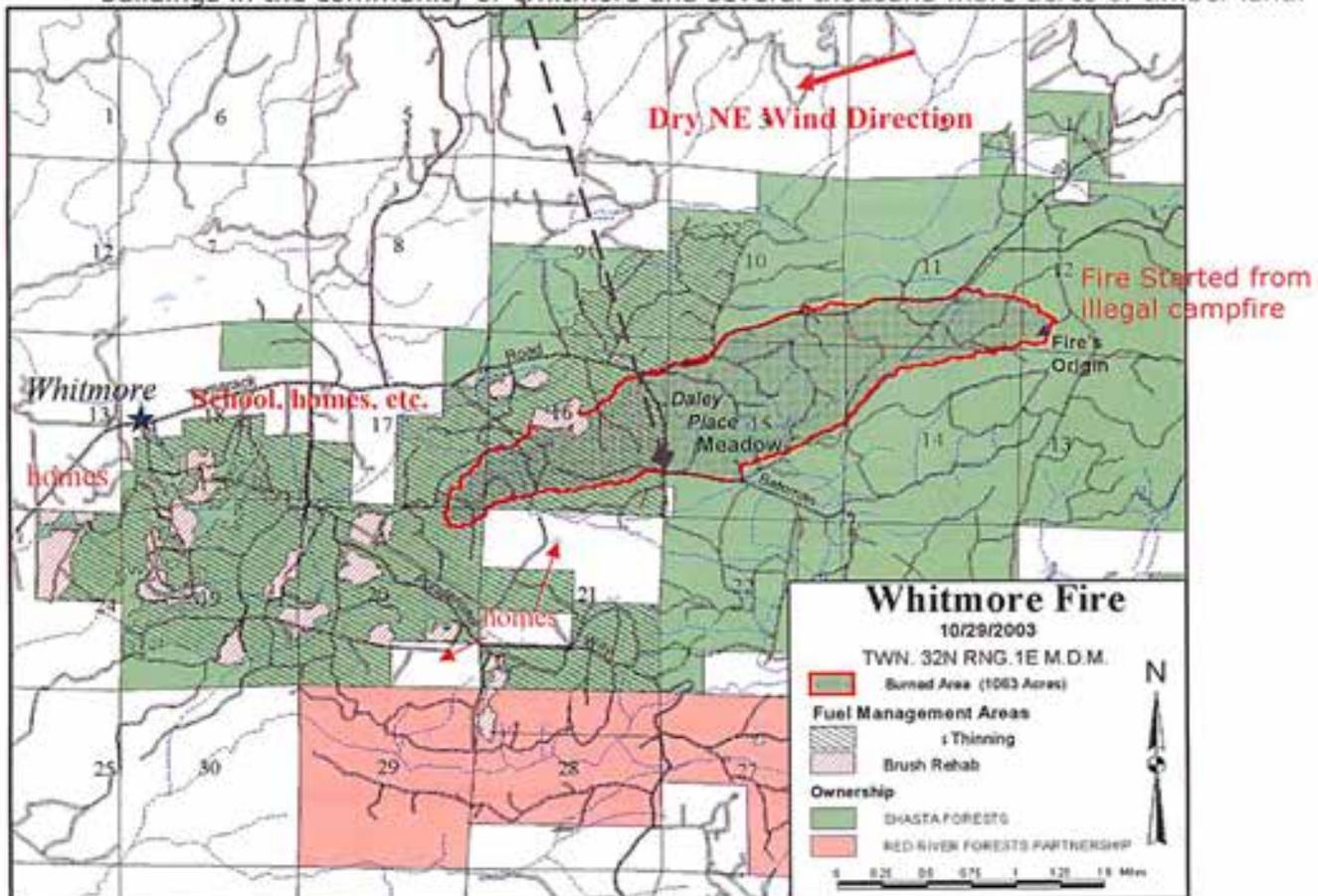


Mount Diablo Base & Meridian
40' Contour Interval
Scale: 2" = 1 Mile





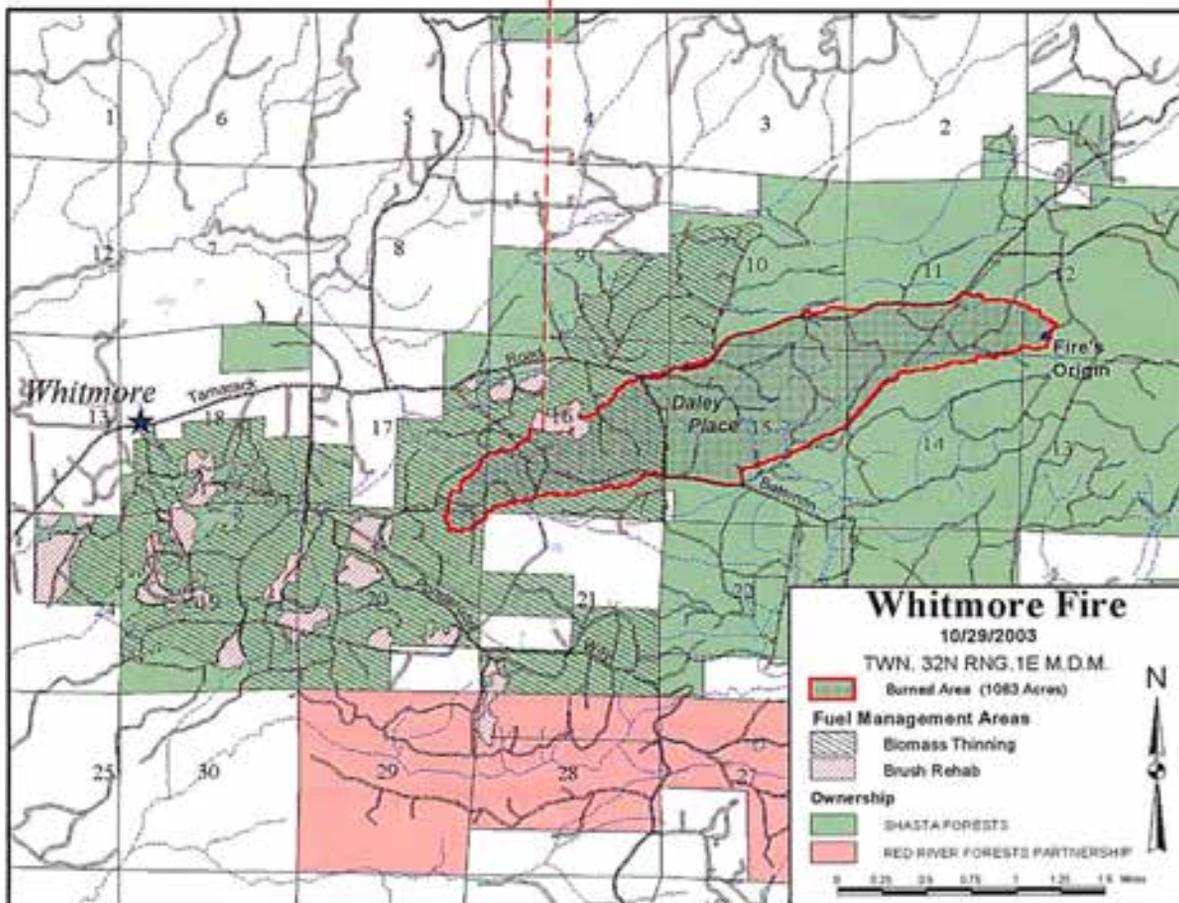
Bateman Rd looking north: Once the fire reached the thinned area west of the Bateman road it went from a column driven crown fire (with 100 to 200 foot flame lengths) to a ground fire with occasional individual tree flare ups. CDF fire fighting forces were able to go from indirect to direct attack and eventual pinch off the front of the fire before it destroyed any homes or buildings in the community of Whitmore and several thousand more acres of timber land.



Thinning removed 37 tons/ac. (24 tons chips + 13 tons sawlogs) primarily ladder fuels and weaker crown trees. Brush rehab removed 34 tons/ac. (primarily brush & some weak trees)



Looking north from burned out TIW Class III ELZ (where no thinning or brush clearing occurred) into cleared brush-field rehabilitation unit (planted w/ conifers) that was used by CDF as a fuelbreak to stop the wildfire on the north flank.





small Parcels w/ homes
35+ tons /ac
PROPERTY LINE

Beaty managed brush cleared & planted
(34 tons/ac removed)

D7 w/ brush rake clearing 15' to 20' tall manzanita near Whitmore.

Forest land owners who have an economically profitable forest management business (i.e. viable net income from sawlog timber) can better afford expensive and risky investments in fuel reduction and forest growth that also benefit nearby communities and the general public. Proper drying of the piles prior to burning is essential, especially considering the very narrow window of opportunity to burn under prescribed conditions that are suitable for both smoke management and fire safety. Safe burning, especially near communities takes careful (& costly) planning and implementation, neither of which should be overly encumbered with "one size fits all" prescriptive Board rules (e.g. requiring treatment within 45 days of creation would have not allowed for enough drying and also would have required unsafe burning in dry, hot early fall to meet the one-size-fits-all "deadline").



Chipping thinned trees near the community of Whitmore. Prior to treatment this was an overstocked ponderosa pine stand (planted several years ago after wildfire) that was also interlaced with tall manzanita. Trees were thinned and much of the brush was crushed incidental to operations by thinning and yarding equipment. Had total brush/slash removal been required as a regulatory condition of the thinning operation, then it would have been too expensive and no treatment would have been done.

Biomass Harvest and Utilization Conversion Factors

1 bone dry ton (BDT) of chips, hog fuel	= 2000 lbs.
1 bone dry unit (BDU) of chips, hog fuel	= 2400 lbs.
1 unit of chips	= 200 cubic feet
1 BDT	= 2.0 green tons, assuming 50% moisture content
1 unit of chips	= 1.0 BDT chips
1 ccf (hundred cubic feet) roundwood	= 1.0 BDU chips
1 ccf roundwood (logs)	= 1.2 BDT chips
1 ccf roundwood (logs)	= 1.2 units of chips
1 ccf roundwood (logs)	= 1.2 cords roundwood (@ 85 cu. ft. wood/cord)

1 standard chip van carries 25 green tons, 12 BDT.

1 BDT fuel will produce 10,000 lbs. of steam
10,000 lbs. of steam will generate 1 megawatt hour (MWH) of electricity
1 MW = 1,000 horsepower
1 MW = power for 1,000 homes

A 50 MW powerplant will use 50 BDT fuel/hour, 1200 BDT/day, 100 chips vans/day.

Fuel Types and Fire Terminology

Timelag Fuel Moisture – Timelag is the rate of moisture change in a fuel. The drying time for dead fuels to lose $2/3^{\text{rds}}$ of the difference in initial and equilibrium moisture content, in hours.

1 hour fuels, 0- 1/4" diameter wood fuel moisture affected by sunlight, temperature, wind
10 hour fuels, 1/4 - 1" diameter wood affected by daily weather changes
100 hour fuels, 1 - 3" diameter wood affected by weekly weather changes, major storms
1000 hour fuels, 3- 9" diameter wood moisture will equilibrate with seasonal conditions
10,000 hour fuels, >9" diameter wood, affected by prolonged, multi-year droughts

Surface fuels – soil surface to 6 ft above ground. Litter, duff, grasses, shrubs, small trees, slash

Ladder fuels – brush, small trees that will carry fire from surface to the overstory tree crowns

Crown fuels – the crowns of overstory trees. Crown fires are usually driven by surface and ladder fuels.

Fire return interval – how often fire returns to an area, in years.

Fire intensity – the amount of energy released from a fire. Flame length is an indication of intensity. Intensity may or may not be directly related to fire effects.

Fire severity – the change in the ecosystem caused by the fire. Low severity – light surface fire, small trees killed; Moderate – most small trees killed, overstory tree canopies damaged, charring on bark of live trees, overstory trees occasionally killed. High – small and understory trees killed, many to most overstory trees killed.

Douglas-fir			Wood density	25 lbs/cu.ft.		
DBH (in)	HT (ft)	Stem Vol (cu. ft)	Stem Wt (Bone Dry BD lbs)	Crown & Tip Wt (BD lbs)	Total Wt	BDTons
2	10	0.1	2.5		2.5	0.00
4	30	1	25	40	65	0.03
6	50	4	100	64	164	0.08
8	70	10	250	97	347	0.17
10	90	20	500	137	637	0.32
12	110	35	875	184	1059	0.53
16	120	64	1600	301	1901	0.95
20	120	95	2375	482	2857	1.43
24	120	130	3250	725	3975	1.99
28	130	190	4750	1030	5780	2.89

Ponderosa pine

2	10	0.1	2.5		2.5	0.00
4	30	1	25	35	60	0.03
6	50	3.7	92.5	66	158.5	0.08
8	70	9	225	113	338	0.17
10	90	17.9	447.5	177	624.5	0.31
12	110	31.1	777.5	259	1036.5	0.52
16	120	58.3	1457.5	478	1935.5	0.97
20	120	88	2200	774	2974	1.49
24	120	123.1	3077.5	1150	4227.5	2.11
28	130	178.7	4467.5	1620	6087.5	3.04

White fir

2	10	0.1	2.5		2.5	0.00
4	30	1.2	30	45	75	0.04
6	50	4.5	112.5	77	189.5	0.09
8	70	11.1	277.5	120	397.5	0.20
10	90	22.3	557.5	175	732.5	0.37
12	110	39.2	980	242	1222	0.61
16	120	71.2	1780	422	2202	1.10
20	120	103.7	2592.5	637	3229.5	1.61
24	120	141	3525	852	4377	2.19
28	130	202.4	5060	1090	6150	3.08

References: Walters, David K., D.W. Hann, and M.A.Clyde. 1985. Equations and tables predicting gross total stem volumes

in cubic feet for six major conifers of southwest Oregon. Forest Research Laboratory, Oregon State University, Corvallis. Research Bulletin 50. 3

Snell, J.A. Kendall, and J.K Brown. 1980. Handbook for predicting residue weights of Pacific NW Conifers.

USDA Forest Service, PNW Forest and Range Experiment Station. General Tech. Report PNW-103. 44 p.

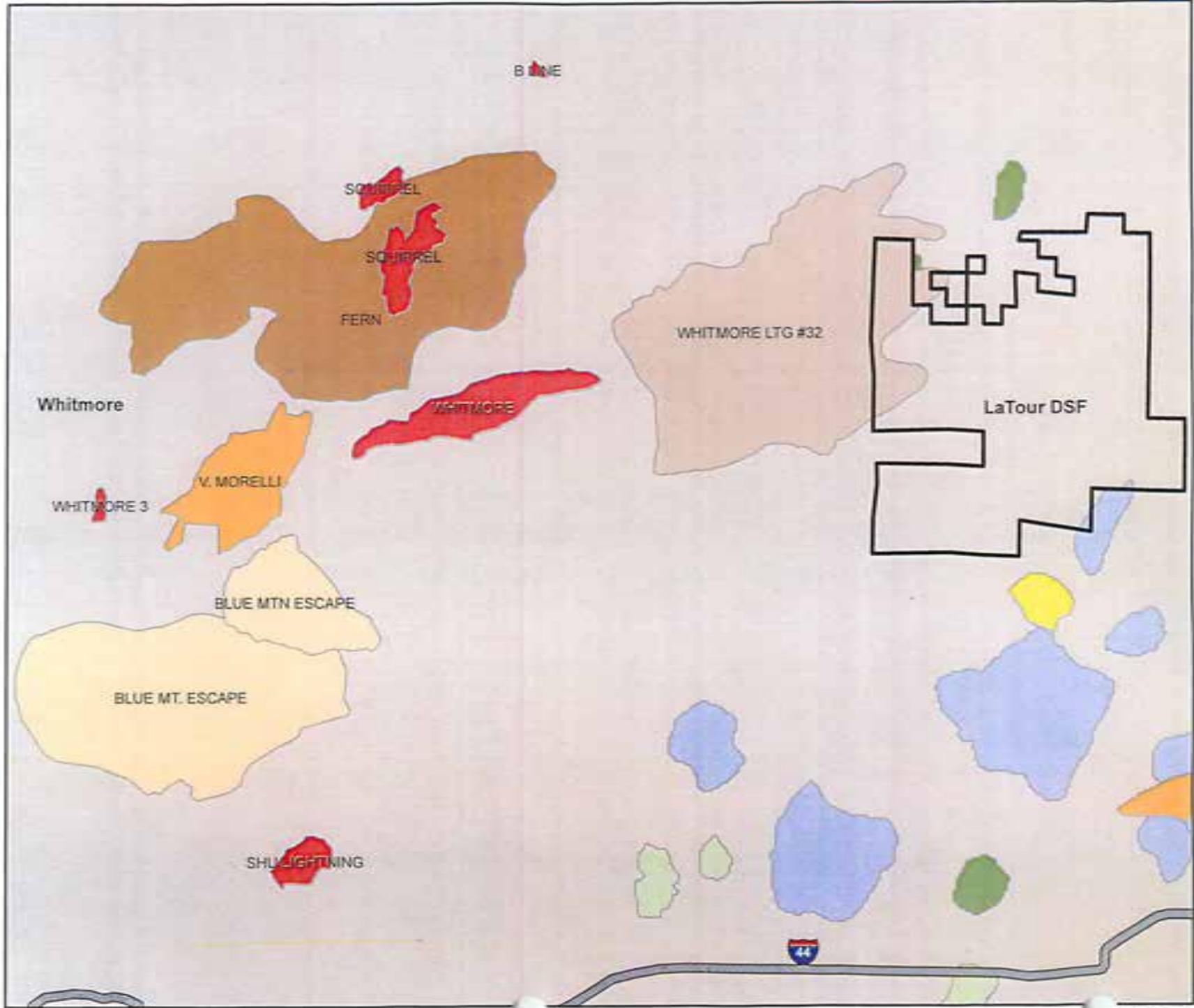
Hartman, David A., W. A. Atkinson, B.S. Bryant, R.O. Woodfin, Jr.. 1976. Conversion factors for the Pacific NW Forest Industry.

Institute of Forest Resources, College of Forest Resources, University of Washington, Seattle, WA. 112 p.

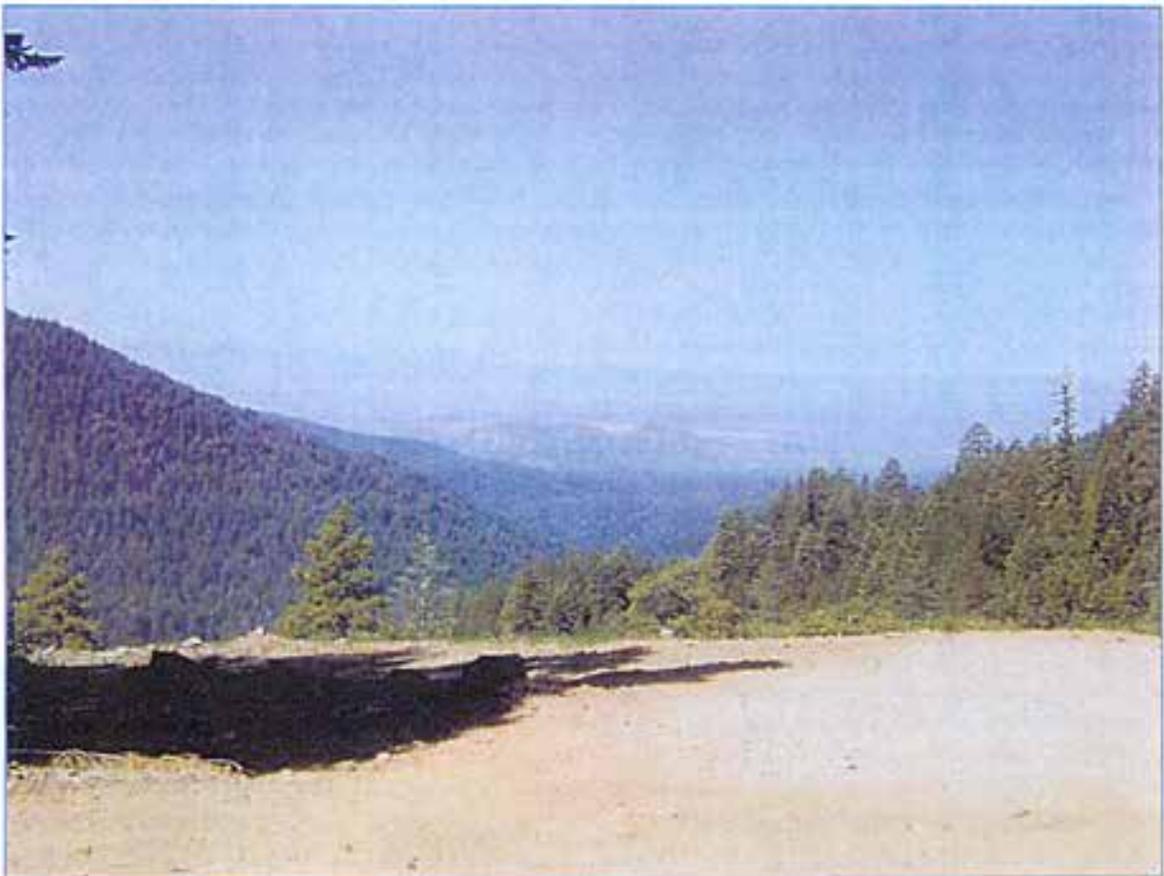
LaTour Fire History 1900 - 2010

Legend

- LaTour Boundary
- Highway
- Fire Year**
- 1900 - 1909
- 1910 - 1919
- 1920 - 1929
- 1930 - 1939
- 1940 - 1949
- 1950 - 1959
- 1960 - 1969
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010



LaTour Demonstration State Forest
Valley View Point



LaTour Demonstration State Forest

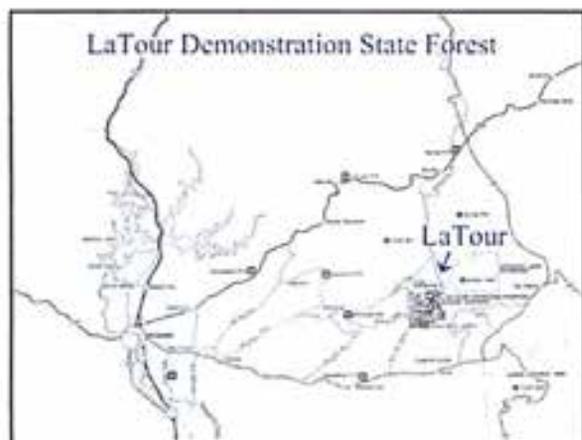
California Department of Forestry and Fire Protection
Shasta-Trinity Unit



Location of LaTour State Forest

- Forest Location
- 50 miles East of Redding
- Primary Access
- Whitmore Road to Bateman Road





Personnel Assigned to LaTour

- Permanent Personnel
 - Forest Manager Dave Loveless
 - Assistant Manager Ben Rowe
 - Research Forester "Vacant"
 - Forestry Assistant Shannon Johnson
- Seasonal Personnel
 - 2-6 Forestry Aides

Establishment of LaTour Demonstration State Forest

- Enabling Legislation
- DSF System
- Purpose of LDSF
- History
- Facts



Enabling Legislation

- In 1930 the U.S. Forest Service exchanged the 9,033 acre tract that would become LaTour State Forest for 10,957 acres of forested state school lands.
- On July 17, 1945 Senate Bill 555 was signed by Governor Earl Warren. This legislation authorized the transfer of LaTour Forest to the California Division of Forestry.

Enabling Legislation

- In 1946, the State Land Commission deeded the LaTour Forest property to CDF in exchange for \$100,000.
- The Forest then became LaTour State Forest and new legislation was signed to provide funding for a system of State Forests.

Demonstration State Forest System

State Forest	County	Size
Jackson	Mendocino	50,195
LaTour	Shasta	9,033
Mountain Home	Tulare	4,807
Boggs Mountain	Lake	3,493
Soquel	Santa Cruz	2,681
Las Posadas	Napa	756
Mount Zion	Amador	164
Ellen Pickett	Trinity	160

Demonstration State Forest System



Purpose of LaTour Demonstration State Forest

The primary purpose of LaTour is to demonstrate economical silvicultural practices and promote continuous forest production, demonstrate good forest management practices, preserve soil, watershed, and wildlife values; and conduct demonstrations and experiments.

History of LaTour State Forest

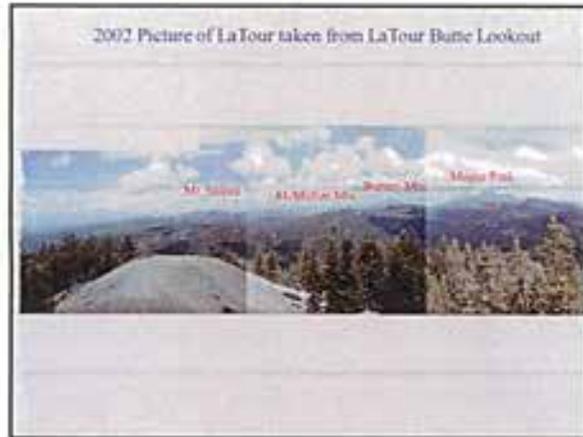


LaTour Butte 1919

- John Works Expedition of 1832
- Yana Indians were first inhabitants.
- Forest named after James C. LaTour, early day blacksmith
- LaTour Butte lookout constructed in 1935
- Present day Forest Headquarters was built in 1954.

1935 Picture of LaTour taken from LaTour Butte Lookout









LaTour Facts



From Herby Jones "Bulldog"

- Elevation
 - 3,500-4,750
- Annual Precipitation
 - 46" (mainly snow)
- Temperature
 - 0°F (winter)
 - 90°F (summer)
- Average Standing Volume
 - 25,245 board feet per acre
- Average growth per acre/year
 - 560 Board Feet

Timber Types of LaTour



True Fir



Sierra Mixed Conifer

- Timber Types
 - Sierra Mixed Conifer
 - True Fir

Timber Species of LaTour

- Timber Species
 - ponderosa pine
 - sugar pine
 - Jeffrey pine
 - lodgepole pine
 - western white pine
 - Douglas fir
 - white fir
 - red fir
 - incense cedar
 - mountain hemlock

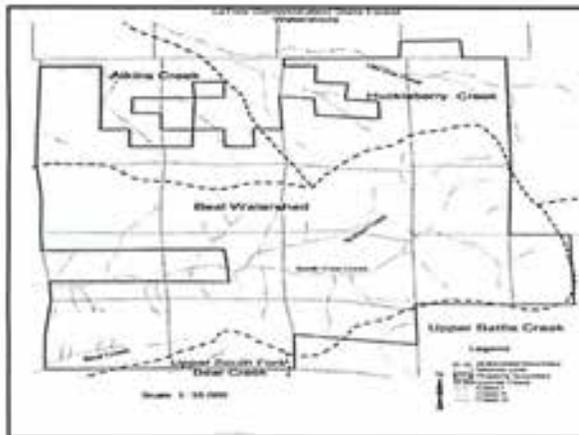


Sugar Pine

Watersheds of LaTour



- The forest comprises the headwaters for all or part of five planning watersheds:
 - Atkins Creek
 - Bear
 - Huckleberry Creek
 - Upper Battle Creek
 - Upper South Fork Bear Creek



Facilities on LaTour

- Forest Headquarters
- Four Campgrounds
- LaTour Butte Fire Lookout



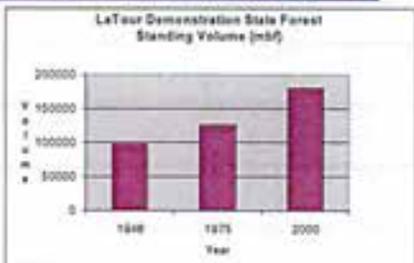

Facilities on LaTour

- Forest Headquarters
- Four Campgrounds
- LaTour Butte Fire Lookout



LaTour Butte Fire Lookout

Standing Timber Volume has Increased Significantly over Time



Year	Standing Volume (mbf)
1948	100,000
1975	125,000
2000	175,000

Silviculture on LDSF

What is Silviculture? Art, science, and practice of establishing, tending, and reproducing forest stands of desired characteristics



Systems used at LDSF

- Selection (95%)
- Other Silviculture
 - Commercial Thinning
 - Sanitation/Salvage
 - Shelterwood
 - Clearcut <6 acres

Timber Harvesting at LaTour

- Early settlers used LaTour's sugar pine for making shakes
- First commercial harvest was Christmas Trees
- First timber harvest on LaTour by the State was in 1951



LaTour's First Timber Sale 1951
Loading with a "Gib" Pile





Timber Harvesting at LaTour



Single Buckle October 1997 Timber Sale

- Timber harvest occurred annually from 1951 to 1978
- From 1978 to 2006 LaTour averaged a timber harvest every other year
- Currently harvesting annually

Timber Harvesting at LaTour

- Option A Annual Allowable Harvest is 4.1 mmbf
- Timber sales average 3-4 million board feet
- Timber sales sold to the highest competitive bidder
- Over 169 mmbf harvested from LaTour from 1951-2012



Landing on LaTour D6F

Timber Sale Revenue's

- The State BOE & Shasta County receive Timber Yield Tax and Property Tax annually (@ \$31,000 for 2012)
- CAL FIRE Forest Resources Improvement Fund (FRIF) programs historically funded by timber receipts:
 - State Forests
 - State Nurseries
 - Forestry Assistance
 - California Forest Improvement Program

Research at LaTour



Research Cooperators

- Pacific Southwest Research Station, USDA Forest Service
- California Department of Fish and Wildlife
- University of California at Berkeley
- Chico State University
- True Fir Cooperative
- National Imagery and Mapping Agency
- Sierra Pacific Industries
- Private Contractors
- LaTour Staff

History of Research at LaTour

- Early research projects focused on converting brush to trees
 - Seeding and Planting Study of 1935
 - Marden Brush Cutter Project of 1961
- Timber Atlas Inventory (TAI)
 - Established 1963
- Continuous Forest Inventory (CFI)
 - Established 1965



Marden Duplex Brush Cutter 1961

Research Projects of Interest

- Horse Logging
- Timbco Study
- Geographic Synthetic Aperture Radar Study
- Pacific Southwest Research Station Studies
- Carbon Sequestration Project
- Proposed Water Monitoring of South Cow Creek
- Proposed Small Mammal Study
- Proposed VTAC Project

Horse Logging Study Conducted by LaTour

- This study demonstrated that horse logging can economically compete with tractor logging in dense stands.



Horse logging early 1990's

Timbco Study Conducted by LaTour

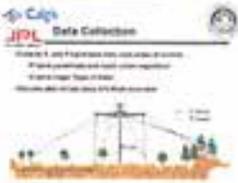
- Conducted in 1995
- Measured production rates and cost
- Findings:
 - Decreased fuel loading
 - Decreased damage
 - Higher logging costs
 - Larger landing size



Timber working at LaTour 1995

GeoSar Study

- Testing of an airborne radar mapping system to penetrate foliage
- LaTour was selected as one of the two test sites because of the intensive vegetation inventory.



JPL Data Collection
Forest & Land Use Inventory and Assessment
Forest Inventory and Assessment
Forest Inventory and Assessment
Forest Inventory and Assessment

Studies Conducted by Pacific Southwest Research Station at LaTour

- Dwarf Mistletoe Thinning
- Response of Red Fir Saplings to Release Treatments
- Response of Pine to Release Treatments
- Blister Rust Resistance in Sugar Pine
- Effects of Density & Shrub Control on WF Plantations
- Releasing Young Conifers from Competing Vegetation and Shrub Succession
- Dwarf Mistletoe Control
- Response of White Fir Poles to Various Thinning Levels

Carbon Sequestration Study

- A demonstration of how to implement a registration of sequestered carbon with the California Climate Action Registry using the Forest Project and Reforestation Protocols
- One of the phase II WestCarb projects funded by the US Department of Energy



Carbon Sequestration Units
LDSF, 2006

Proposed Water Monitoring of South Cow Creek

- Measure Turbidity
- Determine suspended sediment concentration
- Measure Water Temp.
- Measure Precipitation
- To be installed in conjunction with the proposed VTAC Project



Water Monitoring Station on South Cow Creek, Anza, CA

Proposed Small Mammal Study

- An Evaluation of Group Selection and Variable Retention Silvicultural Systems on Species Population Diversity and Habitat Use by Small Terrestrial Mammals and Birds



Proposed VTAC Project

- LDSF has developed a proposal and submitted it to VTAC for review, to conduct timber operations within Water and Lake Protection Zones (WLPZ's), as per Title 14 CCR § 936.9(v) of the Forest Practice Rules. The purpose for this Pilot Project and proposed operations is two-fold: 1) To demonstrate the viability of the application of this FPR section, and 2) to implement silvicultural practices intended to reduce the current potential for a catastrophic wildfire to occur within the watersheds comprising LDSF.

Site-Specific Riparian Zone Management:

Section V Guidance



Anadromous Salmonid Protection Rule Section V

Technical Advisory Committee (VTAC)

December 2012

Sacramento, California



SITUATION 4. INTERIOR STANDS WITH HIGH CATASTROPHIC WILDFIRE RISK

Unmanaged riparian stands can be sources of fire migration in fire-prone landscapes (Kobziar and McBride 2006, Murphy et al. 2007, Stone et al. 2010, Van de Water and North 2011) (Figures 19, 20, 21, and 22). North et al. (2009) report that riparian forests now have some of the heaviest ladder and surface fuel loads of any Sierran forest communities. Safford et al. (2009) state that fuel treatments that include removal of surface and ladder fuels in California yellow pine and mixed conifer forest types are highly effective management tools for reducing fire severity and canopy tree mortality. Treatments designed to reduce fire risk while improving overall riparian functions are an appropriate class of proposals under Section V of the ASP Rules (see 14 CCR § 916.9 [936.9, 956.9] (v)(6) in Appendix C). Goals for site-specific proposals include creating fire resilient forests, promoting reduced fire intensities, and retaining functional habitat following a wildfire.

Typical Suitability Criteria

- Areas outside the zone of coastal influence (e.g., coastal fog zone) within the geographic scope of the ASP rules (high catastrophic wildfire risk is a greater problem in the interior areas of California)
- Overstocked, single-cohort stands, including in the riparian zone (Figure 23)
- Dense ladder fuels (Figure 24)
- Riparian stand surrounded by younger stands, recent harvests such that the riparian zone becomes the source of fuel relative to the surrounding forest

Design Factors to Consider

- Fire behavior models show a high risk of catastrophic wildfire (i.e., severe fire behavior and a high likelihood of stand replacing wildfire event)
- Reduction/elimination of vertical and horizontal continuity among fuel layers (surface, ladder and crown fuels)
- Increased sedimentation, possible loss of wood in watercourse channels, and possible loss of wood recruitment potential from the riparian zone.

Treatment Options

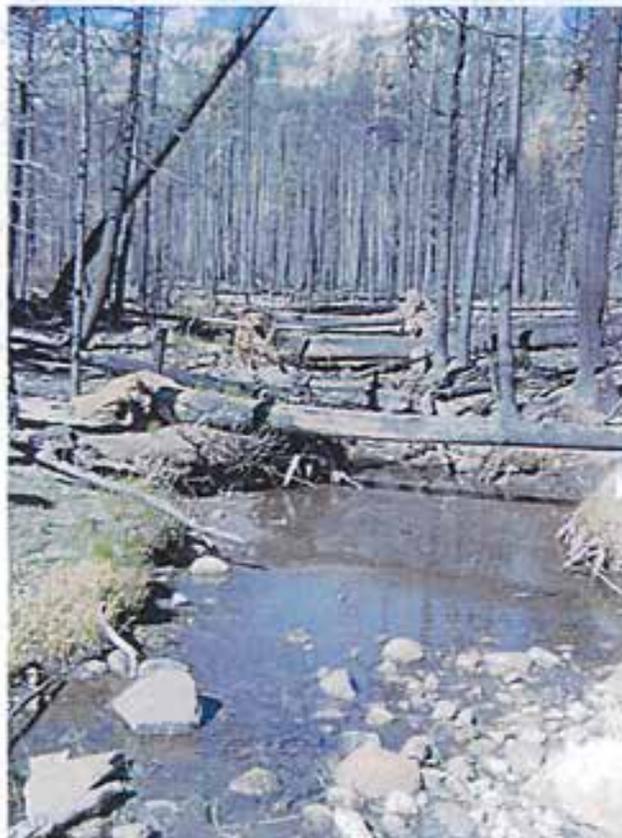
- Thinning from below (removing intermediate and co-dominant fuels)
- Single tree selection
- Group selection
- Sanitation-salvage
- Variable retention
- Alternative prescriptions
- Prescribed fire with or without silvicultural treatments (Beche et al. 2005, Arkle and Pilliod 2010)
- Other (including combined treatments)

Hazards (Red-Flags)

- Existing water temperature standard issues (particularly for 303(d) water temperature impaired waterbodies)
- Water temperature near biological thresholds
- Microclimate conditions negatively impacted
- Risk to nearby dwellings or subdivisions
- Risk to sensitive species present
- Risk to historical archeological structures

Hypothetical Example

A Class I watercourse located in the Cascade Range near a major state highway was subjected to a catastrophic wildfire 50 years ago, with a much smaller fire occurring 10 years ago. The area naturally regenerated, producing an overly dense stand both in the riparian zone and on the adjacent hillslopes. Fire behavior models and fire start data show that this area is highly prone to catastrophic wildfire (i.e., a rapidly moving crown fire). State and federally listed anadromous fish use the Class I watercourse. The RPF proposes a prescription to reduce surface fuels, intermediate fuels, and co-dominate fuels (i.e., "ladder fuels") in the stand, which reduces the overstory and understory vegetation below the required retention standards in the ASP rules. This treatment is to occur both in the Class I WLPZ Core, Inner, and Outer Zones, as well on the hillslopes beyond the WLPZ, creating a landscape-level fire hazard reduction project. The RPF will make a case for removing trees and other vegetation below the retention standards in the ASP rules, since the area has an established fire history and fire behavior models document a significant problem. In addition to describing how the stand will be improved for potential future timber production, the RPF will include a discussion of how the riparian functions necessary for salmonid life stages will be better secured and maintained by this fuel reduction treatment.



Figures 19 and 20. Angora Creek watershed following the 2007 Angora Fire in the Lake Tahoe Basin, where dense stands of trees in the Angora Stream Environment Zone (SEZ) likely contributed to the rapid fire spread upslope to Angora Ridge (Murphy et al. 2007).



Figure 21. Aerial photograph taken of the Ponderosa Fire, August 2012, in Tehama County. Note how the WLPZ riparian vegetation "wicked" the fire through irrigated pasture ground on either side of the Digger Creek channel (photo provided by Mark Lathrop, SPI).



Figure 22. Aerial photograph of an unnamed tributary of Digger Creek that was heavily burned during the 2012 Ponderosa Fire in Tehama County (photo provided by Stacy Stanish, DFW).



Figures 23 and 24. Interior California stands with high fuel loading and elevated risk of catastrophic wildfire (photos provided by Kip Van de Water, USFS, Plumas National Forest).

Memorandum

To: Pete Cafferata
Helge Eng

Date: 11/30/2012

Telephone:

Website: www.fire.ca.gov

From: Dave Loveless, Forest Manager, LDSF
California Department of Forestry and Fire Protection (CAL FIRE)

Subject: LDSF VTAC Pilot Project Preliminary Proposal

Latour Demonstration State Forest (LDSF) is in the process of evaluating the potential for and opportunities to incorporate either site-specific measures or nonstandard operational provisions for the protection and restoration of watersheds with listed anadromous salmonids into current and future Timber Harvesting Plans, as per 14 CCR 936.9(V), referred to as Section V, of the Forest Practice Rules (FPR's). The goal is to use at least one of these site-specific proposals as a pilot project for the VTAC, which is seeking additional projects that can demonstrate how the Section V pathway can promote more immediate (short-term) responses to active riparian management practices.

LDSF comprises the headwaters for several watersheds. One major planning watershed, Beal (5507.310103), includes South Cow Creek which drains much of the Forest and is the focus of these proposed projects. Measures or provisions described and allowed under Section V provide for the potential and opportunity to conduct forest management activities within the watercourse and lake protection zone (WLPZ) intended to modify the existing dense stand structures. The proposed activities include unevenage regeneration silvicultural methods, such as individual tree and group selection prescriptions designed to thin trees and to create a series of small openings within the canopy with the goal of reducing the fuel hazard. While the upper reaches of South Cow Creek have not been subjected to catastrophic stand replacing fires since the Forest's inception in 1946, the lower reaches in and around the community of Whitmore have a long history of significant fire events on a regular basis, including the 6,950 acre Whitmore Fire in 1978 that occurred in the Atkins Watershed and consumed 800 acres on LDSF. The dense stand structures within the 300 foot WLPZ corridor along South Cow Creek provide a perfect avenue for a catastrophic fire to access the upper reaches of the Beal planning watershed. The proposed projects are intended to reduce the potential for a catastrophic wildfire to decimate this watershed and the resulting negative impacts such an event would have on the existing habitat for anadromous salmonids and other terrestrial wildlife species.

In order to evaluate the effects, if any, of the proposed projects on the watershed, LDSF intends to establish a water monitoring station on South Cow Creek to measure stream temperature, turbidity, and suspended sediment. We are also currently in the process of establishing a weather station on the Forest to monitor storm events in order to correlate weather activity with runoff and stream conditions. Our ongoing roads management and monitoring plan, intended to identify, correct and track potential road and watercourse crossing sediment sources, will also play an important role in the watershed monitoring process for this project. The attached map indicates the location of the initial projects proposed on LDSF. We currently have a field day scheduled for

Friday, December 7th to further evaluate the project. We invite you to contact us for a tour of the project areas and to discuss the projects methodologies, goals and objectives in further detail and to determine whether they conform with the goals set forth in Section V of the FPRs.

Recommended ASP Rule Section V Pre-Consultation Guidance

[This document will be compiled into an instruction sheet and a separate form that can be printed and used in the field. The instructions will also indicate that the form is optional, and that users can alter or modify it as needed]

Purpose: The purpose of Pre-Consultation activities is to:

- 1) Evaluate the site specific proposal in the context of restoration and recovery objectives of the Anadromous Salmonid Protection (ASP) rules (i.e., consistent with requirements in 14 CCR Section 916.9 v (1)),¹
- 2) Identify potential issues of concern that may require additional considerations for the site specific proposal, and
- 3) Give the landowner and/or RPF the ability to determine the potential acceptance of proposed actions.

The intent is to quickly identify issues of potential controversy to allow for a more efficient application of resources during the planning period. The benefit of using this (or a similar) form is that it can:

- Facilitate the preparation of documentation required for an evaluation pursuant to 14 CCR 916.9 [936.9, 956.9] (v)(3).
- Organize and document the preparation and outcomes of pre-consultation discussions with agency representatives.
- Help evaluate the level of effort needed to develop the information to comply with agency needs.
- Ensure a common understanding between the landowner (plan proponent) and the agencies to minimize any mis-communication.
- Help identify permitting requirements that may be necessary.

The enclosed form is optional. It is provided solely for the benefit of the landowner/RPF in the planning of a Section V site specific proposal. The documented outcomes of discussions with agencies do NOT represent formal agency approval, but

¹ See the recommendations included in the Recovery Strategy for California Coho Salmon (DFG 2004) at the following weblinks:

http://www.dfg.ca.gov/fish/documents/SAL_SH/SAL_Coho_Recovery/ReportToCommission_2004/07.RangewideRecommendations.pdf

http://www.dfg.ca.gov/fish/documents/SAL_SH/SAL_Coho_Recovery/ReportToCommission_2004/08.WatershedRecommendations.pdf

this information is intended to provide timely feedback to the RPF during the planning process. CAL FIRE will NOT rely on this form, but will confirm forest practice rule (FPR) conformance through evaluation of documentation included in the timber harvesting plan (THP) and through the Review Team process, regardless of the content in this form. However, a completed pre-consultation form can be submitted with the THP application to ensure that discussions with agencies or other stakeholders are part of the public record.² Any changes from the proposal discussed in this pre-consultation form that are included in the final THP should be clearly described in the THP submittal.

It is incumbent on the plan proponent to determine the level of effort appropriate for this pre-consultation form. Only those sections applicable to the site specific proposal should be completed.

During the Pilot Phase, we request that all pre-consultation forms, regardless of the outcome, be submitted to the Section V Technical Advisory Committee (VTAC) to help understand where roadblocks are occurring. CAL FIRE will take the lead in facilitating a process so that these forms are compiled, after removing landowner names, and submitted to the VTAC [*perhaps in the form of a website or email for submission – Sound Watershed can help facilitate this if necessary*].

² According to CEQA laws, the general public has the right to pertinent information that the lead agency (CAL FIRE) or Responsible Agency (other state agencies) use to make their determinations. Such information will be made public upon submission to the THP process, and thus the documentation submitted with the THP should be sufficiently complete as to be in compliance with CEQA.

Part I) Pre-Consultation Information

SUMMARY OF SITE SPECIFIC PROPOSAL

PROPOSAL OBJECTIVES:

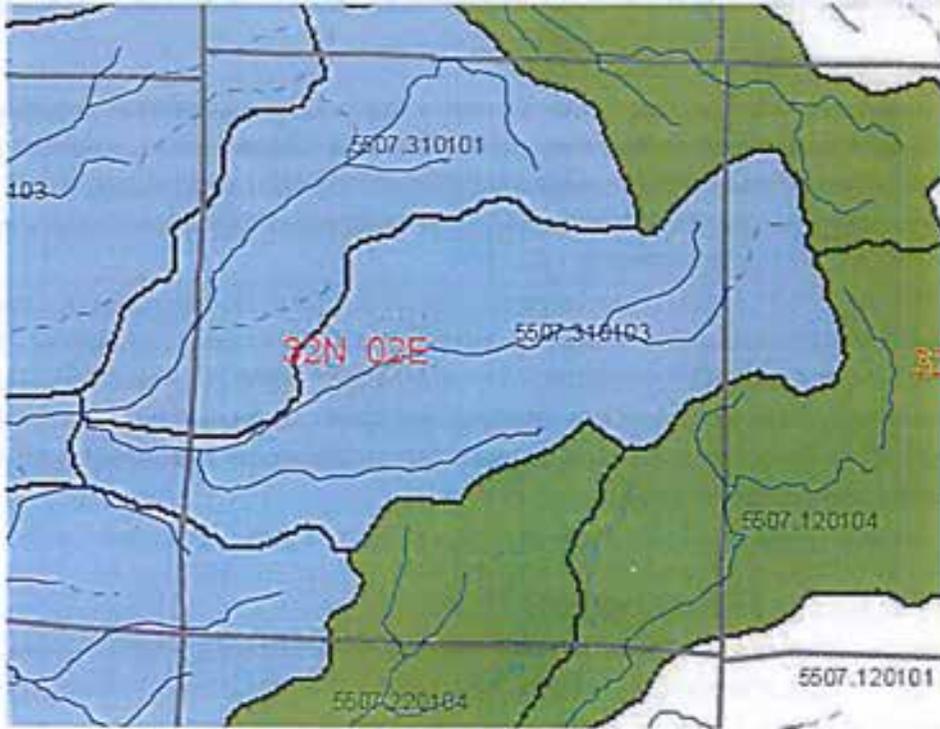
- To propose site specific measures and nonstandard operational provisions to conduct operations within the WLPZ of an ASP watershed as provided for in the Forest Practice Rules under 14 CCR § 936.9(v)(3), and in accordance with the guidelines specified in 936.9(v)(6)(A) to achieve the goals and objectives set forth in 936.9, subsections (a) and (c).
- The proposed projects are intended to create fire resilient forests, promote reduced fire intensities, retain functional habitat following a wildfire, and to effectively reduce the potential for a catastrophic wildfire to decimate the Beal Planning Watershed and the resulting significant adverse effects such an event would have on the existing habitat for anadromous salmonids and other terrestrial wildlife species.

ABSTRACT: (ALSO SEE PROPOSAL CONTEXT):

Briefly summarize the site specific proposal, including references to graphics (where appropriate). Summarize the who, what, where, when, why, and how sufficient to provide agency staff with enough context to understand the issues before the field site visit. Also, the plan proponent should outline the initial justification for the site specific proposal.

Latour Demonstration State Forest (LDSF) comprises the headwaters for several watersheds. One major planning watershed, Beal (5507.310103), includes South Cow Creek which drains much of the Forest and is the focus of these proposed projects. Measures or provisions described and allowed under Section V provide for the potential and opportunity to conduct forest management activities within the watercourse and lake protection zone (WLPZ) intended to modify the existing dense stand structures in order to reduce the potential for a catastrophic wildland fire. The proposed activities include unevenage regeneration silvicultural methods, such as individual tree and group selection prescriptions designed to thin trees and to create a series of small openings within the canopy with the goal of reducing the vertical and horizontal continuity of fuels. While the upper reaches of South Cow Creek have not been subjected to catastrophic stand replacing fires since the Forest's inception in 1946, the lower reaches in and around the community of Whitmore have a long history of significant fire events on a regular basis, including the 6,950 acre Whitmore Fire that occurred in 1978 in the Atkins Watershed and consumed 800 acres on LDSF. Catastrophic fire incidents such as this and others in adjacent watersheds provide the

context for this proposal and justification for the treatments proposed herein. The dense stand structures within the 300 foot WLPZ corridor along South Cow Creek, both within LDSF and on adjacent lands, provide an uninterrupted avenue for a catastrophic fire to access the upper reaches of the Beal planning watershed.



Beal Planning Watershed (5507.310103)

SITE SPECIFIC PROPOSAL CONTEXT

To be prepared prior to the consultation to provide agency staff with basic information about the proposal.

GENERAL PROPOSAL INFORMATION

Forest Practice Rule Location (Geographic Scope)

- Coastal Anadromy Zone –
 - Confined
 - Flood Prone Area or Channel Migration Zone
 - Southern Subdistrict (SSD)
- Outside Coastal Anadromy Zone –
 - Confined
 - Flood Prone Area or Channel Migration Zone
- Upstream of an ASP Planning Watershed

Watercourse Class/Type

Length of Class I Watercourse (ft) 3,900 feet

Length of Class II-L Watercourse (ft) 300 feet

Length of Class II-S Watercourse (ft) _____

Length of Class II-SSD Watercourse (ft) _____

Length of Class III Watercourse (ft) _____

Proposal Types

- Instream Large Wood Enhancement
- Fire Hazard Reduction
- Flood Prone Area Management
- Core Zone WLPZ Vegetative Management
- Inner Zone WLPZ Vegetative Management
- Outer Zone WLPZ/ ELZ Management
- Sediment Reduction Related to Logging Roads, Crossings, Landings and/or Skid Trails
- Channel Bank Stabilization
- Barrier Modification/Removal

Other (explain)

Applicable Rule Goal – 14 CCR 916.9(a)

- Comply with terms of TMDL
- Prevent significant sediment load increase
- Prevent significant channel instability
- Prevent significant blockage of aquatic migratory routes
- Prevent significant adverse impacts to streamflow
- Protect, maintain, and restore conifer trees that can provide LWD recruitment
- Protect, maintain, and restore canopy needed for shade and nutrient inputs

Applicable WLPZ Objective – 14 CCR 916.9(c)

- Bank stability (core zone) [(c)(1)]
- Large wood recruitment/placement (core, inner, outer zones) [(c)(1), (c)(2), (c)(3), (c)(5)]
- Canopy retention (core, inner, outer zones) [(c)(1), (c)(2)]
- Vertical structural diversity (inner, outer zones) [(c)(2)]
- Species diversity for nutrient input (inner zone) [(c)(2)]
- Wind resistance where windthrow is likely (outer zone) [(c)(3)]
- Microclimate control (outer zone) [(c)(3)]
- Habitat for terrestrial wildlife species dependent on riparian areas (outer zone) [(c)(3)]
- Sediment filtration (outer zone) [(c)(3)]
- Water and nutrient supply (CII-L) [(c)(4)]
- Sediment storage and transport rate (CII-L) [(c)(4)]
- Functional wood supply for fish habitat (CII-L) [(c)(4)]
- Implementation of practices to maintain, protect, and contribute to restoration of properly functioning habitat [(c)(5)]

Improvement of Beneficial Functions

- Bank Stability
- Large Wood Recruitment
- Water Temperature
- Nutrient Input
- Upslope Stability
- Habitat Improvements (e.g., pools, cover, etc.)
- Vegetative Structure Diversity for Fish and Wildlife Habitat
- Microclimate, Sediment Filtration
- Fish Passage Improvements
- Other (Maintain and Protect existing Beneficial Functions by reducing the potential for catastrophic wildland fire)

Evaluation Type (circle one)

CDFG Concurrence (14 CCR 916.9(v)(2)) OR Full Justification (14 CCR 916.9(v)(3))

Proposed Standard Rule Modifications (list applicable rules)

14 CCR § 936.9 (f)(4)(A) Core Zone: *The minimum width of the Core Zone shall be 30 feet measured from the watercourse transition line or lake transition line. Sanitation-Salvage is prohibited except as provided in 14 CCR § 916.9 [936.9, 956.9], subsections (s), (t), and (u).*

14 CCR § 936.9 (f)(4)(B) Inner Zone: *The minimum width of the Inner Zone shall be 40 feet measured from the landward edge of Core Zone. Harvesting prescriptions should focus on practices that use thinning from below. Silvicultural systems for harvesting are limited to the use of commercial thinning or single tree selection modified to meet the following requirements:*

2. *Sanitation-Salvage is prohibited except as provided in 14 CCR § 916.9 [936.9, 956.9], subsections (s), (t), and (u).*

3. *Postharvest stand shall have a minimum 70% overstory canopy cover. The postharvest canopy may be composed of both conifers and hardwood species and shall have at least 25% overstory conifer canopy.*

4. *Postharvest stand shall retain the 7 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.*

14 CCR § 936.9 (f)(4)(C) Outer Zone: *The minimum width of the Outer Zone shall be 30 feet measured*

from the landward edge of the Inner Zone. Silvicultural systems for harvesting are limited to the use of commercial thinning or single tree selection modified to meet the following requirements:

1. Postharvest stand shall have a minimum 50% overstory canopy cover. The postharvest canopy may be composed of both conifers and hardwood species and shall have at least 25% overstory conifer canopy.

14 CCR § 936.9 (f)(4)(D) Preferred Management Practices in the Inner and Outer Zone:

When timber operations are considered pursuant to 14 CCR §§ 916.3 [936.3, 956.3], subsection (c) and 916.4 [936.4, 956.4], subsection (d), the following Preferred Management Practices should be considered for inclusion in the Plan by the RPF and by the Director:

2. Heavy equipment should be limited to slopes less than 35% with low or moderate EHR;
3. Use feller bunchers or hydraulic heel boom loaders which do not drag/skid logs through the zone;
4. Minimize turning of heavy equipment which would result in increased depth of ground surface depressions; and
5. Use mechanized harvesting equipment which delimb harvested trees on pathway over which heavy equipment would travel.

PROPOSAL SPECIFIC INFORMATION

[Landowner Contact Information](#)

Dave Loveless, RPF #2220

Manager – LaTour DSF



Shasta-Trinity Unit

875 Cypress Ave.

Redding, CA 96001

Office (530) 225-2505

Cell (530) 448-2492

[Proposal Location \(including maps\)](#)

General Vicinity: On Latour Demonstration State Forest located approximately 50 miles east of Redding, CA and approximately 11 miles east of Whitmore, CA on the Bateman Road.

Legal: Township 32 North, Range 2 East, Portions of Sections 12, 13 and 15, and Township 32 North, Range 3 East, Portions of Sections 7 and 18.

See attached project area photos and maps.

Proposal Partners or Collaborators

Pete Cafferata
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Sacramento, CA 94244-2460

Cajun James
Principle Research Scientist
Sierra Pacific Industries
PO Box 496028
Redding, CA 96049-6028

Additional Information (site photos, data, maps, etc.)

List here and include as attachments

Attached maps:

- Map 1 – LDSF Vicinity Map
- Map 2 – Upper & Lower LDSF Proposed VTAC Pilot Project Areas
- Map 3 – Lower Unit LDSF Proposed VTAC Pilot Project Area
- Map 4 – Upper Unit LDSF Proposed VTAC Pilot Project Area

Attached site photos:

- Photos 1-18 Lower Unit LDSF Proposed VTAC Pilot Project Area
- Photos 19-20 Lower Unit Roaring Creek (Class II)
- Photos 21-26 Upper Unit LDSF Proposed VTAC Pilot Project Area

TECHNICAL JUSTIFICATION FOR PROPOSED MANAGEMENT MEASURES

To be prepared prior to the consultation to the extent that information is available.

PROPOSAL RATIONALE - INTERPRETATION OF EXISTING FUNCTIONAL OPPORTUNITIES/DEFICIENCIES

Summarize the status of key riparian functions (wood supply, temperature, sediment, nutrient loading, etc.) that the proposed action will address. Use of the Riparian Risk Assessment Process may substitute for the descriptions below (include results here).

Based on information contained in the Latour Demonstration State Forest Watershed Monitoring Project, prepared in 2001 and detailed below, the current conditions of South Cow Creek in relationship to wood supply, water temperature, sediment and nutrient loading were in relatively good condition at that time. This conclusion is based on the “properly functioning” or “STABLE” classification as indicated in the report for reaches 1 and 2 where the proposed projects are located. The proposed operations will have no significant effect on the wood supply, water temperature,

sediment or nutrient loading of the watercourse other than to alter portions of the surrounding timber stand conditions in such a manner as to help protect, preserve and maintain the current existing riparian functions should a wildfire occur in the watershed.

[Brief Summary of Resource Conditions at the WATERSHED SCALE from Existing Watershed Analyses, Assessments, TMDL Documents, NOAA listed species recovery plans, and other information sources \(including personal knowledge\).](#)³

In March 2000 the California Department of Forestry and Fire Protection (CAL FIRE) awarded the Sacramento Watersheds Action Group (SWAG) a contract to develop and implement the Latour Demonstration State Forest Watershed Monitoring Project (the Project). The Project originally had three components: Water Quality Monitoring, Stream Channel and Fish Habitat Assessment, and Canopy Cover Measurement for all Class I and II Watercourses located on the Forest. The Project was later modified to incorporate the Canopy Cover Measurement into the Stream Channel and Fish Habitat Assessment. The results of the initial Stream Channel and Fish Habitat Assessment phase were prepared and provided to CAL FIRE in June, 2001. Excerpts of that report pertaining specifically to South Cow Creek follow:

SWAG assembled an interdisciplinary team (ID Team) to conduct the first phase of the Project – the Stream Channel and Fish Habitat Assessment. The work was directed by a Watershed Geologist/Geomorphologist and Certified Professional Erosion Control Specialist. The ID field team consisted of a civil engineer, a fish habitat specialist, an environmental horticulturist, and two field technicians. One of the field technicians was a natural resource major at Shasta College who had successfully completed 4 semesters of Watershed Restoration and was a principal riparian condition investigator for the Sulphur Creek Watershed Analysis and Action Plan. The other technician was an environmental engineering student in a masters program at UC Davis.

For the fieldwork, the ID Team split into two teams. One, two-person team evaluated stream channel health and the other two-person team conducted a fisheries habitat assessment on Class I and Class II streams within the LaTour Demonstration State Forest (the Forest).

The ID Team made three visits to the Forest during the Summer and Fall 2000. The purpose of the first field work session at the Forest (June 25 through July 1) was to identify study reaches, develop protocol, conduct Proper Functioning Condition (PFC) assessment, conduct Large Woody Debris assessment (LWD), conduct fish habitat

³ Note that a more comprehensive list of watershed scale documents for context assessment is available in the VTAC Guidance Document, Chapter 10.

assessment and fish surveys, identify water quality monitoring points, install water temperature monitoring devices, and install cross-section monitoring points. The purpose of the second fieldwork session (August 27 through September 1) was to complete assessments and monitoring begun in June. A final visit was made on November 3rd to retrieve the water temperature monitoring devices.

METHODS

As previously mentioned, the ID Team split into two teams to conduct the fieldwork. The stream channel assessment team (PFC Team) members included a hydraulic engineer, an environmental engineer and an environmental horticulturist. The PFC Team used the Proper Functioning Condition (PFC) and Large Woody Debris (LWD) assessments to evaluate stream channel condition. The fish habitat assessment team (Fish Team) members included a fish habitat specialist and the riparian specialist. The Fish Team performed a habitat inventory, biological sampling, and inventoried percent surface fines. The ID Team met after each fieldwork day, exchanged notes and discussed the day's findings.

The PFC Team worked ahead of the Fish Habitat Team and flagged reach and segment start and stop points. Reach breaks were determined by changes in stream type, stream class, major tributary confluences, or major landscape features. Reaches were further broken down into segments. Segment breaks occurred at major landscape features (i.e. road crossings) or major changes in stream characteristics (i.e. heavy aggradation). The entire lengths of all Class I streams were assessed. A representative Class II tributary stream to each Class I stream was selected for assessment. Neither Atkins Creek nor Old Cow Creek have Class II tributaries within the Forest. Based on flow rates, Beaver Cr. (tributary to South Cow Cr.) was selected for assessment. Since Bullhock Creek has no Class II tributaries, the Class II middle and upper reaches of Bullhock Creek were assessed. An unnamed tributary (Class III) to Old Cow Creek and an unnamed tributary (Class III) to South Cow Creek were chosen for assessment based on anticipated and past logging in those areas.

The following is a description of the methods used by both the PFC Team and the Fish Team:

PFC Assessment

As outlined in the project proposal, the Proper Functioning Condition (PFC) assessment was used to assess the condition of the streams. Proper functioning condition (PFC) is a *qualitative* method for assessing the condition of riparian-wetland areas. The PFC assessment is intended to give a very broad description of stream conditions, which will then aid the team in developing the future monitoring needs and possible monitoring locations or index reaches. The term PFC is used to describe both the assessment

process, and a defined, on-the-ground condition of a riparian-wetland area. PFC is not intended to be a monitoring tool.

The methodology was developed over several years by a national interagency (BLM, FWS, NRCS) ID team. The PFC Team used the protocol outlined in the PFC Manual TR 1737-15 *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (Prichard, et al. 1998) to conduct the assessment.

- The PFC assessment is intended to provide a consistent approach for assessing the condition of riparian-wetland areas. This assessment of condition determines whether a riparian wetland area will withstand a relatively high flow event without unraveling. The assessment looks at the riparian wetland area and asks if it will:
- Dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve flood-water retention and ground water recharge
- Develop root masses that stabilize streambanks against cutting action.

PFC does not indicate overall ecological health of a riparian wetland system as the name might imply. The rating used by the protocol for PFC may be misleading unless one fully reads the attributes of the procedure. The ecological function of a riparian wetland may lack integrity, but still achieve a protocol rating of "properly functioning". Such might be the case in an area where exotic vegetation forms a stabilizing structure for maintaining stream channels from unraveling in a high flow events, yet not provide suitable habitat for native fauna. For this reason, ratings used by the protocol were changed: Properly functioning was changed to "**Stabile**". **Functional -At Risk** was changed to "**Stability-At-Risk**", and "**Nonfunctional**" was changed to "**Not-Stabile**".

The PFC Team walked the entire length of each Class I stream and select Class II and Class III streams within the Forest. For each segment, the PFC Team used a standard checklist to respond to a series of 17 questions concerning hydrology, vegetation, and erosion/deposition (see Appendix). Items on the checklist received a "yes," "no" or "not applicable" answer. Notes were taken to describe the reasoning behind any "no" answers and to note any areas of concern within the segment. These notes were an important part of the determination process. Additionally, key features within each segment were photographed and logged.

The answers to the checklist items are intended to aid the ID Team in determining the proper classification of the stream reach or segment. There is no set number of "yes" or "no" answers to determine the classification. It was only through review of historical data, PFC checklists and notes and discussion by the ID Team that a determination could be made. Stream classifications are as follows:

- **Stabile (S):** The riparian-wetland area has adequate vegetation, landform, or large woody debris to 1) dissipate stream energy associated with high water

flow, thereby reducing erosion and improving water quality; 2) filter sediment, capture bedload, and aid floodplain development; 3) improve flood-water retention and ground-water recharge; 4) develop root masses that stabilize streambanks against cutting action; 5) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; 6) support greater biodiversity.

- **Stability-At-Risk (SAR):** Riparian-wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation. Additionally, a trend is assigned to SAR areas. The trend is either “upward” if the stream is moving toward PFC, or “downward” if the stream is moving away from PFC. If the ID Team has insufficient information to determine a trend, then the trend is “not apparent.”
- **Not-Stabile (NS):** Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc.
- **Unknown:** Riparian-wetland areas that managers lack sufficient information on to make any form of determination.

LWD Assessment

The PFC Team concurrently conducted the Large Woody Debris (LWD) assessment along with the PFC assessment. The PFC Team followed protocol for conducting the LWD assessment as spelled out in the California Fish and Game’s *California Salmonid Stream Habitat Restoration Manual – Third Edition* (Gary Flosi, et al. 1998). The methodology calls for the inventory to be conducted by two people, while in the stream channel walking upstream. PFC Team members recorded information onto the LWD Inventory Form. The occurrence of large woody material (living and dead) in the stream and for 50 feet upslope on both banks is recorded by size class (diameter and length) and type (down, standing, perched). The methodology calls for 200 feet be surveyed per 1000 feet of stream. The PFC Team completed the LWD Inventory Form for the first 200-foot section of each segment. The selection of the first 200-foot section within each segment was determined using a random selection process.

Habitat Assessment

The fisheries habitat inventory conducted on the Class I streams within the Forest followed the methodology presented in the *California Salmonid Stream Habitat Restoration Manual – Third Edition* (Gary Flosi, et al. 1998). The 10% Sampling method (Appendix O) was utilized in order to streamline the assessment. A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the Appendix of this report. This form was used in the Forest to record

measurements and observations, along with a field notebook, map and camera. Additional equipment included: 165' nylon tape, a depth gauge, fines grid, mask, solar pathfinder, polarized glasses, waders, and felt soled wading boots.

The **10% Sampling Protocol** is as follows:

1. Walk and measure the entire stream length.
 - a. Identify every habitat unit by type.

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Each Class I and Class II stream within the LaTour State Forest was inventoried separately, and further delineated by reach and segment (noted R1S1, etc) in order to evaluate the habitat components by reach (numbering of habitat units started with a "1" for each reach). De-watered units are labeled "dry."

- b. Measure the length of each unit.

The habitat assessment in the LaTour State Forest streams used standard basin level measurement criteria. These parameters require that the minimum length of a described unit must be equal to or greater than the stream's mean wetted width. Channel dimensions were initially measured using a nylon tape and a depth gauge marked off in tenths of feet. Unit lengths were estimated ocularly once a confidence level was attained by calibrating the eye and the instrument. Eye calibration occurred several times throughout the day. Depths were measured throughout the survey with the depth gauge. Pool tail crest depth at each pool unit was measured at the thalweg.

2. Record all measurements and observations (complete sample for each first-time encounter of each habitat type found in a stream channel type reach.
3. Record all measurements and observations (complete sample) for every randomly selected habitat unit number. Using a random number table, a number between one and ten was selected for every ten units inventoried. The Habitat Inventory Data Form has spaces for ten habitat units per page. The random selection occurred at the beginning of each page change.
4. For each pool habitat the maximum depth, pool tail crest (riffle crest) depth and pool tail embeddedness were recorded.
5. The percentage of canopy cover was measured every third habitat unit, using a solar pathfinder. This is a variation from the DFG protocol, which calls for the use of a spherical densiometer. The USFS Pacific Southwest Region, *Stream Condition Inventory* method (Platts, et.al. 1987) was used instead. Variations and uses of these two different instruments are included in the Discussion section of this report.

In Class II streams the Habitat Inventory method was used, but only habitat types and lengths of each unit were identified. Field notes were taken with the habitat components of the inventory method in mind. Canopy was estimated, maximum pool depths were recorded and percentage of fines measurements occurred sporadically due to the infrequency of pools and tailouts. Biological data consisted of observation from the bank and occasional dives. All fish sightings were noted. Additionally, upper reaches of Bullhock Creek and South Cow Creek and their tributaries were assessed ocularly. Field notes and some photos were taken.

Percent Surface Fines

The percentage of surface fines were inventoried using the methodology outlined in the *USFS, R5 SCI (Stream Condition Inventory), ver. 3.4, 6/27/96*, pg 29-30. See Protocol in Appendix. Fine sediment is the fine-grained particles in stream banks and substrate. These are defined by diameter, varying downward from 0.08 inch (2mm). Salmonid spawning habitat may be considered to be degraded when fine sediment levels reach 20% or greater. Measurements were taken periodically in spawnable habitats, including pool tailouts and runs. This is a variation from the protocol, which calls for sampling only in pool tailouts. Additional measurements were felt to be easily captured and possibly beneficial. A 12"x 12" grid was tossed randomly in these habitats. Looking through the glass of a diving mask, the particle sizes <2mm were counted if the grid intersection fell on top of them. Each point represents 2% fines. A total of 50 grid intersects were possible. The number of fines intersects was multiplied by 2 (100%). The grid was tossed three times in each habitat. The three percentages were then averaged.

Biological Sampling

Biological sampling during a stream inventory is used to determine fish species, age class and their distribution in the stream. Biological sampling was accomplished by direct observation, using a mask and snorkel. Dive units were identified and flagged during the habitat typing process. Units representing a variety of habitat types were selected in each reach/segment. Dives followed the habitat typing inventory by no more than two days and no sooner than ½ day. Beginning at the downstream end of the unit, crewmembers counted every fish seen within the unit. Species and age class were differentiated. Dives occurred at two different times over the 2000 field season (June and August). The following lengths determined the age class for each dive period:

	<u>June</u>	<u>August</u>
0+	1 ½" or less (Young of the year)	1 ½" or less (Young of the year)
1+	1 ½" to 3"	3" to 6"
2+	3" or greater	6" or greater

Initially, replicate dives (both divers counting each fish) took place, until crewmembers developed technique and consistency. On larger streams (S. Cow Creek) lane dives were

employed, where the two divers dove separate portions of the unit and the total count was the sum of their observations. Sometimes, it was more accurate to have one diver count 2+ fish and the other count all the younger fish. On small streams, only one diver observed in each unit, with divers alternating dives. Visibility was very good in most streams, except in Atkins Creek. Direct observation did not occur in this stream. An alternative has yet to be employed.

RESULTS

The results have been summarized into five categories in table form: 1) Proper Functioning Condition Assessment; 2) Large Woody Debris Assessment; 3) Habitat Inventory; 4) Percent Surface Fines; 5) Biological Survey. Analysis of the data is presented in the Discussion section of this report. Complete sets of tables, charts and field notes are included by stream in the Appendix.

Proper Functioning Condition Assessment

Data from the Proper Functioning Condition Assessment is summarized in Tables 1.1 through 1.6 below. Each stream has a separate table, in which PFC information is presented by reach. Columns include Reach Number, PFC Rating (S = Stable, SAR = Stability-At-Risk with associated trend, NS = Not-Stable), Stream Class (I, II, or III), and Length for the reach (in feet).

Table 1.2: South Cow Creek

<i>Reach</i>	<i>Rating</i>	<i>Class</i>	<i>Length (feet)</i>
1	S	I	3237
2	S	I	11779
3	NS	I, II	1563

Large Woody Debris (LWD)

Data from the Large Woody Debris Assessment is summarized in Tables G through L below. Each stream has a separate table, in which LWD information is presented by reach. Columns include Reach Number, total number of Living Pieces (live trees with DBH > 1 ft. both instream and on both banks), total number of Streamside Dead Pieces (includes down, standing and perched material found within 50 ft. of the stream on both banks), total number of Instream Dead Pieces (LWD within the stream channel), and Total LWD (living, dead, instream, and on the banks). Numbers in each cell represent the number of pieces counted (within the category) per 100 feet of stream.

TABLE 2.2: South Cow Creek

<i>Reach</i>	<i>Living Pieces</i>	<i>Streamside Dead Pieces</i>	<i>Instream Dead Pieces</i>	<i>Total LWD</i>
1	13.0	8.0	0.0	21.0
2	16.2	9.7	1.0	26.9
3	17.0	1.5	0.0	18.5

Fish Habitat Inventory

Complete sets of tables, charts and field notes for each stream inventoried are contained in the Appendix by stream.

Table 3.1 below is a summary for all streams for Level II riffle, flatwater, and pool habitat types by **occurrence** and Table 3.2 is a summary for all streams based on **total length**. The Level II and Level IV habitat types relationships and abbreviations are presented on the following page. (See Table 1 in the Appendix for more detailed information)

TABLE 3.1: % POOL, RIFFLE, FLATWATER BY OCCURRENCE

	South Cow Class I
% Riffle Units	45
% Flatwater Units	39
% Pool Units	12
% Dry Units	3
% Culvert	0

TABLE 3.2: % POOL, RIFFLE, FLATWATER BY TOTAL LENGTH

	South Cow Class I
% Riffle Units	44
% Flatwater Units	44
% Pool Units	5
% Dry Units	7
% Culvert	0

Table 3.3 below summarizes the residual pool volumes in cubic feet for each stream.

TABLE 3.3: MEAN RESIDUAL POOL VOLUME (CU. FT.)

	South Cow Class I
Mean Residual Pool Vol.	555

Table 3.4 summarizes the Level IV habitat types by **occurrence** and Table 3.5 below summarizes the Level IV habitat types by **total length** for all streams. Twenty-one different habitats were identified over the entire length of the survey. (See Table 2 in the Appendix for more detailed information)

TABLE 3.4: % LEVEL IV HABITAT TYPES BY OCCURRENCE (ABBREVIATIONS IN APPENDIX)

	South Cow Class I
LGR	6
HGR	30
CAS	1
BRS	8
POW	0
GLD	4
RUN	8
SRN	27
TRP	1
MCP	4
CCP	0
STP	1
LSR	0
SLBk	0
PLP	3
SCP	1
BPB	1
BPL	0
DPL	0
DRY	3

<i>CUL</i>	0
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TABLE 3.5: % LEVEL IV HABITAT TYPES BY LENGTH

	South Cow Class I
<i>LGR</i>	6
<i>HGR</i>	32
<i>CAS</i>	0
<i>BRS</i>	7
<i>POW</i>	0
<i>GLD</i>	2
<i>RUN</i>	4
<i>SRN</i>	38
<i>TRP</i>	0
<i>MCP</i>	1
<i>CCP</i>	0
<i>STP</i>	1
<i>LSR</i>	0
<i>SLBk</i>	0
<i>PLP</i>	1
<i>SCP</i>	0
<i>BPB</i>	0
<i>BPL</i>	0
<i>DPL</i>	0
<i>DRY</i>	7
<i>CUL</i>	0

Table 3.6 summarizes the pool types by occurrence and Table 3.7 below summarizes the pool types by length for all streams. (See Table 3 in the Appendix for more detailed information)

TABLE 3.6: % POOL TYPES BY OCCURRENCE

	South Cow Class I
<i>Main</i>	48
<i>Scour</i>	32
<i>Backwater</i>	19

TABLE 3.7: % POOL TYPES BY LENGTH

	South Cow Class I
<i>Main</i>	52
<i>Scour</i>	29
<i>Backwater</i>	19

Table 3.8 below shows a summary of the maximum pool depths in 1-foot increments by percentage of occurrence. Pool quality for Salmonids increases with pool depth. (See Table 4 in the Appendix for more detailed information)

TABLE 3.8: MAXIMUM POOL DEPTHS BY % OF OCCURRENCE

	South Cow Class I
<i>Total Pools Measured</i>	31
<i>% of Pools <1 ft.</i>	3
<i>% of Pools 1-<2 ft.</i>	16
<i>% of Pools 2-<3 ft.</i>	32
<i>% of Pools 3-<4 ft.</i>	26
<i>% of Pools >4 ft.</i>	23

Table 3.9 below illustrates the dominant cover type for each Level II habitat type by stream. Boulder cover includes all in-stream cover provided by the interstitial spaces between boulder and cobble. Insufficient data was collected on Beaver Cr. to summarize. (See Table 5 and Table 10 in the Appendix for more detailed information)

TABLE 3.9: DOMINANT IN-STREAM COVER TYPE

<i>Level II Habitat</i>	South Cow Class I
<i>Riffles</i>	Boulders
<i>Flatwater</i>	Boulders
<i>Pools</i>	Boulders

Table 3.10 below shows the dominant substrate for all streams by Level II habitat type. Class II streams (Beaver and Bullhock) had insufficient data to summarize. (See Table 6 in the Appendix for more detailed information)

TABLE 3.10: DOMINANT/SUB-DOMINANT SUBSTRATE

<i>Level II Habitat</i>	South Cow Class I
<i>Riffle</i>	Boulder/ Bedrock
<i>Flatwater</i>	Boulder/ Gravel
<i>Pool</i>	Bedrock/ Sm. Cobble

Embeddedness was estimated at pool tailouts and given a value 1-5, as noted below. This information is contained in Table 8 in each stream set in the Appendix. Table 3.11 below summarizes the embeddedness by stream and further by stream reach.

Value 1= <25% embeddedness

Value 2= 25%=embeddedness <50%

Value 3= 50%=embeddedness <75%

Value 4= 75%=embeddedness <100%

Value 5=100% embeddedness, not suitable for spawning

Table 3.11: % of Pools by Embeddedness Value at Pool Tailouts

<i>Reach</i>	South Cow Class I		
	1	2	3
<i>% Pools Value 1 <25%</i>	80	61	57
<i>%Pools Value 2 26-<50%</i>	0	17	29
<i>% Pools Value 3 51-<75%</i>	0	0	14
<i>% Pools Value 4 76-<100%</i>	0	0	0
<i>% Pools Value 5 Unsuitable for Spawning</i>	20	22	0

Table 3.12 below illustrates the mean percent canopy density and the coniferous (evergreen) and deciduous component for each stream, further delineated by stream reach. (Table 8 in each stream set in the Appendix contains this information.)

TABLE 3.12: % CANOPY DENSITY

	South Cow Class I		
<i>Reach</i>	1	2	3
<i>% Canopy Density</i>	74	70	60
<i>% Evergreen</i>	93	94	98
<i>% Deciduous</i>	7	6	2

Table 3.13, in two parts below (a) and (b), shows the mean percent bank vegetation, the dominant substrate of the bank and the dominant vegetation type of the bank for all streams and stream reaches. (Table 8 for each stream set in the Appendix contains this information.)

Table 3.13a: % Bank Vegetation, Dominant Substrate and Vegetation of Bank

	South Cow Class I		
REACH	1	2	3
<i>% Bank Cover</i>	64	51	93
<i>Dominant Substrate</i>	Boulder	Boulder	Boulder
<i>Dominant Vegetation</i>	Grass	Grass	Grass

Percent Surface Fines

The following tables illustrate the percent surface fines, > 2mm, found in each stream by reach. In some cases, the sample size per reach is small and may not fully represent the average value over the entire reach. Table 4.1 shows the values, including all spawnable habitats (pool tailouts and runs). Table 4.2 shows only the values for pool tailouts, as per SCI protocol. Note: fines exceeding 20% would require determination whether background levels for meadows are exceeded or if meadows typically have higher soil sub strata of fines as a natural process.

Table 4.1: AVERAGE % SURFACE FINES FOR POOL TAILOUTS & RUNS

<u>Stream/Reach</u>	<u>Average % Fines</u>	<u>Number of Units Sampled</u>
South Cow-1	4	2
South Cow-2	11.4	19
South Cow-3	39	2
South Cow-Total	13.4	23

TABLE 4.2: AVERAGE % SURFACE FINES FOR POOL TAILOUTS ONLY

<i>Stream/Reach</i>	<i>Average % Fines</i>	<i>Number of Units Sampled</i>
South Cow-1	6.4	2
South Cow-2	12.4	11
South Cow-3	39	2
South Cow-Total	15.1	15

Biological Inventory

Results of the direct observation snorkel dives are illustrated below. Densities of each species and age class are represented in fish per cubic meter.

TABLE 5.4: SOUTH COW CREEK: RAINBOW TROUT/M³

	Vol-M ³	Riffle			Flatwater			Pool			All Habitats		
		0+	1+	2+	0+	1+	2+	0+	1+	2+	0+	1+	2+
<i>Reach 1</i>	82.98	-	-	-	.251	.050	.151	.047	.079	.555	.096	.072	.458
<i>Reach 2</i>	375.07	-	-	-	0	.264	.297	.014	.111	.441	.011	.147	.408
<i>Reach 3</i>	50.99	-	-	-	.041	.288	.617	0	.075	.412	.020	.176	.510
<i>Total Stream</i>	509.04	-	-	-	.046	.236	.335	.018	.103	.458	.025	.137	.426

DISCUSSIONS**Stream Channel Assessment**

Overall, the streams within LaTour Demonstration State Forest are functioning properly (34,580 ft. out of 43,893 ft. (79%) were rated Stable, Stability-At-Risk-Upward and Stability-At-Risk, Not Apparent), although the ID Team had concerns about the condition of the meadow reaches within the Forest. With the exception of Old Cow Creek, all of the meadow areas assessed within the Forest were either rated Not-Stable or SAR with a downward trend. The effects of past large storm events and cattle grazing are believed to be the cause of the degradation of the meadow areas. The ID Team recommends that a study of the meadows within the Forest is needed to better understand the cause for what is occurring and to make management recommendations in these critical areas. Causes of meadow degradation are beyond the scope of this assessment.

Large woody material is abundant throughout the Forest. The potential for recruitment of LWD into the streams is high throughout the Forest. The ID Team expected to find LWD scattered throughout the range of stream courses surveyed. Surprisingly, very little LWD was observed in the stream channels. This condition was consistent throughout the Forest. Communication with a previous manager of the Latour State Forest (Personal Communication, McNamara 2001) revealed some LWD was removed in 1983 by a fly fishing club and some large trees were removed from channels after consulting with



Photo 1: Typical debris jam.

California Department of Fish and Game. What was observed were several moderately sized (relative to stream size) debris jams in all of the stream channels. According to the PFC Manual – TR 1737-15 (Don Prichard, et al. 1998), this is to be expected in steep headwater streams, such as those found in Latour Demonstration State Forest. Large woody debris builds up over time in debris jams until a flooding event (i.e. rain on snow) provides enough energy to break the jam and deliver the material downstream. Large areas that were scoured to bedrock and the associated depositional areas downstream found in the Class II reaches of Bullhock Creek are probable evidence of such events.

Despite the LWD being concentrated in debris jams and not scattered more evenly throughout the length of the streams in the Forest, the stream banks in most reaches appeared to be adequately armored by large cobbles/boulders and riparian vegetation. This led the ID Team to conclude that while the presence of LWD is important (as part of the channel formation process and for habitat value), it is not a critical component of bank stability.



Photo 2: Banks are stabilized by cobbles/boulders and riparian vegetation.

All Class I and select Class II and III channels were assessed within the Forest. The results of the assessment are discussed below. The information is presented by stream, with further breakdown by reach and segment. The overall conditions for each stream are summarized followed by the PFC Rating and rationale for each reach within the stream. It is important to note that both the PFC and the LWD assessments have a brief temporal component. They should be thought of as a "snap shot in time." The importance and usefulness of these assessments comes from the identification and prioritization of future assessments, monitoring, or management actions that are needed to create healthy watershed conditions.

Fish Habitat Assessment

The Habitat Inventory method used in this assessment has generated copious amounts of data by stream, contained in the Appendix of this report. This "base line" information identifies and quantifies the physical habitat available and includes the fish distribution surveys to record species present. Critical habitat needs must be met for each species/community in order for it to prosper in a specific environment. Understanding the life stage requirements of each species and their relationship to physical habitat parameters is essential for understanding the affects of land management practices and in planning fish habitat improvement projects. Currently fish habitat relationship models are being developed that include a number of physical and biological variables such as depth, velocity, substrate, cover, temperature, and food availability. It is important to note that factors other than physical habitat may limit production of juvenile salmonids in any given year. Biological factors such as disease, predation, competition and food availability, or factors such as water quality, weather, or water management practices may account for some of the variation in production (CA Stream

Habitat Restoration Manual-3rd edition).

In this discussion, emphasis will be placed on the following physical characteristics of each stream: % of habitat by length, residual pool volume, mean pool depth, % canopy, % fines, in-stream cover rating and fish density by species and age class. These parameters can be affected by land management activities of LaTour Demonstration State Forest. Erosion increased by roads, timber harvest and over grazing by livestock in riparian areas, can affect the physical habitat in the streams. Residual pool volumes will decrease and fine sediment (<2mm) will increase in depositional reaches. Removal of the riparian canopy can affect the water temperature and the large wood in-stream cover for fish. This assessment provides the initial guidance in developing long-term methods for a monitoring program.

The 10% sub-sample method was utilized in order to streamline this assessment. As the stream is dissected into smaller reaches and segments, the validity of the 10% sampling breaks down. In some cases, the sample size becomes too small to make accurate statements about the physical condition. Field observations and notes will augment the data in these cases.

The percent canopy density measurements were made using a solar pathfinder instead of a spherical densiometer, as called for in the *California Stream Restoration Manual*. The Forest manager did not feel that the use of the densiometer was reliable, as measurements varied too much between users. The solar pathfinder was selected, in lieu of the densiometer. Both instruments are used in stream habitat assessment methods. It is important to understand what is being measured when measuring and comparing canopy densities. The spherical densiometer measures the percentage of shade directly overhead (i.e. shade at noon). The solar pathfinder measures the % percentage of shade throughout the day, using the August solar arc. Typically, the densiometer measurements show less shade than the solar pathfinder.

Large woody debris is an important component to most streams. Large wood provides structure to the stream, as well as cover for fish. A large woody debris assessment was completed by the PFC Team in all Class I and II streams within the Forest and is included in the Stream Channel Assessment portion of this report.

DISCUSSIONS BY STREAM AND REACH

SOUTH COW CREEK-CLASS I

Stream Channel Assessment

The South Cow Creek Study Site originates in the headwater areas above South Cow Creek Campsite and flows roughly west, exiting the Forest onto private land that protrudes into the Forest, then reentering the Forest and finally exiting on the west property line. South Cow Creek flows for approximately 3.25-miles within the Forest before entering private property. Upon reentering the Forest, South Cow Creek flows

for an additional 0.4-miles within the Forest before crossing the west property line. South Cow Creek was divided into three reaches. Reach 1 contains two segments. Reach 2 contains six segments. Reach 3 contains one segment. The PFC assessment for reach 1, segment 1 and reach 3, segment 1 were conducted during the June work session. The PFC assessment for reach 1, segment 2 and all of reach 2 was conducted during the August work session.

Nearly all (91%) of South Cow Creek within the Forest was rated **Stabile**, with the exception being Reach 3, the meadow reach adjacent to and below South Cow Creek Campsite. Reach 3 was rated **Not-Stabile**. The amount of total LWD (22 pieces per 100 ft.) was consistent with the average for all streams within the Forest (22 pieces per 100 ft.). Conditions within each reach are discussed below.

Fish Habitat Assessment

South Cow Creek is the largest watershed within the Forest and has one other Class I stream as a tributary, Bullhock Creek and several other smaller tributaries, the most noteworthy being Beaver Creek. Bullhock Creek and Beaver Creek are evaluated in their own sections below. The length of South Cow Creek from the property line just below the confluence with Bullhock Creek to the South Cow Creek road crossing below the South Cow Creek Campground was assessed in late August, 2000. Reach 3, from the South Cow Creek road crossing below the campground to the road crossing above the campground was assessed in late June. The total length of 16,579 ft. was divided into three reaches with a total of 252 habitat units delineated, 61 of which were fully measured (24%). By length, 44% are riffles, 44% are flatwater, 5% are pools and 7% are dry. Compared to Old Cow Creek, South Cow has less linear feet of pool habitat. The mean residual pool volume over the entire stream is 555 cu.ft., substantially more volume per pool than any of the other streams within the Forest. The mean pool depth is 1.8 ft., the highest of the streams within the Forest. An average of 15.1% surface fines over the entire stream was calculated, with the highest percentage occurring in Reach 3, the meadow reach below the campground. The dominant cover type is boulder and the shelter (cover) complexity is low to moderate, with an average rating of 69 for pools. Canopy density over the entire stream is 69%, with 94% consisting of coniferous vegetation. This is comparable to Old Cow Creek.

Thirty-one dives occurred over the entire stream length. Only rainbow trout were observed, in contrast to Old Cow Creek, where brook trout also exist. Overall, 2+ rainbow trout were most dense in pool habitat (.458 fish/M³), similar to the density observed in Old Cow Creek. 2+ rainbow trout densities were the highest in Reach 3, the meadow reach (.510 fish/M³). An interesting comparison is to Old Cow Creek where the 2+ rainbow trout density was very low (.095 fish/M³) in the meadow reach, probably due to competition with the brook trout. The 1+ rainbow trout in South Cow Creek preferred flatwater habitats (.236 fish/M³), as did 0+ trout (.046 fish/M³). Visibility was very good in South Cow Creek and some underwater photos were taken. Replicate dives occurred in larger units, especially in pools, giving confidence to the numbers of fish observed.

Reach 1 (Segments 1-2)

Stream Channel Assessment

Reach 1 was rated **Stabile**. Reach 1 is a discontinuous reach, with Segment 1 being the western-most segment of South Cow Creek on the Forest entering and exiting from private land. Segment 2 begins approximately 1.15 miles upstream of where Segment 1 ends and ends at the confluence of Bullhock Creek. Similar conditions exist within both segments, although Segment 1 had considerably more LWD in the stream. Banks were stabilized primarily by large cobbles/boulders and riparian vegetation (and LWD in Segment 1). Woody riparian vegetation is more diverse in both species make-up and age-class within Reach 1 (especially Segment 1) than in the upper reaches of South Cow Creek. Stream bank erosion sites exist within both segments and will be discussed in detail below.



Photo 5: Erosion site at the lower end of SCC R1S1.



Photo 6: Erosion of left bank on SCC R1 S2.

Segment 1 (SCC-R1-S1) begins at the far west property line (approximately 100 ft. downstream of the confluence of Roaring Springs and continues upstream approximately 0.4 miles to about 200 ft. downstream of the confluence of an unnamed tributary entering on stream right. Overall, substrate is larger. Banks are armored primarily by LWD and large boulders. There is a 120-ft. high landslide at the west property line. The cause of the landslide was not determined.

Segment 2 (SCC-R1-S2) begins at the west property line approximately 0.25-miles downstream of the confluence of Bullhock Creek and continues upstream to the confluence. The beginning of Segment 2 is a bedrock channel. Immediately below (on private property) is a large depositional area consisting of primarily large cobbles and boulders. There is an approximately 100-ft. stretch of severely eroding left bank in the middle of the segment. Vegetation has stabilized an aggraded area on the right bank forcing the channel to migrate a small amount towards the left bank. This is most likely the cause of the erosion of the left bank.

Fish Habitat Assessment (Segment 2 only)

The lower segment (Segment 1) of Reach 1 was not assessed during the 2000 field season due to weather and time constraints. Segment 2 began at the property boundary below the confluence of Bullhock Creek and ended at its confluence, with a total length of 1125 ft. Twenty habitat units were delineated, with 10 units fully measured (50%). Pools made up only 15% of this reach by length, of which most was step-run and high gradient riffle habitat. The mean pool depth is 1.7 ft, with a shelter rating of 60, again low/moderate. The dominant cover is white water, which provides a bubble curtain under which fish can hide. The canopy density is good (74%) and is 93% coniferous. Reach 1 has the lowest percentage of fines (6.4%) in the entire stream, which is probably due to the steep gradient of this reach, >4%. Some bank scour was observed on the left bank just below a small tributary in the lower portion of this reach. Further investigation of the source is recommended.

Three dives occurred in this reach with an average dive time of 15 minutes each. 2+ rainbow trout were observed in both flatwater and pool habitats, but were most dense in the pools (.555 fish/M³). The 1+ rainbow trout were nearly evenly distributed in both flatwater (.050 fish/M³) and pools (.079 fish/M³), but the 0+ rainbow trout preferred the flatwater (.251 fish/M³) over the pool habitat (.047 fish/M³).

Reach 2 (Segment 1-6)

Stream Channel Assessment

Reach 2 was rated **Stabile**. Reach 2 is approximately 11,779 feet in length and is divided into six segments. There are several sections of bedrock channel throughout the reach. The stream channel and banks are stable and only a few erosion sites are worth noting for this reach. The banks are armored primarily by cobbles/boulders and herbaceous vegetation. Several springs enter South Cow Creek within this reach. Total LWD (27 pieces per 100 feet) is greater in this reach than most other reaches within the Forest. Debris jams were observed in all segments within this reach.

Segment 1 (SCC-R2-S1) begins at the confluence of Bullhock Cr. and continues upstream to the bridge at Steel Bridge Rd. The valley floor widens in this segment allowing the stream to access floodplain areas. Significant deposition has occurred on these floodplains and they are well vegetated. There are also several overflow channels that have cut there way through the depositions. A tributary entering from stream left showed signs of considerable erosion. The cause of this erosion should be investigated. Woody riparian vegetation was spotty and some of the streambank was dominated by upland species.

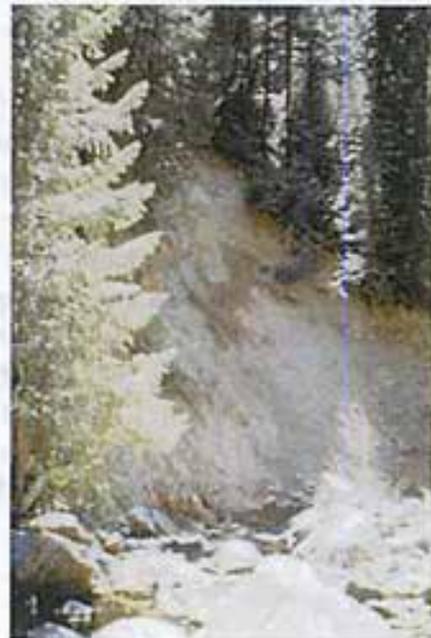


Photo 7: Hillslope erosion in SCC R2 S2.

Segment 2 (SCC-R2-S2) begins at the bridge at Steel Bridge Rd. and continues upstream to the remains of an old crossing (dead end spur off of Middle Bridge Rd). Hillslope erosion was observed on the left bank. Riparian species were predominantly herbaceous species in the lower half of the segment. A greater number of woody species are found in the upper half.

Segment 3 (SCC-R2-S3) begins at the remains of an old crossing (dead end spur off of Middle Bridge Rd.) and continues upstream to the crossing at Middle Bridge Rd. There are intermittent bedrock sections throughout this segment. Riparian vegetation is primarily herbaceous.

Segment 4 (SCC-R2-S4) begins at the crossing at Middle Bridge Rd. and continues upstream to the crossing at Upper Bridge Rd. There are several springs within this segment creating dense herbaceous riparian vegetation.

Segment 5 (SCC-R2-S5) begins at the crossing at Upper Bridge Rd. and continues upstream to the confluence of Beaver Creek. Intermittent bedrock channel sections continue in this segment. Riparian vegetation is primarily herbaceous species.

Segment 6 (SCC-R2-S6) begins at the confluence of Beaver Creek and continues upstream to the crossing at South Cow Cr. Rd. Smaller-sized gravel deposits were seen in pools than noted in previous segments. Riparian vegetation remains primarily herbaceous.

Fish Habitat Assessment

This reach began at the confluence of Bullhock Creek and continued all the way to the South Cow Creek Rd crossing below the South Cow Creek Campground for a total length of 12,054 ft. Six segments were identified within this reach. Two hundred and two habitat units were delineated with forty-one units fully measured (20%). Pools made up only 3% of this reach by length, a very low percentage. Mean pool depth is comparable to the other two reaches at 1.9 ft. and is good compared to other streams within the Forest. The pool shelter rating of 85 in this reach is also better than in the other two reaches. The dominant cover is boulder. The canopy density is again made up of coniferous vegetation (94%) and is 70% average over the length of this reach. The average percentage of fines is 12.4% and the slight increase may be from documented road failures upstream that occurred during the New Year 1997/98 storm events.

Twenty-one dives were undertaken in this reach. Only rainbow trout were observed with the greatest density occurring in the 2+ age class (.408 fish/M³) in all habitats. Again, the 2+ trout preferred the pool habitat (.441 fish/M³) compared to the flatwater (.297 fish/M³). The 1+ fish comprised less of the total population overall (.147 fish/M³) and preferred the flatwater (.264 fish/M³) compared to the pools (.111 fish/M³). 0+ fish were only observed in the margins of pool habitat and in very small densities (.014 fish/M³).

Segment 1 from Bullhock Creek to Steel Bridge was similar to Reach 1 below, but with more bedrock sheet habitat. Old braided, high flow channels were observed between HU #25-37. Some key large pieces of wood were observed and the pool depths were

good. A tributary at HU #25 shows signs of deep fluvial scour and may be associated with a road crossing above. Scour is often associated with an increase concentrated flows and/or velocity.

Segment 2 from the Steel Bridge to Lower Bridge also has several braided channels. The Forest manager identified a potential natural barrier, approximately 250 ft. upstream from the Steel Bridge. Pool, riffle and flatwater habitats were snorkeled above and below this large logjam. 1+ and 2+ rainbow trout were observed both below and above for 150 ft., although smaller numbers of fish were observed above. This does not appear to be a barrier.

Segment 3 from Lower Bridge to Middle Bridge also has bedrock sheet habitat, but it is made up of clay material that acts like bedrock. Three tributaries enter this segment from the left, all appear to show signs of high fluvial scour. Some erosion from the road and fillslope just below Middle Bridge was evident in the stream. A possible low flow barrier due to a debris jam was observed in HU #110. Springs seeped from the left bank from HU # 103-106.

Segment 4 from Middle Bridge to Upper Bridge has long reaches of high gradient riffle/step-runs and very few pools. Bedrock sheets were present and consisted of clay material. There are many springs and wet meadows along this segment of stream. There appeared to be a good large wood component in the stream, as well.

Segment 5 from Upper Bridge to the Beaver Creek confluence is similar to Segment 4, with long reaches of high gradient riffle/step-run and bedrock sheet habitats. The bedrock is again composed of clay material. The water temperature gets colder the closer to Beaver Cr., which has a 6°C temperature at its mouth.

Segment 6 from Beaver Creek to the South Cow Creek Rd crossing below the

South Cow Creek Campground has very low flows (Beaver Creek flows are \geq to South Cow Creek), marginal habitat and warmer temperatures (9°C) than Beaver Cr. Few fish were observed in this segment, except at the pool created by the culvert at the road crossing.

Reach 3 (Segment 1)

Stream Channel Assessment

Reach 3 (SCC-R3-S1) was rated **Not-Stabile**. Reach 3 begins at the crossing at



Photo 8: Severe headcut in meadow reach (SCC R3 S1).



Photo 9: Deposition in the meadow reach (SCC R3 S1).

South Cow Creek Rd. and continues upstream to where the channel begins to braid (break point for class 2 stream). The channel type changes to an E-Type as the stream flows through the meadow area. Severe downcutting was occurring. Evidence of three periods of downcutting was observed. Two large headcut features (approximately 5-8 feet high) were observed within the reach. The stream was disconnected from the floodplain. Woody riparian vegetation was practically non-existent and the herbaceous streamside vegetation was inadequate to stabilize the banks.

The upper reaches above the South Cow Creek Campsite show signs of degradation. Roads have caused the diversion of one of the tributary forks. The resulting roadside gully is depositing material into the meadow. Additional inboard ditches are concentrating runoff and increasing peak flows in the tributary streams. This is resulting in downcutting of the tributaries. Material is being deposited onto the meadow area, where water was observed running subsurface.

Fish Habitat Assessment

This reach is the meadow reach, which begins at the South Cow Creek Rd crossing below the South Cow Creek Campground and ends at the road crossing just above the campground. It is included as part of the Class I stream analysis because of the presence of fish that remain in the stream throughout the year, although sections of stream near the campground do go subsurface later in the season. This portion of South Cow Creek was assessed in late June, while flows were still continuous throughout the reach. The total length of this reach is 1563 feet. Thirty-five habitats were delineated, with seven



Photo 10: Severe headcut in meadow reach (SCC R3 S1).

habitats fully measured (20%). Pools make up 10% of the habitat by length, with a mean pool depth of 1.4 feet. The dominant shelter is undercut banks and the shelter rating of 18 is quite low. Canopy density is 60%, with 98% of this coniferous. This density is similar to that of Old Cow Creek, but there is very little deciduous canopy component in South Cow Creek. Surface fines are very high, 39%. This is the highest percentage of surface fines found in all streams within the Forest. Erosion problems from the road above the upper crossing of this

reach have deposited large amounts of sediment in the upper meadow reach. Compounding this problem is the severe headcutting observed in the lower meadow reach. 5-8 ft. headcuts in unstable soils will likely continue to migrate up through the meadow without some treatment.

Seven dives were conducted in this reach, with an average dive time of 6 minutes each. 2+ rainbow trout densities were greater in flatwater (.617 fish/M³) than in pools (.412

fish/M³). This is probably due to the lack of in-stream cover, especially in the pools. In HU # 223, all fish observed were hiding under a single rootwad, which provided the only cover. A photo was taken. 1+ rainbow trout densities were similar to Reach 2, with the preference in flatwater habitat (.288 fish/M³) over pools (.075 fish/M³). Few 0+ fish were observed and were only found in flatwater (.041 fish/M³).

Key Assumptions of Proposal Benefits

- Reduce the vertical and horizontal continuity of fuels.
- Incorporate structural diversity to improve terrestrial habitat.
- Increase deciduous hardwood component within the riparian zone for nutrient input by opening the current closed conifer canopy.
- Reduce the potential for catastrophic wildland fire.
- Maintain and protect the existing riparian functions.

Outline Preliminary Rationale for Consistency with Requirements in 14 CCR Section 916.9 v (1) (p.98 of CA Forest Practice Rule Book 2012)

14 CCR Section 916.9 v (1) specifies the following:

"In consideration of the spatial variability of the forest landscape, the RPF may propose site-specific measures or nonstandard operational provisions in place of any of the provisions contained in this section. Site specific plans may be submitted when, in the judgment of the RPF, such measures or provisions offer a more effective or more feasible way of achieving the goals and objectives set forth in 14 CCR § 916.9 [936.9, 956.9], subsections (a) and (c), and would result in effects to the beneficial functions of the riparian zone equal to or more favorable than those expected to result from the application of the operational provisions required under 14 CCR § 916.9 [936.9, 956.9]."

This proposal details site-specific measures and nonstandard operational provisions intended to meet the requirements of 14 CCR Section 936.9 v (1). The project is intended to provide a more effective or more feasible way of achieving the "goal" of "protecting" the properly functioning salmonid habitat, as specified under 14 CCR Section 936.9 (a), by adhering to the following:

- (1) **Complying with the terms of a Total Maximum Daily Load (TMDL).**
- (2) Preventing significant sediment load increase to the watercourse system.
- (3) Preventing significant instability of the watercourse channel or bank.
- (4) Preventing significant blockage of any aquatic migratory routes for any life stage of anadromous salmonids or listed species.

- (5) Preventing significant adverse effects to streamflow.
- (6) Protecting trees (especially conifers), snags, or downed large woody debris that currently, or may in the foreseeable future, provide large woody debris recruitment needed for instream habitat structure and fluvial geomorphic functions.
- (7) Protecting the quality and quantity of vegetative canopy needed to:
 - (A) Provide shade to the watercourse to maintain daily and seasonal water temperatures within the preferred range for anadromous salmonids or listed species where they are present or could be restored; and
 - (B) provide a deciduous vegetation component to the riparian zone for aquatic nutrient inputs.
- (8) Preventing significant increases in peak flows or large flood frequency.

The project is also intended to provide a more effective or more feasible way of achieving the "objective" of "protection" of the beneficial uses of water, and properly functioning salmonid habitat and listed aquatic or riparian-associated species, as specified under 14 CCR Section 936.9 (c), by adhering to "a primary objective for all WLPZ's" and implementing the following practices as specified in subsection (5): Fuel hazard reduction activities that will reduce fire hazards and stand replacing wildfires which would result in significant adverse effects to salmonid species or riparian habitat.

EXISTING CONDITION SUMMARY

Complete only the questions below that apply to the proposal. Narrative discussions are acceptable and supporting data or graphics may be desirable. These issues will be formally addressed in the THP, and this section can be used in the plan. Additional issues may be discussed.

1. *Briefly outline the existing riparian structure (species, structure, function) and how proposed treatments will affect vegetative structure diversity for fish and wildlife habitat.*

The current riparian area is composed of a mosaic of mid to late seral mixed conifer trees with a small hardwood component. This structure provides for all the key riparian functions including LWD recruitment, shade (temperature), bank stability, nutrient input and terrestrial habitat. The proposed treatments will alter a small portion of the riparian area, approximately 10%, by incorporating an early seral component which will add structural diversity, reduce the vertical and horizontal continuity of fuels, and maintain and protect the properly functioning riparian habitat by reducing the potential for a catastrophic wildfire event which would result in significant adverse effects to that habitat.

2. *Describe how the existing and/or trending conditions of channel types are affecting fish habitat functions and how proposed treatments will improve habitat conditions.*
3. *Describe the vegetative structure, canopy closure, and potential wood recruitment conditions under existing and future conditions in the absence of the site specific proposal, and how the proposed treatment will affect the trajectory and development of functional tree sizes available for potential wood recruitment.*

The proposed project will have minimal effect on the potential for wood recruitment into the watercourse as only a relatively small portion of the overall riparian zone along South Cow Creek, approximately 24 acres of the total 227 acres of Class I WLPZ located on the Forest, is proposed for treatment. In addition, any trees providing streamside bank stability will be retained and trees leaning toward the watercourse will be retained for future recruitment.

4. *Describe the existing water temperature patterns and how the proposed treatments are likely to affect future temperature regimes.*

According to the SWAG Report (2001) discussed above, the existing water temperatures in South Cow Creek range from 6° to 9° C. As South Cow Creek flows generally in a westerly direction, approximately one-half of the proposed treatment area is located on the north side of the watercourse which provides little to no shade component for temperature control. Given this geomorphic feature as well as the limited application and strategic placement of the proposed group selection units, the proposed treatments will likely have an insignificant effect on the water temperature.

5. *Describe the existing and/or trending instream sediment conditions and how upslope sediment sources affect habitat conditions and how proposed treatments will affect upslope stability and sediment delivery.*

According to the SWAG Report (2001), the upper reach (3) of South Cow Creek is exhibiting excessive (>20%) surface sediment fines for pool tailouts and runs. The Report indicates that this may be primarily due to the down-cutting that has occurred through South Cow Creek Meadows. The balance of the watercourse (reaches 1 and 2), as reported in Table 4.1 of the Report, exhibited sediment fines levels well below the 20% threshold indicated in the Report. The proposed treatments are located in the lower reaches of the watercourse and, if properly implemented, will not individually or cumulatively impact upslope stability or increase sediment delivery.

6. *Describe how the existing vegetative structure is producing a high risk of catastrophic wildfire in both the riparian zone and on the upland area of the watershed, and how the proposed treatment will reduce this risk.*

The contiguous vertical and horizontal continuity comprising the existing dense stand structure both within and outside the riparian zone combined with the catastrophic wildfire history associated with areas downstream from the proposed project area lend credence to the familiar term “not if, but when” will a fire of devastating proportions occur in this watershed. Recent fire events in nearby watersheds serve to illustrate how the current constraints imposed on ASP watersheds have curtailed forest management activities within the riparian zone, further contributing to the catastrophic events. Proactive forest management activities, as proposed in this pilot project, are intended to reduce the potential for such an event, or reduce the impacts if such an event were to occur. The alternative choices and results of those choices are clearly visible in other watersheds where management options have been delayed or altogether avoided. The end result will produce stand conditions that reduce the potential for catastrophic fire by promoting reduced fire intensities at the landscape level and retaining functional habitat following a wildfire.

Fuel models (see “Methods of Analysis” below) that best describe the fuel conditions for fire behavior in the South Cow Creek drainage include Fuel Model 8 for the upper project area and Fuel Model 10 for the lower project area. These models also best represent the corresponding areas surrounding each project area. Fuel Model 8 is described as follows:

“Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentrations that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. The litter is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Rate of spread 1.6 chains/hour, flame length 1 foot.”

While Fuel Model 8 is depicted in the publication as having an estimated 5 tons of total fuel load per acre, <3-inch, ocular estimates of the actual stand fuel loading, including larger material may be closer to 10-15 tons per acre. Also, while the fuel model does not address the potential for crown fire, due to the actual stand density and the estimated crown closures ranging from 75 to 100%, the risk of crown fire spread, once initiated, would be considered extreme.

Fuel Model 10, for the lower reaches, is described as follows:

“The fires burn in the surface and ground fuels with greater fire intensity than other timber litter models. Dead-down fuels include greater quantities of 3-inch or larger limbwood resulting from over-maturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel

situation, leading to potential fire control difficulties. Any forest type may be considered if heavy down material is present; examples are insect or disease ridden stands, wind-thrown stands, over-mature situations with deadfall, and aged light thinning or partial-cut slash. Rate of spread: 7.9 chains/hour and 4.8 foot flame length (both models assume 8% dead fuel moisture and 5 mile/hr windspeed). Fires such as in Model 10 are at the upper limit of control by direct attack. More wind or drier conditions could lead to an escaped fire."

7. *Briefly describe how the existing vegetative structure is affecting hydrologic, geomorphic, and biological functions in flood prone areas/overflow channels and how the proposed treatment will likely affect these functions.*
8. *Briefly describe how the existing vegetation in the riparian zone is affecting biotic diversity and nutrient input, and how the proposed treatment will likely affect these functions.*

PROPOSED DESIGN ELEMENTS/METRICS/STANDARDS

Specifically, the proposed project consists of two distinct project areas on LDSF. One project area is located along the lower reaches of South Cow Creek on the Forest and comprises approximately 10 acres within the WLPZ while the other is located along the upper reaches and covers approximately 14 acres within the WLPZ. Additionally, and corresponding with elevational changes between the project areas, each area is comprised of a relatively uniform but different stand type. The lower project area consists of an uneven-age mixed conifer stand type with a small hardwood component. The portion of this project area located on the south side of South Cow Creek is covered under Timber Harvest Plan (THP) 2-12-061-SHA which is currently under review. The balance of this project area located north of South Cow Creek may be amended into the plan once it is approved, if the project is recommended to move forward. Operations to be conducted under this THP are planned for 2014 and 2015. In contrast, the upper project area is comprised of a more uniform even-aged true fir stand with no hardwood component. This project area is not currently covered under an existing THP. However, both areas are proposed to be treated similarly by establishing a series of group selection silviculture units along both the north and south sides of the watercourse, not to exceed 2.5 acres each, and whose boundaries extend from within the core zone upslope and beyond the outer zone. Exact group selection unit configurations will vary depending upon topography, slope, stand structure and other physical features. Individual tree selection silviculture will be applied between the group selection units to further reduce both the vertical and horizontal continuity of the stand structure to a minimum of 75 square feet of basal area per acre. Similar prescriptions will be applied to the surrounding area outside both of the proposed project areas and WLPZ.

PROPOSED MONITORING

In order to evaluate the effects, if any, of the proposed projects on the watershed, LDSF intends to establish a water monitoring station on South Cow Creek to measure stream temperature, turbidity, and suspended sediment. We are also currently in the process of establishing a weather station on the Forest to monitor storm events in order to correlate weather activity with runoff and stream conditions. Our ongoing roads management and monitoring plan, intended to identify, correct and track potential road and watercourse crossing sediment sources, will also play an important role in the watershed monitoring process for this project.

ASSESSMENT OF POTENTIAL IMPACTS - METHODS OF ANALYSIS

List the sources of data, analysis methods used, or other analytical information used to arrive at your interpretation.

An analysis of the risk of catastrophic wildland fire to the Beal Watershed is based on the use of General Technical Report INT-122, "Fuel Models for Estimating Fire Behavior", April, 1982.

Analytical information used to evaluate the conditions of South Cow Creek is the Latour Demonstration State Forest Watershed Monitoring Project prepared by Sacramento Watersheds Action Group (SWAG) in 2001.

PART II) Pre-Consultation Results

This section can be used to summarize the outcome of the pre-consultation. It provides a place for the landowner/ RPF/RPF designee to informally document a list of potential issues of concern, documentation or information needs, questions, preliminary findings, and preliminary levels of support from each agency or individuals that participated in the pre-consultation. This form is NOT intended to imply that agency approval is required prior to proceeding with the THP. Nor does it imply that ALL agencies must be consulted for all issues.

The plan proponent is encouraged to engage in discussions with agencies and individuals participating in the pre-consultation and to document such interactions. Agencies that participate in the review are encouraged to provide a written summary of their initial concerns. This section is voluntary, but documentation will help support the THP submission.

This summary could be derived from written documentation provided from participants that attended the pre-consultation field meeting or otherwise provided written responses to pre-consultation discussions.

NOTE: CAL FIRE will use the THP record (not this form) to make regulatory determinations. The pre-consultation results are for the benefit of the landowner/landowner representatives in preparing the THP, and thus only need to be documented sufficiently to satisfy that need.

CONTACT LIST

List the names of all persons contacted and/or consulted, including contact information.

POTENTIAL ISSUE DESCRIPTIONS

Outline or briefly describe each potential issue of concern, outstanding question/information request etc. listed in the summary table.

ASSOCIATED PERMITTING ACTION ITEMS

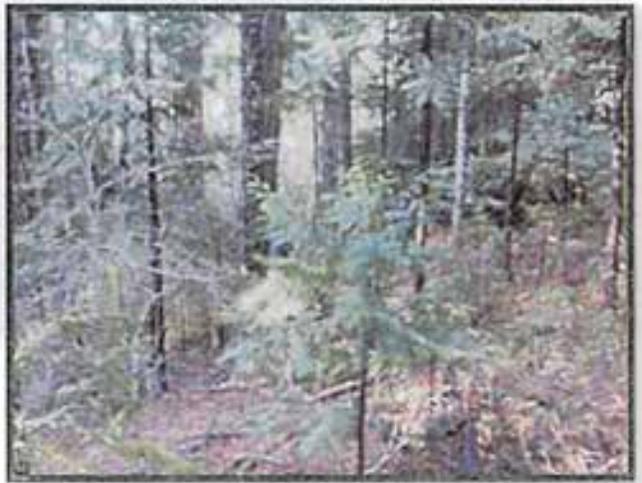
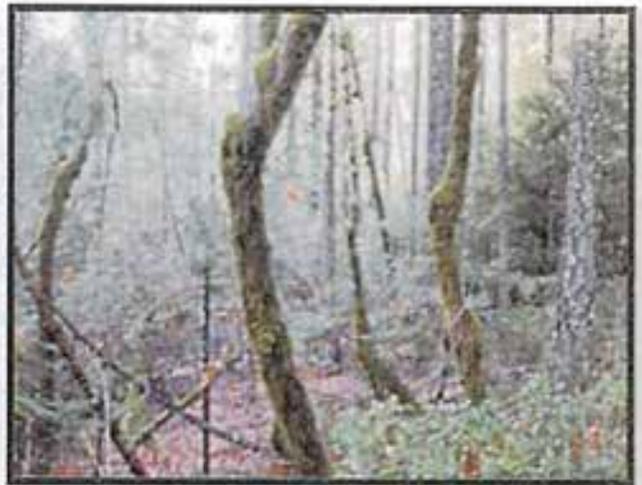
Outline any permitting actions discussed.

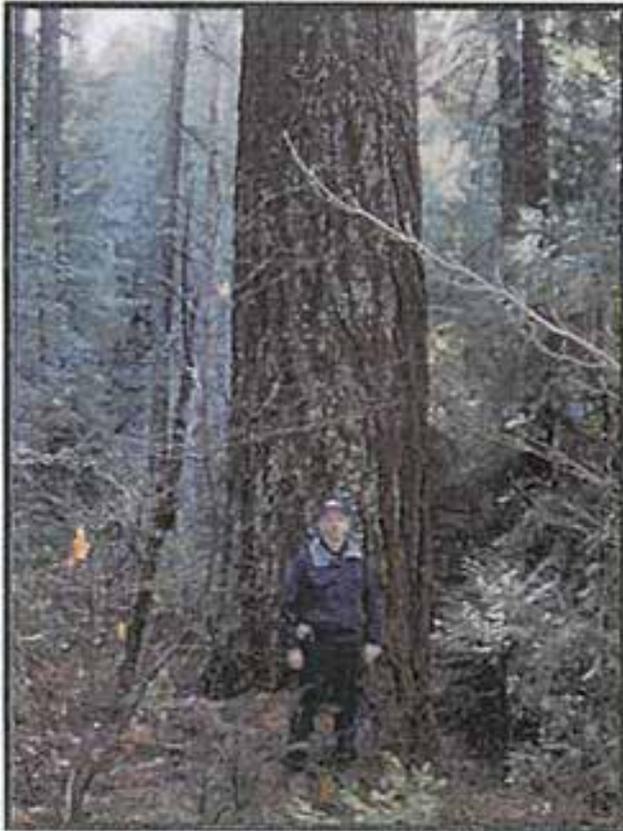
ATTACHMENTS AND OTHER DOCUMENTS

Attach any letters, discussions, or other appropriate written documentation.

Photos 1-18: Lower South Cow Creek Unit - LDSF Proposed VTAC Pilot Project Area

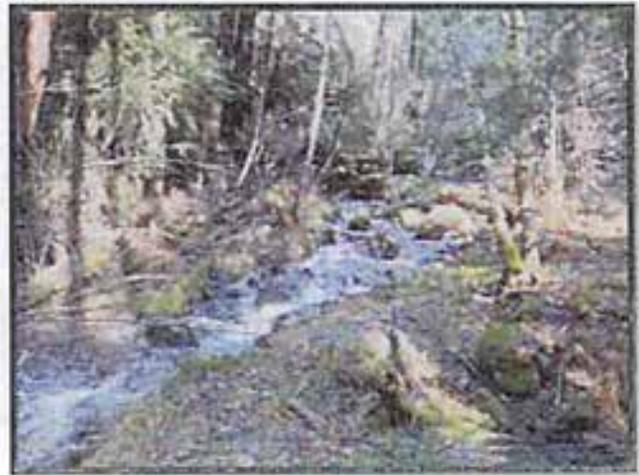








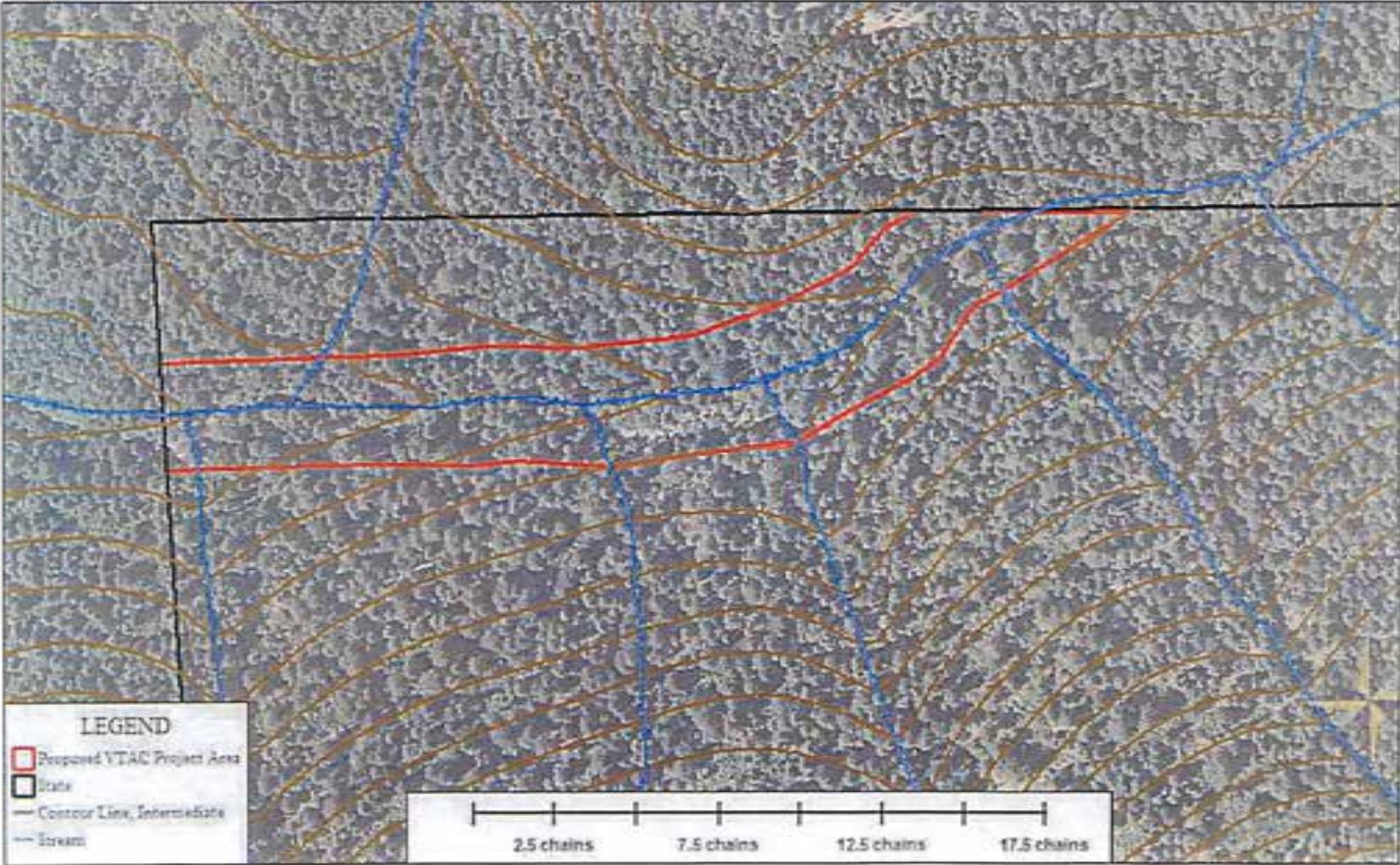
Photos 19 20: Lower Unit Roaring Creek (Class II)



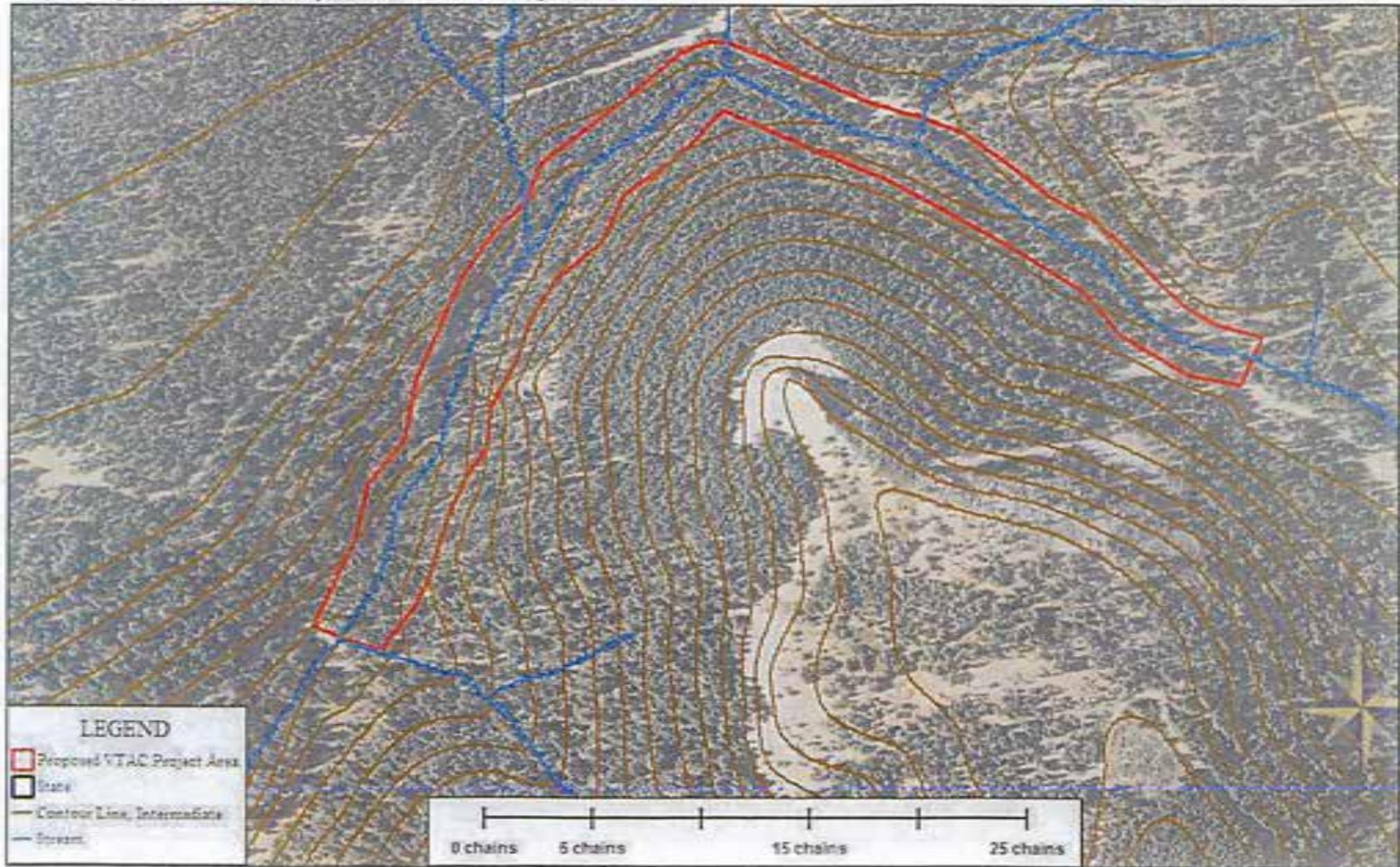
Photos 21-26: Upper Unit South Cow Creek - LDSF Proposed VTAC Pilot Project Area



Map 3 – Lower Unit LDSF Proposed VTAC Pilot Project Area



Map 4 – Upper Unit LDSF Proposed VTAC Pilot Project Area



LaTour Demonstration State Forest
South Cow Creek Meadows – Downcutting
Future Restoration/Stabilization Project



Rim Road Stop – Cytospora

Cytospora Canker of True Firs (*Cytospora abietis*)¹

Hosts: Rarely Douglas-fir, true firs.

Distribution: Throughout the natural range of true firs in California. Cytospora canker has been reported infrequently on Douglas-fir in the extreme northern part of the state.

Symptoms and Signs: Brick-red flagging caused by cankers girdling and killing branches is the most striking symptom of the disease in spring and summer. Later in the year the foliage on these branches dries and turns brown to tan. Other, less easily observed symptoms and signs of infection are the cankers themselves, which are sunken, dead patches of bark tissue; resin exudation at the canker site; small, pimple-like fruiting bodies embedded in the dead bark; and orange, threadlike spore masses exuded from the fruiting bodies when wet.

Life Cycle: *C. abietis* is a weak parasite that usually attacks only trees that have been weakened by other agents including insects, fire, other diseases, drought, and human activities. One primary agent is dwarf mistletoe (*Arceuthobium* spp.) which predisposes firs to infection by Cytospora canker. In some stands of fir nearly a fourth of all branches infected with dwarf mistletoe are also infected with *C. abietis*. The fungus spreads by means of spores, which splash onto surrounding trees and branches when it rains. Small wounds and openings in the bark, such as those made by insects and dwarf mistletoe, are favored sites of infection. The fungus grows within the inner bark and eventually girdles and kills the branch.

Significance: Cytospora canker is one of the most damaging diseases of true firs in California. Trees of all sizes and ages are affected. Damage is especially heavy in stands also infected with dwarf mistletoe. Trees on poor sites or those on the eastern slopes of the Sierra Nevada suffer severe damage. Crown loss, top dieback, and mortality often result from heavy infection.

Similar Pests: Branch tips exhibiting yellow to red foliage caused by Cytospora canker are distinctive and not readily confused with other diseases of firs.

Management Options: Reducing the levels of dwarf mistletoe in fir stands will in turn reduce the incidence of Cytospora canker. Also, any methods that reduce tree stress from drought or other predisposing factors will make fir less susceptible to infection and damage. Avoid planting firs on drought-prone or high-stress sites. Proper spacing and nutrition, and adequate soil moisture, will help lessen the incidence of disease in Christmas tree plantations.

1) D. L. Wood, T. W. Koerber, R. F. Scharpf, A. J. Storer. 2003. *Pests of the Native California Conifers*. California Natural History Guides 70. Berkeley and Los Angeles: University of California Press.

Excerpts from the Latour Demonstration State Forest Management Plan, 2013:

A. Vegetation Resources Inventory

The red fir species component is still showing signs of decline due to an on-going infestation of *cytospora abietis* (fir canker) along with sanitation-salvage harvesting of infected trees and poor regeneration success by both natural and artificial means. Those areas most heavily infected with *cytospora* fungus will be treated to eliminate the source and re-planted, where appropriate, with white fir and/or other species to halt the cycle of infection.

E. Silvicultural Systems

Clearcutting will be utilized in a few instances where chronic disease or insect infestations have severely damaged stands or for research purposes. As described previously, red fir on LDSF is very susceptible to infection by dwarf mistletoe and *cytospora*. There are a few scattered pockets of dense young red fir stands that are heavily damaged by these diseases and exhibiting high mortality rates. These stands will be clearcut over a period of time, taking into consideration adjacency constraints, and artificially regenerated with white fir or other appropriate species in order to reduce the prevalence and impact from these diseases.

K. Christmas Trees

Future Christmas tree management will include the conversion of brush fields and rehabilitation of red fir stands heavily infected with *cytospora* initially into Christmas tree plantations that will ultimately develop into merchantable timber stands as well.

V. RESOURCE PROTECTION

A. Insects and Disease

The main cause of growing stock loss from disease is the fir canker (*Cytospora abietus*). *Cytospora* infects red fir on LDSF and has caused substantial degradation and mortality in some stands. The clearcuts that have been conducted and are planned for the future focus primarily on stands of red fir heavily infected and dying. Stands that have not become heavily infected are those that have been thinned and/or are isolated from the disease and growing well.

Excerpts from the Sierra Nevada Conservancy Grant Funded Fuelbreak/Table Top Biomass Contract, Exhibit A – Scope of Work:

The red fir in the Table Top biomass thinning treatment area is infected with *Cytospora abietis*, a fungus widely found in California's true fir stands and commonly found in association with dwarf mistletoe. Therefore, this planned treatment covers a broader geographic area than those treatment areas specifically designed to create fuelbreaks. While this fungus can attack white fir and other tree species it is more specific to and prominent in the red fir in this stand and elsewhere on LDSF. Typical visible symptoms

include increasing brick-red to brown flagging (needle die-back) in the crowns of infected trees, eventually leading to branch death and eventual tree mortality. Infected overstory trees also spread the disease to the understory, which perpetuates the infection cycle. In this area, in addition to the criteria described above, those trees larger than 12 inches at DBH whose crowns exhibit *Cytospora* flagging greater than 50% and those trees that have succumbed to this disease shall be removed. Snags to be saved for wildlife purposes shall be marked (painted) with a white "W" at DBH by CAL FIRE personnel prior to operations. Trees in the 3-12 inch DBH range will be selected for removal based on spacing, species and the above described visible signs of infestation. The desired residual spacing for this area is also twenty feet.



Fir canker (*Cytospora abietis*)

LaTour Demonstration State Forest
Variable Retention Prescription



Aggregated Retention (If <30 Acres, 10% of Treated Area)



Dispersed Retention (Minimum 10 square feet of Basal Area per Acre on Site II or Less)

Variable Retention Discussion Rim Road on LaTour Demonstration State Forest

Stand Conditions: The stand is located at approximately 6200 feet in elevation along the eastern edge of LaTour DSF. Species composition is white fir, red fir, western white pine, sugar pine, lodgepole pine, Jeffery pine, mountain hemlock. The red fir is infested with *Cytospora sp.* and mistletoe while the western white pine and sugar pine have blister rust.

There are two different stocking levels within the VR stand. One area has a basal area of 100 to 140 sq. feet of mature timber, with little to no regeneration in the under story. The second area is more variable with portions having less than 100 sq feet of basal area with an understory of manzanita and chinquapin, other portions are comprised with dense stands 300+ square feet of advanced regeneration to small pole sized timber, and other areas contain are uneven-aged stand with basal area ranging from 170-240 sq feet of basal area. Portions of the Variable Retention unit are heavily infected with fir canker and blister rust and it is very difficult to find a countable tree as defined by 14 CCR 895.1. Post harvest the stocking will meet the retention standards of 14 CCR 933.4 (d), and within five years following harvest the entire Variable Retention unit shall meet 300 point count as per 14 CCR 932.7(b)

Concerns and constraints: LDSF concerns with the stand are, trying to establish a healthy timber stand for the future and control the spread of *Cytospora sp.* and blister rust. Lassen National Forest is the adjacent landowner and the diseases are present in the adjacent timber stands. Another concern is the establishment of a plantation with the competing vegetation.

LDSF RIM ROAD THP - Variable Retention Unit
Estimated Basal Area per Acre - Pre and Post Harvest

Species	Basal Area (ft ²) by Diameter Class								
	0-6" dbh	7-12" dbh	13-18" dbh	19-24" dbh	25-30" dbh	31-36" dbh	37-42" dbh	Total	
White fir	Pre	5	10	25	15	12	3	1	71
	Post			1	3	1			5
Red Fir	Pre	1	7	12	8	2	1		31
	Post				1	1			2
Jeffery pine	Pre			1	1				2
	Post								0
Western White pine	Pre		3	12	7	3			25
	Post				1	1			2
Lodge pole pine	Pre	1	2	5	2				10
	Post				1				1
Sugar pine	Pre		2	5	10	3	1		21
	Post				1	1			2
Mountain Hemlock	Pre		1						1
	Post		1						1
Total	Pre	7	25	60	43	20	5	1	161
	Post	0	1	1	7	4	0	0	13

Variable Retention



Before Harvest (4/25/2010)



After Harvest (7/8/2012)

RECEIVED

OCT 13 2009

Shasta-Trinity Resource Management FOR ADMIN. USE ONLY

FOR ADMIN. USE ONLY Amendments-date & S or M

TIMBER HARVESTING PLAN STATE OF CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION RM-63 (02-03)

THP No. 2-09-084-SHA (2)

Dates Rec'd OCT 07 2009

- 1. SHU 7. RT 2. FGI 8. Brook 3. WQS 9. 4. LNF 10. 5. PW-SHA 11. 6. CGS 12.

THP Name: Rim Road

(In the CDF FPS, this is "THP Description")

If this is a Modified THP, check box: []

Date Filed

Date Approved

Date Expires

Extensions 1) [] 2) []

This Timber Harvesting Plan (THP) form, when properly completed, is designed to comply with the Forest Practice Act (FPA) and Board of Forestry and Fire Protection rules. See separate instructions for information on completing this form. NOTE: The form must be printed legibly in ink or typewritten. The THP is divided into six sections. If more space is necessary to answer a question, continue the answer at the end of the appropriate section of your THP. If writing an electronic version, insert additional space for your answer. Please distinguish answers from questions by font change, bold or underline.

SECTION 1 - GENERAL INFORMATION

This THP conforms to my/our plan and upon approval, I/we agree to conduct harvesting in accordance therewith. Consent is hereby given to the Director of Forestry and Fire Protection, and his or her agents and employees, to enter the premises to inspect timber operations for compliance with the Forest Practice Act and Forest Practice Rules.

1. TIMBER OWNER(S) OF RECORD: Name: California Department of Forestry and Fire Protection

Address 875 Cypress Avenue

City Redding State CA Zip 96001 Phone (530) 225-2505

Signature Bruce A Beck 10-6-09 Date

NOTE: The timber owner is responsible for payment of a yield tax. Timber Yield Tax information may be obtained at the Timber Tax Section, MIC: 60, State Board of Equalization, P.O. Box 942879, Sacramento, California 94279-0060; phone 1-800-400-7115; BOE Web Page at http://www.boe.ca.gov.

2. TIMBERLAND OWNER(S) OF RECORD: Name: California Department of Forestry and Fire Protection

Address 875 Cypress Avenue

City Redding State CA Zip 96001 Phone (530) 225-2505

Signature Bruce A Beck 10-6-09 Date

TIMBERLAND OWNER(S) OF RECORD: Brooks Walker et al. C/O W. M. Beaty & Associates (Water drafting only)

Address: P.O. Box 990898

City Redding State CA Zip 96099-0898 Phone (530) 243-2783

Signature: See attached letter Section V Date:

RECEIVED

OCT 07 2009

REDDING FOREST PRACTICE

SECTION II - PLAN OF TIMBER OPERATIONS

NOTE: If a provision of this THP is proposed that is different than the standard rule, the explanation and justification should normally be included in Section III unless it is clearer and better understood as part of Section II.

14. a. Check the Silvicultural methods or treatments allowed by the rules that are to be applied under this THP. Specify the option chosen to demonstrate Maximum Sustained Production (MSP) according to 14 CCR 913 (933, 953) .11. If more than one method or treatment will be used show boundaries on map and list approximate acreage for each.

- Clearcutting ac. Shelterwood Prep. Step ac. Seed Tree Seed Step ac.
Shelterwood Seed Step ac. Seed Tree Removal Step ac.
Shelterwood Removal Step ac.
Selection 142 ac. Group Selection ac. Transition ac.
Commercial Thinning ac. Road Right of Way ac. Sanitation Salvage ac.
Special Treatment Area ac. Rehab. of Understocked Area ac. Fuelbreak ac.
Alternative ac. Variable retention 55 ac. Other 3 ac.

Total acreage 200 ac.: Explain if total is different from that in 8. MSP option chosen: (a) [X] (b) [] (c) []
THP 2-02-187 SHA South Cow THP

b. If Selection, Group Selection, Commercial Thinning, Sanitation Salvage or Alternative methods are selected the post harvest stocking levels (differentiated by site if applicable) must be stated. Note mapping requirements of 1034 (x) (12).

Selection: Immediately upon completion of operations the area shall meet the stocking standards of CCR 933.2(a)(2)(A)(2), 75 square feet per acre of basal area shall be retained for Site III lands. The residual stand shall contain sufficient 18 inch DBH trees to meet at least the 15 sq/ft basal area, size, and phenotypic quality of tree requirement specified under the seed tree method as specified in CCR 933.1(c)(1)(A)(1.). Post harvest stocking will be met with group A species.

c. [] Yes [X] No Will evenage regeneration step units be larger than those specified in the rules (20 acres tractor, 30 acres cable)? If yes, provide substantial evidence that the THP contains measures to accomplish any of subsections (A) - (E) of 14 CCR 913 (933, 953) .1 (a) (2) in Section III of the THP. List below any instructions to the LTO necessary to meet (A) - (E) not found elsewhere in the THP. These units must be designated on map and listed by size.

d. Trees to be harvested or retained must be marked by or marked under the supervision of the RPF. Specify how the trees will be marked and whether harvested or retained.

All harvest trees shall be marked in Orange paint with a horizontal stripe near breast height and a mark at the stump. A sample area will be marked prior to the preharvest inspection.

[] Yes [X] No Is a waiver of marking by the RPF requirement requested? If yes, how will LTO determine which trees will be harvested or retained? If yes and more than one silvicultural method, or Group Selection is to be used, how will LTO determine boundaries of different methods or groups?

e. Forest products to be harvested:

Sawlogs, cull logs, chips, pulp logs, and fuel-wood, poles.

- [] Yes [X] No Are group B species proposed for management?
[] Yes [X] No Are group B or non-indigenous A species to be used to meet stocking standards?
[] Yes [X] No Will group B species need to be reduced to maintain relative site occupancy of A species?

If any answer is yes, list the species, describe treatment, and provide the LTO with necessary felling and slash treatment

guidance. Explain who is responsible and what additional follow-up measures of manual treatment or herbicide treatment are to be expected to maintain relative site occupancy of A species. Explain when a licensed Pest Control Advisor shall be involved in this process.

g. Other instructions to LTO concerning felling operations

Check all road location flagging, watercourse flagging, WLPZ boundary flagging, EEZ and ELZ flagging, and skid trail flagging prior to the commencement of any falling operations. Have the responsible RPF or supervised designee replace any flagging that is incomplete or unclear.

Trees designated for removal within the EEZ or ELZ shall be directionally felled towards the perimeter and away from the protection zone and endlined, so as to keep heavy equipment out of the protection zone. In the ELZ of Class III watercourses, trees may be felled bridging the watercourse and endlined from outside the ELZ. The purpose of this measure is to allow for trees that if not directionally felled across the ELZ would fall into the ELZ or damage the residual stand.

- h. Yes No Will artificial regeneration be required to meet stocking standards?
- i. Yes No Will site preparation be used to meet stocking standards? If yes, provide the information required for a site preparation addendum, as per 14 CCR 915.4 (935.4, 955.4).

Site Preparation Addendum per 14 CCR 935.4 (a)-(h)

- a) **Site preparation within the Variable Retention (VR) unit may occur, but will not be required to meet stocking.**
- b) **Methods of site preparation may include manual slashing of sub-merchantable unharvested material, brushraking logging slash and brush into burn piles, and contour ripping.**
- c) **Mechanical equipment – excavator, bulldozer with rippers.**
- d) **All retention trees in the dispersed retention area have been marked with a white stripe at dbh and all clusters within the aggregate retention area have been identified with red and white stripped flagging. All site preparation activities shall stay out of the retention clusters and retention trees shall not be removed. Site preparation activities are prohibited within the ELZ of the Class III watercourse.**
- e) **No exceptions or alternatives to the standard rules are requested.**
- f) **The Variable Retention Unit is the only area where site preparation may occur.**
- g) **LTO shall be amended into the plan prior to the start of any site preparation.**
- h) **All mechanical site preparation shall be conducted between May 1 and November 15**
- i) **Pile construction and burning shall adhere to Item 31 within this THP.**
- j) **Unit shall be planted with group A species within two years of completion of operations.**
- j. If the rehabilitation method is chosen provide a regeneration plan as required by 14 CCR 913 (933, 953) .4 (b).

Feasibility of Alternatives

No significant adverse effects from the proposed operations under this THP are expected to occur. However, an analysis of THP alternatives follows.

Purpose

The legislative authority for the State Forest System is contained in Public Resources Code (PRC) §4631-4658. CAL FIRE is responsible for the management of LDSF. As part of this oversight, the LDSF staff operates under a management plan, which provides general objectives and goals. The plan is required pursuant to Public Resources Code (PRC) §4645 and Article 8 of the California Board of Forestry and Fire Protection (Board) policy.

LDSF has a management plan (SCH # 2008062009), approved by the board, which provides direction and guidance for the managed uses of forest resources with an emphasis on forest demonstration, research, recreation, maintenance of wildlife habitat, and water quality protection. Timber harvesting is one of the mechanisms used to implement forest management goals and foster maintenance and enhancement of other non-timber resources. Guided by the statutes, the Board of Forestry and Fire Protection establishes policy, which governs LDSF and other state forests. Board policy states that the primary purpose of the state forest program is to conduct innovative demonstrations, experiments, and education in forest management.

Objectives

- Demonstrate sound forest management.
- **Demonstrate Board approved Variable Retention Silviculture**
- Reduce fuel loading thus reducing the risks of wildfires
- Avoid the waste of timber resources
- Enhance growth and vigor of timber resources
- Improvement of the forest road system
- Improve wildlife habitat, and watershed values promoted by the resulting healthy stands

The project as proposed meets is in conformance with the 2008 LDSF Management Plan (SCH # 2008062009), LDSF's Option A for Long Term Sustained Yield (LTSY), and the Board's policy. The project also meets the following objectives:

Achieve a balance between growth and harvest over time consistent with the harvesting methods within the rules of the Board.

Harvesting the trees that are infected with *Cytospora* sp. and white pine blister rust. Thus improving forest health and reducing tree mortality and fuel loading.

Maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife community within the planning watershed.

Maintain growing stock, genetic diversity, and soil productivity.

Applies and gives a visual demonstration of the Variable Retention Silviculture.

Creek and Old Cow Creek. Further evaluation of the watercourses occurred in the summer of 2000 from the *LaTour Demonstration State Forest Watershed Monitoring Project, Stream Channel and Fish Habitat Assessment* prepared by the Sacramento Watersheds Action Group (SWAG) under contract with the Department of Forestry and Fire Protection. In this report South Cow Creek, Bullhock Creek and Old Cow Creek were assessed within LDSF boundaries.

The SWAG report evaluated the Class I reaches of all three creeks and concluded nearly all of the watercourses are stable with some instability observed at the upper reaches in the meadows and the first 300 feet of Old Cow creek where it exits LDSF. Banks were stabilized primarily by large cobbles, boulders, and riparian vegetation. Bullock Creek shows evidence the watercourse has supported large flood events. Some bank scouring, erosion and depositional features are present in the upper reaches in the Class II segment adjacent to the THP. These features are largely due to the 1997 rain-on-snow event that caused significant runoff in the watershed.

Plan addendum # 14

Selection: pursuant to 14CCR 933.2(a)(2)(A), selection will occur on 142 acres of the plan area. Three silvicultural considerations were observed within the existing stands (1) high stand density in the true fir stands (2) lack of regeneration, and (3) disease and mistletoe infection. In the selection area the average basal area is estimated at 180 square feet per acre and ranges from 100 to 220 square feet per acre. The target average basal area post harvest in the group selection area is 120 square feet, but this THP does not limit LDSF from retaining the Forest Practice Rule standards of 75 square feet. The site classification in the area to be harvested is Dunning Site III

Variable Retention: pursuant to 14CCR 933.4(d), Variable Retention will occur on 55 acres of the plan. Aggregate Retention will occur on 30 acres and Dispersed Retention will occur on 25 acres. The existing stand is declining in health and vigor. Disease problems such as dwarf mistletoe, *cytospora* spp, and blister rust are infecting the Red Fir and Western White pine. The mistletoe and *cytospora* spp. have been transferred from the overstory to the understory. The intent of this prescription is to capture future tree mortality, improve forest health, and establish a healthy timber stand, while providing biological and structural elements of the pre-harvest stand for integration into the future stand. Retention standards shall be met immediately after harvest. The stocking standards of 14 CCR § 912.7 [932.7, 952.7](b)(1) shall be met within five years following completion of operations and retention trees, that meet the definition of "countable tree" (14 CCR 895.1) will be used to meet stocking.

Aggregate retention standards: a minimum of ten percent of the aggregate retention area shall be retained in clusters. Eleven individual clusters have been identified on the ground and flagged with red and white stripped flagging. The clusters range in size from .1 acres to .4 acres. The locations of the clusters are shown on the THP map. One or more of the following criteria was used to identify the clusters: 1) provide a visual cover/break from the Rim Road to the rest of the unit, 2) contain several trees greater than 24 inch dbh trees for snag recruitment, 3) contain snags and or large woody debris, 4) provide a brush component for the future stand, 5) contain several healthy mature seed trees of multiple species, 6) juxtaposition to other clusters, 7) advanced healthy regeneration, 8) minimal operational constraints.

Dispersed retention standards: on the 25 acres of dispersed retention area the minimum basal area retained shall be 20 percent of the Resource Conservation Standards basal area levels stated in 14 CCR 932.7(b)(2). Leave trees have been designated with white paint and one or more of the following criteria was used to identify the retention trees: 1) Large live culls (decadent and deformed trees > 24 inch dbh), 2) Healthy mature seed trees, 3) Lodge pole pine > 20 inch dbh for snag recruitment, 4) juxtaposition – no spot within the harvest area shall be further than 300 feet from a retention tree, 5) species preference - White fir, Jeffery pine, western white pine, mountain hemlock, red fir.

Meadow Restoration: Approximately 3 acre of a historic seasonal wet meadow will be restored as per 14 CCR 939.15. The seasonal meadow is located at the headwaters of Bullhock Creek. Year round springs are located on the down stream edge of the meadow. The seasonally wet portion of the meadow is occupied with a very dense stand of 6 to 8 foot tall lodge pole pine. The uniform age of the Lodgepole pine and evidence of piling and burning in the past it appears that previous management has tried to restore the meadow in the past. The ground disturbance caused by the equipment used to pile the meadow caused a very suitable seed bed for the Lodgepole pine and the restoration effort failed. NO equipment will be used within the seasonal meadow. The Lodgepole pine stand will be hand cut and piled. An EEZ (red and white stripped flagging) has been flagged around the meadow restoration perimeter.

Vegetation control: control of competing vegetation may be required to insure the survival of the regeneration within the Variable Retention units. The primary competing vegetation with the regeneration is Chinquapin, manzanita, and grasses. The competing vegetation may be controlled by manual, mechanical or chemical treatments.

Mechanical treatments: All equipment utilized for the control of competing vegetation shall adhere to the protection measures described within this THP including ELZs, and the Winter Operations Plan.

Chemical treatments: The registration of herbicides in California is a CEQA equivalent process, and when applied according to the label instructions, no significant adverse impacts to wildlife and water resources should occur. Herbicides use is regulated by the Department of Pesticide Regulation (DPR) and enforced by the County Agricultural Commissioner. The use, type and the timing of the herbicide shall be determined and recommended by a Licensed Pest Control Advisor (PCA) and the application shall adhere to the PCA's recommendation, the herbicide label instructions, and the Mitigated Negative Declaration, State Clearing House (SCH) # 2008062009 for LDSF Management Plan 2008.

Plan addendum #17 - Erosion Hazard Rating (EHR)

The Soil Survey of Shasta County California and field observations were used to determine the erosion hazard rating (EHR) for this THP area. The EHR areas were delineated according to soil type and ground observations with regard to slope, ground cover, and physical characteristics. The EHRs for the THP area are low and moderate. The EHR types are delineated on the EHR Map.

Plan addendum #31 - Piling and burning for hazard reduction

The standard rules 14 CCR 937.2(a) and 937.5(b) state slash to be treated by piling and burning shall be treated no later than April 1 of the year following creation, or within 30 days following climatic access, or as justified in the plan. The piles and concentrations shall be burned at a safe time during the first wet fall or winter weather or other safe period following piling and according to laws and regulations.

An alternative to the standard rule is proposed to allow treatment of landing slash accumulations that result from the use of chipping and/or de-limbing equipment created after September 1 of each year. This material may be burned the following fall when safe burning conditions occur. This alternative practice shall be applied over the entire THP area.

This practice differs from the standard practice in that piles will remain in place over the spring and summer and will be treated in the fall, rather than in the winter or early spring following their creation.

This alternative will provide equal or greater hazard reduction. Slash will be concentrated in the landings so that it is no longer a fuel component of the forested stands. There will be protective space around the piles as specified in Section II, Item 31. Also, there have been several incidents of burnt piles rekindling and even escaping following spring burning in this general region. Allowing fall burning of these piles will assure better consumption of the material and a cooling off period through the winter months.

All other provisions of 14 CCR 937.5 will be complied with. Piles will be constructed so that they are sufficiently free of soil for effective burning. These piles will be burned at a safe time during wet fall or winter weather according to other applicable laws and regulations. Piles that fail to burn sufficiently to remove the fire hazard shall be further treated to eliminate the hazard. All necessary precautions shall be taken to confine

(d) Variable Retention. Variable retention is an approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the pre-harvest stand for integration into the post-harvest stand to achieve various ecological, social and geomorphic objectives. The major variables in the variable retention harvest system are retention types, densities, and spatial arrangement of retained structures; aggregated retention is the retention of structures or biological legacies as intact forest patches within the harvest unit; dispersed retention is the retention of structures or biological legacies in a dispersed or uniform pattern. Retained trees may be intended to become part of future stands managed by the Selection regeneration method. Retained trees are often designated as decadent tree or snag recruitment hence not ever intended for harvest. Regeneration after harvest outside of aggregated retention patches may be obtained by direct seeding, planting, sprouting, or by natural seedfall.

(1) In the plan, the RPF shall describe in sufficient detail to provide for review and evaluation: the trees and elements retained, the objectives intended to be achieved by retention, the distribution and quantity of retained trees, the intended time period of retention, and any potential future conditions or events the RPF believes would allow harvest of retained trees. The RPF may explain and justify, and the Director may approve a plan which indicates up to 50% of retained trees are intended for harvest during future Intermediate Treatments of the regenerated portion of the harvest area where such harvest(s) are consistent with stated Variable Retention objectives.

(2) The retention standards for Dispersed Retention shall be measured in average basal area per acre. Where retention is aggregated in groups (greater than or equal to one-tenth acre), percentage of harvest unit area shall be the standard. Sum of all areas within groups divided by harvest unit acres will be used to determine percentage of aggregated retention in the harvest unit. Area and trees located within any standard width WLPZ will be excluded from calculating retention.

(3) The following retention standards shall be met:

(A) Minimum dispersed Variable Retention standard is 20 percent of the Resource Conservation Standards basal area levels stated in 14 CCR § 912.7 [932.7 952.7] (b) (2), 10 percent of harvest area in aggregated retention or combinations thereof. Variable Retention harvests at the minimum retention level shall be limited to 30 acres.

(B) Table 1 shall be used for Determining the Maximum Size Harvest Area for Variable Retention. For areas with a combination of dispersed and aggregated retention types for determination of permissible unit size, the percentage of basal area in dispersed retention portions of the combination area may be reduced proportionately to the area in aggregated retention indicated in Table 1.

Table 1

<i>Dispersed Retention</i>	<i>Aggregated Retention</i>	<i>Maximum Size Harvest Area</i>
>20% of 912.7 [932.7, 952.7](b)(2)	>10% Area	30 Acres
>30% of 912.7 [932.7, 952.7](b)(2)	>15% Area	40 Acres
>35% of 912.7 [932.7, 952.7](b)(2)	>20% Area	60 Acres
>45% of 912.7 [932.7, 952.7](b)(2)	>25% Area	80 Acres
>55% of 912.7 [932.7, 952.7](b)(2)	>30% Area	120 Acres
>75% of 912.7 [932.7, 952.7](b)(2)	>40% Area	200 Acres

(C) Aggregated retention areas that conform to the definition of Late Succession Forest Stands under 14 CCR § 895.1, with the exception of the minimum 20 acre threshold size, may be counted as contributing 1.5 times the acres they actually occupy toward providing retention.

(D) Retention trees classified as Dunning's Class 3, 4, 5, or 7 which exceed the size standards of 14 CCR § 912.7 [932.7, 952.7] may be counted as contributing 1.5 times their actual basal area toward providing retention.

(E) Retention standards shall be met on each 20-acre maximum area(s) within each harvest unit. Retention standards may be met by either dispersed, aggregated or a combination of the two types of retention.

(F) Unless explained and justified by the RPF in the plan, and approved by the Director, no point within the harvest area where retention standards are met by dispersed retention shall be more than 300 feet from a retention tree.

(G) With the exception of 14 CCR § 913.4 [933.4, 953.4] (d)(3)(J) below, the average height of dispersed retention trees shall be at least the average height of dominants and codominants of like species in the pre-harvest stand.

(H) For areas where the plan relies on natural seedfall to obtain regeneration, dispersed retention trees shall meet the standards of 14 CCR § 913.1 [933.1, 953.1](c)(1). Where retention is aggregated, retained aggregates shall meet the standards of Commercial Thinning required under 14 CCR § 913.3 [933.3, 953.3](a) including (a)(1)(A) or (a)(1)(B).

(I) Where specific WHR habitat elements are insufficient to provide functional wildlife habitat, the RPF may explain and justify and the Director may approve alternatives to the standards of subsections 14 CCR § 913.4 [933.4, 953.4](d)(3)(G) and (H).

(J) Decadent and Deformed Trees of Value to Wildlife, and Snags which meet the standards of 14 CCR § 912.7 [932.7, 952.7](b)(3)(A,B or C) and 14 CCR § 912.7 [932.7, 952.7](c) may be counted to meet up to 15 square feet of basal area per acre of retention in excess of the minimum variable retention standards (ref. 14 CCR § 913.4 [933.4, 953.4](d)(3)(A)).

(K) Trees shall be retained for at least 50 years unless a shorter period of time is described in the plan, explained and justified by the RPF, and approved by the Director.

(4) Retention standards shall be met immediately after harvest and if retention trees are to be used to meet stocking, at the time the stocking report is approved.

(5) The stocking standards of 14 CCR § 912.7 [932.7, 952.7](b)(1) shall be met within five years following completion of operations.

(6) Retention trees shall be protected to the extent feasible during timber operations consistent with 14 CCR §§ 914.1 [934.1, 954.1]; 914.2 [934.2, 954.2](e); 914.3 [934.3, 954.3]; 915.2 [935.2, 955.2]; 915.3 [935.3, 955.3] and 917.7 [937.7, 957.7].

(7) The plan shall indicate the estimated average pre-harvest and post-harvest basal area by species and diameter class. Diameter class designations shall be grouped in no greater than 6" classes.

(8) Where retention is aggregated in groups, the RPF shall provide in the plan a general description of group locations and/or a map showing the approximate location of the groups. This information shall be provided for each logging unit.

(9) All trees to be harvested or all retention trees shall be marked by, or under the supervision of, an RPF prior to felling operations. Where timber harvesting does not occur within retained aggregates, the boundaries of retained aggregates may be designated in lieu of marking individual trees within retained aggregates. A sample area must be marked prior to a pre-harvest inspection for evaluation. The sample area shall include at least 10% of the harvest area for each stand type represented in the range of conditions present in the area. Where necessary to evaluate the proposed retention, the Director may require additional marking before plan approval.

(10) To facilitate restocking, a regeneration plan must be included in the plan. The regeneration plan shall include site preparation, method of regeneration, and other information appropriate to evaluate the plan. Site preparation activities shall be designed to protect retention elements and maintain ground cover to the extent practicable while at the same time result in seedling establishment on the site and encourage long-term site occupancy of the regenerated trees.

(11) Another Variable Retention harvest may not be applied to the Variable Retention harvest area for at least 50 years for Class I, 60 years for Class II or III, or 80 years for Class IV and V site class lands after acceptance by the Director of the completion report except as specified in: (i) a THP that has been approved pursuant to 14 CCR § 913.11 [933.11, 953.11](a), (ii) an SYP, (iii) a PTEIR or, (iv) an NTMP).

(12) Within ownership boundaries, no logical logging unit contiguous to a previously harvested Variable Retention harvest area may be harvested by a Variable Retention method unless the previously harvested Variable Retention unit has an approved report of stocking and the dominant and codominant trees, not counting retention trees, average at least five years of age or average at least five feet tall and three years of age from the time of establishment on the site either by the planting or by natural regeneration. If these standards are to be met with trees that were present at the time of the harvest, there shall be an interval of not less than five years following the completion of operations before adjacent Variable Retention management may occur.

(13) A Regeneration Method Used in Evenaged Management, other than Shelterwood Preparatory Step, may not be applied to the Variable Retention harvest area for at least 50 years for Class I, 60 years for Class II or III, or 80 years for Class IV and V site class lands after acceptance by the Director of the completion report.

(14) Within an ownership, at least 10 years must pass after a Variable Retention harvest that exceeds the size standards of 14 CCR § 913.1 [933.1, 953.1] (a)(2) before a Regeneration Method Used in Evenaged Management, other than Shelterwood Preparatory Step, may occur in an adjacent logical harvest area.

(15) Within an ownership, the separation requirements and adjacency limitations of 14 CCR § 913.1 [933.1, 953.1](a)(3, 6 and 7) shall apply equally to Variable Retention harvest areas and evenaged regeneration units.

(16) Alternative Prescriptions proposed under 14 CCR § 913.6 [933.6, 953.6] may not reference Variable Retention as the most nearly feasible method (ref. 14 CCR § 913.6 [933.6, 953.6](b)(3 and 4)). Alternative Prescriptions which approach but do not fully meet the minimum standards of Variable Retention shall be considered Alternatives to a Regeneration Method Used in Evenaged Management.

912.7, 932.7, 952.7 Resource Conservation Standards for Minimum Stocking [All Districts, note (b)(1)(D)]

The following resource conservation standards constitute minimum acceptable stocking in the Coast [Northern, Southern] Forest District after timber operations have been completed.

(a) Rock outcroppings, meadows, wet areas, or other areas not normally bearing commercial species shall not be considered as requiring stocking and are exempt from such provisions.

(b) An area on which timber operations have taken place shall be classified as acceptably stocked if either of the standards set forth in (1) or (2) below are met within five (5) years after completion of timber operations unless otherwise specified in the rules.

(1) An area contains an average point count of 300 per acre on Site I, II and III lands or 150 on site IV and V lands to be computed as follows:

(A) Each countable tree [Ref. PRC § 4528(b)] which is not more than 4 inches d.b.h. counts 1 point.

(B) Each countable tree over 4 inches and not more than 12 inches d.b.h. counts 3 points.

(C) Each countable tree over 12 inches d.b.h. counts as 6 points.

(D) [Coast] Root crown sprouts will be counted using the average stump diameter 12 inches above average ground level of the original stump from which the sprouts originate, counting one sprout for each foot of stump diameter to a maximum of 6 per stump.

(D) [Northern] Sprouts over 1 foot in height will be counted, counting one sprout for each 6 inches or part thereof of stump diameter to a maximum of 4 per stump.

(D) [Southern] Root crown sprouts over 1 foot in height will be counted, using the average stump diameter at 1 foot above the average ground level of the original stump, counting 1 sprout for each foot of stump diameter to a maximum of 6 per stump.

(2) The average residual basal area measured in stems 1 inch or larger in diameter, is at least 85 square ft. per acre on Site I lands, and 50 square ft. per acre on lands of Site II classification or lower. Site classification shall be determined by the RPF who prepared the plan.

(3) To the extent basal area standards are specified in the rules in excess of 14 CCR § 912.7(b)(2) [932.7(b)(2), 952.7(b)(2)], up to 15 square feet of basal area of those standards higher than the minimum may be met by counting snags, and decadent or deformed trees of value to wildlife in the following sizes:

(A) 30 inches or greater dbh and 50 feet or greater in height on site I and II lands;

(B) 24 inches or greater dbh and 30 feet or greater in height on site III lands; and

(C) 20 inches or greater dbh and 20 feet or greater in height on site IV and V lands.

(c) The substitution provided for in 14 CCR § 912.7(b)(3) [932.7(b)(2), 952.7(b)(2)] may only be done when the potential spread of insects and diseases will not have a significantly adverse impact on long term productivity or forest health.

(d) The resource conservation standards of the rules may be met with Group A and/or B commercial species. The percentage of the stocking requirements met with Group A species shall be no less than the percentage of the stand basal area they comprised before harvesting. The site occupancy provided by Group A species shall not be reduced relative to Group B species. When considering site occupancy, the Director shall consider the potential long term effects of relative site occupancy of Group A species versus Group B species as a result of harvest. If Group A species will likely recapture the site after harvest, Group B species do not need to be reduced. The time frames for recapturing the site shall be consistent with achieving MSP. The Director may prohibit the use of Group A and/or B commercial species which are non-indigenous or are not physiologically suited to the area involved. Exceptions may be approved by the Director if the THP provides the following information and those exceptions are agreed to by the timberland owner:

(1) Explain and justify with clear and convincing evidence how using Group A nonindigenous, or Group B species to meet the resource conservation standards will meet the intent of the Forest Practice Act as described in PRC § 4513. The discussion shall include at least:

(A) The management objectives of the post-harvest stand;

(B) A description of the current stand, including species composition and current stocking levels within the area of Group B species. The percentage can be measured by using point-count, basal area, stocked plot, or other method agreed to by the Director.

(C) The percentage of the post-harvest stocking to be met with Group B species. Post harvest percentages will be determined on the basis of stocked plots. Only the methods provided by 14 CCR §§ 1070-1075 shall be used in determining if the standards of PRC § 4561 have been met.

(D) A description of what will constitute a countable tree, as defined by PRC § 4528 for a

LaTour Demonstration State Forest
Bullhock Meadow Restoration



Meadow Restoration: Approximately 3 acre of a historic seasonal wet meadow will be restored as per 14 CCR 939.15. The seasonal meadow is located at the headwaters of Bullhock Creek. Year round springs are located on the down stream edge of the meadow. The seasonally wet portion of the meadow is occupied with a very dense stand of 6 to 8 foot tall lodge pole pine. The uniform age of the Lodgepole pine and evidence of piling and burning in the past it appears that previous management has tried to restore the meadow in the past. The ground disturbance caused by the equipment used to pile the meadow caused a very suitable seed bed for the Lodgepole pine and the restoration effort failed. NO equipment will be used within the seasonal meadow. The Lodgepole pine stand will be hand cut and piled. An EEZ (red and white stripped flagging) has been flagged around the meadow restoration perimeter.

Vegetation control: control of competing vegetation may be required to insure the survival of the regeneration within the Variable Retention units. The primary competing vegetation with the regeneration is Chinquapin, manzanita, and grasses. The competing vegetation may be controlled by manual, mechanical or chemical treatments.

Mechanical treatments: All equipment utilized for the control of competing vegetation shall adhere to the protection measures described within this THP including ELZs, and the Winter Operations Plan.

Chemical treatments: The registration of herbicides in California is a CEQA equivalent process, and when applied according to the label instructions, no significant adverse impacts to wildlife and water resources should occur. Herbicides use is regulated by the Department of Pesticide Regulation (DPR) and enforced by the County Agricultural Commissioner. The use, type and the timing of the herbicide shall be determined and recommended by a Licensed Pest Control Advisor (PCA) and the application shall adhere to the PCA's recommendation, the herbicide label instructions, and the Mitigated Negative Declaration, State Clearing House (SCH) # 2008062009 for LDSF Management Plan 2008.

Plan addendum #17 - Erosion Hazard Rating (EHR)

The Soil Survey of Shasta County California and field observations were used to determine the erosion hazard rating (EHR) for this THP area. The EHR areas were delineated according to soil type and ground observations with regard to slope, ground cover, and physical characteristics. The EHRs for the THP area are low and moderate. The EHR types are delineated on the EHR Map.

Plan addendum #31 - Piling and burning for hazard reduction

The standard rules 14 CCR 937.2(a) and 937.5(b) state slash to be treated by piling and burning shall be treated no later than April 1 of the year following creation, or within 30 days following climatic access, or as justified in the plan. The piles and concentrations shall be burned at a safe time during the first wet fall or winter weather or other safe period following piling and according to laws and regulations.

An alternative to the standard rule is proposed to allow treatment of landing slash accumulations that result from the use of chipping and/or de-limbing equipment created after September 1 of each year. This material may be burned the following fall when safe burning conditions occur. This alternative practice shall be applied over the entire THP area.

This practice differs from the standard practice in that piles will remain in place over the spring and summer and will be treated in the fall, rather than in the winter or early spring following their creation.

This alternative will provide equal or greater hazard reduction. Slash will be concentrated in the landings so that it is no longer a fuel component of the forested stands. There will be protective space around the piles as specified in Section II, Item 31. Also, there have been several incidents of burnt piles rekindling and even escaping following spring burning in this general region. Allowing fall burning of these piles will assure better consumption of the material and a cooling off period through the winter months.

All other provisions of 14 CCR 937.5 will be complied with. Piles will be constructed so that they are sufficiently free of soil for effective burning. These piles will be burned at a safe time during wet fall or winter weather according to other applicable laws and regulations. Piles that fail to burn sufficiently to remove the

CALIFORNIA FOREST PRACTICE RULES - 2009

939.15 Protection of Wildlife Habitat [Northern]

All trees within aspen stands (defined as a location with the presence of living aspen (*Populus tremuloides*)), meadows and wet areas may be clearcut and these areas exempted from stocking provisions in order to restore, retain, or enhance these areas for ecological or range values, and to balance the protection and regeneration of aspen stands, meadows and wet area habitats in California's forest ecosystems with the other goals of forest management as specified in 14 CCR § 897. These areas shall be shown on the plan map and the plan shall describe the extent of the area proposed for clearcutting. The RPF shall consult with DFG prior to plan submittal. If wet areas are proposed for clearcutting, the RPF shall also consult with the appropriate RWQCB in those locations where the applicable basin plan identifies wet areas as a beneficial use.

Bullhock Meadow Restoration



Before Treatment (7/14/2010)



After Treatment (7/9/2012)

**Sierra Nevada Conservancy
Grant Application**

for the

**California Department of Forestry and
Fire Protection**

**Latour Demonstration State Forest
Fuelbreak / Flat Top Biomass Project**

January 17, 2012

Memorandum

To: Chris Dallas
Mt. Lassen Area Representative
Sierra Nevada Conservancy

Date: May 8, 2013

Telephone: (530) 225-2505

Website: www.fire.ca.gov

From: Dave Loveless, Manager – Latour Demonstration State Forest (LDSF)
California Department of Forestry and Fire Protection (CAL FIRE)

Subject: SNC Grant #578, LDSF Fuelbreak/Table Top Biomass Project

Dear Chris,

As per our conversation on May 8, 2013, below is an updated “**Workplan and Schedule**” for the above referenced project as provided in our original grant application. As discussed, due to the severity of last season’s fires and the resulting abundance of biomass fuel available to the local market, perspective buyers have requested that the operations be delayed until the 2014 field season. As a result I am providing an updated workplan and schedule for the project. As indicated below, we will proceed with the project bid solicitation this summer in order to get the project under contract this year for the actual operations to take place in 2014.

a. Workplan and Schedule

• Workplan

The workplan, describing details and deliverables (underlined), necessary to successfully implement this project are included in the following outline and summarized in the “Schedule” table:

I. Prepare CAL FIRE Contract and Bid Package

- a. As a State Agency, CAL FIRE is required to prepare a contract, subject to review through the Department of General Services (DGS) for services in excess of \$5,000, and solicit competitive bids through the CAL FIRE Business Services Office. The contract approval process typically requires several months to complete the internal review and must be approved prior to disseminating the bid package to potential bidders.

II. Prepare & Submit Harvest Exemption

- a. As described below under “Regulatory Requirements/Permits”, a harvest exemption will be required in order to conduct operations for those portions of the project area not already covered under existing approved Timber Harvest Plans (THPs).
- b. The exemption must be submitted to CAL FIRE at least five days prior to commencement of operations.

- c. The exemption is only valid for one year from the date it is accepted for filing.
 - d. An exemption is prepared and submitted annually for the entire Forest to cover salvage operations. This exemption will also cover the fuelbreak and biomass operations proposed under this grant. The exemption is submitted once the snow melt allows for access onto the Forests, typically by June 1. A new exemption will be prepared and submitted prior to operations, which is anticipated to begin between June 1 and July 1, 2014.
- III. Solicit Bids for Work
- a. The bid package, or notice, is sent to perspective bidders well in advance of the specified due date. It contains maps and project specifications including the bid due date and the contract expiration/project completion date. It also contains a schedule for a site visit with interested perspective bidders to visit the project site and ask pertinent questions prior to bid submission.
 - b. The tentative date for the bid solicitation, mailing the bid package to perspective bidders, is June 15, 2013.
- IV. Flag/Sample Mark Project Areas
- a. A sample mark has been prepared for the Fuelbreak along McMullen Mountain Road. Additional sample marks will be done in each of the treatment areas prior to commencement of work.
 - b. Snags to be retained for wildlife purposes will be marked in the Table Top biomass treatment area prior to operations.
 - c. Flagging has been completed for each of the project areas.
- V. Open/Award Bid
- a. Due to the projects elevation and lack of winter access the bid due date is July 26, 2013 to allow perspective bidders to visit the project site prior to submitting bids. A mandatory pre-bid tour of the project area is scheduled for July 8, 2013.
- VI. Project Work Commencement/Completion
- a. Upon awarding the bid, and approval of the contractor by CAL FIRE Contracting, the contractor may commence work.
 - b. Tentative commencement date specified in the contract is no earlier than June 1 and no later than July 1, 2014, depending upon the successful bidders schedule and production rates. However, the contract will contain an expiration final completion date of November 1, 2014.
 - c. Assuming a production rate of five acres per day, the project could conceivably be completed by late August, 2014. However, given the uncertainties with regard to the contract approval process as well as weather conditions and access, and to avoid the need to extend the contract, the contract specifies a completion date of November 1, 2014.

• **Schedule**

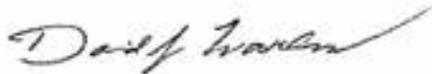
<u>PROJECT DELIVERABLES</u>	<u>TIMELINE</u>
Prepare CAL FIRE Contract & Bid Package	July 30, 2012
Prepare & Submit Harvest Exemption	By June 1, 2014
Solicit Bids for Work	June 15, 2013

Flag/Sample Mark Project Areas	Fall , 2012 – Summer 2013
Mandatory Pre-Bid Tour	July 8, 2013
Open/Award Bid	July 26, 2013
Project Work Commencement/Completion	June 1, 2014 – November 1, 2014

Though this project has been deferred a field season for reasons beyond our control, I am confident that the LDSF Fuelbreak/Table Top Biomass project is still a viable and valuable endeavor and committed to its completion.

I you have any questions regarding the updated workplan and schedule, please feel free to contact me.

Sincerely,



Dave Loveless, RPF #2220
Manager – LaTour DSF



Shasta-Trinity Unit
875 Cypress Ave.
Redding, CA 96001
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5. Narrative Description

a. Detailed Project Description Narrative

• Project Description

The LDSF Fuelbreak/Flat Top Biomass project site is located on LaTour Demonstration State Forest (LDSF), which is located approximately 45 miles east of Redding, in Shasta County. The project consists of creating a 400 foot wide fuelbreak, 200 feet on each side, along a series of four road segments located on LDSF covering 199 acres. In addition, a biomass thinning operation is planned on Table Top Mountain which encompasses 104 acres. In total, the Fuelbreak/ Table Top Biomass operation covers 303 acres on LDSF.

Location

One fuelbreak segment is located along a portion of the McMullen Mountain Road which is located on a main ridgeline that transects from east to west near the center of LDSF. This segment is 12,500 feet long and covers 100 acres. Another segment is located on the Cutter Road which is located in the northeastern portion of LDSF. This segment is 6,178 feet long and covers 57 acres. The last two fuelbreak segments are located on the Rim Road, another main ridgeline located in the southeastern portion of LDSF. The combined Rim Road segments are 4,544 feet long and will create 42 acres of fuelbreak. The 104 acre Table Top Biomass thinning operation is located on the eastern Forest boundary, covering the area from the south side of Flat Top Mountain west to the Rim Road and south to the Huckleberry Road.

Scope of Work

Both the fuelbreak and the biomass thinning operations have similar treatment criteria. In general, each treatment area will consist of harvesting small trees 3-12 inches in diameter at breast height (DBH) to achieve a desire spacing of approximately twenty feet between retained residuals. Harvesting will take place by means of mechanical sheers, skidding the resulting raw material referred to as doodles to nearby landings, chipping and blowing the material into chip vans, and transporting the chips to a co-generation plant located either in Redding or Burney.

All treatment area boundaries will be designated with florescent orange flagging. Sample treatment areas will be leave-tree marked in order to key equipment operators into tree selection and spacing criteria to allow completion of the operation using operator selection. With the exception of lodgepole pine and those infected trees, both criteria described below, those live trees that are larger than 12 inches in DBH shall be retained.

Those trees that are smaller than 14 inches to be retained to meet stocking and spacing criteria shall be those dominant trees that exhibit the best phenotype (physical characteristics) based on the immediately surrounding trees. Retained species in order of preference shall be Douglas-fir, sugar pine, ponderosa pine, western white pine, white fir and red fir. Where sufficient stocking exists in the preferred species to meet the twenty-foot spacing criteria, lodgepole pine smaller than 18 inches at DBH, based on ocular estimate, shall not be retained.

While similar in treatment criteria and objectives, the Table Top biomass thinning treatment is also targeted and intended to provide more than a fuelbreak and expanded growing space. The red fir in this area is infected with *Cytospora abietis*, a fungus widely found in California's true fir stands and commonly found in association with dwarf mistletoe. Therefore, this planned treatment covers a broader geographic area than those treatment areas specifically designed to create fuelbreaks. While this fungus can attack white fir and other tree species it is more specific to and prominent in the red fir in this stand and elsewhere on LDSF. Typical visible symptoms include increasing brick-red to brown flagging (needle die-back) in the crowns of infected trees, eventually leading to branch death and eventual tree mortality. Infected overstory trees also spread the disease to the understory, which perpetuates the infection cycle. In this area, those trees larger than 12 inches at DBH whose crowns exhibit *Cytospora* flagging greater than 50% and those trees that have succumbed to this disease shall be removed. Snags to be saved for wildlife purposes shall be marked (painted) with a "W" at DBH prior to operations. Trees in the 3-12 inch DBH range will be selected for removal based on spacing, species and the above described visible signs of infestation. The desired residual spacing for this area is also twenty feet.

Goals/Results

The objectives (goals/results) in each treatment area are also similar, and two-fold:

- 1) Resource protection by reducing the fuel loading in strategic areas, and thereby reducing the risk of and from catastrophic fire. This will be accomplished by reducing the number of conifer stems per acre in the smaller DBH classes. This will also reduce the ladder fuels that can allow ground fires to climb into the tree canopies resulting in catastrophic crown fires.
- 2) While a secondary by-product of the fuels reduction/biomass thinning, the operation will also serve to improve forest health and tree vigor by expanding growing space and reducing inter-tree competition for nutrients, moisture and sunlight.

- 3) Specific to the Table Top Biomass treatment area, an additional goal is to reduce the prevalence, impact and spread of the Cytospora fungus infection in the current and future crop of trees.

- **Project Summary**

The areas surrounding LDSF have a long history of devastating fires occurring on a regular basis, with significant fires occurring most recently in 1968, 1978, 1987, and 2003. The LDSF Fuelbreak/Flat Top Biomass project will create 303 acres of fuelbreak on LDSF (deliverable) which will reduce the risk of catastrophic wildfire while improving stand vigor and tree growth by thinning overstocked and/or Cytospora infected trees. In the event of fire on or approaching LDSF, these strategic fuelbreaks will act as natural barriers that will reduce the fire intensity, the potential for crown fire, the rate of spread, and provide logistical areas from which fire suppression efforts may more safely and successfully be undertaken. Additionally, the Flat Top biomass operation will improve the current and future stand health by removing much of the existing source of the ongoing Cytospora infection.

- **Environmental Setting**

The California Department of Forestry and Fire Protection (CAL FIRE) manages approximately 71,000 acres of Demonstration State Forests (DSFs), on behalf of the public. LaTour Demonstration State Forest (LDSF), a 9,033-acre mixed conifer forest located in the northern Sierra Nevada/southern Cascades is the second largest DSF. LDSF is located in eastern Shasta County in Townships 32 and 33 North, Ranges 2 and 3 East M.D.B & M. It ranges in elevation from 3,800 feet to over 6,700 feet with 80 percent of LDSF above 5,000 feet. The nearest community is Whitmore, eleven miles to the west.

LDSF is the headwater source of two major streams, Old Cow Creek and South Cow Creek. A tributary to the North Fork of Battle Creek and South Fork of Bear Creek drain small portions of the south side of LDSF.

The Board of Forestry and Fire Protection establishes policy which governs LDSF and other State Forests. Board policy states that the primary purpose of the state forest program is to conduct innovative demonstrations, experiments, and education in forest management. The entire LDSF has been zoned as a Timberland Production Zone (TPZ). This means the land is devoted to and used for growing and harvesting timber and compatible uses. Compatible use is defined as any use that does not significantly detract from the use of the land for, or inhibit, growing and harvesting timber. Compatible uses include watershed management, fish and wildlife habitat management, hunting and fishing, and grazing. No change in current land uses on or surrounding the project

areas are proposed or anticipated. The following is a list of management goals for LDSF (major goals synonymous with SNC mission and goals are underlined):

1. Maintain and strive to improve the research and demonstration program to provide valuable information regarding timber production, wildlife habitat requirements for various species that inhabit LDSF, and road management practices that result in reduced sediment. This information should be made available to the general public, small forest landowners, resource professionals, timber operators, and the timber industry. Research and demonstration projects will be aimed at providing practical information for forest landowners who need to manage a host of forest resources, including but not limited to, wildlife, water, soil, sensitive plants, and timber. Due to limited staff resources, cooperative research projects will be sought with other public and private researchers who share a common interest and direction in forest management. Staff will seek opportunities to disseminate to landowners and educate the public information on regarding Best Management Practices (BMPs) to maintain a healthy forest ecosystems. Continue research into forest-based carbon sequestration and forest management techniques to promote forest adaptation and resiliency to climate change.

2. Maintain a timber inventory for purposes of estimating growing stock by species and site class. The timber inventory data will be used to calculate timber growth and future sustained yield calculations. The timber inventory will also be used to estimate the quantity of certain wildlife habitat attributes such as snag retention and stand structure. The collection of this data will assist managers in evaluating wildlife use and habitat condition on LDSF.

3. Provide low impact recreational opportunities for forest visitors. Work toward expansion and improvement of existing facilities and the development of new recreational opportunities in suitable areas.

4. Harvest timber under sustained yield management (PRC 4513), methods and levels of harvest which permit continuous production of timber achieves maximum sustained production of high quality timber products (PRC 4513) without degrading the productivity and health of the forest, and contributes to local employment and tax revenue. Timber production will be conducted to provide local job opportunities, consistent with the overall objective of providing for recreation, wildlife, fisheries, aesthetic enjoyment, protection of soil resources, and protection of water quality.

5. Improve and maintain watershed protection through forest practices and erosion control efforts. Continue operating under the existing road management plan to maintain public access and prevent contamination of watercourses from road water runoff.

6. Continue an aggressive pest management program to help prevent the spread of insects and disease to keep tree mortality at a minimal level.

Harvest salvage material where feasible and compatible with the management of other forest resources.

7. Continue the fire prevention and hazard reduction programs and construct fuel breaks in critical areas to help keep the damage from wildfires at a minimum. Begin an aggressive prescribed burn program or other non-fire vegetation management program to help reduce the hazard associated with uncontrolled wildfires.

8. Work toward maintaining the widest possible diversity of managed forest stands in different successional stages, in order to foster ecosystem resiliency and adaptability to climate change, and develop a laboratory of representative forest conditions for research. Seek opportunities to maintain or increase functional wildlife habitat within the planning watersheds.

9. Prevent site degradation by using erosion controls and soil conservation practices in all management activities.

10. Continue to provide safe conditions for employees and visitors, identifying potentially hazardous situations, and where appropriate provide for safety guidelines, procedures, and equipment.

The surrounding property ownership includes private and National Forest lands. All adjacent lands are managed for timber production. Land to the north is administered by Beaty and Associates (Beaty) with Sierra Pacific Industries (SPI) owning a portion of the land. Property to the east is administered by Lassen National Forest and Beaty. SPI owns and administers lands to the south. Lands to the west are administered by Beaty and SPI.

b. Workplan and Schedule

• Workplan

The workplan, describing details and deliverables (underlined), necessary to successfully implement this project are included in the following outline and summarized in the "Schedule" table:

I. Prepare CAL FIRE Contract and Bid Package

- a. As a State Agency, CAL FIRE is required to prepare a contract, subject to review through the Department of General Services (DGS) for services in excess of \$5,000, and solicit competitive bids through the CAL FIRE Business Services Office. The contract approval process typically requires several months to complete the internal review and must be approved prior to disseminating the bid package to potential bidders.

II. Prepare & Submit Harvest Exemption

- a. As described below under "Regulatory Requirements/Permits", a harvest exemption will be required in order to conduct operations

for those portions of the project area not already covered under existing approved Timber Harvest Plans (THPs).

- b. The exemption must be submitted to CAL FIRE at least five days prior to commencement of operations.
- c. The exemption is only valid for one year from the date it is accepted for filing.
- d. The exemption will be prepared and submitted by October 31, 2012.

III. Solicit Bids for Work

- a. The bid package, or notice, is sent to perspective bidders well in advance of the specified due date. It contains maps and project specifications including the bid due date and the contract expiration/project completion date. It also contains a schedule for a site visit with interested perspective bidders to visit the project site and ask pertinent questions prior to bid submission.
- b. The tentative date for the bid solicitation, mailing the bid package to perspective bidders, is October 31, 2012.

IV. Flag/Sample Mark Project Areas

- a. A sample mark has been prepared for the Fuelbreak along McMullen Mountain Road. Additional sample marks will be done in each of the treatment areas.
- b. Snags to be retained for wildlife purposes will be marked in the Table Top biomass treatment area prior to operations.
- c. Sample marking and flagging will be completed by the end of October, 2012.

V. Open/Award Bid

- a. Due to the projects elevation and lack of winter access the tentative bid due date is December 3, 2012 to allow perspective bidders to visit the project site prior to submitting bids.

VI. Project Work Commencement/Completion

- a. Upon awarding the bid, and approval of the contractor by CAL FIRE Contracting, the contractor may commence work.
- b. Tentative commencement date June 1, 2013, depending upon the successful bidders schedule and production rates. However, the contract will contain an expiration final completion date of October 31, 2013.
- c. Assuming a production rate of five acres per day, the project could conceivably be completed by the first of October, 2013. However, given the uncertainties with regard to the contract approval process as well as weather conditions and access, and to avoid the need to extend the contract, the contract will specify a completion date of October 31, 2013.

- **Schedule**

PROJECT DELIVERABLES	TIMELINE
Prepare CAL FIRE Contract & Bid Package	July 30, 2012
Prepare & Submit Harvest Exemption	October 31, 2012
Solicit Bids for Work	October 31, 2012
Flag/Sample Mark Project Areas	Summer- Fall , 2012
Open/Award Bid	December 3, 2012
Project Work Commencement/Completion	June 1, 2013 – October 31, 2013

c. Restrictions, Technical / Environmental Documents and Agreements

- **Restrictions**

Purchase of the property by the California Division of Forestry was made possible with the enactment of Chapter 1465 Statutes, dated July 17, 1945. Therein the legislature encumbered the sum of \$100,000 from the State Treasury for the purchase of the Cow Creek Unit by the Division of Forestry from the State Lands Commission. The patent deed to the property known as "LaTour State Forest" was executed on January 8, 1946. LDSF was the first sizable state forest acquired.

LDSF has no property restrictions, leases and/or encumbrances that could adversely impact the proposed Fuelbreak/Table Top Biomass project completion. (See Checklist – Restrictions/Agreements N/A)

- **Agreements**

As describe above under the "Workplan", as a State Agency, CAL FIRE is required to prepare a contract, subject to review through the Department of General Services (DGS) for services in excess of \$5,000, and solicit competitive bids through the CAL FIRE Business Services Office. The contract approval process typically requires several months to complete the internal review and must be approved prior to disseminating the bid package to potential bidders. As per the Forest Practice Rules (FPRs), only Licensed Timber Operators (LTO) may conduct timber operations in the State of California. Upon awarding the project to the successful bidder both parties (CAL FIRE and contractor) will sign and receive a copy of the signed contract agreement and bid package. As this project is dependent upon the availability of grant funds, the contract will be prepared and submitted to CAL FIRE for review once SNC grant funding is approved in July, 2012. A copy of the contract agreement will be provided to SNC as a deliverable once it has been approved by CAL FIRE. (See Checklist – Restrictions/Agreements N/A)

- **Regulatory Requirements/Permits**

The Forest Practice Rules require that an environmental impact assessment be prepared as a part of and prior to harvesting timber in California. Portions of the proposed project area are covered under existing Timber Harvest Plans (THPs), a permitting process guided by statutes and implemented through policies established by the Board of Forestry as the functional equivalent of an EIR. Specifically, the entire 104 acre Table Top Biomass project area is covered under approved THP #2-09-084-SHA. A portion of the 42 acre Fuelbreak along the Rim Road is covered under approved THP #2-09-059-SHA. A portion of the McMullen Mountain Fuelbreak is also covered under an approved THP, #2-10-049-SHA. Portions of these documents are attached (See Supplemental and Supporting Documents and RegPermit.pdf)

For the balance of the Fuelbreak project areas, a timber harvest exemption will be required in order for timber operations to occur, and will be submitted to CAL FIRE, the lead review agency, prior to operations. Unlike a timber harvest plan (THP), which is a permitting process typically required prior to commercially harvesting timber in California, an exemption is a notification. Exemptions are allowed for timber operations that meet certain conditions and criteria, including the harvesting of dead, dying, or diseased trees and fuelwood products in amounts of less than 10% of the average volume per acre and operations that are limited to those trees that eliminate the vertical continuity of vegetative fuels and the horizontal continuity of tree crowns, for the purpose of reducing the rate of fire spread, duration and intensity, fuel ignitability, or ignition of tree crowns, as per Forest Practice Rules, 14 CCR §1038 (b) and (i) and the Forest Practice Act, Public Resource Code 4582. The exemption must be submitted at least five days prior to commencement of operations. As this project is dependent upon the availability of grant funds, the attached exemption notice (See Supplemental and Supporting Documents and RegPermit.pdf) will not be submitted to CAL FIRE for review until after grant funding is approved in July, 2012. Also, as an exemption is only valid for one year after submission, and as actual work is planned to commence in 2013, the exemption will be submitted to CAL FIRE in October of 2012. The SNC will receive a final copy of the Exemption, as a deliverable, once it has been submitted and accepted for filing by CAL FIRE.

In addition to existing, approved THPs and an Exemption to be prepared for this project, the LDSF staff operates under a Board of Forestry approved Management Plan. This plan provides general objectives and goals, and lays out the planned on-the-ground management on LDSF for the next five to ten years with an emphasis on forest demonstration, research, recreation, maintenance of wildlife habitat, and water quality protection. It serves as a guide to Forest managers as well as a public

disclosure of the management direction at LDSF. The plan is required pursuant to Public Resources Code (PRC) §4645 and Article 8 of the California Board of Forestry and Fire Protection (Board) policy.

- **California Environmental Quality Act (CEQA)**

While projects conducted on Latour Demonstration State Forest are not subject to review under the provisions of NEPA (See Checklist - NEPA N/A), as required on federal lands, they do require CEQA analysis and documentation. In general, the California Environmental Quality Act (CEQA) requires that an analysis of the potential environmental impacts be conducted, submitted, and approved prior to undertaking projects that are subject to a permitting process. The LDSF Management Plan, discussed above, is subject to review and approval by the California Board of Forestry, and therefore requires an environmental assessment. This requirement is fulfilled by a Negative Declaration CEQA document that has been approved for the LDSF Management Plan. That is, this project is covered by and in compliance with LaTour Demonstration State Forests' (LDSF) Management Plan and accompanying Mitigated Negative Declaration (State Clearinghouse #2008062009), both revised and approved by the California State Board of Forestry in August, 2008. This approved CEQA document, Notice of Determination attached to the application (See Supplemental and Supporting Documents and CEQA.pdf) contains the analysis necessary to conclude that projects such as the proposed Fuelbreak/ Biomass operation, combined with the past, present, and reasonably foreseeable probable future projects will not have a reasonable potential to cause or add to significant adverse cumulative impacts to the watershed, soil productivity, biological, recreation, visual, traffic, or other resources.

- d. Organizational Capacity**

Latour Demonstration State Forest has a full-time staff of three and a seasonal staff of two to six Forestry Aides. Full-time staff includes the following:

Dave Loveless, Forest Manager, RPF #2220 (Registered Professional Forester). Dave has a BS Degree in Forestry from Humboldt State University (HSU), has been working in the forest industry for 37 years and has been an RPF since 1984. He was an Associate with W.M Beaty & Associates, Inc., a land and timber Management Company located in Redding, for 24 years, and has been with CAL FIRE for seven years. Prior to becoming Forest Manager at LDSF, he held the position of Review Team Chair with CAL FIRE, heading an inter-agency interdisciplinary team tasked with reviewing all timber harvest plans (THPs) in inland northern California.

Ben Rowe, Assistant Forest Manager RPF #2686. Ben has a BS Degree in Wildlife Management from HSU, and has been working in the forest industry since 1993 and has been an RPF since 2000. He was a forester for Louisiana Pacific, a private consultant for wildlife and forestry, and also worked for W. M. Beaty and Associates until 2005. Ben started with CAL FIRE in 2005 and has been at LDSF since 2006.

Shannon Johnson – Forestry Assistant II. Shannon has a BS Degree in Conservation Biology from California State University Sacramento (CSUS). She has been working with CAL FIRE since 2004, starting as a Student Assistant at Sacramento Headquarters and also worked on LDSF for three seasons as a Forestry Aide while completing her degree. Prior to returning to LDSF in 2011 she was a Forestry Assistant II in the San Diego Unit and also at Jackson Demonstration State Forest (JDSF). She has recently taken the RPF examination.

Forestry Aides are hired each summer for two to nine months to assist staff with timber inventory, timber sale preparation, and other projects and tasks on LDSF. LDSF intends to hire four Forestry Aides for the 2012 and 2013 field seasons.

Also, as described above under "Agreements", this project will be contracted to and executed by a licensed timber operator (LTO), as required under the Forest Practice Rules. There are several LTOs in the area who specialize in and have the appropriate equipment to conduct a biomass thinning operation. The contract will be administered and the operation supervised by LDSF Staff to ensure that the work is completed in compliance with the contract specifications.

In addition to the experienced and well rounded workforce, LDSF has a track record of undertaking and completing numerous projects on an annual basis. Staff prepares THPs and administers timber sales, typically harvesting 2-4 million board feet of timber annually. Approximately 900 acres are re-inventoried annually to maintain a database for timber and wildlife management. Sixty acres of brush was cleared, under contract, and an additional twenty acres broadcast burned last year in preparation for planting. Road contracts were prepared both last year and this year and the projects were completed on-time. The road projects are intended to improve and disconnect the road drainage system to reduce run-off and discharge into watercourses in order to enhance the watershed. As part of this year's timber sale, fifty-five acres of brush was cleared under a variable retention silvicultural prescription in preparation for planting. Many of these projects are similar in nature and objective to this fuelbreak/biomass project; reduce fuel loading, improve stand vigor, forest health, improve wildlife habitat and diversity, and watershed enhancement.

Other fuelbreaks have also been established along high use roads such as the Bateman and Huckleberry Roads. These projects were completed, under contract, by LDSF Staff and have been maintained through the use of inmate fire crews or by means of contracts to control vegetation.

e. Cooperation and Community Support

The Cow Creek Watershed Management Group (CCWMG) is an organization comprised of local ranchers, timber companies, small landowners and other involved citizens interested in protecting and managing the Cow Creek drainage and other surrounding watersheds. As a major landowner/manager in this watershed, CAL FIRE is involved in this organization, and the LDSF Manager is a member of the Board. In general, the CCWMG is supportive of any activities that serve to protect or enhance these watersheds and their resources from which many derive their livelihood as well as recreational enjoyment. (See attached letter of support from the CCWMG).

In addition, the LDSF Management Plan, discussed above, is revised and presented to the Board of Forestry every five years. As described, this plan provides general objectives and goals, lists past projects, and lays out the planned on-the-ground management on LDSF. This process is transparent, open and available to the public for comment. The LDSF staff also has the opportunity to interact on a regular basis with recreational users where we have the opportunity to solicit feedback as to their general perception of LDSF. While anecdotal, comments received through these cursory contacts and conversations with the general public indicate overwhelmingly positive support for the management practices conducted on LDSF. Work to be conducted under this grant will not only serve to protect and further enhance the resources, but will also demonstrate to the public the commitment to obtain these goals through intensive forest management on LDSF.

f. Long-Term Management and Sustainability

A critical factor in establishing fuelbreaks includes a commitment to maintain them in order to preserve and capitalize on the original investment so that, should the need arise, they serve their intended purpose. CAL FIRE is committed to managing the LDSF for the long-term by investing in forest management as well as infrastructure, and by maintaining those assets and investments. As described under "Organizational Capacity", other fuelbreaks have been established along high use roads such as the Bateman and Huckleberry Roads and have been maintained through the use of inmate fire crews and contract work to control brush and manage ingrowth. This year inmate crews cleared brush and trees along approximately three miles of roads on LDSF, including portions of existing Bateman fuelbreak. The work was

accomplished this fall and winter by hand clearing, piling, and burning. These crews, stationed at the Sugar Pine Camp near Ingot and Hwy 299, work on LDSF on an annual basis as available, typically after fire season.

The maintenance frequency and intensity for fuelbreaks are dependent upon how rapidly undesirable vegetation may begin to re-occupy the site and how much of this vegetation, ladder fuels, litter, and down material, is acceptable before the fuelbreak begins to lose functionality. Concentrations of heavy fuels created from falling limbs and snags, and removed during the original treatment are much slower to build up to the point where they create a fire hazard. However, ladder fuels, often a key contributor in stand replacing fires, must be removed before they provide that component and opportunity. Established fuelbreaks on LDSF are treated on an as-needed basis with follow-up thinning and brush removal occurring roughly every ten years. For the long-term management of this project, fuelbreaks established under this grant project will be inspected annually and maintained on a similar ten-year or as-needed schedule utilizing inmate crews. Guided by these essential management and maintenance standards, no additional supplemental and supporting documents are requisite for the management of these fuelbreaks (See Checklist – Long-Term Management Plan N/A).

g. Performance Measures

The following is a list and discussion of potential performance measures that may apply to this fuelbreak/biomass project. The first four quantitative performance measures listed are required, if applicable, to all projects, as per SNC Grant Guidelines. The subsequent three are proposed project-specific performance measures selected from the pre-approved list developed by the SNC:

- **Number of People Reached**

As described above under "Cooperation and Community Support", those members of the Cow Creek Watershed Management Group and other interested parties who attend the meetings are familiar with management activities that take place on LDSF. In addition, LDSF accommodates over 6,000 recreational visitors and campers annually. Uses include camping, fishing, hunting, picnicking, sightseeing, hiking, horseback riding, nature walks, ATV, winter recreation, firewood and Christmas tree cutting. Each of these visitors are exposed to management activities that have and are occurring on the Forest. We have also been working with Shasta College, a local community college, to develop a MOU which would allow the college to use facilities and to conduct summer classes for those interested or majoring in natural resource fields. This program will provide further outreach and opportunities to expose and educate the community about management activities on LDSF.

- **Dollar Value of the Resources Leveraged for the Sierra Nevada**
Grant funds provided for this project through the Sierra Nevada Conservancy will be leveraged in two fundamental ways:
 - The biomass material produced from this operation will be sold by the contractor to substantially offset the cost of operations. The remaining cost of the operation in excess of revenue, primarily attributable to the haul distance and resulting cost, will be supplemented by grant funds to subsidize the extended haul cost. Based on a projected yield of 4,500 tons of biomass from the operation, an estimated cost of \$64 per bone-dry ton delivered to market, and a current quoted spot price of \$44 per bone-dry ton delivered, the operation will yield revenues, approximately \$198,000, that will offset nearly 69% of the cost, approximately \$288,000. Actual costs and revenues will not be known until the contract bid is awarded, the exact amount of biomass material is known, and the harvested material is sold. These figures will be provided at the conclusion of the operation.
 - LDSF staff In-kind contribution. Those costs associated with preparing the application, permits, environmental documents, contracts, field preparation and layout, flagging, marking, contract administration, and subsequent reports. See "Budget" for all projected cost estimates and the estimated dollar value of in-kind contributions from the grantee that extend, or leverage, SNC grant funds.
- **Number and Type of Jobs Created**
The LaTour Fuelbreak/Flat Top Biomass project is a significant undertaking that will take several months to complete. During this time, it will employ numerous personnel not only to accomplish the specific project, but indirectly as a result of the trickle down effect as well. While it is uncertain whether this project may result in creating new jobs in the community as a whole, it will contribute to maintaining and perpetuating existing jobs in the timber industry, co-generation energy production industry, and the community as well.
- **Number of New, Improved or Preserved Economic Activities**
This performance measure pertains to the fuelbreak/biomass project in that significant revenues will be generated through the sale of the biomass material to a co-generation plant by the contractor, which will be used to cover much, but not all, of the cost of the operation. The balance of the operating costs are intended to be subsidized under this SNC grant program (See "Budget"). The influx of wages spent by individuals directly and indirectly involved in this project into the community will contribute to and can only serve to stimulate economic activity both locally and beyond.

- **Kilowatts of Renewable Energy Production Capacity Maintained or Created**

The raw materials, all renewable by-products, harvested from the fuelbreak/biomass operation will be used to generate energy. Based on conversion tables available at <http://rsbiomass.com/woodfuels.html>, softwood chips at 30% moisture content can produce approximately 3.5 kWh of electricity per Kg of fuel. Also, based on an estimated total production of 4,500 tons of biomass material, predominantly composed of softwood chips, the estimated amount of renewable energy production capacity maintained by this project is calculated to be 14,288 million kilowatt-hours (4,500 tons = 4,082,331 Kg * 3.5 kWh/Kg = 14,288 megawatt-hours. This translates into enough energy to supply 2,381 homes with electricity for a year, based on an average household consumption of 6,000 kWh per year (<http://www.physics.uci.edu/~silverma/actions/HouseholdEnergy.html>).

- **Tons of Carbon Sequestered or Emissions Avoided**

In 2007 the State of California passed the Global Warming Solutions Act (AB 32), which set targets to reduce greenhouse gas emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. The California Air Resources Board was tasked with obtaining compliance with the cap through regulatory and market approaches. Planning is currently underway and definitive decisions by the Board have not yet been taken, however, it appears that forests will play a significant role in non-regulated strategies to meet targets. This is anticipated to occur both as offsets within a cap and trade system and through voluntary measures.

Recognized strategies to mitigate GHG emissions and enhance terrestrial sequestration include reforestation, forest management and fuels treatments to avoid catastrophic losses. LDSF will contribute to the targets of AB32 by increasing the resiliency of the Forest to catastrophic mortality by improving the general health of stands, pre-fire implementation of shaded fuel breaks and maintenance of firefighting infrastructure such as roads, signage and water sources. The long-term carbon stocks of the Forest are anticipated to increase over time. For example, the LDSF Long-Term Management Plan (Option A Plan) indicates that the timber inventory on the Forest will increase from about 22.7 MBF per acre in 2005 to 34.4 MBF per acre in 2105.

Forest products produced from LDSF will sequester carbon during their life cycle. Biomass fuels produced on the Forest also provide an opportunity to replace fossil fuels with an alternative energy source that is close to carbon neutral.

LDSF, in cooperation with WESTCARB, is currently conducting a Carbon Sequestration Project designed to demonstrate various methods to

improve carbon sequestration in forested environments and the protocols in carbon registration. A total of seven units encompassing 281 acres were established between 2007 and 2009 and treated by various means including clearing brush using tractor & brush rake or masticator, controlling brush with spray treatments to release existing conifers, and planting tree seedlings.

Annually across the country, millions of tons of carbon are emitted into the atmosphere as a result of the environment and typical nature of the fuels consumed under wildland fire conditions. By implementing this fuelbreak/biomass project on LDSF, potentially thousands of tons of emissions may be avoided in the event of a fire. The material harvested during this operation will be dried and burned at one of several surrounding co-generation plants under environmentally controlled conditions. While there are alternative opinions, current Federal EPA regulations have accepted the premise that facilities fueled by woody waste are "carbon-neutral". That is, it is considered a process that simply speeds up the carbon cycle that would otherwise naturally occur as plants decompose. Therefore, emissions produced by converting the material from this project to energy in licensed wood-burning co-generation plants are considered to be "carbon neutral" according to the EPA.

Alternatively, based on extrapolation of information contained in Forest Carbon Emissions Model (FCEM) Report No. 2 for four California Fires, prepared by Thomas M. Bonnicksen, Ph.D., March 12, 2008, a catastrophic fire on LDSF may conservatively have the potential of emitting 50 tons of CO₂ per acre produced from combustion, and 185 tons of CO₂ per acre produced from combustion and decay over a 100-year period. Expanded forest wide, these estimates amount to approximately 452 thousand tons and 1.671 million tons, respectively, of potential CO₂ emissions that may be avoided from a catastrophic fire on LDSF.

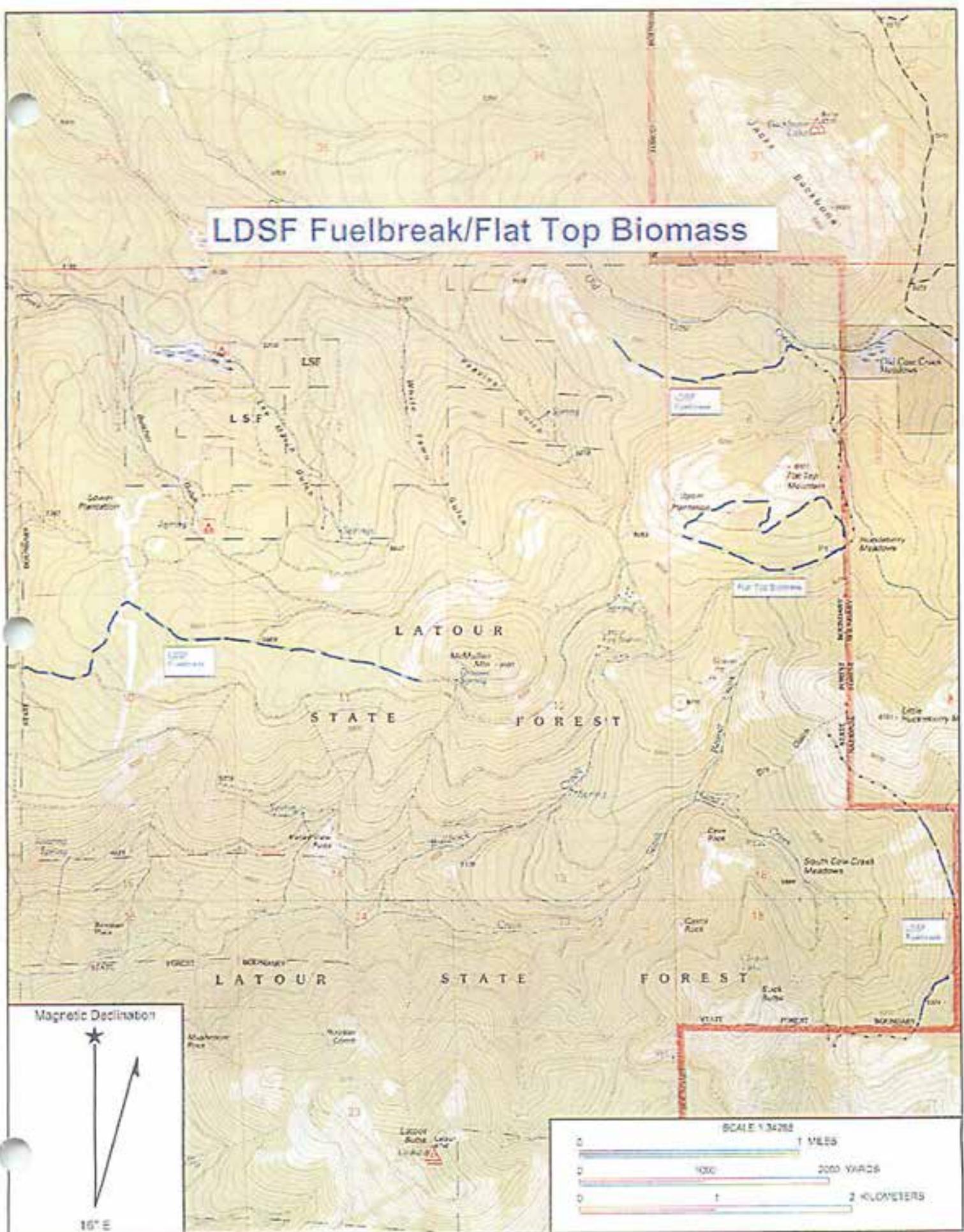
In this report, the author states: "The immensity of greenhouse gas emissions illustrated in Table 7 from just these four wildfires is a warning. Clearly, we must make every effort to reduce the amount of excess biomass in forests to prevent catastrophic wildfires. That means thinning trees to restore the natural health and diversity of forests and to make them more resistant to crown fires. Reducing wildfires may be the single most important action we can take in the short-term to reduce greenhouse gas emissions and fight global warming."

- **Acres of Land Improved or Restored**

The Fuelbreak/Flat Top Biomass project will improve the productivity of the forest land by removing dense brush and the overstocked smaller conifer trees (ladder fuels) that are currently competing with crop trees for

limited resources, moisture, nutrients and sunlight, as well as creating hazardous and potentially catastrophic fire conditions. This project proposes treatment of 303 acres of timberland. Actual acres treated will be reported upon completion of the project.

LDSF Fuelbreak/Flat Top Biomass

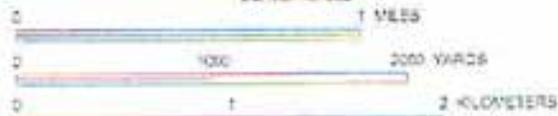


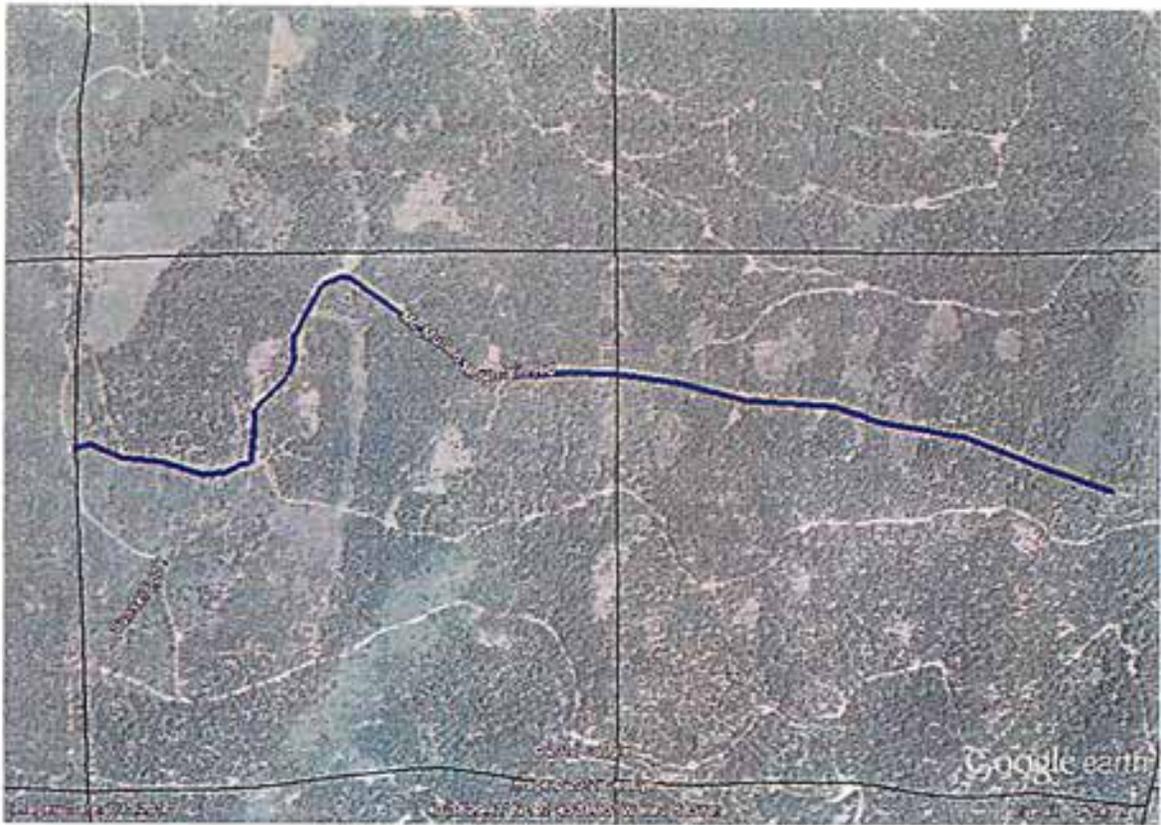
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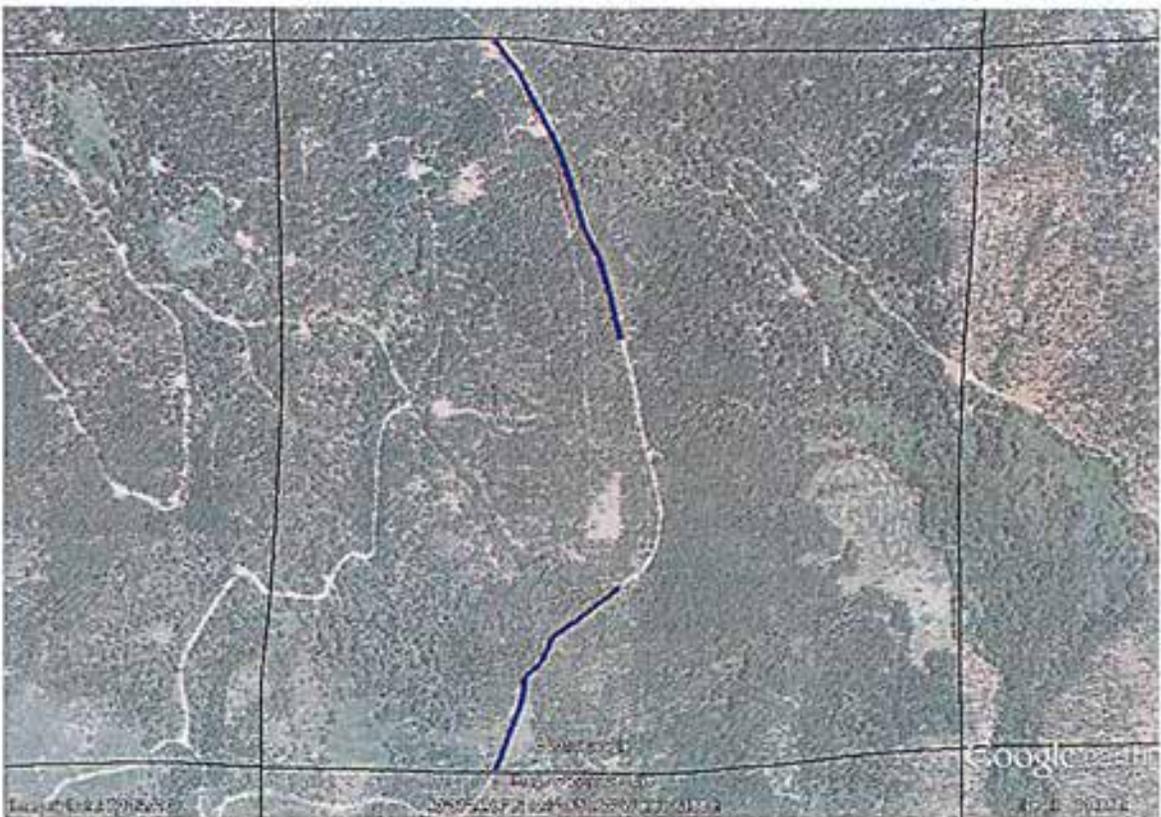
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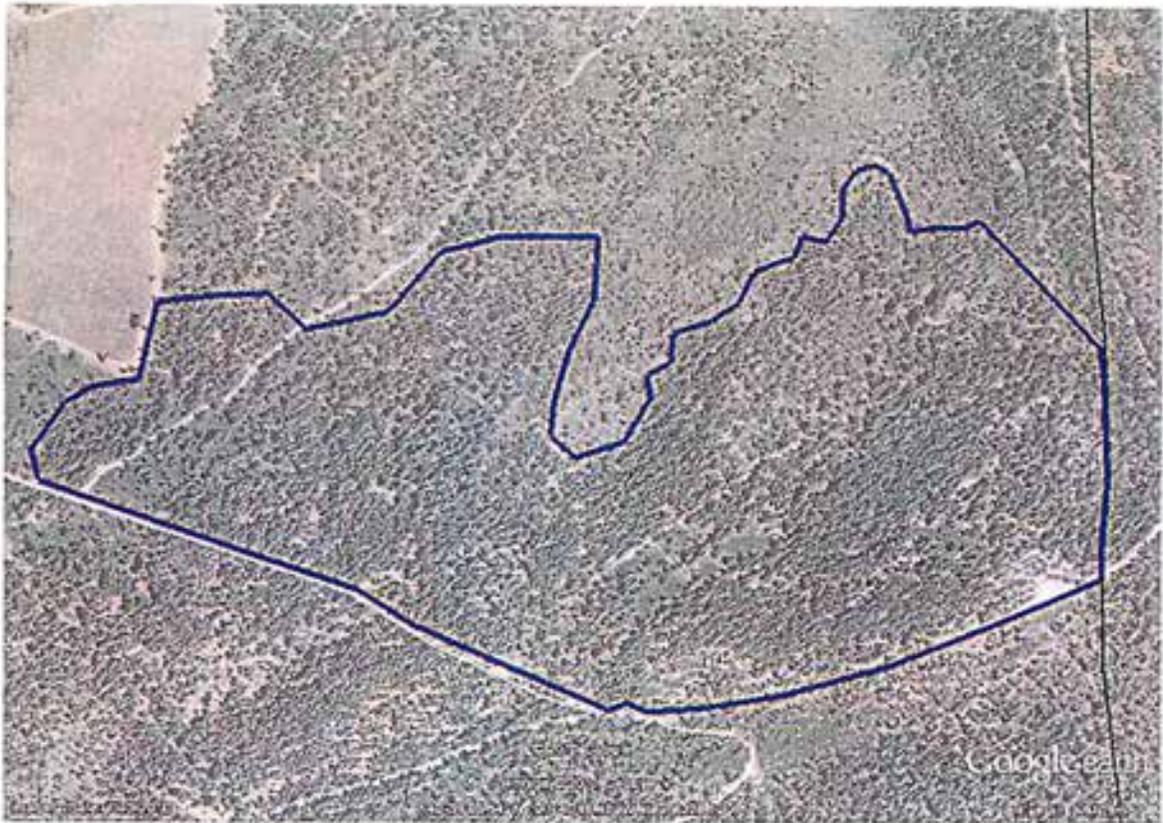




LDSF Fuelbreak/Table Top Biomass –
McMullen Mountain Road Fuelbreak Segment



LDSF Fuelbreak/Table Top Biomass – Rim Road Fuelbreak Segments



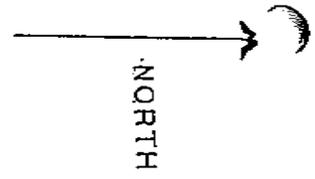
LDSF Fuelbreak/Table Top Biomass – Table Top Biomass Area



LDSF Fuelbreak/Table Top Biomass – Cutter Road Fuelbreak Segment

LATOUR DEMONSTRATION STATE FOREST HEADQUARTERS

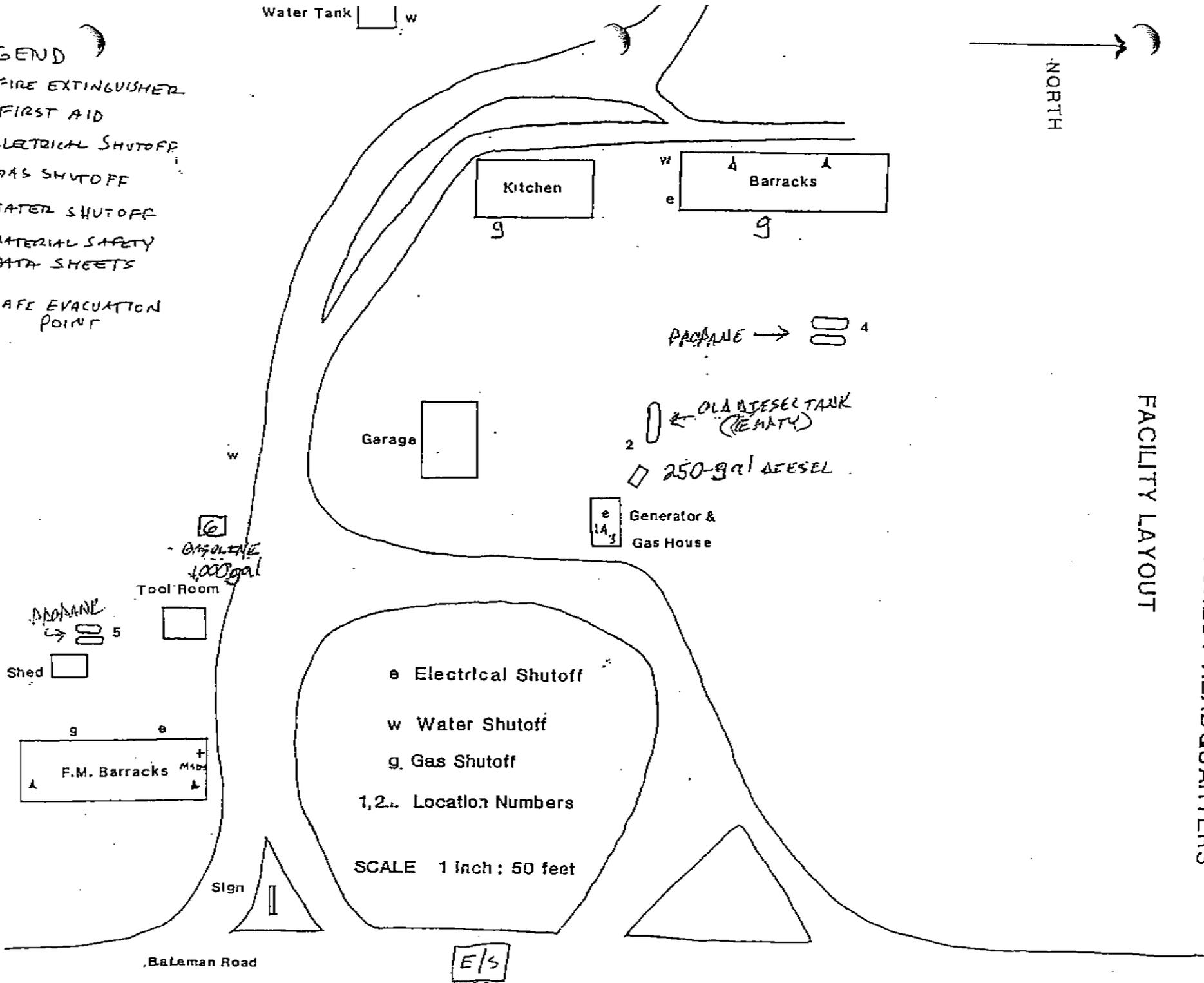
FACILITY LAYOUT



Water Tank [] w

LEGEND

- ▲ = FIRE EXTINGUISHER
- + = FIRST AID
- e = ELECTRICAL SHUTOFF
- g = GAS SHUTOFF
- ∨ = WATER SHUTOFF
- DS = MATERIAL SAFETY DATA SHEETS
- = SAFE EVACUATION POINT





CAL FIRE LaTour State Demonstration Forest Phase One

Shasta College Representative: Ken Nolte Instructor ("COLLEGE")
Project Representative: Bruce Beck, CAL Fire ("CAL FIRE")

Letter of Understanding

The Shasta College Natural Resources Program and CAL FIRE have mutually recognized an opportunity to utilize the CAL FIRE State Forest—LaTour State Demonstration Forest as an educational facility. The Natural Resources program will use the site as an "outdoor laboratory." CAL FIRE sees the value in this partnership as education is a core objective for CAL FIRE and the use of their State Forests.

Educational Value

This project is of educational interest to the Shasta College Natural Resources Program for the following reasons:

- The opportunity of having a true Working Forest available for students to learn skills, such as timber measurements and how to manage a forest environment, is an invaluable experience to our students.
- The LaTour Forest will provide students with invaluable practical experience in dealing with project/owner relations.
- The unique arrangements of having LaTour serve as a demonstration forest will also expose Natural Resource students to concepts and applied theory.

Project Scope

Under this agreement, through the direction of CAL FIRE, the Shasta College Natural Resources Program will work under a phased approach, with the understanding that further Letters of Understanding or Amendments to this document may have to be developed for the use of overnight facilities.

1. **Phase One** will allow Natural Resource students to visit site for day use. Students will conduct lab activities, work on projects and observe actual forest management.
2. **Phase Two** would mean transitioning from day use to overnight use. The idea would be to develop curriculum for a dedicated class which incorporates the use of the LaTour Forest site. At this time, this agreement is only applicable to the day use. The COLLEGE will continue to

investigate and work with CAL FIRE on the second phase to develop an amendment to this original Letter of Understanding.

The size and scope of the COLLEGE's participation in this project may be changed at any time upon mutual written agreement by both parties.

COLLEGE:

- Will provide transportation, as needed, to ensure students arrive at site.
- Will provide any necessary tools or equipment, including safety equipment, to perform lab activities.
- Will provide supervision of students at all times by COLLEGE staff.
- Will provide daily site-specific safety training for students.
- Will adhere to CAL FIRE standard behaviors, such as no smoking, no littering and all litter resulting from COLLEGE use will be removed.
- Will provide liability insurance coverage for COLLEGE students, staff and faculty.
- Will provide workers' compensation insurance for COLLEGE staff and faculty.
- COLLEGE staff will work collaboratively with CAL FIRE staff to ensure site used for daily use is cleared and approved for usage.

CAL FIRE:

- Will provide the project site.
- CAL FIRE staff will work collaboratively with COLLEGE staff to ensure site used for daily use is cleared and approved for usage.
- CAL FIRE will coordinate special tour guides and/or experts related to curriculum covered during lab activities.

Current 2013 Projects List Latour Demonstration State Forest

- Initial Study (IS)/Management Plan Update
- Develop Conservation Easements w/ CE Holders for PG&E Parcels (South Cow Creek – Shasta Land Trust, Battle Creek – Western Shasta RCD, Pit/Tunnel - ?)
- VTAC Proposal (Submitted 2/2013, Committee Site Visit in June, Cabled Cow THP amendment, new THP preparation)
- Peavine Creek Timber Sale Contract Administration (3.2mmbf, @ \$573,000)
- Cabled Cow THP/Timber Sale Preparation (2014-15 Timber Sales)
- Timber Salvage Contract (To remove winter storm windthrow/blowdown, per 5000 Handbook: <100mbf and <\$25,000)
- Rock Crushing Contract – LDSF Quarry (Awarded to Schnetzer Engineering, 5,000 yards – 3 size sort)
- Timber Atlas Inventory (Annual re-cruise, @ 450+ of 3,600 plots)
- Weather Station Installation (w/ remote download, GOES compatible)
- Huckleberry Road Repair Contract (2 miles, \$9,470, May 2013)
- Bateman Road Maintenance (Sugar Pine Conservation Crews, HFEO w/backhoe, clear inside ditch)
- Middle Bridge Road/Latour Butte Lookout Road Maintenance (HFEO w/ dozer, clear debris/brush/rockslide)
- North Sandow Plantation Rehab/Brush Clearing Contract (40 acres, bid/operate summer 2013)
- Sierra Nevada Conservancy Fuelbreak/Biomass Operation Grant (\$90,000 awarded in 2012, bid summer 2013, operate summer 2014, mark/flag)
- Spray Contract (bid summer, spray fall 2013)
- Planting Contract (bid summer, plant fall 2013, 30,000 Cal Forest Nursery seedlings)
- LDSF Land Surveys (CAL FIRE Surveyors to replace old compass survey agreement, Section 2, coordinate with Beaty & SPI)
- USDA-PSW WF plantation density/shrub control study (follow-up, Jainwei Zhang lead researcher)
- Barracks Maintenance (Install new shower, Office flooring, paint, security doors, window shutters, upper barracks renovation, generator repairs, telephone, etc...)
- Miscellaneous Office (Monthly BOF reports, budget/expenditure reconciliation - AFAS/HFD)
- Staff Training (SHU Workshop Presentation, Chainsaw S-212, Basic Forest Practice, Hazmat, First Responder, Intermediate ICS I-300, FOBS, Resource Demob Unit Leader S-349, GIS Workshop)
- Fire Assignments (as needed, i.e. 2012: @ 3 man/months – Permanent & Aide time)
-

Travelin' in Time: LaTour Demonstration State Forest has ties to early pioneer

By Dottie Smith

Thursday, April 11, 2013

The LaTour Demonstration State Forest, in eastern Shasta County, is a place full of natural wonders, including the great and mighty sugar pine tree that many Shasta County residents have yet to see.

Since it is a "demonstration" forest, it has a different purpose and is managed differently from other state forests. It is used for wildland research in maintaining crop forestland and for demonstration of practical economic forest practices.

Timber is also harvested from the forest. The first timber sale was made in 1951. Most of the timber stands have been harvested twice and a few areas have been harvested three times.

The forest became state property in 1930 when the state exchanged 10,957 acres of scattered state school lands with the Forest Service for the 9,033-acre tract. In 1946, it became LaTour State Forest when the state deeded the property to the California Division of Forestry in exchange for \$100,000.

The forest is named for pioneer James C. LaTour, who held squatter rights on 320 acres of meadow at the foot of LaTour Butte in 1850. He purchased his homestead in 1872, making him the legal owner of the land now known as LaTour Meadows.

He was affectionately known as Loving Uncle Jim. He had a great saying: "Do it today — the clock of life is wound but once and no man has the power to say when the hands will stop."

He arrived at Shasta in 1849 by ox team and earned a living by blacksmithing, freighting and performing work as a scribe one who writes documents by hand. He also had a knack of braying like a mule. History says that Jackass Flat near Horsetown supposedly received its name because of him — he would call his pastured stray mules back by braying.

He moved from Shasta to an area north of Viola in 1850 and quickly went into business with others. He partnered with James King in a shake-making business near Shingletown. He partnered with Matthew Brand in cattle ranching, a freighting

business, and the operation of Hill's Trading Post and relay station for the California-Oregon Stage Line once located on the south side of Deer Flat beside Nobles Emigrant Trail. Brand and LaTour hauled the first bullion load from Shasta to the mint at Carson City, Nev.

LaTour was in Carson City when he heard of Brand's death. So determined was he to return home, he immediately sold the ox team and walked back to the trading post at Viola in freezing weather and knee-deep snow.

LaTour Demonstration State Forest came close to being traded to a privately owned company in Humboldt County in the late 1990s. It didn't happen and we still have a large forest of the great and mighty sugar pine trees to admire.

It is easy to drive to; all you need is a full tank of gas to get back and forth. The forest has campgrounds, hunting and fishing during the seasons, snowmobiling, biking, and horseback riding.

To get there; drive to Whitmore and through town until you get to Bateman Road. Turn right. This road will lead you to the forest headquarters. Remember, the forest gates are locked until the snow melts. For information, call the main headquarters in Redding at 225-2438.

Dottie Smith is the author of "The Dictionary of Early Shasta County History," the book from which most of this information was extracted and also from the "LaTour Demonstration State Forest" pamphlet. She is the former curator of the Shasta College Museum and instructor of Shasta County History at Shasta College. Check out her daily history blog at www.redding.com and her website at www.shastacountyhistory.com. Contact her at historydottie@yahoo.com



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