FOREST FIRE ANALYSIS IN TURKİYE (2000-2024)

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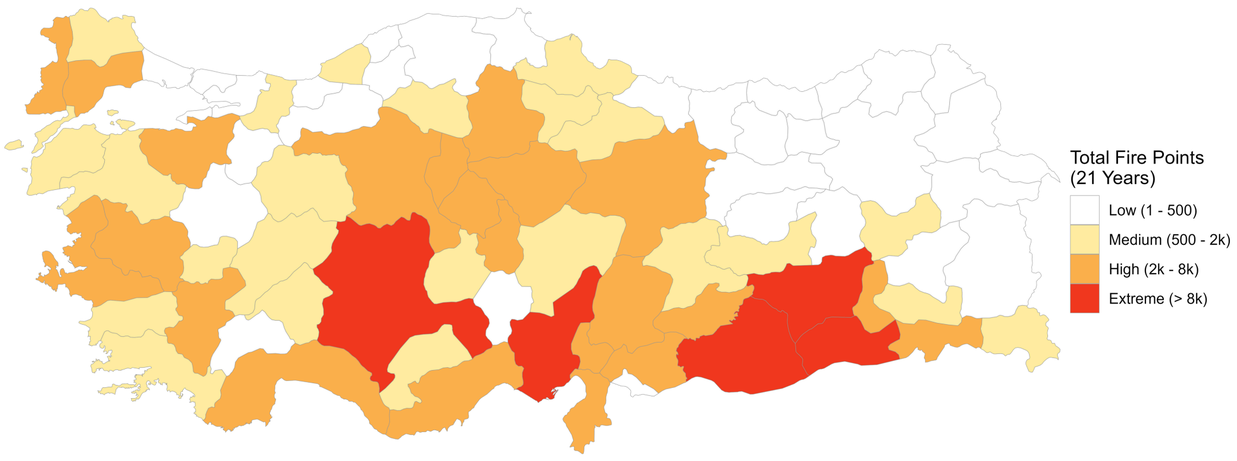
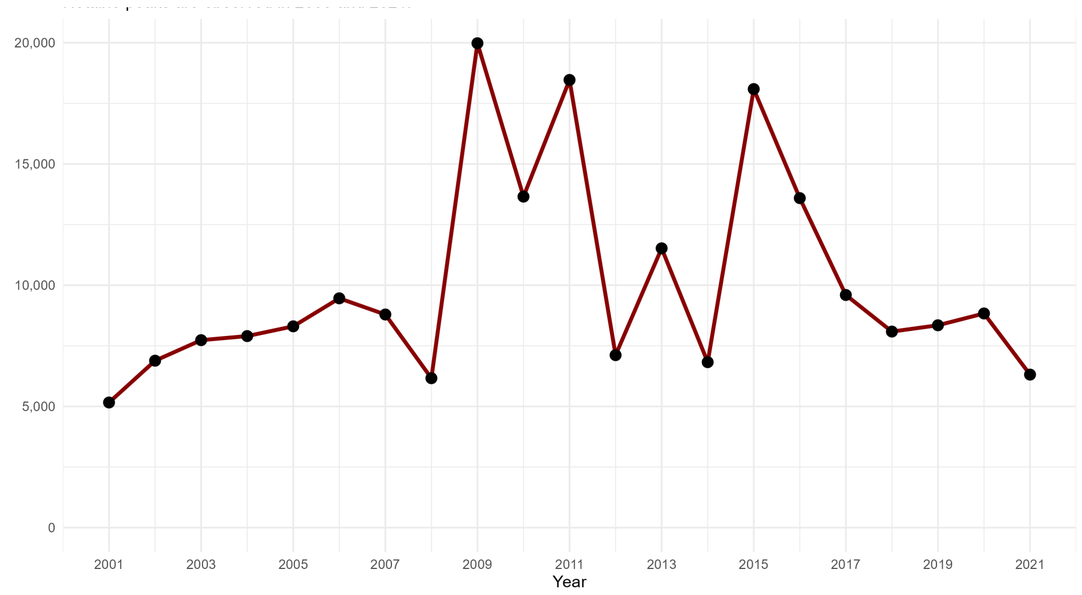
Introduction In this project, I analyzed forest fire incidents in Turkey using NASA satellite data (2000-2021) and examined the primary causes and rehabilitation efforts based on OGM Activity Reports (2020-2024). The main objective is to visualize the spatial distribution Of fires across provinces, understand seasonal trends, and evaluate post-fire recovery strategies.





Identify the most vulnerable regions, I aggregated the fire incidents by province boundaries.

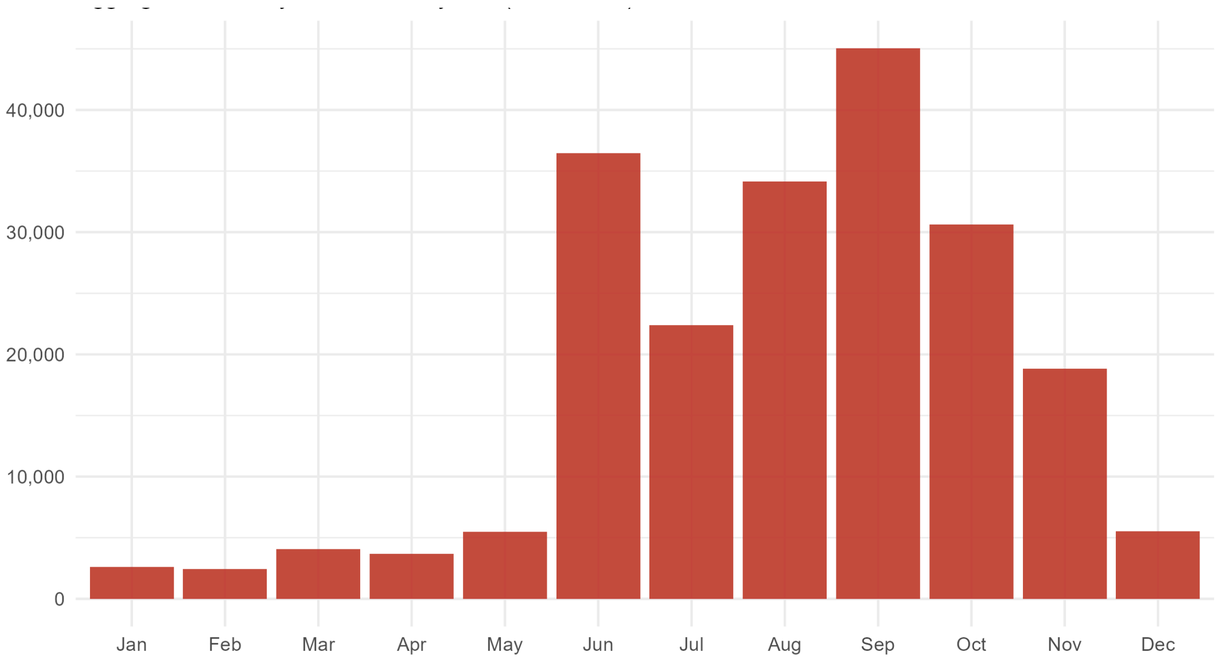
The map below uses a categorized scale to highlight extreme outliers. The choropleth map reveals high fire activity in two distinct regions, categorized as "Extreme (>8,000 points):

1- **Mediterranean** & **Aegean Coasts**: Provinces like **Antalya, Muğla,** and **İzmir** exhibit high fire counts primarily due to **forest fires** driven by the **hot climate**.

2-**Southeastern Anatolia**: Provinces like **Adana** and **Sanliurfa** also appear in the highest category. This is largely attributed to intensive **agricultural stubble burning**, which satellite sensors detect as **fire anomalies** alongside **forest incidents**.

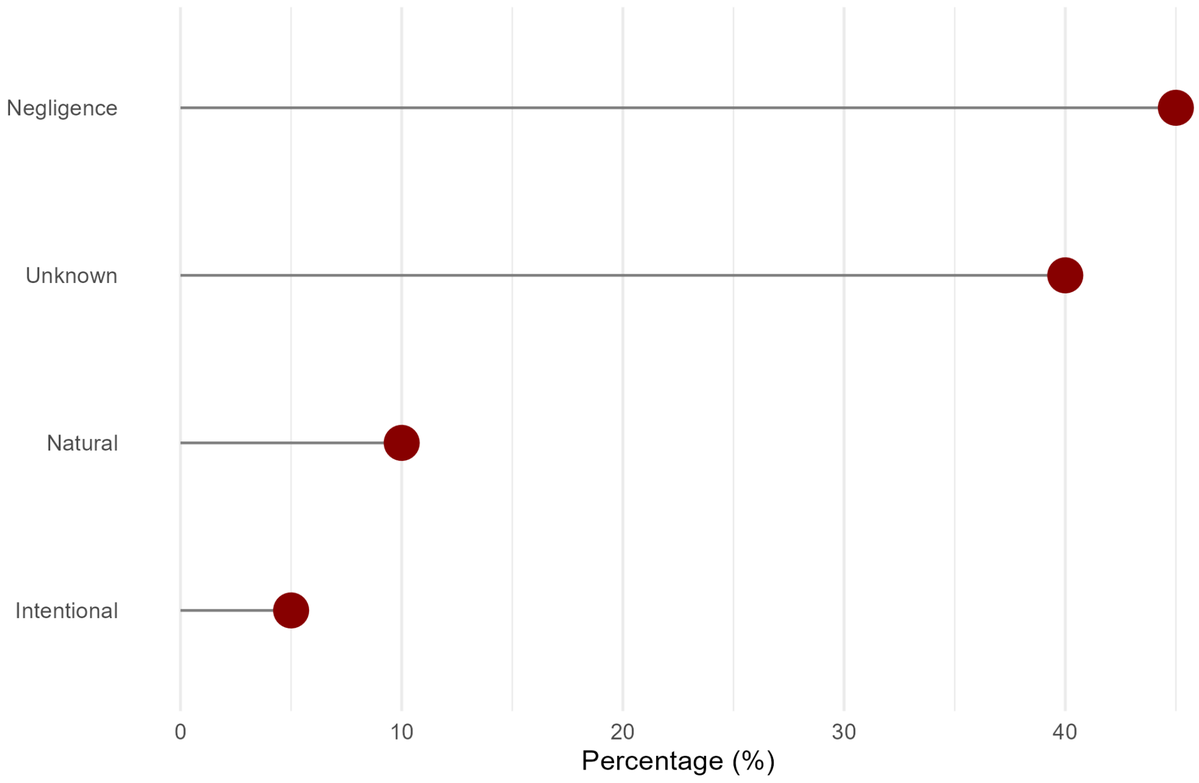
Annual Trend and Anomalies

I examined the yearly evolution of fire frequencies to detect any increasing trends or specific outlier years over the two-decade period. Note: Data for the year 2000 was excluded due to incomplete satellite coverage. The time-series reveals a fluctuating trend where the highest frequency of fire points was actually recorded in 2009, likely driven by widespread **agricultural** burning practices. While the 2021 is slightly lower in count, it corresponds to the catastrophic **"mega-fires"** that destroyed vast forest areas. This distinction highlights that satellite fire counts reflect the number of hotspots rather than the total area burned.



Seasonal Analysis

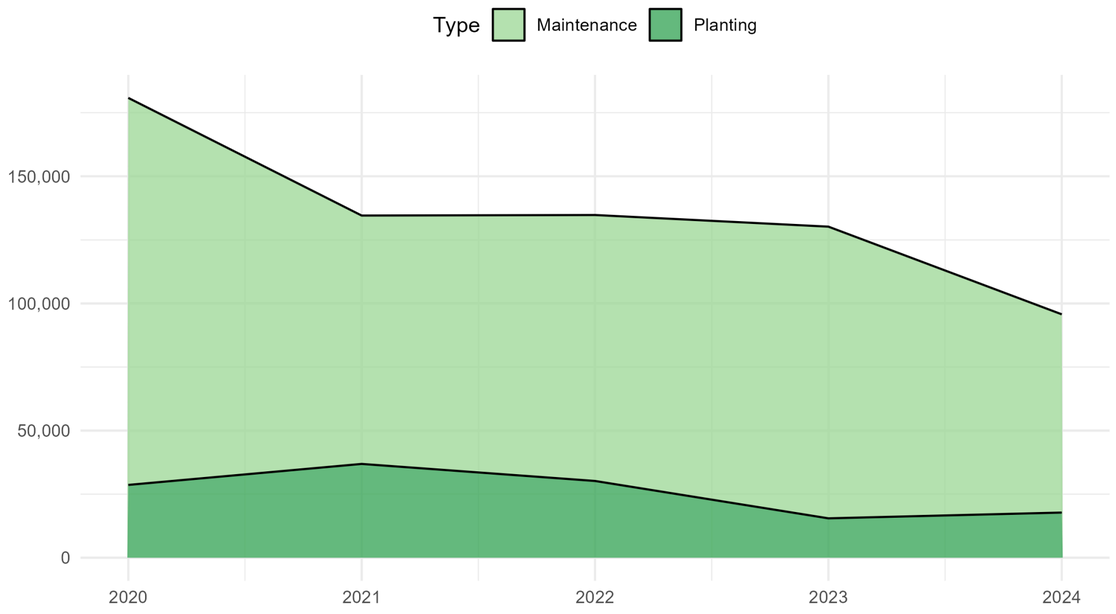
Understanding "**when**" fires occur is crucial for preparedness. I analyzed the monthly distribution of fire incidents to identify the **peak fire season**. This chart represents the cumulative summary of fire incidents for each month across the entire **21-year study period**. By aggregating longitudinal data, the chart filters out year-to-year variations and reveals the region's permanent seasonal character. The data confirms a strict seasonal cycle where **fire activity rises sharply in June and reaches its absolute peak in September**.



Primary Causes of Fires Analysis

I visualized the primary causes Of fires to understand the human factor.

The Lollipop chart clearly shows that **Negligence (45%)** is the leading cause of forest fires, far exceeding natural causes like **lightning (10%).** This implies that **most fires are preventable through stricter public regulations.**



Reforestation Analysis

The Area chart indicates that rehabilitation efforts ***focus heavily on the maintenance*** *of existing areas rather than new planting. While new afforestation peaked in 2021 following the major fires, it has shown a declining trend, stabilizing around 17,000 hectares in 2024. Notably, the total volume of rehabilitation activity (combined area) shows a downward trend from 2020 to 2024.*

Conclusion This study reveals that fire incidents in Turkey exhibit a dual character: forest fires concentrated in coastal Mediterranean zones and agricultural burning in Southeastern Anatolia. While the temporal analysis highlights 2021 as a catastrophic anomaly driven by climate factors, the prevalence of negligence (45%) indicates that human error remains the primary driver. Furthermore, recent data shows a strategic shift in rehabilitation efforts towards maintenance rather than new afforestation, with a noticeable decline in total activity volume since 2020. Future policies must address both public awareness for prevention and sustainable resource allocation for recovery.

Data Sources & References NASA FIRMS (Satellite Data): Dataset: Fire Information for Resource Management System (FIRMS) [2000-2021]. Access: Retrieved via Kaggle (NASA Earthdata). Usage: Used for spatial mapping, seasonal analysis, and annual trend plotting. General Directorate of Forestry (OGM): Source: Republic of Türkiye General Directorate of Forestry (Or man Genel Müdürlüğü). Document: 2024 Administrative Activity Report (2024 Faaliyet Raporu). Table: “Ağaçlandırma Çalışmaları Uygulama Sonuçları, 2020-2024” (Table 22). Usage: Used for analyzing primary causes and rehabilitation/afforestation efforts.