

The How Many Salmon Eggs per Board Foot Problem: Roads, Trails, and Resource Protection in Jackson Demonstration State Forest



A Case for Protection
by
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Pomo Charmstone from Three Chop Ridge, recovered 1992



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Executive Summary

The 2016 update to the Jackson Demonstration State Forest (Jackson) Management Plan (Plan) and supportive databases, map research, and on-site observations all indicate that management of the existing 48,652 acres of public lands within Jackson warrants a new perspective on how continued forest practices that allow for new road building and timber extraction is contrary to existing ecosystem transformations due to climate change.

This paper is intended to foster new discussions and new policies on how Cal Fire, the agency tasked with managing Jackson, can modify the existing Plan to accommodate California's landmark legislation requiring the state to reduce its overall greenhouse gas emissions to 1990 levels by 2020 and 40% below 1990 levels by 2030. Assembly Bill 1504 monitors the initial target established for California forests to sequester 5 million metric tons of carbon dioxide equivalent annually until 2020.¹ (The most recent data available). California aims to become carbon neutral by 2040. One way to partially achieve these goals is through redwood forest preservation. The vast majority of forestlands within Jackson is maturing second-growth redwood (*Sequoia sempervirens*). These trees have been proven to be the greatest carbon sequestration plants on earth. "A fervid new push is being made to protect and restore previously clear-cut coast redwood forests after studies documented how they store more carbon than any other tree, a characteristic that researchers believe could be used as a bulwark against global warming."²

According to Ernest Moniz, former US Energy Secretary, "We need every option we can generate for low carbon."³

This paper will advance the argument that a forest management plan formulated on outdated technologies and practices does not meet the needs of today's critical climate change challenges. The paper will show that recreational visitation in Jackson and Mendocino County is on the rise. Additionally, the fire danger associated with the fuel loads added to the forestlands from various past, current, and planned timber removal "demonstrations."

Finally, this report will show the damage logging roads and skid trails have had to ancient Native American trails through Jackson. It will present maps, data, and research on why a short-term moratorium on timber harvesting is in order to sort through both the outdated model of extraction currently employed in the forest, and the need for increased dialogue between all stakeholders including recreational users, tribes, and elected officials who will ultimately help determine the path going forward for best and wisest use of these public lands. The paper concludes with the author's suggested solution for going forward.

¹ USDA Research and Development. See at: www.fs.fed.us accessed on 19 March 2021.

² "New reason to conserve redwoods - they're best at storing polluting carbon," *SF Chronicle*, 30 April 2020, <https://www.sfchronicle.com/environment/article/New-reason-to-serve-California-s-redwoods-15238034.php>

³ Ernest Moniz, President of Energy Futures Initiative: see at: www.earth.stanford.edu Accessed on 19 March 2021.

Historical Background

Raymond M. Rice⁴ may have phrased the conundrum between preservation and extraction best when he stated, “Aggravating the conflict of world views is the reluctance of politicians to avail themselves of the science that there is to quantify opposing values and strike a balance that is in the public’s interest. That is what I call the ‘how many salmon eggs per board foot problem.’”⁵ He clarifies his position in a section entitled “The Political Arena.” “Industry views its land as a tree farm whose management should be free of infringements on an owner’s property rights as a wheat farmer’s. Environmentalists—and to a large extent the general public—view the owners of forest land as custodians of natural resources who should be subjected to public oversight.”⁶

The story of management of Jackson Demonstration State Forest begins within the history of the land, pre and post European encroachment. Well-documented in the archeological and cultural history literature, no brief overview here can give justice to the 10,000 years or more of Indigenous presence in the hills, valleys, and forests of Mendocino and Lake Counties. Selected referenced works to that body of research are found below.⁷ “The Xa-Ben-Na-Po Band of Pomo Indians inhabited the region (the area around Mount Konocti) as many as 12,000 years ago – 4,000 years before Egyptian civilization. Mount Konocti was revered as sacred by the peaceful tribes, who numbered in the thousands until the early 1800s.”⁸ Professor Thomas Layton has accurately reported in *The Voyage of the Frolic* on the evidence found at the *Frolic* wreck site on the Mendocino Coast and the influence the chance grounding of that schooner had on the Pomos who lived both along the coast and in the interior valleys.⁹ When the bounty of the region was discovered by the Europeans, the Indigenous people were corralled into reservations, resulting in the need for a fort and garrison at Fort Bragg. The First People were then unceremoniously marched at gun point from their ancestral lands to reservations inland, so that the massive extraction of trees could begin. Many tribes were forced to live within tight boundaries with numerous competing tribal neighbors, who in some instances had proven in the past to be less than friendly.

More information and the importance of the archeological find of the charmstone on Three Chop Ridge within Jackson (shown on the title page) will be covered below.

Between the grounding of the *Frolic* in 1850 and this writing, nearly all of the old growth redwoods in Mendocino County have been converted into lumber. Soon after a party of treasure seekers looking for the contents of the *Frolic* arrived on the coast, lumber mills sprang up on nearly

⁴ Formerly Chief Research Hydrologist, Pacific Southwest Research Station, USDA Forest Service.

⁵ Rice, Raymond M. “Why Caspar Creek — then and Now,” *Proceedings of the Conference on Coastal Watersheds: The Caspar Creek Story*, USDA General Technical Report PSW-GTR-168, June 1998, p.12. Hereafter cited as *Proceedings*.

⁶ Rice, p.12.

⁷ Kroeber, A.L. *Handbook of the Indians of California* (Chapters 15-17), Dover Publications, New York, 1976; Aginsky, B.W. and E. G. *Deep Valley*. Stein and Day, New York, 1967; Brown, Vincent. *Pomo Indians of California and their Neighbors*, Naturegraph Publishers, August 1, 1969; Kennedy, Nia. *The Pomo (Spotlight on the American Indians)*, January 15, 2018; Clark, Cora, *Pomo Indians: Myths and Some of Their Sacred Meanings*, June 5, 2011. Et. Al.

⁸ <https://lakecounty.com/explore/history-of-lake-county-california/> accessed on 19 March 2021

⁹ Layton, Thomas. *The Voyage of the Frolic*. University of Stanford Press, 1997.

every creek and river mouth, in valleys, and in long flat stretches of the county's numerous streams. Wonderfully documented in several books by local authors, (see below and in the accompanying bibliography), the era of falling, bucking, jack-screwing (the early method of moving large logs by hand), hauling and sluicing giant redwoods to these sawmills became the economic backbone of the County for decades.¹⁰ As recently as 1968 there were 33 sawmills, railroad tie camps, and shingle mills operating in the County.¹¹ Today, just two major sawmills exist in the entire county.

Extraction methodologies change over time. This is as true of the timber industry as it is with any commercial mining or fishing operation. And it is surely true that as technologies change, so too does the rapidity of extraction. These increases in delivery time drove the supply and demand of the product, redwood lumber. Witness the ancient logging techniques used in the mid-1800s: hand axes, whip-saws, jack screws and yoked oxen were used to drag the logs to the mill. Compare that with today's chainsaws, tractors, yarders, and logging trucks. In the early years of timber harvest, it might take several days to lay out a falling bed of small tress for a single large redwood so the brittle old growth tree would not shatter upon felling. The woodsman then had to create a springboard system get high enough on the tree base to cut the undercut by hand axe. Then the back cut began with a two-man "misery whip," which led to the tree landing (if all went right) onto the bed. Clearing even an acre of these giants was a slow and methodical man vs. nature undertaking. But evidently, given the proliferation of charred old growth stumps in the woods today, these hardy men were up to the task. In the span of one hundred years of logging, now only approximately five (5) percent of the old-growth coast redwood forest remains.¹²

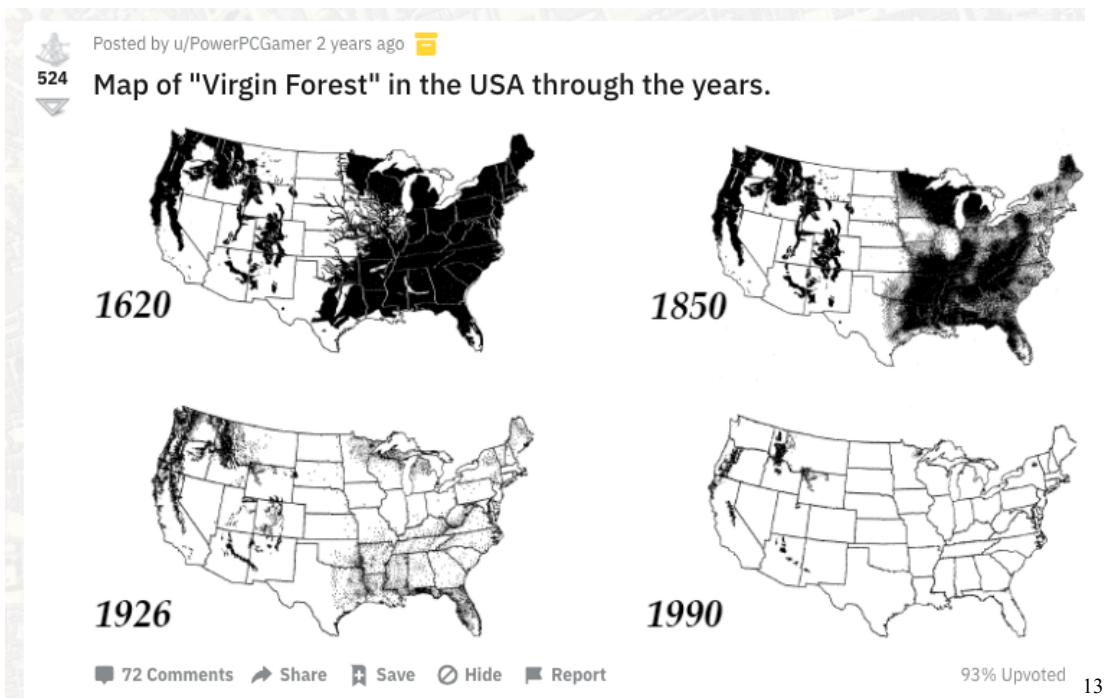


Figure 1: Decline of Old Growth (OG) Forests through the decades

¹⁰ See: Holmes, Alice. *Mills of Mendocino County: A Record of the Lumber Industry, 1882—1996*, January 1, 1996; Jackson, W. Francis, *Big River was Dammed*, FMMC Books, 1991; and <https://rootsofmotivepower.com/wp-content/uploads/2018/03/Roots-Of-Motive-Power-Highline-2009-April-Vol-27-01.pdf>.

¹¹ *Timber Resources of Mendocino and Sonoma County*, USDA Bulletin, 1972.

¹² <https://www.savetheredwoods.org/about-us/faqs/> Accessed on 20 March 2021.

¹³ https://www.reddit.com/r/MapPorn/comments/axau4e/map_of_virgin_forest_in_the_usa_through_the_years/ Accessed on 20 March 2021.



Figure 2: Logging with the Flying Machine on Caspar Creek¹⁴

Above (Figure 2) is an example of what logging looked like as the introduction of a new technological invention began harvesting trees on Caspar Creek (probably the North Fork) in the late Nineteenth Century. Called the “Flying Machine,” because it could move relatively quickly up the creek beds, the mechanism used steam and winch power. It greatly reduced the time it took to strip entire watersheds of timber and could deliver logs to the mill in record time. Tractor logging was the next major logging invention that changed the way operations occurred in the woods. Large Caterpillar tractors, introduced in the 1920s, could move logs more efficiently, create new roads with ease, and generally increase the speed with which logs could be moved downriver to the mills.

The photo on the left shows fish passage and the spawning habitat in Caspar Creek have been seriously compromised due to past logging practices. Resource management’s bottom line in extractive businesses was, and continues to be, the investment quotient of timber operators, mill owners, and shipping companies so that they make money. The faster logs could/can be cut into lumber and the quicker it came on the market the bigger the asset total on the profit and loss books. The timber industry seems to have ignored the plants, animals, fish, and integrity of watersheds from where the product came. More than half of the contents of *Proceedings* (previously referenced) deals with logging impacts of channel form, erosion and suspended sediment, and effects on aquatic vertebrates and habitat in the North Fork of Caspar Creek.

Figure 3 below shows the layout of the Caspar Mill, the final destination for the logs heading west from the hillsides to the sawmill. Note the curving bridge spanning the creek at the bottom of the photograph. During hours of operation prior to the mill’s closure in November 1955, auto trips from or to Fort Bragg on this section of State Highway 1, allowed travelers to witness from their cars the huge logs from up river being rolled over the high embankment and splashing into the mill pond. (Personal observations of the author).

¹⁴ From the author’s private collection.



Caspar Lumber Company, Caspar, CA. October 1953. Sec 1, T17N, R18W

The first sawmill was built on this site in 1861. The mill was acquired in the 1880s by Jacob Green Jackson, who's family would own the mill until it was closed in November, 1955. Caspar Lumber Company's 46,878 acres of timberland were sold to the State of California to form the Jackson State Forest. Lumber was loaded onto schooners via wire tramway from the north bluff of the harbor. The company operated an extensive railroad system, the Caspar, South fork and Eastern Railroad, which reached north into the South Fork of the Noyo River, and then east into the headwaters of Big River. The company began using trucks in the woods to feed the railroad reloads in 1936 and switched entirely to trucks in 1946.

Photo courtesy of Theron Brown & Chris Baldo

Figure 3: The Caspar Mill and Lumber Drying Yard



One of the most revealing clues we have to this extraction period in human history comes from a cartoon entitled *Birth of a Toothpick*. This animated short clearly shows the “It’s only just a tree” mentality that ruled the timber industry. “Who needs to strap Nellie to a sawmill log when the heroine herself has become the log! *The Birth of a Toothpick*, released in 1939, is unlike anything else made

during this period at Lantz. It might be offbeat, but the commitment to its joke is played full-throttle for laughs.”¹⁵

Sylvia, the giant redwood in the cartoon, may have been a simple metaphor for recreating nature for human benefit. But there is more to this story if we analyze the message further. Dan, the tree-hugging, Scandinavian-accented, lover of nature presents a contrasting viewpoint to the attitude that nature is there to help humans achieve the Biblical mandate to “be fruitful and multiply.” And while early Mendocino pioneer, Nathaniel Smith’s, boast that he netted 15,000 pounds of salmon in ten minutes, may be an example of tall-tale braggadocio, we do know from Jackson’s *Mendocino City, A Daily Journal — 1852-1938*, that the trees cut during the period were large, and that the abundance of wildlife and fish in the watersheds and marine environment was prodigious.

- Two men caught 250 trout (steelhead) as the trout law had expired. 1 April 1881 (p. 67)
- W.H. Kelly and Fred Brown joined forces in delivering 371,982 feet of redwood logs to the Company. 31 July 1857. (p. 13)
- The mill sawed 102,000 feet of lumber from 157 logs. 28 July 1903 (p. 136)
- Chinese shipped out 11 boxes of clams taken from the (Big) River. (The Chinese were brought in to strip the River of its clams). 25 October 1913 (p. 193)
- 24 salmon were caught on Big River by a young man using a trolling outfit. 15 November 1902 (p. 208)
- John Walsh harvested 7083 pounds of merchantable potatoes on 1/3 of an acre located on Lansing Street. 16 November 1912 (p. 208)
- Combined high tide and storm waters from a heavy rain brought down 7,000 logs into the Boom. 20 November 1900 (p. 210)
- 79 nice big fellows, as Nathaniel Smith seined a great haul of salmon on the river. (Fish sold for 25 cents each). 6 December 1900 (p. 221)
- Five inches of rain fell in less than 24 hours. 10 December 1937 (p. 223)
- Joe, the Italian fisherman, caught five sharks in the bay. The largest one was over five feet in length and weighed more than 100 pounds. 2 January 1886 (p. 9)
- Harry Boos, Tony Gomes and Joe Andre were given a bad time by a shark while they were fishing just offshore. A 30-foot shark stayed near their boat, bumping into it, at which point they sped for shore. 29 February 1920 (p. 43)
- J. S. Neto and Ruel Armas landed a 103-pound halibut. 21 September 1904 (p. 173)
- 53-pound codfish caught in the Bay by fisherman Joe Luce (Lenhares), Joe Vierra and Domingo Valador. 2 September 1914 (p. 163)¹⁶
- Also noted by Jackson in *Big River was Dammed* is the location on Railroad Gulch (Big River watershed) of a tree 19.5 feet in diameter. It is unclear if this tree was still standing at the time he wrote the book, but onsite research on that section of the watershed did not reveal a tree or stump of that size. Further research is necessary.



¹⁵ <https://cartoonresearch.com/index.php/the-birth-of-a-toothpick-1939/> Accessed on 1 April 2021.

¹⁶ Jackson, W. Francis. *Mendocino City: A Daily Journal—1852-1938*, Mendocino Historical Research, Inc.



Figure 4: A few nice ones. Ling cod caught on a typical fishing excursion along the Mendocino Coast in the early days. Note the handline used in right hand of fisherman on left.



In more recent logging history, production of old growth redwood peaked in the early 1960s and waned as the decade closed. Timber harvest in the county in 2005 was 120,841,000 board feet with a market value of \$89,441,000 (Table 4-B and Figure 4-3 in County General Plan), which decreased to 103,031,000 board feet valued at \$74,594,400 in 2007.¹⁷

Like it or not, a new paradigm is emerging, one that drives the local economy:

Lodging and tourism promotion is (sic) vital to Mendocino County's economy because of the impacts of visitor spending on taxpayers, businesses and employees. In 2018, the most recent year for which complete baseline information is available, total direct travel spending in the county increased 9.15% to \$482.2 million. Tourism remains a notable employer within the

¹⁷ Mendocino County General Plan: <https://www.mendocinocounty.org/home/showpublisheddocument?id=5234> Accessed on 20 March 2021.

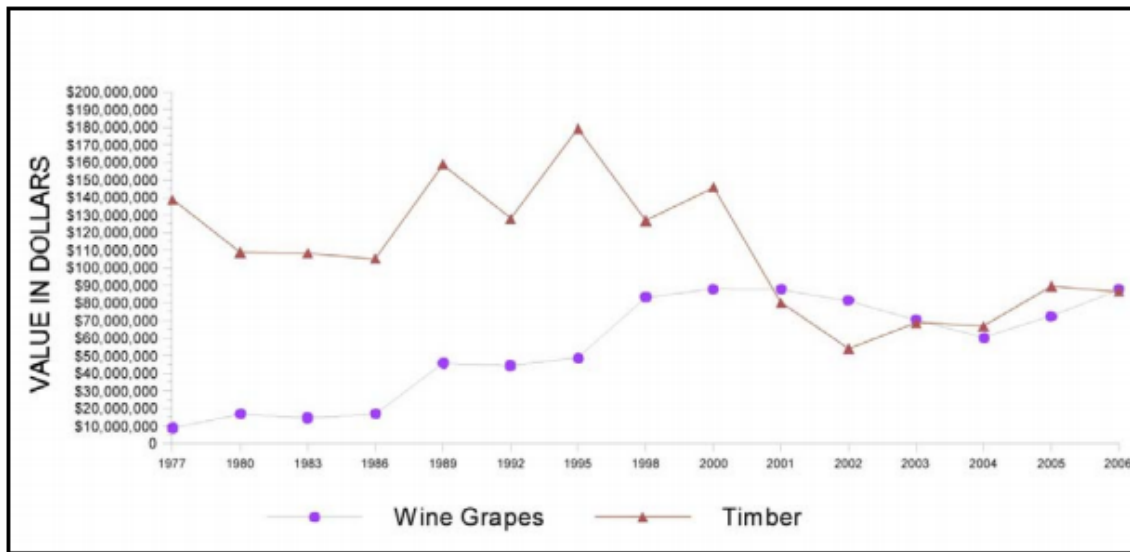
county with the industry supporting 6,900 jobs and generating earnings of more than \$214 million.¹⁸

Tourism has become very prominent in Mendocino County over the last 20 years. In 1998, direct visitor spending in Mendocino County was \$257.9 Million. It grew to \$342.7 Million in 2008. Due to the recession, tourism spending bottomed out at \$331.1 Million in 2010. Growth was minor through 2013. The market began to pick up again in 2014, with significant growth through 2017, which had total direct visitor spending of \$456 Million. This is an overall increase of 77% between 1998-2017.¹⁹ Preliminary numbers from Dean Runyan & Associates provided by Visit Mendocino show tourism spending increased to \$482 Million in 2018, a year-over-year increase of nearly 6%.

Timber represents the second highest value commodity, with a gross “at mill” value of \$102,000,000. Mendocino County ranked 4th in the state in timber volumes and produced roughly 7.6% of the state’s total timber harvest in 2017.”¹⁹

Obviously, something new is happening County-wide.

VALUE OF TIMBER AND WINE GRAPE HARVEST IN MENDOCINO COUNTY, 1977-2006



Source: Mendocino County Crop Report, 2006.

Figure 5: Wine Industry catches Timber Industry in Mendocino County in 2006.²⁰

¹⁸ Mendocino County Lodging Business Improvement District 2020-2021 Annual Report, <http://mendocinotourism.org/> Accessed on 22 March 2021.

¹⁹ Economy: Mendocino County 2018-2019 Economic Assessment: <https://www.edfc.org/wp-content/uploads/2015/12/FINAL-2018-2019-Mendocino-County-Economic-Assessment.pdf> Accessed on 22 March 2021.

²⁰ County Plan, p. 4-28.

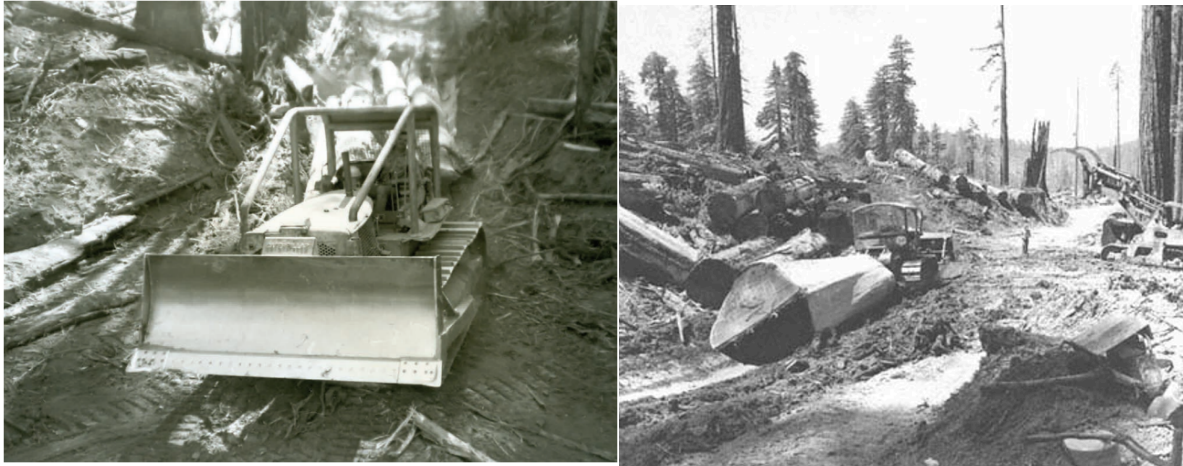


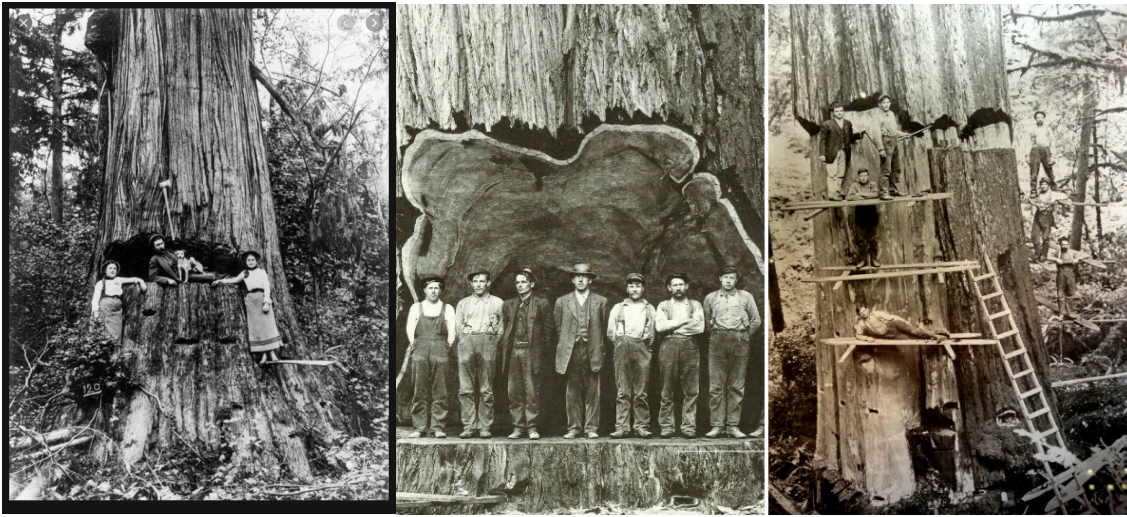
Figure 6 & 7: Use of Cat on Albion river circa 1950.²¹



Old Boom: Looking downriver

Figure 8: Log jam on Big River

²¹ <https://rootsofmotivepower.com/wp-content/uploads/2018/03/Roots-Of-Motive-Power-Highline-2009-April-Vol-27-01.pdf> Accessed on 20 March 2021.



Stock photos from internet showing size of trees felled.

The effects of continued tree harvest on watersheds began drawing forester's attention in the early 1990s.

By the mid-1990s, erosion incidents related to these roads were increasingly frequent. In 1994, a detailed landslide survey of the South Fork Caspar Creek watershed documented 10 significant features estimated to have occurred within the last five years. Nine were related to the road and skid trail system. In 1995, two additional failures occurred as a result of deteriorated steel culverts and displaced 434 cubic meters (568 cubic yards) of sediment, routing most of the material directly to the perennial stream channel. During the 1997-1998 El Niño storm season, five large road-related landslides occurred in the South Fork watershed, displacing 1,675 cubic meters (2,190 cubic yards) of sediment. Two additional landslides occurred, displacing 568 cubic meters (743 cubic yards) of material, but these were not related to the road system built in 1967 (Cafferata and Spittler 1998). p.6.²²

Studies in Jackson Demonstration State Forest point to an alarming new erosion situation in the forest: "The erosional costs associated with road decommissioning in this study were significantly greater than anticipated during project planning." And,

Evidence from 2006 suggests that the treated roads are relatively small sources of new erosion, but the remaining skid trail and road system still poses risks in this watershed. Continuing research efforts in the Caspar Creek watersheds will investigate the implications of additional watershed restoration techniques, as well as the hydrologic consequences of additional timber harvest operations.²³

The Caspar Creek watershed history is one of high-density logging use. Norm Henry, California Department of Forestry researcher once described the history of the watershed this way:

²² <https://www.fs.fed.us/psw/topics/water/caspar/pubs/Rd600DecomNote.pdf> Accessed on 18 March 2021.

²³ Keppeler, Elizabeth T. *State Forest Road 600: A Riparian Road Decommissioning Case Study in Jackson State Demonstration Forest*. P. 16.

In 1860, the Caspar Logging Company was founded, the owners having purchased most of the Caspar Creek watershed (which eventually was sold to the State of California in 1947). A sawmill was built at the mouth of Caspar Creek ultimately producing up to 25,000 board feet of lumber per day. Jacob Green Jackson, after whom Jackson State Forest is named, bought the mill in 1864 and soon after had three log crib dams built on Caspar Creek. The dams were built to provide additional stream discharge for river log drives, permitting logging operations to be expanded into the upper reaches of Caspar Creek. Thirty thousand logs or more were often tiered in the channel, waiting to be floated down to the mill during high winter flows.²⁴ (See photo of Big River [Figure 6] log tiering above).



Thus, we come to today when the managers of Jackson, through the office of Cal Fire, the agency responsible for the overall health and welfare of the entire acreage within the forest, continue to “demonstrate” various logging techniques within the boundaries of this public forest.

According to the informational map/brochure developed to welcome visitors to Jackson, “State forests are used for forestry experiments, and to demonstrate the productive and economic possibilities of good forest practices, and of maintaining forest crop land in a productive condition. The management of State forest and the cutting and sale of timber and other forest products conform to forest management practices designed to promote continuous forest production with due regard to the preservation of soil, water, scenic wildlife, and recreational values.”²⁵

The history of the watersheds draining the Big and Noyo Rivers, and the Caspar, Jughandle and Mitchell Creeks reveals how the now-outdated philosophy of resource extraction effects watersheds. As Nash so concisely puts it, “(Those) involved in the pioneering process revealed a proclivity for the rural and useful. Wherever they encountered wild country they viewed it through utilitarian spectacles: trees became lumber, prairies farms, and canyons the sites for hydroelectric dams.”²⁶

The complete dominance of the landscape by the timber industry can be shown in the photographic evidence available in the Kelley House Museum of Mendocino’s archival record. Witness below the entire Albion flat covered by the fourth mill on that site:

²⁴ *Proceedings*, p 1.

²⁵ Welcome to Jackson State Forest, State of California, The Resource Agency, Department of Conservation, Division of Forestry, map of Jackson. In personal collection.

²⁶ Nash, Roderick. *Wilderness and the American Mind*. Yale University Press, New Have, 1967, p. 31.



Figure 9: Albion Flat 1897

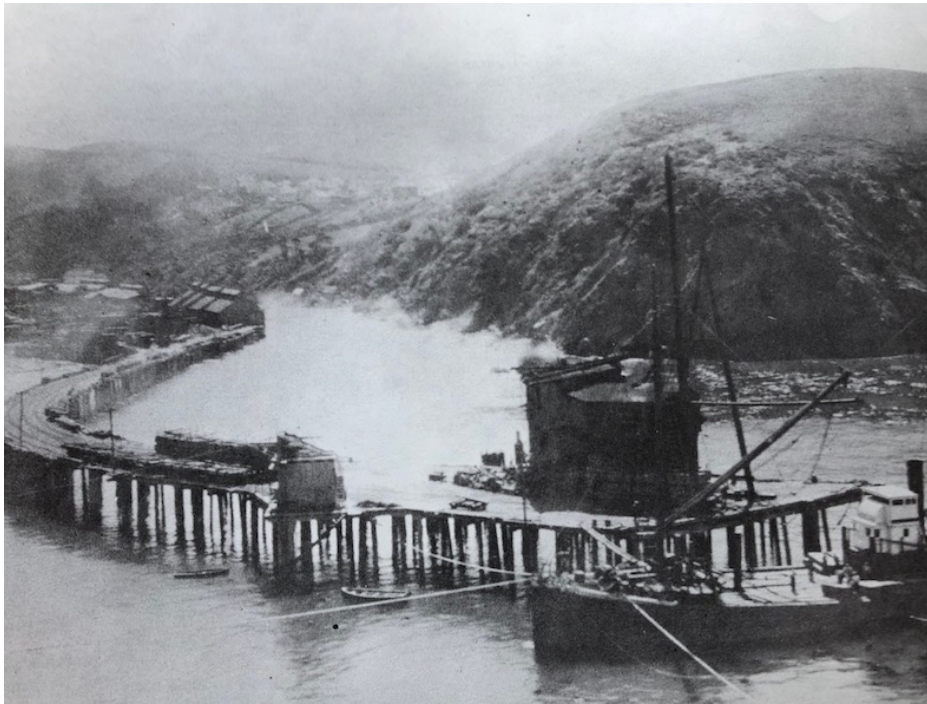


Figure 10: How the need to move lumber to market via schooner created impacts on the inner tidal zone. Albion, 1897.²⁷

²⁷ Two photos from the *Mendocino Historical Review*, Vol. IV, No. 2, 1974.

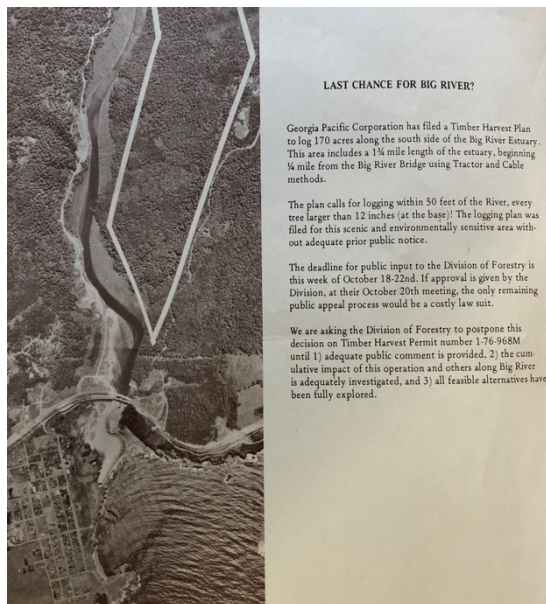


Figure 11: Last Chance for Big River Flyer: In 1976, a section of Big River near the mouth was about to be logged by Georgia Pacific. Public input on this important local issue reversed the decision to cut the timber on that section. “We are asking the Division of Forestry to postpone this decision of THP 1-76-9068M until the cumulative impact of the operation and others along Big River is adequately investigated.” The plan was ultimately shelved and in 2002 the property became part of what is now the Big River portion of the Mendocino Headlands State Park. See drone footage of this section at: <https://www.savetheredwoods.org/blog/spectacular-view-of-big-river-mendocino-old-growth-redwoods-project/> Proving, once again, people do have a voice!

Trails, Rails, and Roads

Any discussion of roads should take into consideration the Working Guidelines from the National Marine Fisheries Service. “Road density values . . . are compared to a threshold of 3 miles of road per square mile.”²⁸ According to National Marine Fisheries Service’s working guidelines, watersheds over the 3 miles of road per square mile threshold are characterized as “not properly functioning.”²⁹

Watershed and road analysis of lands adjacent to Jackson are relevant when discussing conditions within Jackson simply because so much of the state forest timber production lands are in the Big River watershed to the south of Jackson, or the Noyo river on the north of Jackson. A Klamath Resource Information System (KRIS) Noyo study reveals that road densities average 6.7 mi/sqmi in the Noyo basin. Research reveals that when the Big River estuary lands were purchased from the Hawthorne Timber Company in 2002, road densities on that track to land (84 square miles within what are now the Park boundaries) was 7.4 miles of roads per square mile (mi/sqmi). “It is likely that the actual length of roads within the Park is higher,”³⁰ due to data relying primarily on aerial photography and limited ground surveys. (Source cited under #28).

Compare those numbers with the Cal Fire Jackson State Road database. That data reveals an estimated 350 miles of actively used roads in Jackson, with another 150 miles of potentially improperly abandoned roads.³¹ Thus, there are a total of 500 miles of used and unused roads within the 48,652 acres of the forest. With 640 acres to the square mile, it is easy to calculate that Jackson covers

²⁸ Noyo Road Density Information in KRIS. www.krisweb.com/krisnoyo/krisdb/html/krisweb/noyo_background/roadskris.htm Accessed on 15 March 2021.

²⁹ KRIS Noyo, cited above.

³⁰ California Geological Survey map in private collection. Listed as: www.conservation.ca.gov/cgs 2004, in personal collection.

³¹ JDSF Management Plan, p. 213.

approximately 765 square miles. With 500 miles of roads in that area, the formula of mi/sqmi/road length equals a road density of 6.57 mi/sqmi within the Jackson.

Refer to Map 7 in Appendix 1 for a graphic picture of road densities in Jackson.

Studies on the sediment loads carried by the sub-tributaries within the entire watershed are revealed in these quotes from the USDA Forest Service studies done on Caspar Creek:

For the individual subcatchments the median increase in storm sediment load was 107% in clear-cuts and 64% in partly clear-cut catchments. The median annual sediment load increase was 109% (58 kg ha-1yr-1) from clear-cut catchments and 73% (46 kg ha-1yr-1) from partly clear-cut catchments. The most important explanatory variable was the increased volume of streamflow during storms. The increased flows, accompanied by soil disruption and intense burning, accelerated erosion of unbuffered stream banks and channel headward expansion.

The principal objective of the 40 years of research in these catchments is to evaluate the impacts and recovery from road construction and selection and clear-cut harvesting by tractor and cable on streamflow, suspended sediment, and bedload.

From 1971 to 1975, 50% stem volume of the 90-year-old second-growth redwood and Douglas-fir forest was selectively cut and tractor-yarded to roads near the stream. This practice was compliant with forest practice rules in use in California in the early 1970s.

From 1989 to 1991, 50% of the 100-year-old second growth redwood and Douglas-fir forest was clear-cut and the trees were cable-yarded to roads near the ridge. Buffer strips left along perennial streams were selectively logged. This practice was compliant with forest practice rules in use in California in the early 1990s.³²



Figure 12: Caspar Creek clear-cut circa 1990.

³² Ziemer, Robert R. "Caspar Creek." (Pacific Southwest Research Station, USDA Forest Service, United States, rziemer@fs.fed.us) https://www.fs.fed.us/psw/publications/ziemer/Caspar_Creek.pdf Accessed on 22 March 2021.

With this amount of clear-cut activity within a three-year period, one can expect an increase in soil and stream temperatures. “One watershed was clear-cut 5 years after the observations began. After clear-cutting, the annual mean soil temperature at 0.5, 1.0, 2.0, and 3.0 m depths rose by about 2.2, 2.0, 1.7, and 1.4°C, respectively.”

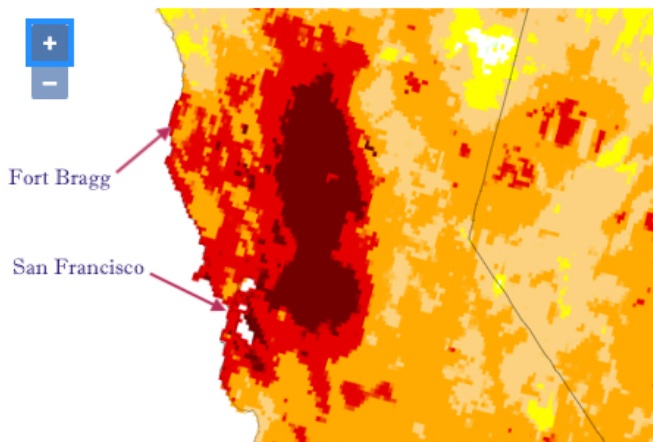
(See examples of studies at: “Effects of Clear-cutting and Slash-burning on Stream Temperature in Southwestern British Columbia,” *Journal of American Water Resources Association*, October 1981: <http://onlinelibrary.wiley.com/doi/abs/10.1111/j.1752-1688.1981.tb01309.x>; and “The impact of forest clear-cutting on soil temperature: a comparison between before and after cutting, and between clear-cut and control sites,” <https://doi.org/10.1007/s10310-003-0063-x>)

Thus, given the amount of timber removal activity being planned or approved on Jackson (see Map 2 in Appendix 1) as of today’s date, it is relatively easy to determine that, given the drought-like conditions California is experiencing, fire danger becomes a reality on these state forest lands. (See Map 3 in Appendix 1).

Palmer Drought Severity Index (PDSI)

EXPERIMENTAL

Current PDSI



This new experimental implementation of the Palmer Drought Severity Index (PDSI) uses the high-resolution gridMET gridded research dataset and USDA STATSGO soils data. The PDSI is a standardized index based on a simplified soil water balance and estimates relative soil moisture conditions. The magnitude of PDSI indicates the severity of the departure from normal conditions. A PDSI value >4 represents very wet conditions, while a PDSI <-4 represents an extreme drought. This PDSI uses a new methodology for sub-monthly PDSI.

PDSI data is updated every 5 days, with a delay of 4 to 5 days. [Learn more.](#)

Figure 13: Current Drought Severity Index

New road building and existing road structures within Jackson contribute to a number of potential hazards, including the aforementioned soil and stream warming. Slash left to rot on the ground, residues of THPs that failed to remove the downed limbs, and the brush and regenerative plants that follow timber harvest, also add to the fire danger. The argument that shaded fuel breaks and removing mature second growth trees decreases fire danger seems contrary to what is happening on the ground. A glimpse at the fuel load on the fringes and within the cut area of the 2018 THP (1-16-124 -MEN) just north of the end of pavement on County Road 409, supports the argument that the forests are less protected from wildfire than they were before this operation occurred.



An additional component, and an aspect of road building that is not addressed in the Jackson Management Plan, is the destruction of the ancient trails once used by the Native American Pomo People to conduct trade between the valleys inland and the resources and temporary villages on the

coast. This revealing quote from the Aginskys' book on the Pomo clearly states how important these trails were to the first people:

Within the Pomo territory, the tools, implements, and utensils necessary for occupations, daily life, and specialized activities were traded and exchanged, as well as bought and sold. Sea otter skins, which were rare and greatly desired throughout the region, brought high prices. The people from the coast . . . brought sea products of every sort into the interior: salt, seaweed, sea otter skins, clamshells and so on. In the course of routine visits and trading expeditions, every thing passed back and forth from the extremes of east and west, that is from the coast and the Lake through the valleys of the \Russian River.³³

Vinson Brown and Douglas Andrews contend that the original trails “usually followed the ridges where there were canyons and along the rivers in the large valleys.”³⁴ And this is exactly as one would expect. Over millennia trails through the western Coastal Range adopted the path of least resistance. The “ridge runners,” who according to Brown and Andrews, often used head straps to support loads approaching 200 pounds surely wanted to decrease the effort by staying high on the ridges whenever possible.

It is reasonable to believe that the first roads laid down to move logs and merchandise mimicked these ancient trails. If you wanted to get somewhere, it makes a lot of sense to know the trail led somewhere. Thus, we have important trails, noted in Brown and Andrews, and in Francis Jackson's research, that Highway 20 may have been originally used by the indigenous people to go to and from the coast. The discovery of the Pomo village on Three Chop Ridge in the 1980s (Professor Layton's archeological research site)³⁵ supports the notion that the first trail may have followed what is now Road 308 (Three Chop Ridge Road) through Jackson. Then proceeding westward, it stayed high on the ridge heading down County Road 408 to the intersection of Road 500. (See Map 6).

The story of the discovery of the charmstone pictured on the title page is well told in the Papers on Northern California Archeology:

The charmstone was found on October 23, 1992, by Registered Professional Forester (RPF) William Windes. Bill was one of 39 students attending CAL FIRE Archaeological Site Recognition Training Course #27, which was held in the Ukiah area from October 21 to 23, 1992. The third and final day of training consisted of a series of field exercises conducted at Three Chop Village (CA-MEN-790) in Jackson Demonstration State Forest. A group of about 10 foresters was walking up the road from the main house-pit area. Midway up the road, RPF Bill Windes, walking behind the others, spotted something in the middle of the dirt road and brought it to the attention of Dan Foster. The item was a charmstone deeply embedded in the road; recent grading had exposed the very top of the artifact. When Foster removed it with the aid of a trowel, it was clear this was an in-situ discovery. The road had cut through an archaeological deposit and exposed the charmstone.³⁶

³³ Aginsky, p. 201-202.

³⁴ Brown, Vinson and Andrews, Douglas. Cited above. p. 41.

³⁵ <https://scahome.org/publications/proceedings/Proceedings.21Hector1.pdf> Accessed on 20 March 2021.

³⁶ “A Charmstone Discovery in the Redwood Forest of Mendocino County, California;” Hector, Susan M. et. al, in *Papers on Northern California Archaeology*, Proceedings of the Society for California Archaeology, Volume 21, 2009, pp. 47-57, seen at: <https://scahome.org/publications/proceedings/Proceedings.21Hector1.pdf> Accessed on 14 April 2021.

. . . the Mato Pomo, with winter villages in Sherwood Valley, generally claimed the coast north of the Noyo River mouth, while the Mitom Pomo, with winter villages in Little Lake Valley, claimed the coast to the south. Both Stewart's (1943) Mato and Mitom informants agreed that the coast was used only seasonally, and there were no permanent coastal settlements in Northern Pomo territory prior to the displacements caused by the coming of whites. The wreck of the *Frolic* occurred well within undisputed territory claimed by the Mitom Pomo. Moreover, the recovery of Chinese ceramics from the *Frolic*'s cargo at Three Chop Village (MEN-790), situated at the midway point of the major ridge-line trail linking the Little Lake Pomo with the coast, is strong evidence that the *Frolic* was looted by the Mitom Pomo and that during the late prehistoric and contact periods Three Chop Village was indeed occupied by Mitom Pomo.

Probably two major trails linked Little Lake Valley with the coast, both ascending the ridge 8 km west of Willits by following the course of Broaddus Creek to the top of the divide. From this point, one trail followed Three Chop Ridge along what is today Three Chop Road, then to Indian Springs Road, ultimately descending the ridge near the intersection of Highway 20 and Big River Road. From there, a 6 km walk to the west brought the traveler out of the mountains on to the upper most fifth marine terrace overlooking the Pacific near the headwaters of Mitchell Creek. Another 6 km walk was necessary to reach the ocean's edge at Jughandle Creek, only 3 km north of the *Frolic* wreck site. The alternate trail route led to the historic Mitom village of Buldam at the mouth of Big River. It diverged from the Three Chop Trail near the top of the divide 8 km west of Willits, descended Sevenmile Grade and proceeded to the coast, following about the same route as the present day Highway 20 and Big River Road (Stewart 1943:37).³⁷

My personal exploration of these ancient trails began in the 1970s when the owner of Old Mill Farm (an in holding of Jackson on Road 740), Charles Hinch, suggested we search for trails that he believed ran close to or through his property just east of Road 500 in Jackson. Chuck was convinced that areas of Jackson, especially the western portion, should have, under a Senate Bill proposed (SB 1063), "protection of other recreational scenic resources and assure public access, . . . (that) means protect trails which interconnect these areas. The trails are established and should be recognized as a vital part of the area."³⁸

While on several recognizance missions, he and I discovered what we believed were sections of the original trail. We found on one particularly memorable stretch along Hi Chute Ridge from Road 408 to the Laguna crossing on Big River, numerous obsidian shards in the dirt of the trail bed. These sections have, unfortunately, been destroyed by logging roads and skid trails in the years since our discovery hikes in the '70s.

The Jackson Management Plan lists no specific requirements or protocols for cultural surveys of timberlands proposed for harvest because language in the California Environmental Quality Act

³⁷ Stewart, Omar C. *Notes on Pomo ethnogeography*. University of California Publications in American Archeology and Ethnology 40(2):29-62. Berkeley:1943; and Layton, Thomas L. *Western Pomo Prehistory. Excavations at Albion Head, Nightbird's Retreat and Three Chop Village, Mendocino County, California*. Monograph 32, Institute of Archeology, University of California, Los Angeles:1990

³⁸ Hinch, Charles. Trail Preservation Letter to State law makers, circa, 1975. In author's private collection.

requires THP applicants (Cal Fire in this case) complete this component. Cal Fire does present a *Cultural Resources Review and Guidelines* manual for Cal Fire projects. It includes this statement: “The primary goal of the procedures are (sic) to ensure resources are identifies (sic) and protected.”³⁹ The premise is as shaky as the faulty grammar in the sentence.

Meanwhile, in the 400 + page Plan, there is a section entitled, “Public Concern Regarding the Management of JDSF.” Of the fourteen topics listed, carbon sequestration, fire danger, destruction of ancient trails, and climate change are not listed. Another reason for an updated version of the Plan to be discussed by all parties involved.

✱

During the early days of timber extraction, railroads and their associated trestles and tunnels were also created in what is now primarily Jackson. Especially important in assessing the impacts roads and railways had on the trails within Jackson is the little *Western Railroader* “Enlarged Edition” issue entitled “Caspar Lumber Company: Caspar, South Fork and Easter Railroad.”⁴⁰



Figure 14: The world’s largest wooden trestle over Jughandle Creek, 1889. (see Maps 4 & 5)

Trails, rails, and roads have undeniably made impacts on both the economics and topography of the lands through which they pass. One can only guess at the total disturbance of land destabilized by the early pioneers in their quest to get logs to the mill. There were at least 27 splash dams on Big River alone. When tripped, the amount of water released floated the old growth (OG) downriver. A careful survey of the section of the North Fork from Dunlap to the confluence with the Main Fork — even today — reveals the scouring that occurred during log drivers of both riverbanks. This movement of water and wood left the corridor stripped of riparian cover and the essential habitat overstory to the pools used by anadromous fish. It’s important to visualize how much of this habitat was destroyed by prior logging methodology. Trails became roads, roads led to rail development. This interconnectivity

³⁹ <https://www.fire.ca.gov/media/11171/cultural-resource-review-procedures-final.pdf> Accessed on 4 April 2021.

⁴⁰ Borden, Stanley T. *Caspar Lumber Company: Caspar, South Fork and Easter Railroad*. Issue 315-316, 1966.

of access to the forests contributed to the greater decrease in slope stability as the removal of timber progressed through the decades.

The infrastructure to create a system by which the OG could be handled easily enough to get it aboard a schooner heading to market is in itself a remarkable story. In every sense of the word it has a Herculean task. Missing from some histories is the problem-solving strategies for such an effort. For example, the aforementioned Caspar Lumber mill's need to have a supply of fresh water, delivered at pressure, to the steam boilers used to power the mill was ingeniously solved. The water flowing down Caspar Creek was not used because it would have had to be pumped to elevation to create the "head" necessary for pressure. Early explorers found an ample water source on Doyle Creek, just to the south of Caspar Creek. Fortuitously, in a very unique geological oddity, two creeks, Caspar and Doyle empty into Caspar Bay. A low ridge that separates the two creeks. Caspar Graveyard Road runs up this ridge to Little Lake Road. It would have to be crossed if water from Doyle Creek could be used to power the mill. That problem was solved by drilling a three-inch hole in the bed rock formation on Doyle Creek, (a step in the ecological staircase situated at approximately 250 feet elevation) two miles back from the beach. A pipe diverted the water into a long flume, built on stilts on the north bank of the creek. Made of OG redwood, this covered flume existed late into the '60s. It provided the author and his friends numerous hours of enjoyment hiking from the beach to the pools upstream. In an additional footnote to the history of this section of the Caspar operation is the fact that those pools on Doyle Creek were once stocked with numerous native steelhead fingerlings and resident trout. With the creation of the fill and culverting of the creek that occurred in the mid-1960s when the new Caspar bridge was built, the upper reaches of the creek were blocked and the fish could not reach the pools east of the highway.

Thus, we come to the conclusion that the alterations of the landscape, the removal of mature trees, and the absence of restoration post-timber removal all resulted (and continue to result) in a landscape that begs for relief. An informative map showing the past and present logging activities from 1997 to the present allows us to infer that a shift from mature native forests to managed commercial timberlands has occurred in the past two and half decades:
<http://mendoriveralliance.org/Webmapping/index.html#11/39.3555/-123.5639> (See in Appendix 1).

Fire, Carbon, and Climate:

Next, we come to today's situation in the forest of the coast range, and specifically, the public lands with Jackson. For the County of Mendocino, and perhaps across the globe, three factors come together to present a dire forecast for the future: increased fire danger, the lack of carbon sequestration due to past and present logging activities, and climate instability as it relates to global warming and changes in the weather patterns on the planet. Driven by increased human resource extraction and predicated on the assumption that there *is* such thing as a free lunch, these changes reflect a denialism that resources have a finite limit.

The problem of balancing the global need with the local situation has never been more important. We can examine the record for clues about how to approach the best methodologies regarding storing carbon, reducing fire risk, and adapting to the challenges of a changing climate. Within the record are hints that using existing guidelines on cumulative impacts can make a difference in these areas. Longstanding legal definitions on cumulative impacts have existed for decades. The Council on Environmental Quality (CEQ Guidelines, 40 CFR 1508.7) was issued in 1971. These impacts include all impacts that are influenced by multiple activities or causes. And as this paper

explains, the impacts on the watersheds of the Noyo, Caspar, and Big Rivers have over the years been quite extensive.

Of interest and importance to the local environment is the fact that the California Department of Forestry (now Cal Fire) uses a locale-specific analysis to address cumulative impacts when reviewing timber harvest plans on both state and private lands. (CDF 1998). However, the definition has been updated within the California Environmental Quality Act: “Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time” (California Code of Regulations [C.C.R.] Section 15355). “In other words, a project that you’re evaluating within a certain area may contribute to a larger impact/effect if you look at other projects in that area.”⁴¹

As Leslie Reid explains,

(The CDF) approach is potentially capable of addressing the full range of cumulative impact evaluations that might be important in an area. A standardized impact evaluation procedure could not be developed because of a variety of issues that might need to be assessed, so analysis methods were left to the professional judgment of those preparing timber harvest plans. Unfortunately, oversight turned out to be a problem. Plans were approved even though they included cumulative impact analyses that were clearly in error. In one case, for example, the report stated that the planned logging would indeed introduce sediment to streams, but that downstream riparian vegetation would filter out all the sediment before it did any damage.⁴²

In a recent video conference, Helge Eng, Deputy Director, Resource Manager for Cal Fire, made a similar preposterous claim. He stated that logging actually reduces wildfire danger and that operations that log redwoods actually sequester carbon by turning trees into lumber which store carbon. (Caspar Community meeting 21 March 2021) Given the fact that Cal Fire is currently allowed, under California law, to give themselves approval for harvest plans they write for cuts within state forests, it may not surprise anyone that oversight for their stated mandate that “timber production will be the primary land use on JDSF,”⁴³ is scrutinized by staff who are employed by Cal Fire to further this primary goal. This conflict of interest, while obvious, does not halt the agency from proposing and then approving the vast majority of plans they submit to themselves.

As Cal Fire explains on their website:

CAL FIRE does not have the authority to deny a THP that is in compliance with state and federal rules and laws, simply because the logging plan is unpopular with the public. The Department reviews and approves between 500 to 1400 THPs each year. A THP that does not comply with all forestry and environmental regulations is returned to the RPF (Register Professional Forester). It is only approved after the RPF and landowner agree to make the changes necessary to ensure compliance with all laws. CAL FIRE follows-up on approved

⁴¹https://ceqportal.org/tp/AEP%20CEQA%20Portal_Cumulative%20Impacts.pdf Accessed on 1 April 2021.

⁴² *Proceedings*, p.118.

⁴³ *JDSF Management Plan*, p. 1. See at: https://www.fire.ca.gov/media/ncejt2mz/2016-jdsf-mgmt-plan-final_ada.pdf Accessed on 1 April 2021.

THPs with site inspections and can shut down operations, cite or fine RPFs, Licensed Timber Operators (LTOs), and landowners if illegal operations are found.⁴⁴

No statistics were found on the website to explain what happens when the public posts commentary on specific plans through the channels of the permit process. Under CEQA requirements, public comments must have a response from the applicant for the THP that mitigates or explains how potential areas of concern raised in the public comment period are to be addressed in the final prescription for timber removal.

These legal needs, and the political ramifications that go hand-in-hand with the decisions that create the laws that govern the process, are only one part of the overall scope of the actual work. Consider: the factors inherent in turning a living tree into a piece of lumber are contingent on the use of fossil fuels and present a rather heavy carbon footprint when taken as a whole. Here are the steps necessary to get that redwood con-heart 2x4 to market.

Once the THP is approved, a road must be constructed or maintained to allow the RPF to access the area to be logged. This is accomplished in nearly all cases by driving to the site (use of fossil fuels necessary, noted here as FF).

- Once the trees are marked for removal, the timber fallers drive to the site (FF).
- Chain saws are used to fell the trees (FF).
- The trees are bucked and limbed (FF).
- A skid road is created to get to the downed trees (FF).
- Trees are skidded out to a landing and stacked (FF).
- Logging trucks arrive at the landing to receive the logs (FF).
- Log loaders are used to place logs onto the logging trucks (FF).
- The logging trucks drive to the mill located at the end of narrow, steep coastal roads (FF).
- Log loaders are used to unload the trucks (FF)
- Logs are stacked into piles at mill (FF).
- Logs are placed on conveyer belts (FF).
- The mill, if run by electricity that comes from coal-fired, or natural gas powered, electrical plants, cuts and planes the wood (FF).
- The lumber is graded and conveyed to stacks or air dried in kilns (FF)
- The finished wood is transported by truck to supply houses (FF).
- At the lumber yard the finished lumber is stacked and sorted (FF).
- Consumers have lumber delivered to job sites or transport it themselves (FF).

This is the price (carbon footprint) we pay for finished lumber for construction. In California alone, multiply this process by between 500 to 1400 times (see above) and what we get is a heavy price the planet is paying for the convenience of having sawn lumber readily available for our building projects. But what exactly are these redwood trees, now converted to dimension lumber, being used for? Decks, furniture, fences, structural beams and trim are the most common redwood uses. Roof shakes, siding, and other fire exposed redwood on new constructions are now not recommended in Mendocino County by the Mendocino Fire Safe Council. Which raises the question, if redwood, once predominately used to side buildings, is being replaced by non-combustible materials in new

⁴⁴ <https://www.fire.ca.gov/programs/resource-management/forest-practice/#> Accessed on 1 April 2021.

constructions, why do we need to continue removing these bastions of carbon sequestration from the forests? “A typical tree will sequester (remove from the atmosphere) about 1 ton of carbon in its lifetime. A coast redwood will sequester 250 tons of carbon. Just one coast redwood has the ability to absorb as much carbon as 250 ‘regular’ trees.”⁴⁵

This is the question Cal Fire must answer: If we are to meet the State’s goals of reducing the carbon footprint and become carbon neutral in the near future, what sense does it make to remove the greatest carbon sequesters on the planet?

California has become a leader in advancing the changes necessary to address climate change.

Harnessing the innovative spirit of California, Governor Gavin Newsom today advanced an executive order enlisting California’s vast network of natural and working lands – forests, rangelands, farms, wetlands, coast, deserts and urban greenspaces – in the fight against climate change. A core pillar of Governor Newsom’s climate agenda, these novel approaches will help clean the air and water for communities throughout the state and support California’s unique biodiversity. Harnessing the innovative spirit of California, Governor Gavin Newsom today advanced an executive order enlisting California’s vast network of natural and working lands – forests, rangelands, farms, wetlands, coast, deserts and urban greenspaces – in the fight against climate change. A core pillar of Governor Newsom’s climate agenda, these novel approaches will help clean the air and water for communities throughout the state and support California’s unique biodiversity.⁴⁶

Conclusion:

The above historical examination of the record of destruction on watersheds in the coastal range leads to the conclusion that what we have done is simply not sustainable. The near future is framed in increasing fire danger, climate change, and the lack of predictable outcomes. The question that began this discussion was, “How many salmon eggs should we protect compared with the amount of board feet of lumber we should extract from the forests.”

That question should be continued to be asked, but there is a new interrogatory that cannot be ignored: How many wildfires must we endure because the forests are hotter and drier due to over 150 years of logging practices? It seems clear that the past record supports a conclusion that enough is enough. Mendocino’s economy has already had an extraction climax. A restoration economy is on the horizon. Recreational use of the beaches and forests of the County is on the rise.

Jackson Demonstration State Forest is the ideal site for recreation expansion along the Mendocino Coast. The local state parks are filled to capacity in the summer months as tourism continues to increase along the coast. The combined area of all the parks is a fraction of the size of JDSF, as well as being home to a lower percentage of redwood forest. Increasing camping and fishing opportunities in the state forest will provide alternatives for recreational enthusiasts

⁴⁵ <https://www.sciencedirect.com/science/article/pii/S0378112719316718> Accessed on 2 April 2021.

⁴⁶ “Biodiversity and Boost Climate Resilience.” Published: Oct 07, 2020. From the Office of governor Newsom. See at: <https://www.gov.ca.gov/2020/10/07/governor-newsom-launches-innovative-strategies-to-use-california-land-to-fight-climate-change-protect-biodiversity-and-boost-climate-resilience/> Accessed on 14 April 2021.

as well as generate revenue for the local economy. As mentioned previously, the population of Mendocino County is expected to double within 50 years. People will need jobs the timber industry can't provide, and tourism-related employment is the most realistic candidate to absorb this increased labor force.⁴⁷ Written in 1997, we know Seim's predictions have come true twenty-four years later.

Cal Fire Resource Manager, Helge Eng, a part of Cal Fire's Executive Staff, is now on the record stating, "We have a mandate to do what we do, and I for one like to believe it's God's work."⁴⁸

Until this point of view changes, the following quote makes the most sense in terms of how to proceed.

The state ought to be restoring this publicly owned treasure for its precious ecological and recreational values, not logging it like another big industrial company, said Paul Hughes, (ED of Forests Forever). The Jackson State Forest area proposed for logging constitutes an island of public land in the midst of a half-million acres of industrially owned, devastated redwood timberland. Jackson State Forest is the only tract that realistically could serve as a large sanctuary between San Francisco and Humboldt County for salmon and other endangered redwood-related species. It could also be a recreation haven for the millions of people who live in the Bay Area and Central Valley.⁴⁹

Scientists across the globe are working to address climate change. Second-growth redwoods seem to have emerged as a key to removing carbon from the atmosphere. It makes sense to preserve these trees as we try to figure out the best next steps forward. For the current status of research of redwood forest restoration, please see the work of Will Russell, Ph. D. in the *Open Journal of Forestry* 10.⁵⁰

While that important work is being done, Cal Fire can step up to the plate and refrain from continuing to log public property and leaving behind piles of slash that become tinder for wildfire. As we enter into this historically dry period of low rainfall, lack of fog, and hotter temperatures, this is the least they can do for the residents and visitors of Mendocino County.

Caspar Creek's South Fork today, 14 April 2021, is barely a trickle. Adult Coho salmon were able to spawn there this past winter. Young of the Year (YOY) are present in many of the pools. Yet, if the creek dries up this summer, these tiny fish will die.

Hotter temperatures due to increased logging demonstrations are the last thing these endangered species need. So, the original question might best be answered by stating that millions of Coho salmon eggs are needed per zero board feet of redwood extracted from the forest. If these fish

⁴⁷ Seim, Jeremiah. *Jackson Demonstration State Forest: Background, Issues, and Alternatives* -- Draft for the Dharma Cloud Foundation 1997.

⁴⁸ *Mendocino Voice*, 13 April 2021. See at: <https://mendovoice.com/2021/04/cal-fire-wants-to-begin-timber-harvesting-in-jackson-a-coalition-of-activists-has-other-ideas-tree-sit-continues-in-jackson-demonstration-state-forest-with-major-protest-monday-morning/> Accessed on 14 April 2021.

⁴⁹ https://www.forestsforever.org/archives_resources/press/loggingrelease.html Accessed on 30 March 2021

⁵⁰ Russell, Will. "Herbaceous Understory Indicators of Post-Harvest Recovery in Coast Redwood (*Sequoia sempervirens*) Forests." *Open Journal of Forestry*. Vol.10 No.2, April 2020. Accessed on 10 April 2021. See at: <https://www.scirp.org/journal/paperinformation.aspx?paperid=98734>

have a chance of surviving the climate challenges facing all the inhabitants of this planet, moving in the direction to preserve redwood forests is the far better plan.

Mike Powers, regional manager of the Jackson, when interviewed, could not cite a current study of redwood sequestration being conducted in Jackson. According to the US Forest Service website, over 300 research papers have been published that focus on Caspar Creek. And yet, none has looked into carbon sequestration of redwoods.

The time has come to change the mandate of the Jackson “living laboratory.”



Figure 15:

Thirty foot tall slash pile off County Road 409 left after the Porter THP done in 2018 (1-16-124-MEN)

This is one of many piles left to become fire tinder along County Roads 408 and 409. Three THPs occurred almost simultaneously here in 2018: The Porter, Sequoia, and South Fork Matrix.

Dozens of homes are within a few hundred yards of these logging areas.



A Proposed Solution:

Thus, we need a revised model within the existing public forests guidelines to guide us as we move past timber production as the main method of procuring economic security for County residents. The following is a proposal that can help deliver us into the new economy, and at the same time direct a wiser use of the resources that still exists in the public forest land within the county.

This proposal is for a one-year moratorium on all logging in Jackson while the following occurs:

1. Establish a system, modelled after the California Marine Life Protection Initiative Act’s Implementation Plan, that allows for a scientific re-assessment of the Jackson Management Plan so that it can be revised to meet current California State fire safety and carbon neutrality guidelines; The process shall be called the Mendocino Redwood Forest Protection Initiative (MRFPI);

2. Within this plan, establish three working groups:
 - A. A stakeholder group of all interested or effected parties
 - B. A scientific advisory group (SAG)
 - C. A Blue Ribbon Task Force to advance the findings of all parties toward legislative changes that could establish new parameters to the existing Management Plan;
3. Hire an Executive Director and staff to oversee the administration of these discussions;
4. Actively seek state or private funding through grants to compensate and reimburse stakeholders, scientists, and task force members for time spent on the development of the MRFPI;
5. Hire professional facilitators to insure a quality outcome.

Does Cal Fire have it within their structural mandate to adapt to the changes taking place across the state and around the world? That remains to be seen.

In the meantime, the proposal here seeks to challenge the agency to respond positively to public pressure to make conservation of redwood forests a higher priority that turning trees into financial assets.

California can be a leader in modelling carbon sequestration though preservation of coastal redwoods. Cal Fire can assist in this project.

It is a bold idea whose time has come.

At last, we come to the question that framed the proposal: How many salmon eggs should exist per board feet of lumber extracted from the watersheds where the salmon spawn? To many people the answer, of course, is many eggs per board foot. But what if there are no more of the endangered Coho salmon in our local streams? Since this seems to be the trajectory of the species, perhaps the question is moot.

Still, we can strive for a better result. This paper's intention is precisely that.

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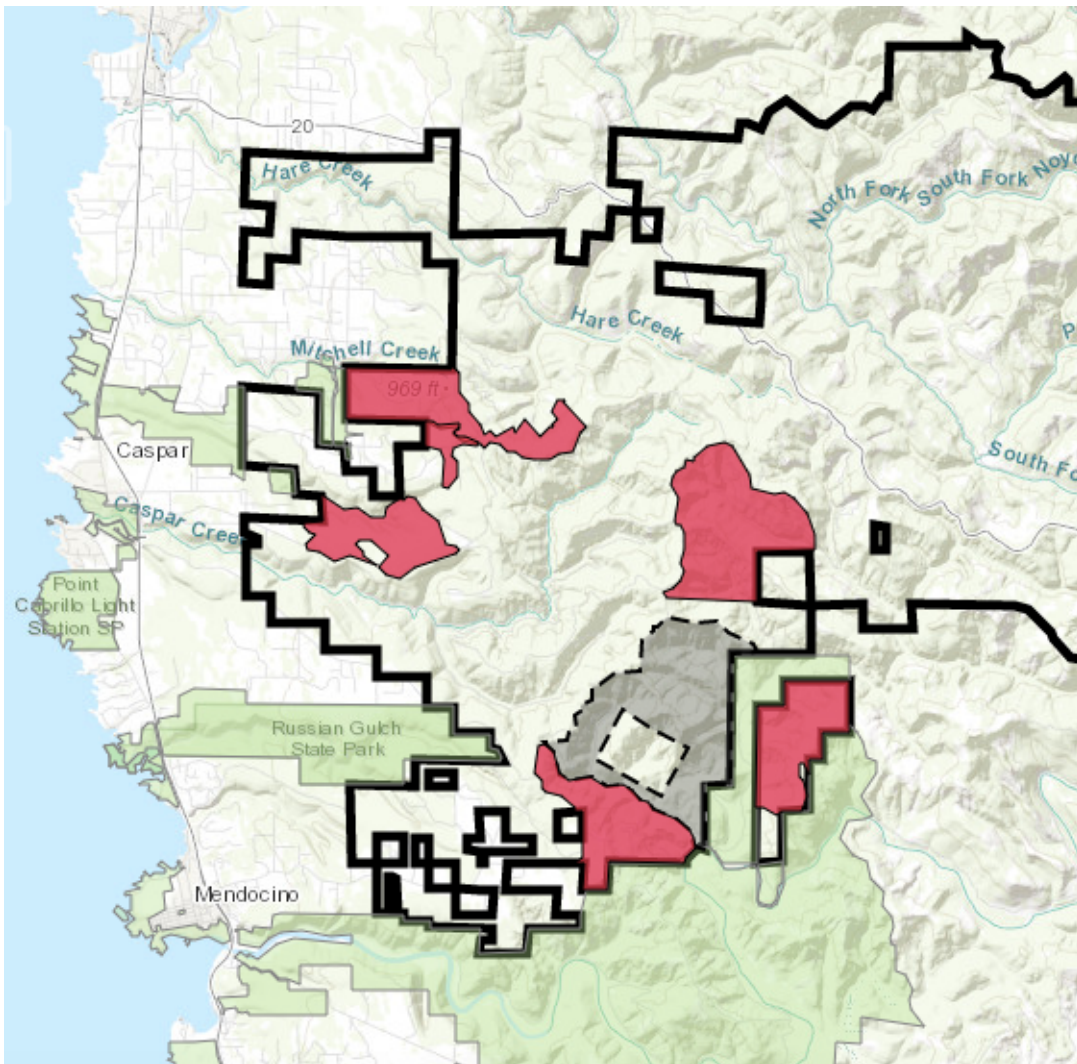
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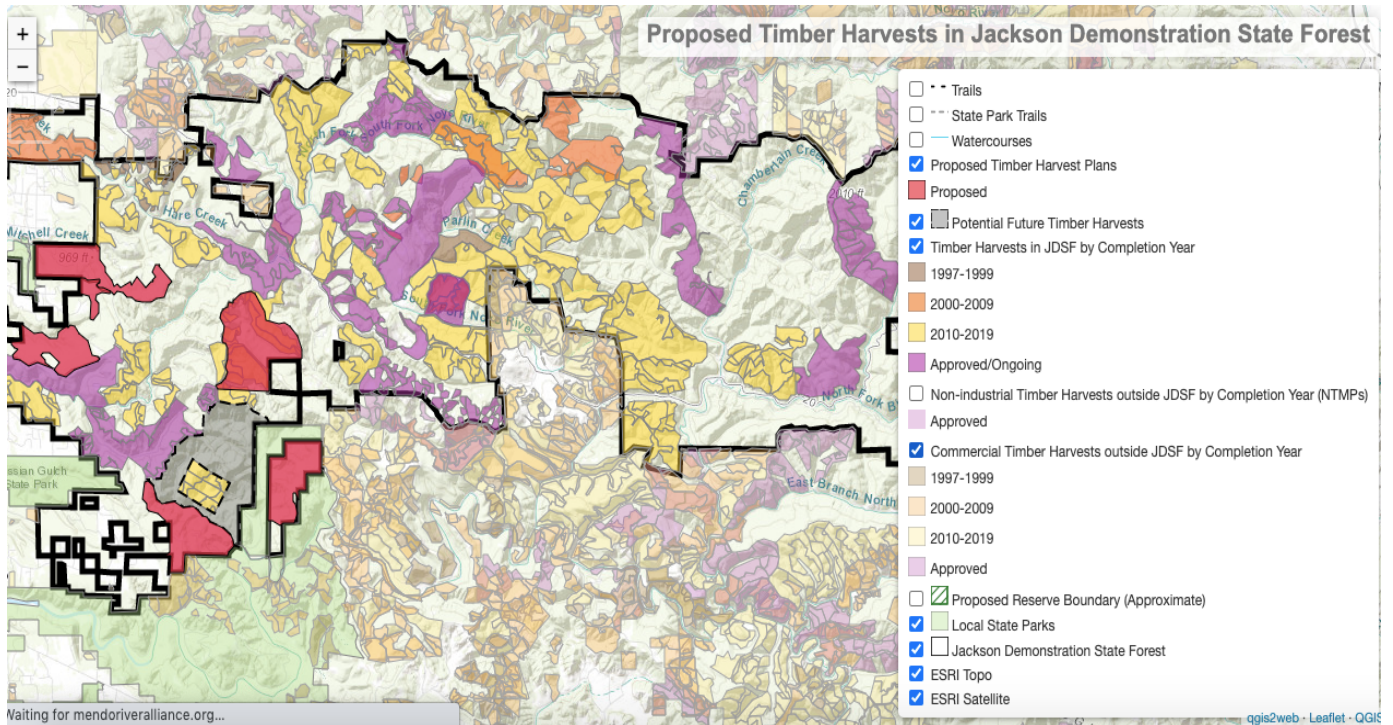
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For Internet resources, please refer to the website addresses listed in the footnote citations.

Appendix 1



Map 1: Proposed and Approved THPs in western section Jackson near residential communities as of April 2021

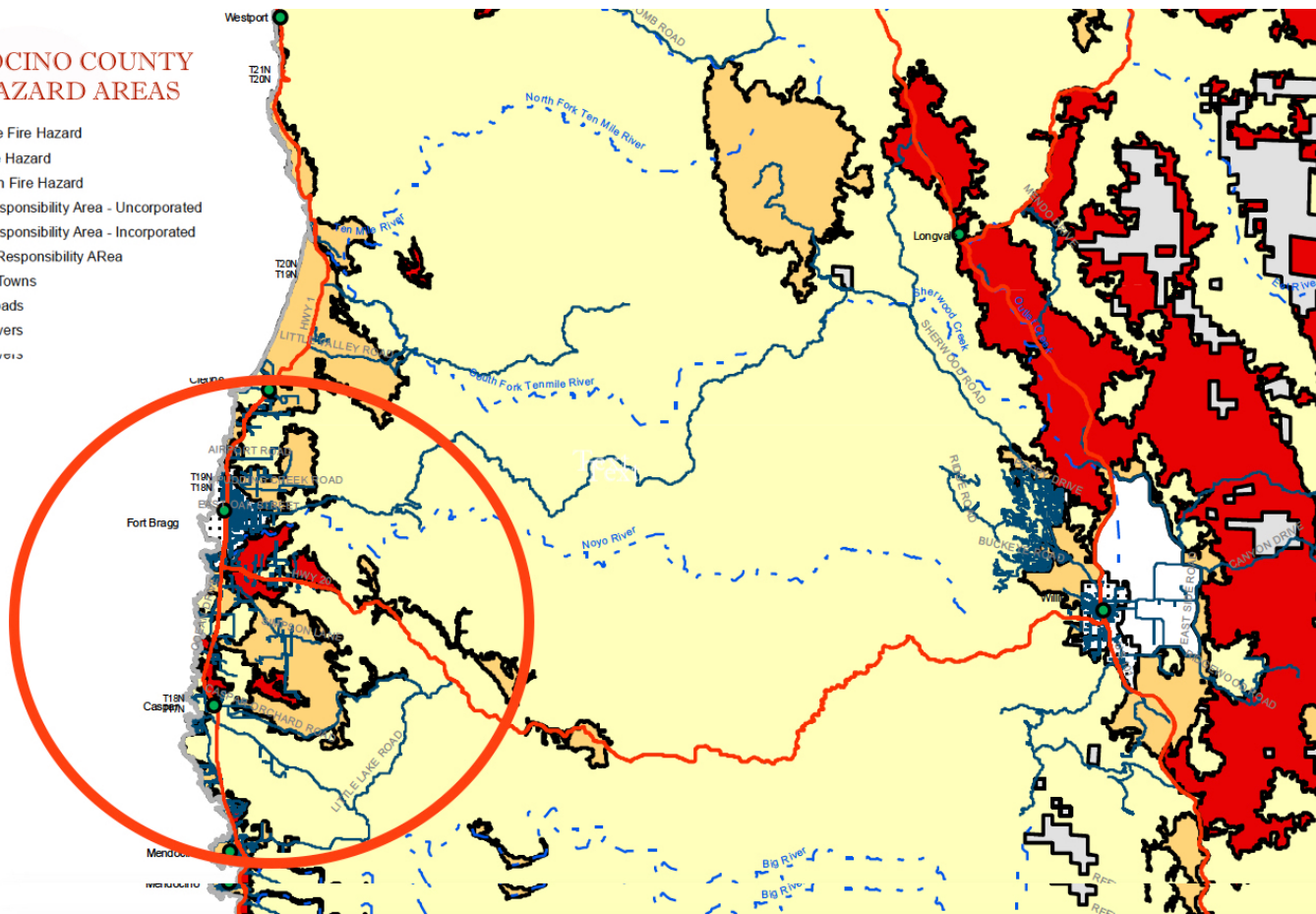


Map 2:

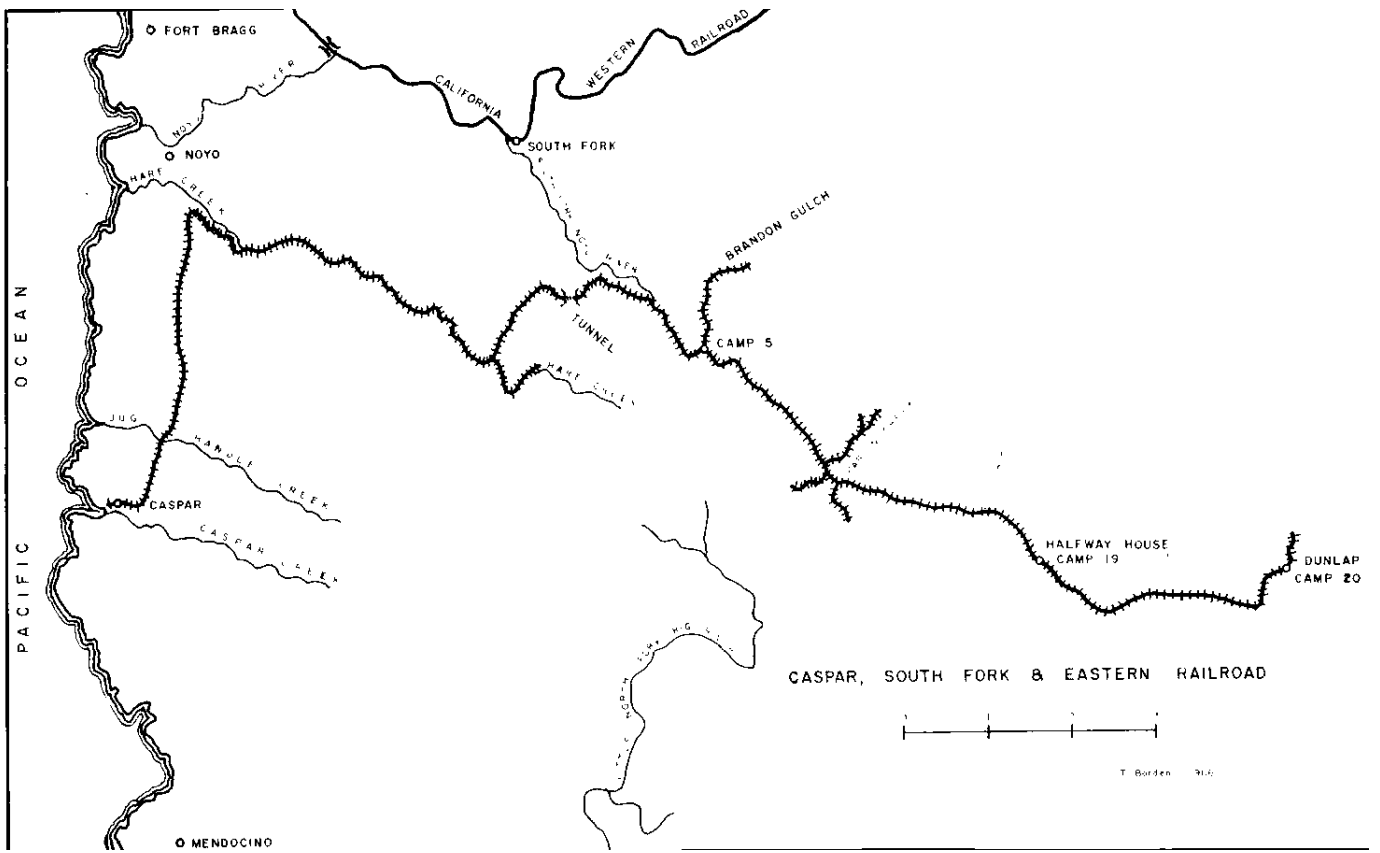
Pending and Proposed THPs west of the 101 Corridor in Mendocino County. See interactive map at: <http://mendocinoriveralliance.org/Webmapping/index.html#12/39.3556/-123.5646>

MENDOCINO COUNTY FIRE HAZARD AREAS

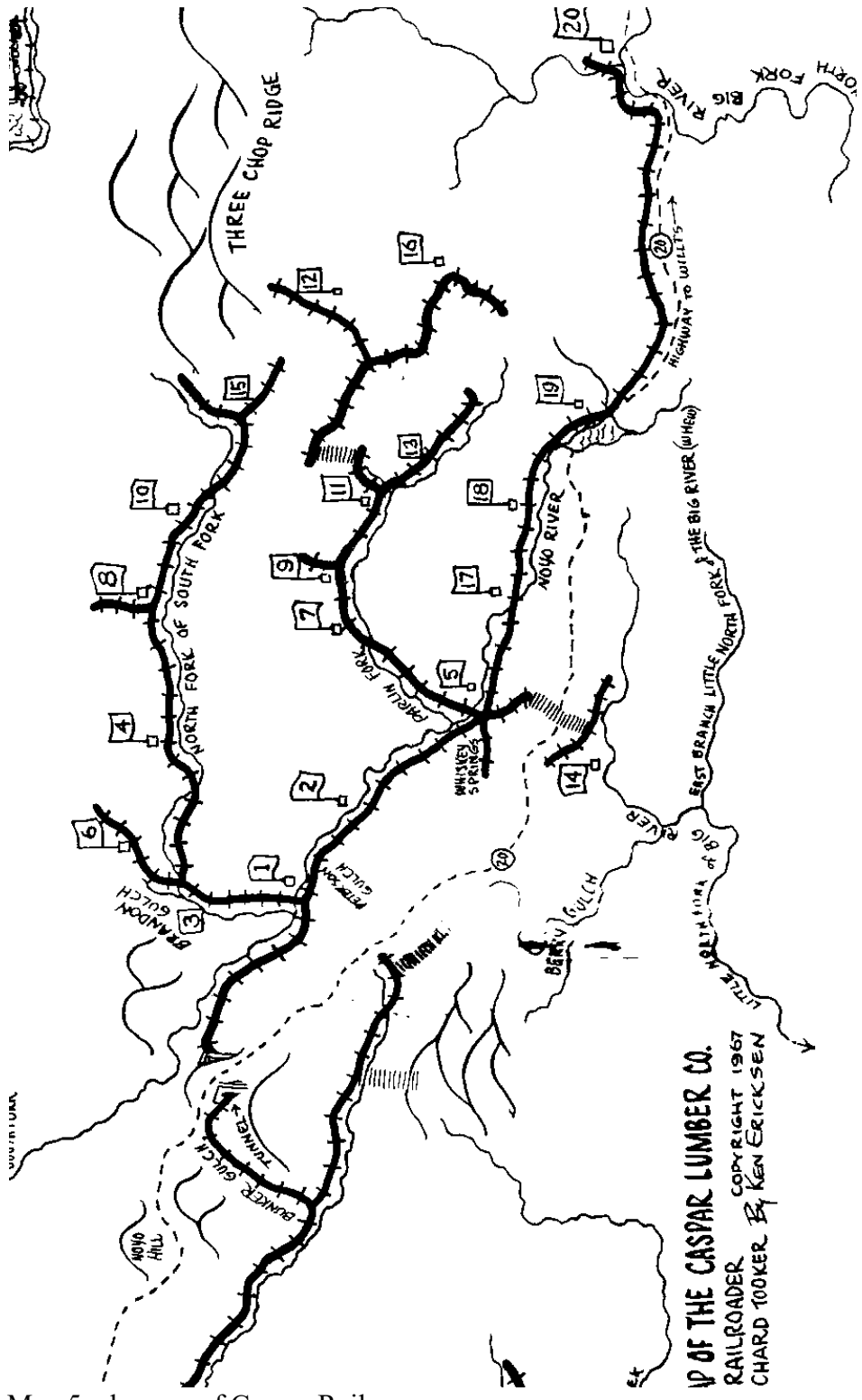
- Moderate Fire Hazard
- High Fire Hazard
- Very High Fire Hazard
- Local Responsibility Area - Unincorporated
- Local Responsibility Area - Incorporated
- Federal Responsibility Area
- Cities & Towns
- Major Roads
- Major Rivers



Map 3: County of Mendocino Fire Hazard map. Note: Most of the Jackson is listed as High Fire Hazard. The Red Circle shows where the heaviest density of homes is near the Jackson.

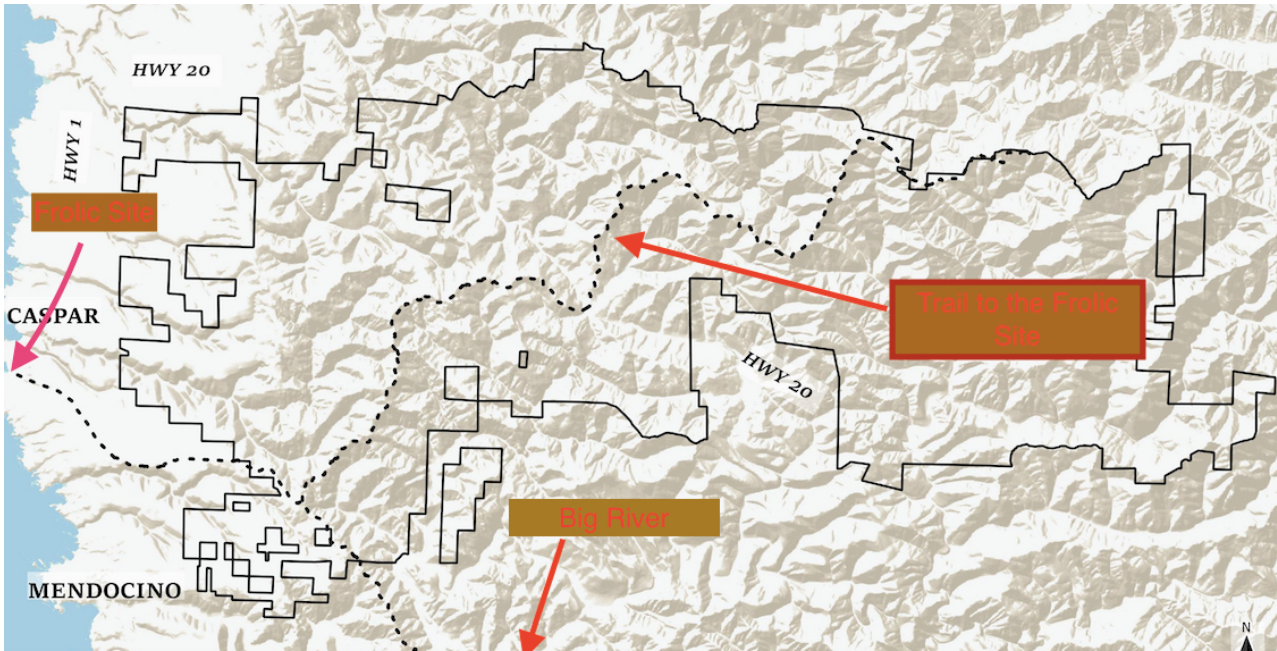


Map 4: Extent of Caspar Railroad from Mill at Caspar Creek mouth to Dunlap on North Fork Big River

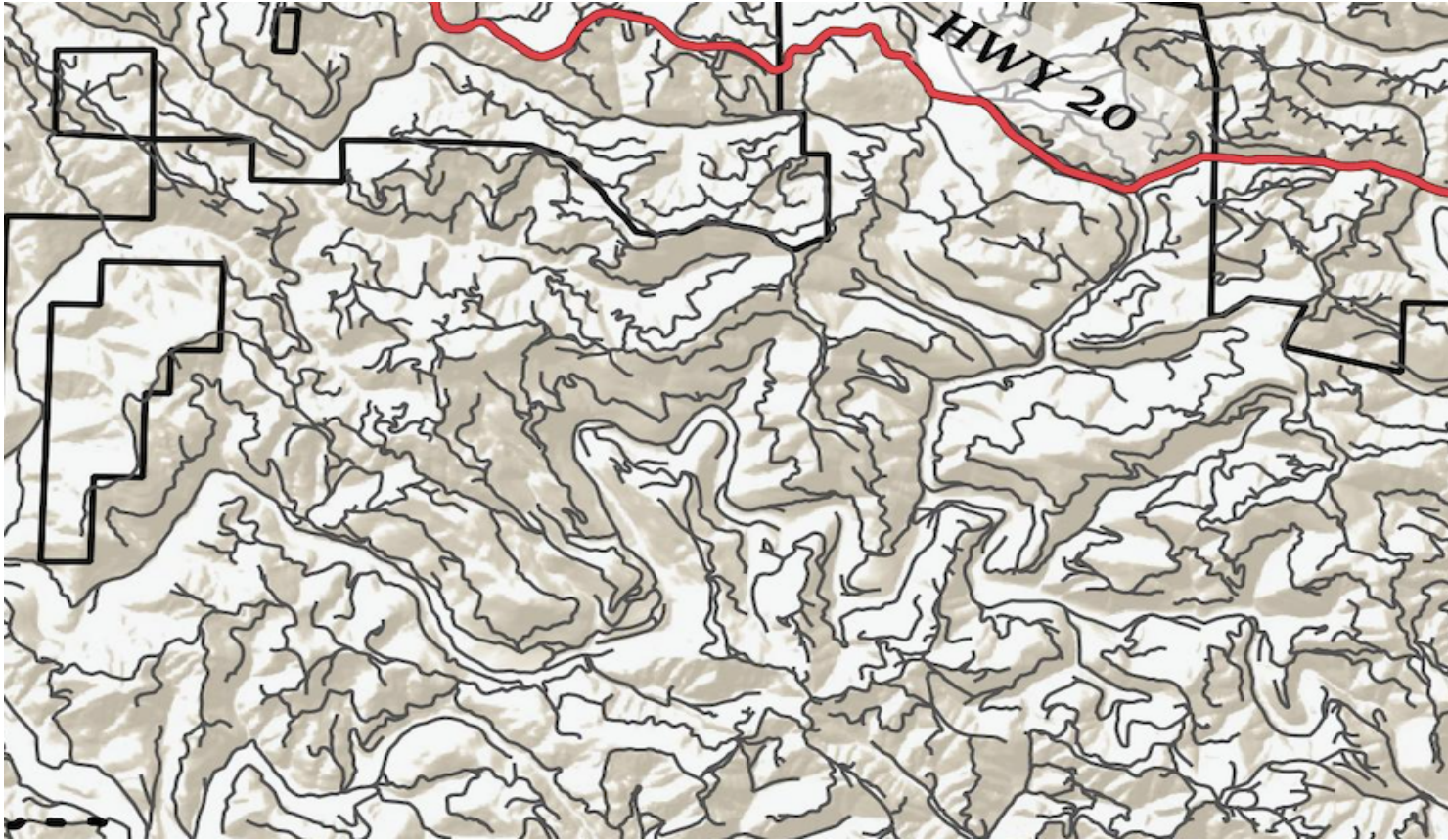


VP OF THE CASPAR LUMBER CO.
 RAILROADER
 CHARD TOOKER BY KEN ERICKSEN
 COPYRIGHT 1967

Map 5: close up of Caspar Railway



Map 6: Possible Pomo Trail from Three Chop Ridge to Frolic wreck site. Please note that the map is an approximation of a best-guess estimate of where this trail once ran. It is in no way intended to present a completely 100% accurate or archeologically proven route.



Map 7: A close up of existing roads within Jackson south of Highway 20. Note: each of the squiggly lines is a logging road or skid trail.

Biographical Notes

The author is a fourth generation Mendocino-born resident. His great grandfather, John Q. Brown, arrived in Mendocino in the 1860s and worked in the timber industry. William's grandchild is the sixth generation of the Lemos family to live on the Mendocino Coast. William attended local schools, and received undergraduate degrees and a life-time teaching credential from Northern California universities. His 35-year tenure at Mendocino schools was capped by co-directing for nine years the School of Natural Resources, (SONAR), a school-within-a-school program that trained students to become resource managers. He received his doctorate in Education for the work he did in the area of wilderness education. He has led dozens of extended wilderness trips, and in 2009 was enrolled in the California Outdoor Hall of Fame for his work educating students in the importance of conservation and preservation of natural resources. He has been a commercial fisherman, carpenter, and on several occasions drove movie stars around when the studios were shooting films on the Mendocino Coast. From 2002 — 2012 he served as a stakeholder on the California Marine Life Protection Act's implementation of conservation areas and reserves offshore. Upon retirement from the school district he worked with a Registered Professional Forester and consulted with the Natural Resources Defense Council on marine protection of the Mendocino Coast. He is a past board member of the Kelley House Museum in Mendocino, where he still volunteers; he was on the board of the Mendocino Land Trust. He is also a member of the Fort Bragg Headlands Consortium. Currently, he serves as the president of the Mendocino Fire Protection District. He lives with his partner of 50 years on a little slice of paradise that borders Jackson Demonstration State Forest just south of Caspar where they raised two extremely gifted children amid a splendid grove of 120-year old second growth redwoods. His interests continue to be protection and conservation of what is left of the resources in Mendocino County. He is an avid hiker, natural historian, wood worker, fisherman, and musician. Someday he may even learn to play the banjo.

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