Project Summary for Annual Report

Project Title: “Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and riparian areas of California” ~~(EMC-2022-004)~~
EMC-2023-002
Reporting Period: January–December 2024
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Project Status Summary

Major Milestones/Work Completed in 2024

- Data Cullation and Aggregation
    - The data used in this project is neither centrally located, nor complete. For example, Watercourse and Lake Protection Zone TA83 hydrology data is split into separate datasets for lakes and streams. Similarly, Timber Harvest Plans, HUC-12, land ownership, and burn severity data gathering required aggregation and integration measures.
    - Harvest exclusion buffers were added to TA83 data with overlaps removed deferring to higher order WLPZ classification
        - Similar actions were applied to HUC/CDFW hydrology layers for statewide analysis
    - Data was clipped to the project area, mapped, and evaluated for quality and accuracy
- Data Updates
    - The Post Fire Vegetation Monitoring Tool (PFVMT) was updated to ensure implementation of the most recent version of the data for analysis
- Google Earth Engine – Landtrendr Exploratory Script Developement
    - Using the data from PFVMT, exploratory analysis of vegetation within WLPZs in Plumas County
    - Methodology refinement and application to 5 fires in Plumas County (Storrie, Chips, Moonlight, North Complex, and Dixie Fires) and various timber harvest types
- Exploratory statistical analysis
    - Spatially continuous analysis in and around WLPZs in Plumas County for:
        - Monitoring Trends in Burn Severity (MTBS)
        - Annual burn probability
        - Normalize Difference Vegetation Index (NDVI)
- Development of a statewide WLPZ burn analysis dashboard
    - County by county look at fire statistics (acres burned, severity) in WLPZs going back to 1970

Preliminary Results / Observations

- Early exploratory analyses suggest there may be detectable differences in fire outcomes (i.e. burn severity) in WLPZs adjacent to timber harvest as compared to WLPZs that lack nearby timber harvest, though effect sizes are relatively small and variable.
- Harvest type (e.g. evenaged vs unevenaged), WLPZ classification, and fire size appear to be significant variables that correlate with burn severity outcomes within WLPZs.
- A significant percentage of WLPZs have experienced wildfire in the last 50 years–the majority occurring in the last 10 years. For example:
    - In 2020, 435,000 acres of WLPZ burned.
    - 34% of those WLPZs affected by fire in 2020 burned at high severity

Challenges & Adaptive Management

- A key challenge has been signal detection given coarse remote sensing resolution (30m) and patchwork of harvests/harvest types within the study area, and the narrow band of interest (no greater than 150ft on either side) that demarcates a WLPZ. Solutions include:
    - Use of spatially continuous analysis techniques moving from stream center/lake shore out
    - Binning/combing similar variables such as WLPZ classes (I and II, III and IV) and certain timber harvest types
- The complexity of variables contributing to wildfire spread and severity dilute signal detection of discrete variables such as timber harvest type, year of harvest completion, and WLPZ classification. Solutions include:
    - Binning/combing similar variables to increase sample size
    - Focusing on subtle differences in fire outcome
- The lack of a comprehensive, statewide dataset for WLPZ classification. Solutions include:
    - Spitting data set by those WLPZs that intersect timber harvest with shoes that do not to create a pseudo-control
- Cal Fire's TA83 dataset is not spatially aligned with the HUC/CDFW water shed datasets. Solutions include:
    - Running separate analyses on the two datasets that take advantage of the unique characteristics of each
- When looking at the individual timber harvest types, the acreage available for analysis varies significantly. The sample size is further limited by those timber harvests that intersect WLPZs. Solutions include:
    - Providing sample size (acreage) values for signal strength context
    - Binning/combing similar variables to increase sample size

Implications of Work to Date & 2025 Plans

- This project is beginning to shed light on how regulatory buffers—designed for water protection—may interact with wildfire outcomes in managed forests.

- In 2025, we will complete statistical modeling of burn severity as a function of WLPZ presence, finish our burn and recovery vegetation analysis, finalize the statewide fire analysis dashboard, and draft a report for the EMC summarizing findings and policy implications.

- Additional work will assess whether specific FPR guidance (e.g., WLPZ buffer width, harvest restriction) aligns with observed fire effects.

Deliverables (as of April 2025)

- Project Map
- A statewide geospatial assessment of total acres burned in WLPZ areas from 1970-2023
- Fall 2024 EMC Presentation