Comment 1 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: vivian
Last Name: blackstone
Email Address: vblackstone9@gmail.com
Affiliation:

Subject: low carbon fuel
Comment:

for the benefit of the majority of people, we need to limit the negative impact of low carbon fuels. May the majority of people be able to afford the proper transportation to do this.

Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-08-16 15:14:04

No Duplicates.

Comment 2 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Lll
Last Name: D
Email Address: Msldill@yahoo.com
Affiliation:

Subject: CARB lower emissions
Comment:

On January 2, 2024, CARB released for public review the Draft Environmental Impact Analysis for the Low Carbon Fuel Standard Regulation (Draft EIA), which assessed the potential environmental impacts of implementing the Proposed Amendments. The Draft EIA concluded implementation of the Proposed Amendments could result in: beneficial impacts to greenhouse gas; less than significant impacts, or no impacts, to energy, odors, mineral resources (short-term construction-related), population and housing, public services, recreation, and wildfire; and potentially significant [indirect/secondary] adverse impacts to aesthetics, agriculture and forestry resources, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources (long-term operational-related), noise, transportation, tribal cultural resources, and utilities and service systems. The Draft EIA was included as Appendix D to the ISOR. CARB circulated the Draft EIA for public review and comment for a period of 45 days that began on January 5, 2024, and ended on February 20, 2024.

Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-08-16 17:02:54

No Duplicates.

Comment 3 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Alex
Last Name: Meyer
Email Address: petition@alexmeyer.com
Affiliation:

Subject: We Need Hydrogen Fuel Subsidies
Comment:

There is a serious risk that hydrogen fuel cell technology for transportation will die on the vine. This situation needs to be addressed urgently.

When I started driving an FCEV car in 2017, the cost of hydrogen was $17 per kg. Now, hydrogen is $36/kg. The difference is the loss of subsidies.

As a result of inadequate subsidies and lack of supply, buyers are turning away from hydrogen-powered vehicles. Because of this, energy companies are hesitating to invest in hydrogen fueling stations. This is a vicious cycle that endangers the prospect of de-carbonizing transportation.

Battery-based electric vehicles are not a solution. They require large-scale mining of toxic substances. They require dedicated parking that is incompatible with high-density and/or low-income housing. And, they take too long to recharge during long trips.

Please bring back reasonable hydrogen prices at the pump.

Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-08-28 13:04:27

No Duplicates.

Comment 4 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Taylor
Last Name: Williamson
Email Address: twilliamson@ksgrains.com
Affiliation: Kansas Corn Growers Association

Subject: Comments from the Kansas Corn Growers Association
Comment:

```
Thank you for the opportunity to submit comment on behalf of the
Kansas Corn Growers Association. Please see the attached file.
```

Attachment: 'www.arb.ca.gov/lists/com-attach/6-eiarecirc_lcfs2024-WzdTNlcwVHRVDFMj.docx'

Original File Name: LCFS_PROPOSED_AMENDMENTS_AUGUST_2024.docx

Date and Time Comment Was Submitted: 2024-08-30 08:28:09

No Duplicates.

Comment 5 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Rafaela
Last Name: Martinez
Email Address: Payita415@gmail.com
Affiliation:

Subject: Racismo
Comment:

```
Grandes empresarios tienen el deber de no empeorar la contaminación
para todos
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Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-09-12 12:11:30

No Duplicates.

Comment 6 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Dante
Last Name: Butler
Email Address: Dante.butler@seiu-usww.org
Affiliation: SEIU USWW

Subject: The Poisoning of a Nation and Those With Power Who Stopped It
Comment:

Hello,

I could focus on the deaths and injuries resulting from past inactions of our elected officials (by ignorance or negligence); I could shine light on the present day poisoning that is both proven and prevalent, however, I want to focus on the best possible future where your voters live long enough to support you when you need them like you are going to support them and their families by regulating the pollution from the airline industry.

Thank you in advance for making the right decision.

Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-09-12 12:10:13

No Duplicates.

Comment 7 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Dennis
Last Name: Clarke
Email Address: dclarke7078@gmail.com
Affiliation:

Subject: out of state diesel delivered in California
Comment:

```
It appears unfair for Tribal Casinos in California to bring Nevada
/ Phoenix diesel in California. This would avoid LCFS and GHG
taxes. Whereas California Truckstops and gas stations have to pay
these taxes. California is loosing lots of taxes to promote our
clean energy agenda.
Thanks
Dennis
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Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-09-23 14:25:14

No Duplicates.

Comment 8 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Claire
Last Name: Norton
Email Address: Claire.Norton@asm.ca.gov
Affiliation: Office of Assemblymember Juan Carrillo

Subject: Legislative Letter to CARB
Comment:

```
Please see attached letter from Members of the California State
Legislature regarding the LCFS.

Comment submitted by Clerk on commenter's behalf.
```

Attachment: 'www.arb.ca.gov/lists/com-attach/13-eiarecirc_lcfs2024-BmoCYQFnBz0Gcwdr.pdf'

Original File Name: Legislative Letter to CARB 9.23.24 - Juan Carrillo.pdf

Date and Time Comment Was Submitted: 2024-09-24 11:17:58

No Duplicates.

Comment 9 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Maya
Last Name: Khosla
Email Address: creekshade@gmail.com
Affiliation:

Subject: Comments on the Sept. 12, 2024 Meeting
Comment:

Thank you for the chance to comment on the Sept. 12th 2024 discussion with CARB. I appreciate the talks focusing on forests and wildfire, and the environmental justice questions and comments. Overall, the approach appeared to favor massive extractions with little or no carbon accounting conducted by the state or associated entities. The first speaker and ensuing discussions seem to have missed relevant discussion points.

Due to the current format for comments submittal, my comments have also been copied to others present, so that the comments may be taken into account and to allow for specific responses.

Regarding the first speaker: Two years ago, North et al wrote a paper supporting the removal/logging of ~80% of the forests to make them more "resistant" to climate change (fire, etc.) - i.e. massive forest extraction to supposedly save forests. The authors based the idea on "historic forest data." But the data they used in the paper left out most of the available forest data in the archives. As part of the work, they took a small subset of the archival data, showing low forest density, leaving out archival evidence of variable and higher forest density.

Several scientific papers disprove a central idea of low-density forests presented in North et al, 2022 (https://www.yahoo.com/news/uc-researchers-omit-key-evidence-203544768.html). In addition to the archives, there is an abundance of historic photographs showing variable and higher forest density.

The first presenter failed to mention the following:
(a) years of empirical data shows that carbon emissions from logging consistently exceed wildfire emissions (logging emissions are 5-10 times greater than wildfire emissions per published studies by Law and others);
(b) archival data in about the variable density of historic forests - which refutes the "low density" idea of "resistant" forests;
(c) 12 years of data analyzed by Hart and others, showing that forests with an abundance of bark beetles do not result in a greater spread of wildfire;
(d) published work by Meigs, Bond, Hanson, and many others showing that fire severity is unaffected by beetle-killed trees;
(e) large and old growth trees up to ~4 feet DBH are removed during forest extraction projects ("reducing stand density"/ "fuels reduction" / "thinning" etc.);
(f) many dense forests tend to retain adequate moisture to experience low intensity fire - which defeats the idea that forest

extraction is the way to reduce fire intensity;
(g) cumulative impacts of tree removals, including tree mortality caused by "thinning" itself;
(h) well-documented soil drying after removals, which was mentioned in comments, and even soil destruction;
(i) multiple cases of high intensity fire that occurs in forests where tree removals were done prior to fire (2021 Dixie Fire is an example).

One of the presenters even suggested that the removed trees could be "put in a biomass facility," failing to mention that such facilities are responsible for some of the worst pollution and human health impacts that we are witnessing in CA - which are related to diseases including cancer, and lung and heart diseases. The person referring to "biomass facility" also failed to mention that burning biomass releases more emissions than burning coal, for an equal amount of energy produced (https://www.biologicaldiversity.org/campaigns/debunking_the_biomass_myth/pdfs/Forest-Bioenergy-Briefing-Book-March-2021.pdf).

The pertinence of carbon emissions from industrial processing and burning - which are far greater than wildfire emissions - should not have been ignored in such a meeting. The extent to which logging related carbon emissions are being routinely ignored by CA, is addressed in a new 2024 report (cited in https://shasta-cnps.org/conservation-news-september-2024/).

Another speaker mentioned that "reducing stand density" in the forest would be made up for "gain all that carbon back" in 10 years when large trees reabsorb the lost carbon No empirical data was provided.

One speaker mentioned the intensity of big fires like the 2021 Dixie Fire but failed to mention that many of the large forest patches that burned with high severity were previously logged - I personally surveyed multiple parts of the Dixie and documented the pre-fire removals of the largest trees in forests areas that burned with high severity. The 2020 Creek Fire is a similar example.

Much gratitude is owed to Matt Holmes who commented on proposed wood pellet operations and on the fact that "fuels reduction" efforts dry out the soils. He mentioned that for forest extraction results in disturbance to forest floor - this too has been shown in field studies that were not mentioned at the meeting. Wood pellet operations (and other "fuels reduction" efforts) routinely remove the largest trees.

Much gratitude is owed to one speaker who mentioned that removal of massive numbers of trees can destabilize the remaining old growth trees, an astute comment backed up by field data. This comment was not adequately addressed.

Astonishingly, there was no mention of snags as nesting, roosting, denning, resting and other wildlife activities supporting much of our biodiversity - the main emphasis was on removals without accounting for the carbon value and wildlife value. The main point emphasized removals with inadequate data.

Coincidentally, reducing stand density to the extent being proposed would most benefit industrial-scale logging in public lands (also not mentioned). Failing to account for the carbon emissions from

forest extraction would be favored by industries seeking to utilize the trees and snags for lumber, biomass energy, biofuels, and other products the state claims are "renewable" and "clean."

The public should have a chance to objectively evaluate the presentations, rather than being exposed to industrial-level forest extraction perspectives. Future meetings should provide the space for a balance of scientific findings rather than findings that suit industrial-scale logging and related removals.

Best regards,
Maya Khosla
Biologist and Writer

Attachment: "

Original File Name:

Date and Time Comment Was Submitted: 2024-09-29 08:28:14

No Duplicates.

Comment 10 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Aaron
Last Name: Forburger
Email Address: Aaron.Forburger@asm.ca.gov
Affiliation: Office of Assemblymember Muratsuchi

Subject: Low Carbon Fuel Standard -- Dairy Biomethane
Comment:

```
Hello,

Please see the attached letter from Assemblymember Muratsuchi and
some of his colleagues in the Legislature regarding concerns with
the Low Carbon Fuel Standard's treatment of dairy biomethane.

Thank You,

Aaron Forburger
Legislative Aide
Assemblymember Al Muratsuchi
66th Assembly District
916-319-2066
```

Attachment: 'www.arb.ca.gov/lists/com-attach/15-eiarecirc_lcfs2024-WmNTe1dnBGZXf1Rm.pdf'

Original File Name: 9.11.24 LCFS_Legislator Sign on Letter.pdf

Date and Time Comment Was Submitted: 2024-09-30 09:51:55

No Duplicates.

Comment 11 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Katie
Last Name: Donahue-Duran
Email Address: katie.donahueduran@neste.com
Affiliation: Neste

Subject: Neste Comments on Recirculated Draft Environmental Impact Analysis
Comment:

Please see the attached comment letter from Neste.

Attachment: 'www.arb.ca.gov/lists/com-attach/16-eiarecirc_lcfs2024-WjRUN10vUnULaAlW.pdf'

Original File Name: Neste_August 16 LCFS Recirculated LCFS Regulation EIR_September 30 2024.docx.pdf

Date and Time Comment Was Submitted: 2024-09-30 10:23:49

No Duplicates.

Comment 12 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Lauren
Last Name: Gallagher
Email Address: LGallagher@cbecal.org
Affiliation:

Subject: Public Interest Letter: Oppose Unless Amended - Proposed Changes to the Low Carbon Fuel St
Comment:

Comment posted by Clerk on behalf of commenter:

Dear Chair Randolph and Members of the Board,

Please see the attached letter from a coalition of public interest organizations regarding the 15-Day Changes to the Low Carbon Fuel Standard released on August 12, 2024. The letter details the undersigned coalitions oppose unless amended stance on the proposed 15-Day Changes.

On behalf of the Fix LCFS Coalition,

Attachment: 'www.arb.ca.gov/lists/com-attach/17-eiarecirc_lcfs2024-VTNQP10kBToCZ1I0.pdf'

Original File Name: FixLCFS Coalition -15 Day Changes Comment Letter Sept. 2024 (003) - Lauren Gallagher.pdf

Date and Time Comment Was Submitted: 2024-09-30 12:04:39

No Duplicates.

Comment 13 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Sophie
Last Name: Ellinghouse
Email Address: sellinghouse@wspa.org
Affiliation: WSPA

Subject: WSPA Comments on LCFS Recirculated EIA
Comment:

Please see attached.

Attachment: 'www.arb.ca.gov/lists/com-attach/18-eiarecirc_lcfs2024-VSJXIlQlBzVWDwFt.pdf'

Original File Name: WSPA LCFS Recirculated EIA Comments 9-30-2024.pdf

Date and Time Comment Was Submitted: 2024-09-30 13:20:36

No Duplicates.

Comment 14 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Orran
Last Name: Balagopalan
Email Address: obalagopalan@smwlaw.com
Affiliation: Shute, Mihaly & Weinberger LLP

Subject: Comments on the RDEIA for the Proposed LCFS Amendments
Comment:

```
Please see the attached comments from the Leadership Counsel for
Justice and Accountability, Central Valley Defenders of Clean Water
& Air, Animal Legal Defense Fund, and Food & Water Watch.
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Attachment: 'www.arb.ca.gov/lists/com-attach/19-eiarecirc_lcfs2024-AGxcPwBgBDMDYFIg.pdf'

Original File Name: Leadership Counsel et al. Comments re RDEIA LCFS Amendments 9-30-24.pdf

Date and Time Comment Was Submitted: 2024-09-30 13:06:09

No Duplicates.

Comment 15 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Steven
Last Name: Berry
Email Address: steven.berry@yale.edu
Affiliation: Yale University

Subject: Comments on Recirculated Draft EIS for LCFS
Comment:

Below are comments on the recirculated draft EIS for the LCFS. These comments are also attached in a zip file along with other materials as attachments.

COMMENTS OF STEVE BERRY & TIM SEARCHINGER
ON RECIRCULATED DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR REVISIONS TO LOW CARBON FUEL STANDARD
(September 2024)

Steven Berry, David Swenson Professor of Economics, Yale University (steven.berry@yale.edu)
Timothy D. Searchinger, Senior Research Scholar, Princeton University (tsearchi@princeton.edu)

We are an economist at Yale University and an environmental scientist at Princeton University and have written papers analyzing the emissions from biofuel use and global land use models. We have previously submitted comments on the proposed revisions to the LCFS and on the most recent 15-day rule amendments. These comments also include a recent paper in which we analyze the GTAP model used by CARB to estimate indirect land use change emissions from crop-based biofuels. In these comments, and in this paper, we briefly explain the compelling evidence that crop-based biofuels are contributing heavily to global cropland expansion and tropical deforestation and likely increase emissions relative to fossil emissions. We also explain how the GTAP model lacks a credible empirical basis, how it has built in structural biases and ungrounded assumptions that guarantee the low ILUC estimates, and how it produces physically impossible land use results by a large margin that are then arbitrarily readjusted to conserve land.

We here resubmit these earlier comments and attachments and now also include an annotated slide presentation that summarizes our research findings. We also include comments submitted by Searchinger and Professors Dan Kammen and Michael O'Hare of the University of California at Berkeley to a panel of the National Research Council that discusses these issues.

The GTAP model results provide the core justification in the recirculated draft environmental impact statement of the findings that the proposed LCFS revisions will reduce greenhouse gas emissions. These findings of reduced emissions are implicitly or explicitly mentioned in much of the document and set forth

quantitatively on pages 59-60. In fact, the best evidence is that at least the elements of the rule that assign reductions in greenhouse gas fuel intensity to crop-based biofuels in general, and vegetable oil-based biofuels in particular, will likely result in large increases in global greenhouse gas emissions over the 30-year period that CARB uses to evaluate the effects of biofuels. These increased emissions are particularly significant if CARB does not cap crop-based biofuels. Because the GTAP model lacks a credible empirical basis for the reasons set forth in our paper, the findings of greenhouse gas reductions in the EIS lack a credible basis or substantial evidence.

Another concern with the draft EIS is that it fails to acknowledge the prominent role that reduced food consumption due to higher food prices plays in CARB's lifecycle analysis for biofuels, and particularly ethanol. These effects were revealed in a paper published by the original GTAP modelers for CARB (Hertel et al. 2010). This effect was also further elaborated in a paper by Searchinger (Searchinger et al. 2015), and was the focus of comments by Berry when hired as an expert consultant by CARB at the time GTAP was first used.

To summarize the implications for food consumption, one prediction of the GTAP model is that roughly half of the crop calories diverted to corn ethanol are not replaced. The reduced food consumption by people or by the livestock they eat results in reduced respiration of carbon dioxide. The way the lifecycle calculation works, this reduction in respiration works as an offset to the greenhouse gas emissions that occur when ethanol is combusted. (Illustrations showing how this offset works in lifecycle analyses are shown in Searchinger [2010]). Without this effect, the GTAP model would have found that ethanol increases greenhouse gas emissions. Although the lack of credibility of the GTAP model makes this finding questionable, if CARB relies on the GTAP model, the role of reduced food consumption should be prominently disclosed to allow a proper consideration of the proposed rule. There is also more reliable evidence that in the short-term, biofuel increases do result in reduced food consumption (Roberts and Schlenker 2013).

References

Hertel, Thomas W., Alla A. Golub, Andrew D. Jones, Michael O'Hare, Richard J. Plevin, and Daniel M. Kammen. 2010. "Effects of US Maize Ethanol on Global Land Use and Greenhouse Gas Emissions: Estimating Market-Mediated Responses." BioScience 60 (3): 223-31. https://doi.org/10.1525/bio.2010.60.3.8.

Roberts, Michael J, and Wolfram Schlenker. 2013. "Identifying Supply and Demand Elasticities of Agricultural Commodities: Implications for the US Ethanol Mandate." American Economic Review 103 (6): 2265-95. https://doi.org/10.1257/aer.103.6.2265.

Searchinger, T.D. 2010. "Biofuels and the Need for Additional Carbon." Environmental Research Letters 5 (2): 024007. https://doi.org/10.1088/1748-9326/5/2/024007.

Searchinger, T.D., R. Edwards, D. Mulligan, R. Heimlich, and R. Plevin. 2015. "Do Biofuel Policies Seek to Cut Emissions by Cutting Food?" Science 347 (6229): 1420-22. https://doi.org/10.1126/science.1261221.

Attachment: 'www.arb.ca.gov/lists/com-attach/20-eiarecirc_lcfs2024-UTIFbFQ4UW8FZgdp.zip'

Original File Name: Comments of Berry & Searchinger and Attachments.zip

Date and Time Comment Was Submitted: 2024-09-30 14:37:20

No Duplicates.

Comment 16 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Joshua
Last Name: Wilson
Email Address: Josh.Wilson@poet.com
Affiliation: POET

Subject: POET Comments on the Recirculated DEIA for the 2024 Proposed LCFS Amendments
Comment:

Attachment: 'www.arb.ca.gov/lists/com-attach/21-eiarecirc_lcfs2024-UGAGOVNhB2QEMAAw.pdf'

Original File Name: 09302024_POET Comments on Recirculated DEIA for CARB LCFS Rulemaking.pdf

Date and Time Comment Was Submitted: 2024-09-30 15:33:34

No Duplicates.

Comment 17 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Lauren
Last Name: Gallagher
Email Address: lgallagher@cbecal.org
Affiliation: Communities for a Better Environment

Subject: Communities for a Better Environment's Comment on the Recirculated DEIA
Comment:

```
Please see the attached document to view Communities for a Better
Environment's comment on the Recirculated Draft Environmental
Impact Analysis for the Proposed Low Carbon Fuel Standard
Regulation.

Sincerely,

Lauren Gallagher
Attorney & Legal Fellow
Communities for a Better Environment
```

Attachment: 'www.arb.ca.gov/lists/com-attach/22-eiarecirc_lcfs2024-VzQFYVQwAg4Ba1c0.pdf'

Original File Name: CBE LCFS Recirc DEIA Comment 9.30.24.pdf

Date and Time Comment Was Submitted: 2024-09-30 15:55:38

No Duplicates.

Comment 18 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Shaye
Last Name: Wolf
Email Address: swolf@biologicaldiversity.org
Affiliation: Center for Biological Diversity

Subject: Comments from Center for Biological Diversity
Comment:

Please see attached comments from Center for Biological Diversity.

Attachment: 'www.arb.ca.gov/lists/com-attach/23-eiarecirc_lcfs2024-V2VTYVIMA2AGOQRb.pdf'

Original File Name: 24 09 30 CBD comments on EIA for LCFS amendments FINAL.pdf

Date and Time Comment Was Submitted: 2024-09-30 16:21:36

No Duplicates.

Comment 19 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Craig
Last Name: Moyer
Email Address: cmoyer@manatt.com
Affiliation: Western Independent Refiners Association

Subject: Comments on Recirculated Draft Environmental Impact Analysis for LCFS Proposed Amendments
Comment:

```
Please see the attached comments on behalf of the Western
Independent Refiners Association regarding the Recirculated Draft
Environmental Impact Analysis for the Proposed Low Carbon Fuel
Standard Regulation. Thank you.
```

Attachment: 'www.arb.ca.gov/lists/com-attach/24-eiarecirc_lcfs2024-VmQGMFFiVzAGLVJi.pdf'

Original File Name: 2024-09-30 WIRA Comment Letter on EIR for LCFS Environmental Analysis.pdf

Date and Time Comment Was Submitted: 2024-09-30 16:30:18

No Duplicates.

Comment 20 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Amanda
Last Name: Parsons DeRosier
Email Address: amanda.derosier@gceholdings.com
Affiliation: Global Clean Energy Holdings, Inc.

Subject: Comments on the Recirculated Draft Environmental Impact Analysis for LCFS
Comment:

Attachment: 'www.arb.ca.gov/lists/com-attach/25-eiarecirc_lcfs2024-AmVcOVI2WFQAdARg.pdf'

Original File Name: GCE RDEIA Comment Letter 09.30.2024.pdf

Date and Time Comment Was Submitted: 2024-09-30 19:56:29

No Duplicates.

Comment 21 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Chad
Last Name: Hanson
Email Address: cthanson1@gmail.com
Affiliation: John Muir Project

Subject: Comments on 9/12/24 presentation to CARB by Malcolm North
Comment:

Note: Your submission system does not function properly and would not accept my comments as written, with figures and photos included. While the text of my comments are below, the figures are found in the additional attached comments (our comments on the North Fork logging proposal), fyi. Chad

30 September 2024

Re: Comments to CARB due Sept. 30 re: Malcolm North presentation to Expert Advisory Committee 9/12 Meeting - AB 1757 discussion

Submitted via:
https://www.arb.ca.gov/lispub/comm/iframe_bcsubform.php?listname=eiarecirc_lcfs2024&comm_period=A

To Whom It May Concern,

On behalf of the John Muir Project of Earth Island Institute, I am submitting these expert scientific comments to address some highly misleading and scientifically inaccurate statements, promoting widespread logging under the guises of thinning, fuel reduction, and restoration/resilience, by U.S. Forest Service scientist Malcolm North.

The North et al. (2022) Article Has Been Scientifically Discredited and Has Been Found to Represent a "Falsification of the Scientific Record"; "Thinning" Kills Far More Trees Than It Prevents from Being Killed.

The Forest Service improperly relies on its North et al. (2022) study, which has been discredited and has been found to represent a "falsification of the scientific record" (Baker et al. 2023).

First, North et al. (2022) relies on previous studies by Collins and Stephens, which reported that there were only 20 to 30 trees per acre in historical Sierra Nevada forests, based on circa 1911 Forest Service field surveys. However, as we found in Baker et al. (2018), the Collins and Stephens work omitted the small-tree data in those historical datasets and failed to use correction factors that the Forest Service itself, a century ago, repeatedly stated were needed to avoid severe underestimations of forest density. The surveys were based on visually estimated distance from the transect line, but surveyors consistently overestimated distance (e.g., they would see 30 or 40 feet to their left and right but would assume

they were seeing 66 feet left and right). Moreover, small trees in historical Forest Service survey data were omitted in recent Forest Service studies. These factors caused a huge underestimation of forest density. When we included all of the improperly omitted data, we found that historical mixed-conifer forests of the Sierra Nevada were 7 times denser, in terms of trees per acre, than the Forest Service erroneously claimed, and historical ponderosa pine forests were 17 times denser than recent, and now discredited, Forest Service studies falsely claimed, as we reported in Baker et al. (2018). Our findings in Baker et al. (2018) are uncontested.

Second, North et al. (2022) misleadingly claimed that "current" forests have 150 to 200 trees per acre, but inexplicably used data from 2011 to represent supposed "current" conditions, and failed to mention that over 90% of their study areas have burned in mixed-intensity wildfires since 2011, and that a large portion of the live trees that existed a decade ago are now snags and downed logs.

The bottom line is that North et al. (2022) severely underreported historical forest density by using previous historical density estimates that have been discredited and superseded, and overreported current live tree forest density by using 2011 as their "current" condition, despite the fact that fire and drought since 2011 have dramatically reduced live tree density in their study areas.

Further, studies that have claimed success of such projects on reducing bark beetle mortality generally do not consider the treatment-caused mortality when considering the concept of a successful treatment. For instance, Fettig et al (2012) examined the effect on bark beetle-induced tree mortality of various levels of thinning in comparison to unthinned areas in mixed-conifer forests in the Sierra Nevada. While they stated that "[i]n the present study, bark beetle-caused tree mortality was relatively low the decade after thinning, never reaching a level that would be considered epidemic for either P. jeffreyi or P. ponderosa..." the authors did not consider the initial mortality event caused by the thinning treatment itself. Their measure of success was whether the level of tree mortality in thinned stands was less than that in the unthinned stands, but apparently mortality was only significant to success if caused by bark beetles. When analyzing the data they present, it is actually quite simple to glean that the overall mortality (i.e. mortality from thinning plus mortality from subsequent bark beetles) in the three thinning treatments was substantial (109 - 289 trees killed per hectare on average) compared to the overall mortality in the unthinned stands (approximately 13 trees killed per hectare on average). Granted, the number of trees killed by bark beetles was slightly lower in the thinning units (3 - 11 trees killed per hectare on average) compared to the unthinned stand (13 trees killed per hectare on average), but this pales in comparison to overall number of trees killed due to the thinning itself (see Figure 1). Another way to view this is, approximately 289 trees per hectare were killed in the most intensive treatment by the thinning itself in order to prevent 10 trees from being killed in the future by bark beetles.

Data taken from Fettig et al. (2012), showing cumulative tree mortality from thinning and bark beetles combined. Note that

thinning killed vastly more trees than it prevented from being killed, and removed vastly more carbon from the forests in the process.

Six et al. (2014) notes a similar pattern:
"Although more trees were killed overall in control units during the outbreak, all controls still retained a greater number of residual mature trees than did thinned stands as they entered the post-outbreak phase."
And a separate study in ponderosa pine forests in the Black Hills similarly demonstrated that far more trees were killed through the actual thinning process than through a subsequent bark beetle outbreak that was more severe than that experienced in the study by Fettig et al. (2012). Negron et al (2017) examined stands in which the overall mortality (again, mortality caused by thinning plus mortality caused by bark beetles) was 242.6 trees killed per acre on average in thinned stands compared to 87.7 trees killed per acre in unthinned stands. As with other similar studies, the treatment was the primary source of mortality in the stand rather than bark beetles. By the end of the outbreak, not only were there more trees in the unthinned stands (203.2 trees per acre on average) compared to the thinned stands (55 trees per acre on average) as well as more basal area (which could be considered a proxy for both biomass and carbon storage; 67.8 square fee per acre compared to 32.3 square feet per acre).
In Sierra Nevada mixed-conifer and ponderosa pine forests after the major drought occurring approximately 2012-2017, Restaino et al. (2019) reported, in Figures 3 and 4, mixed effects of increasing forest basal area on tree mortality from drought and native bark beetles, with no clear relationship. Restaino et al. (2019), in Figure 5, reported that thinned forests had approximately the same or higher tree mortality from drought/beetles compared to unthinned forests for three of the four conifer species studied. Only one of the four conifer species studied, ponderosa pine, had slightly lower probability of mortality in thinned forests than in unthinned forests, but the difference was only 15% on average, while Figure 2a of the study showed that thinning itself killed about 35% of the forest basal area before the drought occurred; thus thinning once again killed more trees than it prevented from being killed, even for the one conifer species out of four for which the thinned areas had somewhat lower probability of tree mortality.
North et al. (2022) fails to divulge or disclose the fact that mechanical thinning, conducted ostensibly to reduce stand densities and reduce competition-related tree mortality, kills far more trees than it prevents from being killed.

Moreover, Baker and Hanson (2022) establish that mechanical thinning kills significantly more trees than it prevents from being killed, when tree mortality from thinning and tree mortality from subsequent wildfire are both taken into account.

Further, the best available scientific evidence, and most comprehensive, finds that forest stands with higher levels of snags (standing dead trees) from drought and native bark beetles do not increase wildfire behavior and often have lower wildfire intensities (Hart et al. 2015, Meigs et al. 2016, Hart and Preston 2020). Moreover, the Forest Service's own research documented the fact that the agency's annual aerial tree mortality surveys have been exaggerating yearly tree mortality profoundly--by tenfold to twentyfold (Slaton et al. 2021). The Forest Service and its scientists have known this for over three years, so why are the agency's scientists continuing to publicly promote the false and

utterly discredited claim that nearly 200 million trees have died due to drought and native bark beetles in California's forests in recent years?

Decades of Science by the U.S. Forest Service and U.S. National Parks Service Clearly Establish that (a) Protecting Communities from Wildfires Can Only Effectively Be Done in the Communities Themselves, and (b) There Is No Need to Remove Trees Before Burning--Either Controlled Burns or Prescribed Natural Fires.

The only effective way to protect human communities from wildland fire is to conduct/support: (a) defensible space pruning within 100 feet or less from homes and other human structures, along with providing information to homeowners about simple steps they can take to make their homes more fireproof (e.g., ember-proof vents) and implement effective wildfire evacuation planning, and (b) prescribed burning and managed wildfire, with no prior tree removal, in the remainder of the Project area. There is no need to remove any trees, even small ones, before conducting such burning--entities engaged in controlled burns and prescribed natural fire activities need only conduct and allow such activities during milder fire weather. For example, the EA (Table 3.8-1) and Responses to Comments (p. 37) for the Plumas National Forest's "Community Protection Project - Central and Western Slope" Project admitted that prescribed fire can be applied without prior thinning, and that prescribed fire alone is far less expensive than mechanical thinning plus slash burning. As we explain below, serious matters of public safety are at issue here, and the landscape-level logging promoted by the U.S. Forest Service, through Dr. North, will increase, not decrease, threats to communities from wildfires.

The only effective way to protect homes from fire is home-hardening and defensible space pruning within about 100 feet of homes or less.

Cohen, J.D. (U.S. Forest Service). 2000. Preventing disaster: home ignitability in the wildland-urban interface. Journal of Forestry 98: 15-21.

The only relevant zone to protect homes from wildland fire is within approximately 100 feet or less from each home--not out in wildland forests.

Gibbons P, van Bommel L, Gill MA, Cary GJ, Driscoll DA, Bradstock RA, Knight E, Moritz MA, Stephens SL, Lindenmayer DB (2012) Land management practices associated with house loss in wildfires. PLoS ONE 7: Article e29212.

Defensible space pruning within approximately 100 feet from homes was effective at protecting homes from wildfires, while vegetation management in remote wildlands was not.

Syphard, A.D., T.J. Brennan, and J.E. Keeley. 2014. The role of defensible space for residential structure protection during wildfires. Intl. J. Wildland Fire 23: 1165-1175.

Vegetation management and removal beyond approximately 100 feet from homes provides no additional benefit in terms of protecting

homes from wildfires.

Tree removal is not necessary prior to conducting prescribed fire or prescribed natural fire (managed wildfire).

Decades of scientific studies have proven that, even in the densest forests that have not experienced fire in many decades, prescribed fire can be applied without prior tree removal, as demonstrated in the following studies:

Knapp EE, Keeley JE, Ballenger EA, Brennan TJ. 2005. Fuel reduction and coarse woody debris dynamics with early season and late season prescribed fire in a Sierra Nevada mixed conifer forest. Forest Ecology and Management 208: 383-397.

Knapp, E.E., and Keeley, J.E. 2006. Heterogeneity in fire severity within early season and late season prescribed burns in a mixed-conifer forest. Int. J. Wildland Fire 15: 37-45.

Knapp, E.E., Schwilk, D.W., Kane, J.M., Keeley, J.E., 2007. Role of burning on initial understory vegetation response to prescribed fire in a mixed conifer forest. Canadian Journal of Forest Research 37: 11-22.

van Mantgem, P.J., A.C. Caprio, N.L. Stephenson, and A.J. Das. 2016. Does prescribed fire promote resistance to drought in low elevation forests of the Sierra Nevada, California, USA? Fire Ecology 12: 13-25.

van Mantgem, P.J., N.L. Stephenson, J.J. Battles, E.K. Knapp, and J.E. Keeley. 2011. Long-term effects of prescribed fire on mixed conifer forest structure in the Sierra Nevada, California. Forest Ecology and Management 261: 989−994.

Stephens, S.L., et al. 2021. Fire, water, and biodiversity in the Sierra Nevada: a possible triple win. Environmental Research Communications 3: Article 081004.

Previous mechanical thinning and post-fire logging was wildly ineffective and counter-productive as a wildfire management and community protection approach.

The images below, from the Washington Post, show the devastation of the town of Greenville, after the Dixie fire swept up from the southwest, moving rapidly northeast through vast areas that had been mechanically thinned, before destroying most of the towns of Greenville and Canyondam, along with the smaller town of Indian Falls.

The images below, from Google Earth, show numerous large areas of pre-fire mechanical thinning and earlier post-fire logging (after the 2012 Chips fire around Butt Valley Reservoir) on the Plumas National Forest, southwest, south, and southeast of the Greenville, Canyondam, and Indian Falls areas, through which the Dixie fire swept before destroying most of the homes and businesses. For each location a pair of images is shown--one after mechanical thinning but before the Dixie fire, and the other after the Dixie fire. GPS coordinates of the imagery locations are shown at the bottom right

margin of each. Most of the mechanically thinned and post-fire logged forests burned at high intensity, as the post-fire images show.

The images below represent all areas of mechanical thinning and/or post-fire logging of any significant size that could be identified as occurring within 15 years or so prior to the 2021 Dixie fire, and which were within the path of the fire as it approached Greenville, Canyondam, and Indian Falls. As the images show, the Dixie fire burned mostly or entirely at high intensity through all such areas. For spatial context, each of these images shows an area that is several thousand acres in size.

Dixie fire perimeter map showing the area on August 7, 2021, immediately after the fire, moving from the southwest to the northeast, destroyed Greenville and Canyondam. The map is from the inter-agency wildfire site, Inciweb: https://inciweb.wildfire.gov

Image Pair #1: Extensive previous post-fire logging on the Plumas National Forest, northeast of Butt Valley Reservoir, and a short distance southwest of Canyondam. The first image is from July 2, 2017, after post-fire logging, and the second is from August 7, 2021, just one day after the Dixie fire burned through this area and destroyed Canyondam.

Image Pair #2: A large area that was mechanically thinned south of Canyondam. The first image is from May 24, 2009, after thinning, and the second image is from July 7, 2022 (note the almost total absence of live, green trees remaining in the thinned areas after the Dixie fire).

Image Pair #3: Mechanical thinning on the Plumas National Forest,

south of Indian Falls. The first image is from May 24, 2009, after thinning, and the second is from July 7, 2022, after the Dixie fire. Note that nearly all of the thinned forest burned at high intensity, with 100% tree mortality in most areas.

Image Pair #4: Mechanical thinning south of Greenville on the Plumas National Forest. The first image is from May 24, 2009. The second is from July 7, 2022, showing almost complete high-intensity fire effects in the thinned area.

Image Pair #5: Postfire logging and mechanical thinning west of Greenville and south of Canyondam on the Plumas National Forest. The first image is from May 24, 2009, and the second is from July 7, 2022, after the Dixie fire. Once again, note that the thinned area is heavily dominated by high-intensity fire.

Image Pair #6: Mechanical thinning on private timberlands south of Greenville. The first image is from May 24, 2009, and the second is from July 7, 2022, after the Dixie fire, with the thinned areas heavily dominated by high-intensity fire.

The approach promoted by the Forest Service is the same approach that the agency has pursued for many years, except now the Forest Service is promoting it on an even bigger scale. In brief, it involves mechanical thinning and post-fire logging of vast forest areas distant from communities based on the claim that this will either directly stop fires from reaching towns or indirectly stop fires by making fires burn much more slowly and so much less intensely that fire suppression crews can easily halt the fire before it reaches a community. This approach is a dangerous, proven failure, as we have seen in Paradise (Camp fire of 2018), Greenville (Dixie fire of 2021), Grizzly Flats (Caldor fire of 2021), and Berry Creek and Feather Falls (North Complex fire of 2020), among others. Please see the maps below showing large areas of thinning and other so-called fuel-reduction logging around towns that were largely destroyed by the Camp fire, Dixie fire, and Caldor fire, respectively. In stark contrast, defensible space pruning immediately adjacent to homes is a consistent success, as we saw in Meyers and South Lake Tahoe in the Caldor fire (map below).

Map from Wildfire Today, showing the Caldor fire racing right through "thinning" units in wildlands but stopping at or immediately adjacent to private property boundaries, where defensible space pruning had been conducted on private lands and a short distance on to the National Forest. Map accessed here. Black ovals have been added to show where the fire stopped in defensible space areas adjacent to homes.

The fire effects to the forest and adjacent communities due to widespread mechanical thinning are serious, given the potential for "thinning" and other logging to increase, not decrease, fire severity, based on science submitted here, and as recognized by the Ninth Circuit Court of Appeals in the 2020 BARK v. U.S. Forest Service case (https://scholar.google.com/scholar_case?case=8163889612711152072&q=BARK+v+forest+service&hl=en&as_sdt=2006).
The Ninth Circuit's reasoning is included here:

First, the effects of the Project are highly controversial and uncertain, thus mandating the creation of an EIS. See 40 C.F.R. § 1508.27(b)(4) & (5) (listing relevant factors for whether an EIS is required, including if the project's effects are "highly controversial" and "highly uncertain"). The stated primary purpose of the CCR Project is to reduce the risk of wildfires and promote safe fire-suppression activities, but Appellants identify considerable scientific evidence showing that variable density thinning will not achieve this purpose. Considering both context and intensity, as required by 40 C.F.R. § 1508.27, this evidence raises substantial questions about the Project's environmental impact, and an EIS is required. See, e.g., Blackwood, 161 F.3d at 1212; Native Ecosystems Council, 428 F.3d at 1238-39.
"A project is `highly controversial' if there is a `substantial dispute [about] the size, nature, or effect of the major Federal action rather than the existence of opposition to a use.'" Native Ecosystems Council, 428 F.3d at 1240 (alteration in original) (quoting Blackwood, 161 F.3d at 1212). "A substantial dispute exists when evidence ... casts serious doubt upon the reasonableness of an agency's conclusions." In Def. of Animals, 751 F.3d at 1069 (quoting Babbitt, 241 F.3d at 736). "[M]ere opposition alone is insufficient to support a finding of controversy." WildEarth Guardians v. Provencio, 923 F.3d 655, 673 (9th Cir. 2019).
The EA explained that the CCR Project will use "variable density thinning" to address wildfire concerns. "In variable density thinning, selected trees of all sizes ... would be removed." This process would assertedly make the treated areas "more resilient to perturbations such as ... large-scale high-intensity fire occurrence because of the reductions in total stand density." Variable density thinning will occur in the entire Project area. Substantial expert opinion presented by the Appellants during the administrative process disputes the USFS's conclusion that thinning is helpful for fire suppression and safety. For example, Oregon Wild pointed out in its EA comments that "[f]uel treatments have a modest effect on fire behavior, and could even make fire worse

instead of better." It averred that removing mature trees is especially likely to have a net negative effect on fire suppression. Importantly, the organization pointed to expert studies and research reviews that support this assertion.

Bark also raised this issue: "It is becoming more and more commonly accepted that reducing fuels does not consistently prevent large forest fires, and seldom significantly 871*871 reduces the outcome of these large fires," citing an article from Forest Ecology and Management. Bark also directed the USFS to a recent study published in The Open Forest Science Journal, which concluded that fuel treatments are unlikely to reduce fire severity and consequent impacts, because often the treated area is not affected by fire before the fuels return to normal levels. Bark further noted that, while "Bark discussed [during the scoping process] the studies that have found that fuel reduction may actually exacerbate fire severity in some cases as such projects leave behind combustible slash, open the forest canopy to create more ground-level biomass, and increase solar radiation which dries out the understory[,] [t]he EA did not discuss this information."

Oregon Wild also pointed out in its EA comments that fuel reduction does not necessarily suppress fire. Indeed, it asserted that "[s]ome fuel can actually help reduce fire, such as deciduous hardwoods that act as heat sinks (under some conditions), and dense canopy fuels that keep the forest cool and moist and help suppress the growth of surface and ladder fuels...." Oregon Wild cited more than ten expert sources supporting this view. Importantly, even the Fuels Specialist Report produced by the USFS itself noted that "reducing canopy cover can also have the effect of increasing [a fire's rate of spread] by allowing solar radiation to dry surface fuels, allowing finer fuels to grow on ... the forest floor, and reducing the impact of sheltering from wind the canopy provides."

The effects analysis in the EA did not engage with the considerable contrary scientific and expert opinion; it instead drew general conclusions such as that "[t]here are no negative effects to fuels from the Proposed Action treatments." Appellants thus have shown a substantial dispute about the effect of variable density thinning on fire suppression. Although it is not our role to assess the merits of whether variable density thinning is indeed effective in the project area to prevent fires, or to take sides in a battle of the experts, see Greenpeace Action v. Franklin, 14 F.3d 1324, 1333 (9th Cir. 1992), NEPA requires agencies to consider all important aspects of a problem. See WildEarth Guardians, 759 F.3d at 1069-70. Throughout the USFS's investigative process, Appellants pointed to numerous expert sources concluding that thinning activities do not improve fire outcomes. In its responses to these comments and in its finding of no significant impact, the USFS reiterated its conclusions about vegetation management but did not engage with the substantial body of research cited by Appellants. This dispute is of substantial consequence because variable density thinning is planned in the entire Project area, and fire management is a crucial issue that has wide-ranging ecological impacts and affects human life. When one factor alone raises "substantial questions" about whether an agency action will have a significant environmental effect, an EIS is warranted. See Ocean Advocates v. U.S. Army Corps of Eng'rs, 402 F.3d 846, 865 (9th Cir. 2005) ("We have held that one of [the NEPA intensity] factors may be sufficient to require preparation of an EIS in appropriate circumstances."). Thus, the USFS's decision not to prepare an EIS was arbitrary and capricious. See Blackwood, 161 F.3d at 1213 (holding that conflicting evidence on the effects of ecological intervention in post-fire landscapes made a proposed project highly uncertain, thus requiring an EIS).

We note that describing mixed-conifer and ponderosa pine forest as having frequent-fire low-severity regimes is outdated and misleading, as it is based on the now-discredited notion that fire return intervals from fire-scar studies are an accurate method to assess historical fire frequencies. Far more detailed and comprehensive analyses have determined that historical fire frequencies in dry forests of the western U.S., such as ponderosa pine and dry mixed-conifer forests, were about 39 years on average (e.g., Baker 2017), and actual fire frequencies (fire rotation) were about 4 times longer than the misleading fire return interval concept suggested (Crompton et al. 2022 Table 1).

What about the effect of mechanical thinning on wildfire severity in mixed-conifer and ponderosa pine forests? The Forest Service's own scientists (Lesmeister et al. 2021) recently conducted a massive, landmark 30-year study--a substantial portion of which was conducted in such forests--and found that, in these forest types (most frequent fire regime), the densest forests with the highest biomass, highest canopy cover, and highest tree densities, on average had lower wildfire severities when fires occurred when compared to more open, lower-density forests resulting from mechanical thinning and other logging operations (see Figure 4b from Lesmeister et al. 2021 below). The Forest Service scientists concluded that more open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have "hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density..."

Notably, Lesmeister et al. (2021) made the same finding in their analysis of more mesic forests, including mesic mixed-conifer forests.
Other Forest Service scientists, in Lydersen et al. (2014), reported the following finding in the 257,000-acre Rim fire of 2013:

"Density of small to intermediate size trees (20-40 cm dbh in the analysis with all plots and both 40-60 cm and 60-80 cm dbh in the analysis excluding plots burned on a plume-dominated day) were also related to Rim Fire severity, with plots with a greater small tree density tending to burn with lower severity."

The very largest scientific analysis ever conducted in dry forests on the subject of tree removal and wildfire severity, Bradley et al. (2016), found that forests completely protected from tree removal had the lowest fire severity, while forests with some limited tree removal allowed had higher levels of fire severity, and forests with the fewest environmental protections and the most tree removal had the highest fire severity. The authors concluded the following:

"We found forests with higher levels of protection [from tree removal] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading. Our results suggest a need to reconsider current overly simplistic assumptions about the relationship between forest protection and fire severity in fire management and policy."

Hanson (2021) made similar findings in dry forests in the approximately 380,000-acre Creek fire of 2020 in the southern

Sierra Nevada, reporting that, based on the Forest Service's own data, forests with previous logging under the rubric of "fuel reduction"--specifically, mechanical thinning and post-fire logging--had overall higher fire severity than unmanaged forests.

More recently, scientists have begun looking at another key question regarding mechanical thinning and wildfire severity in dry forests, related to overall combined tree mortality from thinning itself and subsequent wildfire. These studies have consistently found that mechanical thinning kills more trees than it prevents from being killed in mature and old dry forests, including Baker and Hanson (2022) (pertaining to the Caldor fire of 2021 in the northern Sierra Nevada), and DellaSala et al. (2022) (pertaining to the Wallow fire of 2011 in Arizona). Baker and Hanson (2022) explained why some studies have erroneously reported that mechanical thinning is effective as a wildfire management approach:

"Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily occurs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

Finally, with regard to the common misconception that mature and old-growth stands are "overgrown", and have too many smaller trees relative to historical forests, Baker et al. (2023) meticulously documented the fact that this notion stems from a pattern of scientific omissions in studies funded by the Forest Service. This pattern of omissions of peer-reviewed, published reply articles, which refuted and discredited U.S. Forest Service response articles, created a "falsification" of the scientific record regarding historical forest density and fire regimes. The corrected record shows that historical forests were much denser on average than assumed by the Forest Service and were shaped by mixed-severity fire, not merely low-severity fire.

A large and growing body of scientific evidence and opinion concludes that thinning and post-fire logging in wildlands,

conducted under the guise of fuel reduction and fire breaks, is an ineffective and counterproductive way to protect communities, and it tends to make wildfires spread faster and often more intensely toward towns, putting nearby communities at greater risk.

Calkin, D.E., Barrett, K., Cohen, J.D., Finney, M.A., Pyne, S.J., and Quarles, S.L. (co-authored by U.S. Forest Service). 2023. Wildland-urban fire disasters aren't actually a wildfire problem. Proceedings of the National Academy of Sciences of the United States of America. 120: e2315797120.

"The best way to make existing wildfire-vulnerable developments ignition resistant is to work within the limited area of the 'home ignition zone'--a home and its surroundings within 100 feet (which may include neighboring homes)."

The authors noted that wildfires are driven by climate and climate change, and criticized the current federal management approach embodied in the 2022 Wildfire Crisis Strategy, and in the 2021 Infrastructure Act and 2022 Inflation Reduction Act, that is focused on thinning tens of millions of acres of public, private, and Tribal forests in the western U.S. The authors concluded that we must recognize that wildfire in forests and other wildlands is not only inevitable, but also there is an "ecological necessity" that wildfires occur for native biodiversity benefits. The scientists concluded that the "best way" to protect homes and lives is to focus attention and resources directly on communities, using proven methods to make them fire safe, noting that the current approach is leading to more, not fewer, losses of homes and lives. They promoted "direct funding and technical assistance to communities", instead of spending many billions of dollars managing forests distant from homes.

USFS (U.S. Forest Service) (2022). Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review. U.S. Forest Service, Office of the Chief, Washington, D.C.

Thinning followed by burning caused a massive fire that destroyed communities.

Thinning reduced canopy cover, increasing growth of combustible grasses; associated pile burning caused a huge wildfire, spreading rapidly through thinned areas, burning many homes.

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2019. Mixed-severity wildfire and habitat of an old-forest obligate. Ecosphere10: Article e02696.

Denser, older forests with high canopy cover had lower fire severity and "buffer the negative effects of climate change" regarding wildfires.

"Thinned forests have more open conditions, which are associated with higher temperatures, lower relative humidity, higher wind speeds, and increasing fire intensity. Furthermore, live and dead fuels in young forest or thinned stands with dense saplings or shrub understory will be drier, making ignition and high heat more likely, and the rate of spread higher because of the relative lack of wind breaks provided by closed canopies with large trees."

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2021. Northern spotted owl nesting forests as fire refugia: a

30-year synthesis of large wildfires. Fire Ecology 17: Article 32.

More open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have "hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density..."

Reilly, M.J., et al. (co-authored by U.S. Forest Service). 2022. Cascadia Burning: The historic, but not historically unprecedented, 2020 wildfires in the Pacific Northwest, USA. Ecosphere 13: e4070.

Weather conditions primarily determined fire severity, and forest density was not a factor.

"We found minimal difference in burn severity among stand structural types related to previous management in the 2020 fires. Adaptation strategies for similar fires in the future could benefit by focusing on ignition prevention, fire suppression, and community preparedness, as opposed to fuel treatments that are unlikely to mitigate fire severity during extreme weather."

North, M.P., S.L. Stephens, B.M. Collins, J.K. Agee, G. Aplet, J.F. Franklin, and P.Z. Fule (co-authored by U.S. Forest Service). 2015. Reform forest fire management. Science 349: 1280-1281.

"...fire is usually more efficient, cost-effective, and ecologically beneficial than mechanical treatments."

Lydersen, J. M., M. P. North, and B. M. Collins (co-authored by U.S. Forest Service). 2014. Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes. Forest Ecology and Management 328:326-334.

In the Rim fire of 2013, the authors found that mature mixed-conifer and ponderosa pine forests with "a greater small tree density tend[ed] to burn with lower severity."

Meigs, G.W., et al. (co-authored by U.S. Forest Service). 2020. Influence of topography and fuels on fire refugia probability under varying fire weather in forests of the US Pacific Northwest. Canadian Journal of Forest Research 50: 636-647.

Forests with higher pre-fire biomass are more likely to experience low-severity fire.

Thompson, J.R., Spies, T.A., Ganio, L.M. (co-authored by U.S. Forest Service). 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences of the United States of America 104: 10743-10748.

"Areas that were salvage-logged and planted after the initial fire burned more severely than comparable unmanaged areas."

Thompson, J.R., Spies, T.A. (co-authored by U.S. Forest Service). 2009. Vegetation and weather explain variation in crown damage within a large mixed-severity wildfire. Forest Ecology and Management 258: 1684-1694.

Mature forests with higher canopy cover had lower fire severity.

Thompson, J., and T.A. Spies (co-authored by U.S. Forest Service). 2010. Exploring Patterns of Burn Severity in the Biscuit Fire in Southwestern Oregon. Fire Science Brief 88: 1-6.

"Areas that burned with high severity...in a previous wildfire (in 1987, 15 years prior) were more likely to burn with high severity again in the 2002 Biscuit Fire. Areas that were salvage-logged and planted following the 1987 fire burned with somewhat higher fire severity than equivalent areas that had not been logged and planted."

Graham, R., et al. (U.S. Forest Service). 2012. Fourmile Canyon Fire Findings. Gen. Tech. Rep. RMRS-GTR-289. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 110 p.

Thinned forests "were burned more severely than neighboring areas where the fuels were not treated", and 162 homes were destroyed by the Fourmile Canyon Fire (see Figs. 45 and 46).

Morris, W.G. (U.S. Forest Service). 1940. Fire weather on clearcut, partly cut, and virgin timber areas at Westfir, Oregon. Timberman 42: 20-28.

"This study is concerned with one of these factors - the fire-weather conditions near ground level - on a single operation during the first summer following logging. These conditions were found to be more severe in the clear-cut area than in either the heavy or light partial cutting areas and more severe in the latter areas than in virgin timber."

Countryman, C.M. (U.S. Forest Service). 1956. Old-growth conversion also converts fire climate. Fire Control Notes 17: 15-19.

Partial cutting (thinning) increases wildfire severity, due to microclimate impacts, regardless of whether or how the slash debris is treated.

"Although the general relations between weather factors, fuel moisture, and fire behavior are fairly well known, the importance of these changes following conversion and their combined effect on fire behavior and control is not generally recognized. The term 'fireclimate,' as used here, designates the environmental conditions of weather and fuel moisture that affect fire behavior. It does not consider fuel created by slash because regardless of what forest managers do with slash, they still have to deal with the new fireclimate. In fact, the changes in wind, temperature, humidity, air structure, and fuel moisture may result in greater changes in fire behavior and size of control job than does the addition of more fuel in the form of slash."

"Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand."

"A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns. Some is reflected back to space and the rest is converted to heat and distributed in depth through the crowns. Air within the stand is warmed by contact with the crowns,

and the ground fuels are in turn warmed only by contact with the air. The temperature of fuels on the ground thus usually approximates air temperature within the stand."
"Temperature profiles in a dense, mixed conifer stand illustrate this process (fig. 2). By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 153° at 2:00 p.m."
"Because of the lower temperature and higher humidity, fuels within the closed stand are more moist than those in the open under ordinary weather conditions. Typically, when moisture content is 3 percent in the open, 8 percent can be expected in the stand."
"Moisture and temperature differences between open and closed stands have a great effect on both the inception and the behavior of fire. For example, fine fuel at 8-percent moisture content will require nearly one-third more heat for ignition than will the same fuel at 3-percent moisture content. Thus, firebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open."
"When a standard fire weather station in the open indicates a temperature of 85° F., fuel moisture of 4 percent, and a wind velocity of 15 m.p.h.--not unusual burning conditions in the West--a fire starting on a moderate slope will spread 4.5 times as fast in the open as in a closed stand. The size of the suppression job, however, increases even more drastically."
"Greater rate of spread and intensity of burning require control lines farther from the actual fire, increasing the length of fireline. Line width also must be increased to contain the hotter fire. Less production per man and delays in getting additional crews complicate the control problem on a fast-moving fire. It has been estimated that the size of the suppression job increases nearly as the square of the rate of forward spread. Thus, fire in the open will require 20 times more suppression effort. In other words, for each man required to control a surface fire in a mature stand burning under these conditions, 20 men will be required if the area is clear cut."
"Methods other than clear cutting, of course, may bring a less drastic change in fireclimate. Nevertheless, the change resulting from partial cutting can have important effects on fire. The moderating effect that a dense stand has on the fireclimate usually results in slow-burning fires. Ordinarily, in dense timber only a few days a year have the extreme burning conditions under which surface fires produce heat rapidly enough to carry the fire into the crowns. Partial cutting can increase the severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur."

SNEP (co-authored by U.S. Forest Service). 1996. Sierra Nevada Ecosystem Project, Final Report to Congress: Status of the Sierra Nevada. Vol. I: Assessment summaries and management strategies. Davis, CA: University of California, Davis, Center for Water and Wildland Resources.

"Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity."

Chen, J., et al. (co-authored by U.S. Forest Service). 1999. Microclimate in forest ecosystem and landscape ecology: Variations in local climate can be used to monitor and compare the effects of different management regimes. BioScience 49: 288-297.

When moving from open forest areas, resulting from logging, and into dense forests with high canopy cover, "there is generally a decrease in daytime summer temperatures but an increase in humidity..."

The authors reported a 5 C difference in ambient air temperature between a closed-canopy mature forest and a forest with partial cutting, like a commercial thinning unit (Fig. 4b), and noted that such differences are even greater than the increases in temperature predicted due to anthropogenic climate change.

Dombeck, M. (U.S. Forest Service Chief). 2001. How Can We Reduce the Fire Danger in the Interior West. Fire Management Today 61: 5-13.

"Some argue that more commercial timber harvest is needed to remove small-diameter trees and brush that are fueling our worst wildlands fires in the interior West. However, small-diameter trees and brush typically have little or no commercial value. To offset losses from their removal, a commercial operator would have to remove large, merchantable trees in the overstory. Overstory removal lets more light reach the forest floor, promoting vigorous forest regeneration. Where the overstory has been entirely removed, regeneration produces thickets of 2,000 to 10,000 small trees per acre, precisely the small-diameter materials that are causing our worst fire problems. In fact, many large fires in 2000 burned in previously logged areas laced with roads. It seems unlikely that commercial timber harvest can solve our forest health problems."

Hanson, C.T. 2021. Is "Fuel Reduction" Justified as Fire Management in Spotted Owl Habitat? Birds 2: 395-403.

Thinning followed by burning and post-fire logged areas had higher overall fire severity.

"Within the forest types inhabited by California Spotted Owls, high-severity fire occurrence was not higher overall in unmanaged forests and was not associated with the density of pre-fire snags from recent drought in the Creek Fire, contrary to expectations under the fuel reduction hypothesis. Moreover, fuel-reduction logging in California Spotted Owl habitats was associated with higher fire severity in most cases. The highest levels of high-severity fire were in the categories with commercial logging (post-fire logging, private commercial timberlands, and commercial thinning), while the three categories with lower levels of high-severity fire were in forests with no recent forest management or wildfire, less intensive noncommercial management, and unmanaged forests with re-burning of mixed-severity wildfire, respectively."

Baker, B.C., and C.T. Hanson. 2022. Cumulative tree mortality from commercial thinning and a large wildfire in the Sierra Nevada, California. Land 11: Article 995.

Thinning followed by burning increases overall fire severity.

"Similar to the findings of Hanson (2022) in the Antelope Fire of

2021 in northern California, in our investigation of the Caldor Fire of 2021 we found significantly higher cumulative severity in forests with commercial thinning than in unthinned forests, indicating that commercial thinning killed significantly more trees than it prevented from being killed in the Caldor Fire...Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily occurs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

DellaSala, D.A., B.C. Baker, C.T. Hanson, L. Ruediger, and W.L. Baker. 2022. Have western USA fire suppression and megafire active management approaches become a contemporary Sisyphus? Biological Conservation 268: Article 109499.

Thinning followed by burning increases overall fire severity.

With regard to a previous U.S. Forest Service study claiming that commercial thinning effectively reduced fire severity in the large Wallow fire of 2011 in Arizona, DellaSala et al. (2022, Section 5.1) conducted a detailed accuracy check and found that the previous analysis had dramatically underreported high-severity fire in commercial thinning units, and forests with commercial thinning in fact had higher fire severity, overall.

DellaSala et al. (2022, Section 5.2) also reviewed several U.S. Forest Service studies relied upon by Prichard et al. (2021) for the claim that commercial thinning is an effective fire management approach and found that the actual results of these cited studies did not support that conclusion.

Beschta, R.L.; Frissell, C.A.; Gresswell, R.; Hauer, R.; Karr, J.R.; Minshall, G.W.; Perry, D.A.; Rhodes, J.J. 1995. Wildfire and salvage logging. Eugene, OR: Pacific Rivers Council.

"We also need to accept that in many drier forest types throughout the region, forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years."
"With respect to the need for management treatments after fires,

there is generally no need for urgency, nor is there a universal, ecologically-based need to act at all. By acting quickly, we run the risk of creating new problems before we solve the old ones." "[S]ome argue that salvage logging is needed because of the perceived increased likelihood that an area may reburn. It is the fine fuels that carry fire, not the large dead woody material. We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn."

Morrison, P.H. and K.J. Harma. 2002. Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona. Pacific Biodiversity Institute, Winthrop, WA. 13 pp.

Previous logging was associated with higher fire severity.

Donato DC, Fontaine JB, Campbell JL, Robinson WD, Kauffman JB, Law BE. 2006. Science 311: 352.

"In terms of short-term fire risk, a reburn in [postfire] logged stands would likely exhibit elevated rates of fire spread, fireline intensity, and soil heating impacts...Postfire logging alone was notably incongruent with fuel reduction goals."

Hanson, C.T., Odion, D.C. 2006. Fire Severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13-17, 2006, San Diego, CA.

"In all seven sites, combined mortality [thinning and fire] was higher in thinned than in unthinned units. In six of seven sites, fire-induced mortality was higher in thinned than in unthinned units...Mechanical thinning increased fire severity on the sites currently available for study on national forests of the Sierra Nevada."

Platt, R.V., et al. 2006. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Assoc. Amer. Geographers 96: 455-470.

"Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from thinning] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity."

Cruz, M.G, and M.E. Alexander. 2010. Assessing crown fire potential in coniferous forests of western North America: A critique of current approaches and recent simulation studies. Int. J. Wildl. Fire. 19: 377-398.

The fire models used by the U.S. Forest Service falsely predict effective reduction in crown fire potential from thinning: "Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel Management Analyst (FMAPlus), BehavePlus) based on separate implementations or direct integration of Rothermel's surface and crown rate of fire spread models with Van Wagner's crown fire transition and propagation models are shown

to have a significant underprediction bias when used in assessing potential crown fire behaviour in conifer forests of western North America. The principal sources of this underprediction bias are shown to include: (i) incompatible model linkages; (ii) use of surface and crown fire rate of spread models that have an inherent underprediction bias; and (iii) reduction in crown fire rate of spread based on the use of unsubstantiated crown fraction burned functions. The use of uncalibrated custom fuel models to represent surface fuelbeds is a fourth potential source of bias."

DellaSala et al. (2013) (letter from over 200 scientists):

"Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including...accumulation of logging slash that can add to future fire risks..."

DellaSala et al. (2015) (letter from over 200 scientists):

"Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest. While it is often claimed that such logging is needed to restore conifer growth and lower fuel hazards after a fire, many studies have shown that logging tractors often kill most conifer seedlings and other important re-establishing vegetation and actually increases flammable logging slash left on site. Increased chronic sedimentation to streams due to the extensive road network and runoff from logging on steep slopes degrades aquatic organisms and water quality."

Bradley, C.M. C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western USA? Ecosphere 7: article e01492.

In the largest study on this subject ever conducted in western North American, the authors found that the more trees that are removed from forests through logging, the higher the fire severity overall:
"We investigated the relationship between protected status and fire severity using the Random Forests algorithm applied to 1500 fires affecting 9.5 million hectares between 1984 and 2014 in pine (Pinus ponderosa, Pinus jeffreyi) and mixed-conifer forests of western United States, accounting for key topographic and climate variables. We found forests with higher levels of protection [from logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."

Dunn, C.J., et al. 2020. How does tree regeneration respond to mixed-severity fire in the western Oregon Cascades, USA? Ecosphere 11: Article e03003.

Forests that burned at high-severity had lower, not higher, overall pre-fire tree densities.

Moomaw et al. (2020) (letter from over 200 scientists: https://johnmuirproject.org/2020/05/breaking-news-over-200-top-u-s-climate-and-forest-scientists-urge-congress-protect-forests-to-mitigate-climate-crisis/):

"Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn more intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth."

Moomaw et al. (2021) (letter from over 200 scientists: https://bit.ly/3BFtIAg):

"[C]ommercial logging conducted under the guise of "thinning" and "fuel reduction" typically removes mature, fire-resistant trees that are needed for forest resilience. We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest's microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur.

Bartowitz, K.J., et al. 2022. Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. Front. For. Glob. Change 5: Article 867112.

The authors found that logging conducted as commercial thinning, which involves removal of some mature trees, substantially increases carbon emissions relative to wildfire alone, and commercial thinning "causes a higher rate of tree mortality than wildfire."

Evers, C., et al. 2022. Extreme Winds Alter Influence of Fuels and Topography on Megafire Burn Severity in Seasonal Temperate Rainforests under Record Fuel Aridity. Fire 5: Article 41.

The authors found that dense, mature/old forests with high biomass and canopy cover tended to have lower fire severity, while more open forests with lower canopy cover and less biomass burned more severely.

Baker, W.L., C.T. Hanson, M.A. Williams, and D.A. DellaSala. 2023. Countering Omitted Evidence of Variable Historical Forests and Fire Regime in Western USA Dry Forests: The Low-Severity-Fire Model Rejected. Fire 6: Article 146.

A pattern of omissions of peer-reviewed, published reply articles, which refuted and discredited U.S. Forest Service response articles, created a "falsification" of the scientific record regarding historical forest density and fire regimes. The corrected record shows that historical forests were much denser on average than assumed by the Forest Service and were shaped by mixed-severity fire, not merely low-severity fire.

Sincerely,

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Attachment: 'www.arb.ca.gov/lists/com-attach/26-eiarecirc_lcfs2024-UD5WP1UmVXIEagdY.pdf'

Original File Name: North Fork EA comments 9Sept24.pdf

Date and Time Comment Was Submitted: 2024-09-30 20:43:14

1 Duplicates.

Comment 22 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Nina
Last Name: Robertson
Email Address: nrobertson@earthjustice.org
Affiliation: Earthjustice

Subject: Earthjustice Comments
Comment:

Attachment: 'www.arb.ca.gov/lists/com-attach/27-eiarecirc_lcfs2024-Wj9TNAFyWH8LZQBq.pdf'

Original File Name: Earthjustice-CEQA Comments-Final.pdf

Date and Time Comment Was Submitted: 2024-09-30 21:16:58

No Duplicates.

Comment 23 for Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) - 45 Day.

First Name: Maya
Last Name: Khosla
Email Address: creekshade@gmail.com
Affiliation:

Subject: Re: Comments to CARB due Sept. 30 re: Malcolm North presentation favoring logging
Comment:

Thank you for the chance to comment on the Sept. 12th 2024 discussion with CARB. I appreciate the talks focusing on forests and wildfire, and the environmental justice questions and comments. Overall, the approach appeared to favor massive extractions with little or no carbon accounting conducted by the state or associated entities. The first speaker and ensuing discussions seem to have missed relevant discussion points.

Please see example photos later in the attached document, below the comments.

Due to the current format for comments submittal, my comments have also been copied to others present, so that the comments may be taken into account and to allow for specific responses.

Regarding the first speaker: Two years ago, North et al wrote a paper supporting the removal/logging of ~80% of the forests to make them more "resistant" to climate change (fire, etc.) - i.e. massive forest extraction to supposedly save forests. The authors based the idea on "historic forest data." But the data they used in the paper left out most of the available forest data in the archives. As part of the work, they took a small subset of the archival data, showing low forest density, leaving out archival evidence of variable and higher forest density.

Several scientific papers disprove a central idea of low-density forests presented in North et al, 2022 (https://www.yahoo.com/news/uc-researchers-omit-key-evidence-203544768.html). In addition to the archives, there is an abundance of historic photographs showing variable and higher forest density.

The first presenter failed to mention the following:
(a) years of empirical data shows that carbon emissions from logging consistently exceed wildfire emissions (logging emissions are 5-10 times greater than wildfire emissions per published studies by Law and others);
(b) archival data in about the variable density of historic forests - which refutes the "low density" idea of "resistant" forests;
(c) 12 years of data analyzed by Hart and others, showing that forests with an abundance of bark beetles do not result in a greater spread of wildfire;
(d) published work by Meigs, Bond, Hanson, and many others showing that fire severity is unaffected by beetle-killed trees;
(e) large and old growth trees up to ~4 feet DBH are removed during forest extraction projects ("reducing stand density"/ "fuels

reduction" / "thinning" etc.);
(f) many dense forests tend to retain adequate moisture to experience low intensity fire - which defeats the idea that forest extraction is the way to reduce fire intensity;
(g) cumulative impacts of tree removals, including tree mortality caused by "thinning" itself;
(h) well-documented soil drying after removals, which was mentioned in comments, and even soil destruction;
(i) multiple cases of high intensity fire that occurs in forests where tree removals were done prior to fire (2021 Dixie Fire is an example).

One of the presenters even suggested that the removed trees could be "put in a biomass facility," failing to mention that such facilities are responsible for some of the worst pollution and human health impacts that we are witnessing in CA - which are related to diseases including cancer, and lung and heart diseases. The person referring to "biomass facility" also failed to mention that burning biomass releases more emissions than burning coal, for an equal amount of energy produced (https://www.biologicaldiversity.org/campaigns/debunking_the_biomass_myth/pdfs/Forest-Bioenergy-Briefing-Book-March-2021.pdf).

The pertinence of carbon emissions from industrial processing and burning - which are far greater than wildfire emissions - should not have been ignored in such a meeting. The extent to which logging related carbon emissions are being routinely ignored by CA, is addressed in a new 2024 report (cited in https://shasta-cnps.org/conservation-news-september-2024/).

Another speaker mentioned that "reducing stand density" in the forest would be made up for "gain all that carbon back" in 10 years when large trees reabsorb the lost carbon No empirical data was provided.

One speaker mentioned the intensity of big fires like the 2021 Dixie Fire but failed to mention that many of the large forest patches that burned with high severity were previously logged - I personally surveyed multiple parts of the Dixie and documented the pre-fire removals of the largest trees in forests areas that burned with high severity. The 2020 Creek Fire is a similar example.

Much gratitude is owed to Matt Holmes who commented on proposed wood pellet operations and on the fact that "fuels reduction" efforts dry out the soils. He mentioned that for forest extraction results in disturbance to forest floor - this too has been shown in field studies that were not mentioned at the meeting. Wood pellet operations (and other "fuels reduction" efforts) routinely remove the largest trees.

Much gratitude is owed to one speaker who mentioned that removal of massive numbers of trees can destabilize the remaining old growth trees, an astute comment backed up by field data. This comment was not adequately addressed.

Astonishingly, there was no mention of snags as nesting, roosting, denning, resting and other wildlife activities supporting much of our biodiversity - the main emphasis was on removals without accounting for the carbon value and wildlife value. The main point emphasized removals with inadequate data.

Coincidentally, reducing stand density to the extent being proposed would most benefit industrial-scale logging in public lands (also not mentioned). Failing to account for the carbon emissions from forest extraction would be favored by industries seeking to utilize the trees and snags for lumber, biomass energy, biofuels, and other products the state claims are "renewable" and "clean." The public should have a chance to objectively evaluate presentations, rather than being exposed to industrial-level forest extraction perspectives. Future meetings should provide the space for a balance of scientific findings rather than findings that suit industrial-scale logging and related removals.

Best regards,
Maya Khosla, MS.
Biologist and Writer

Attachment: 'www.arb.ca.gov/lists/com-attach/29-eiarecirc_lcfs2024-VzQBaVEiVmQEXQZo.pdf'

Original File Name: CNRA NWL Presentations- Sept. 12 2024- MK Comments.pdf

Date and Time Comment Was Submitted: 2024-09-30 22:01:56

No Duplicates.

There are no comments posted to Release of Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (eiarecirc_lcfs2024) that were presented during the Board Hearing at this time.