

# Post 2022 Montaña Fire Analysis

Katia Chavez, Rayne McCollough, and Dan Shaw



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(A.K.A. “Deep Dark Woods Fire”)

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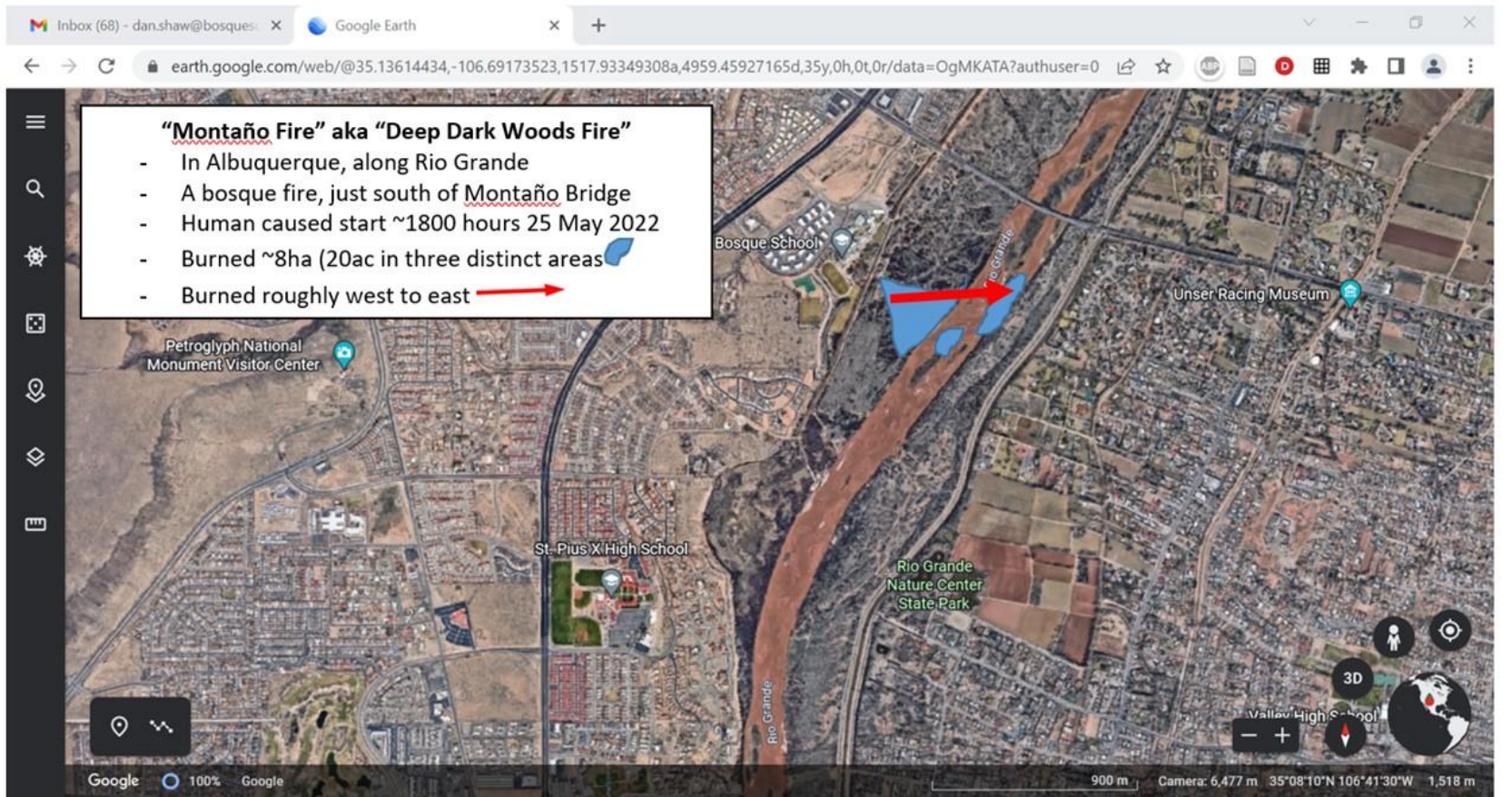
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# Context/Key Facts – Montañño Fire



# Let's Start With Safety First – A Video

- [https://www.youtube.com/watch?v=r9buYt4pXCU&t=3\\_s](https://www.youtube.com/watch?v=r9buYt4pXCU&t=3_s)
- Prioritize safety for the public and researchers collecting data
- Bring awareness to the community
- Be informative about the process
- Signs made by Horizons Albuquerque Middle School students
- Each “keep out/warning” sign around fire site has QR code linked to this fire safety video





# Drone Footage

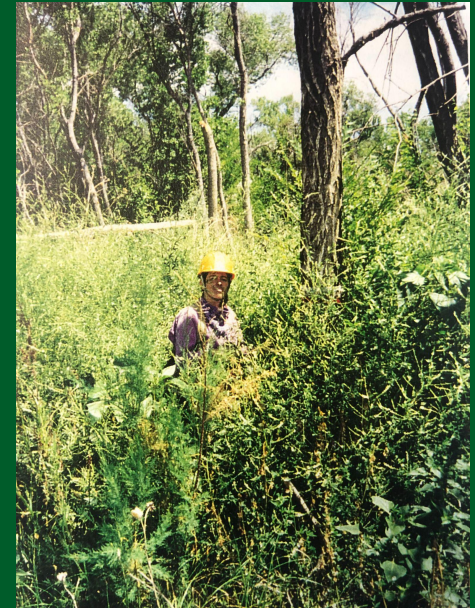
courtesy of Livingston Maclake

<https://drive.google.com/file/d/1XR3I4RlvFIdkFGySzwIAWQSXsXklxUmk/view>



# What do we know about the effects of fire on the Bosque ecosystem?

- **Very few Bosque fire effects studies**  
Especially regarding Rio Grande Cottonwood dominated forest.
- Mary **Stuever's 1997** UNM Master Thesis, ***Fire Induced Mortality of Rio Grande Cottonwood***, remains the most comprehensive study.
  - RG Cottonwoods: very susceptible to fire mortality
  - High fire severity = cottonwood mortality
  - 20% of cottonwoods with main stem mortality had generated surviving clonal/root sprouts 1 year post fire
  - By 2<sup>nd</sup> season post-fire, 1/3 of RG Cottonwood trunks had broken and become forest floor fuel



Stuever in Tingley Fire Site,  
(photo from her thesis)



# Tree Of Heaven Success after 2003 Bosque Fire in a .35ha (1ac) Area

**Within Montañó BEMP site,** (Fire in full site).

- Exotic trees in the northern portion (treatment) of that site were cut down and herbicide applied to their stumps.
- By comparison the south portion (control) of that BEMP site's exotic trees were not treated and there were no management interventions in that area.
- Within the Control, in a subsection 0.35ha (~1 ac) area there were more than 1,000 Tree of Heaven stems >2m tall 15 years after the 2003 fire



# 7 year post fire survival of cottonwood stump sprouts

- Zoo fire (1995)
- Treatment  $\frac{3}{4}$  hectare
- 25% of 99 Cottonwood stumps had regenerated sprouts
- Mean height: 4.3m
- Mean diameter: 42.9mm
- Sprouts are viable restocking option





# Human Contributors to Bosque Fires

- Dams caused increased litter composition on the Bosque floor
- Dams led to decrease in wetlands/marsh areas
- Introduction of exotic species that provide mid-story fuel for fires
- Human caused fires in the Middle Rio Grande area
- The biggest fires were started by smokers and arsonists



Albuquerque Journal

# Methods for Preliminary Cottonwood Survival Survey

(Conducted Early June 2022)

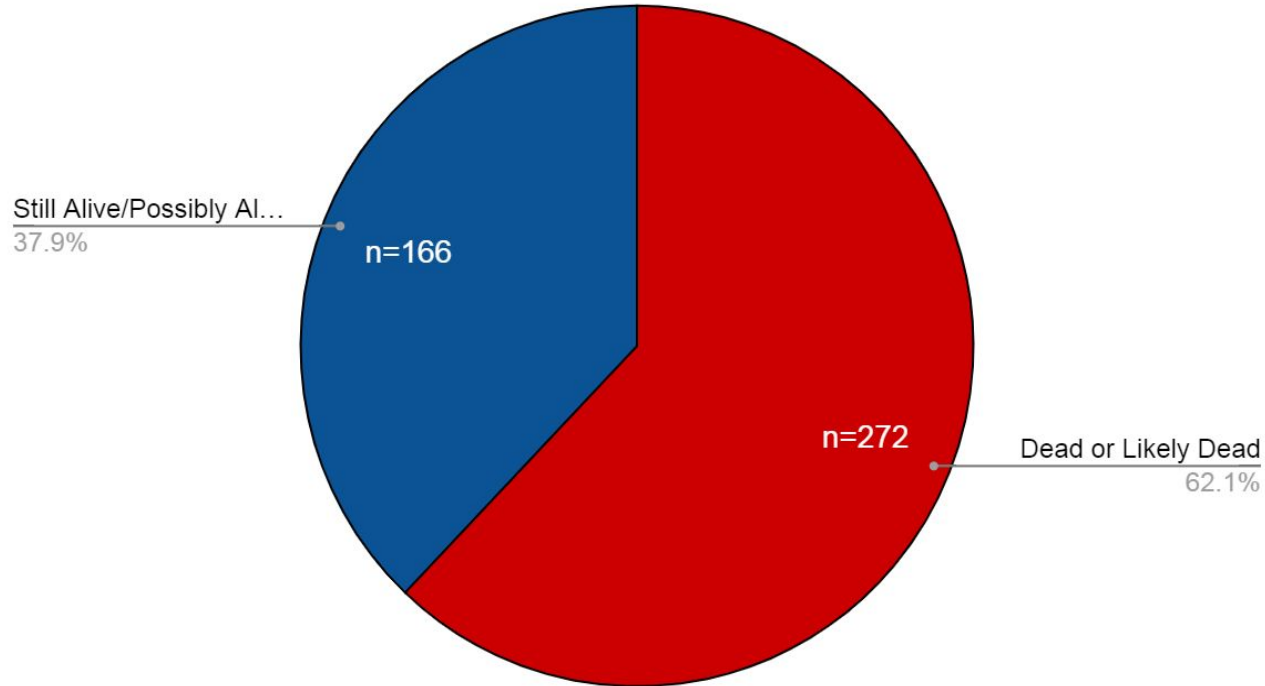
- Survey done approximately 10 days post fire
- We marked trees with an X that we believed dead
- We did not mark trees that we believed were or were possibly still alive
- If no viable bark around base of tree, we considered it dead
- If bark still intact, we considered alive





# Preliminary Survey of Cottonwood Mortality ~ 10 Days Post Montaña Fire

Cottonwood Survey and Mortality Classification Post Fire May 2022



# ~ Methods for Cottonwood Survival and DBH Survey (conducted late July 2022)

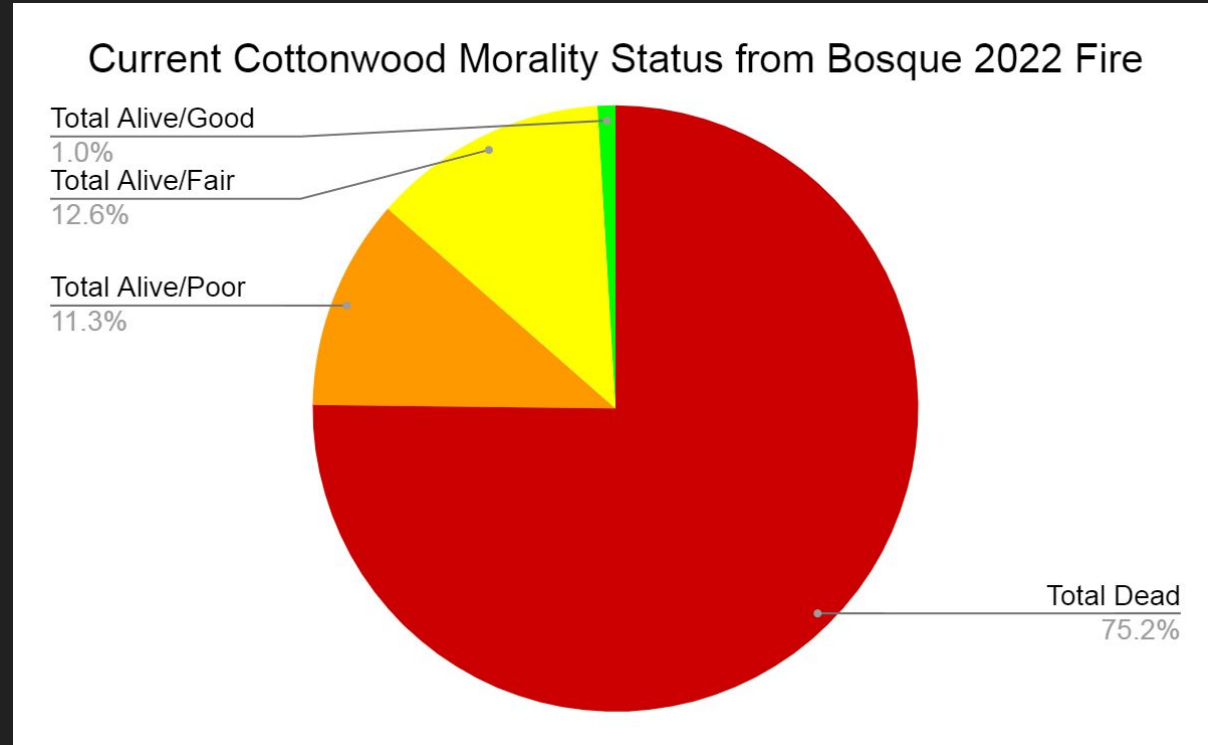
- Survey done approximately 2 months post fire
- Worked with Sean O'Neil the City Forester
- Took DBH on each Cottonwood tree within burn area
- Marked each tree to get accurate count
- If severely burned, we counted dead
- If near bulldozer line or moderately burned, we considered alive but poor condition
- If bark intact but minor burns, we considered alive and fair condition
- If bark intact and no apparent burns, we considered alive and good condition





# 2 Months post fire Cottonwood Findings During DBH Inventory

- Total Cottonwoods: 524
- Total Dead Cottonwoods: 394
- Total Alive/Poor: 59
- Total Alive/Fair: 66
- Total Alive/Good: 5



# Tree Plotter Cottonwood Inventory

(Blue dots first day, red dots second day of survey effort)





# New Sprout Inventory

(2.5 months post fire)

## Exotic Species -

Totals:

Salt Cedar: 436

Russian Olive: 718

Tree of Heaven: 880

## Native Species -

Totals:

Cottonwood: 558

New Mexico Olive: 264

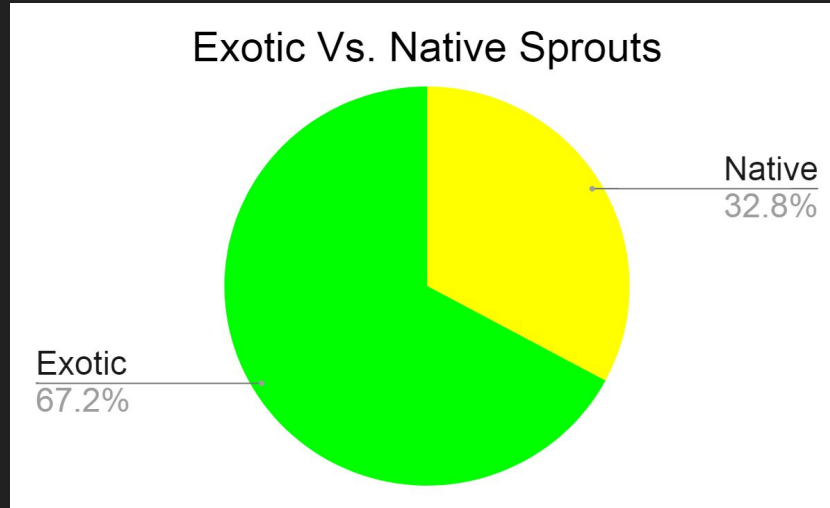
Black Willow: 173

**Total Exotics:**

**2,034**

**Total Natives:**

**955**



# Subset of Exotic Sprouts in a 1.5 Hectare Section (Comprising ~20% of area burned)

## Exotic Sprouts in just the River Strip Subset:

Total Count: 800

Salt Cedar: 297

Russian Olive: 248

Tree of Heaven: 255



# Cottonwood

Total Sprouts: 558





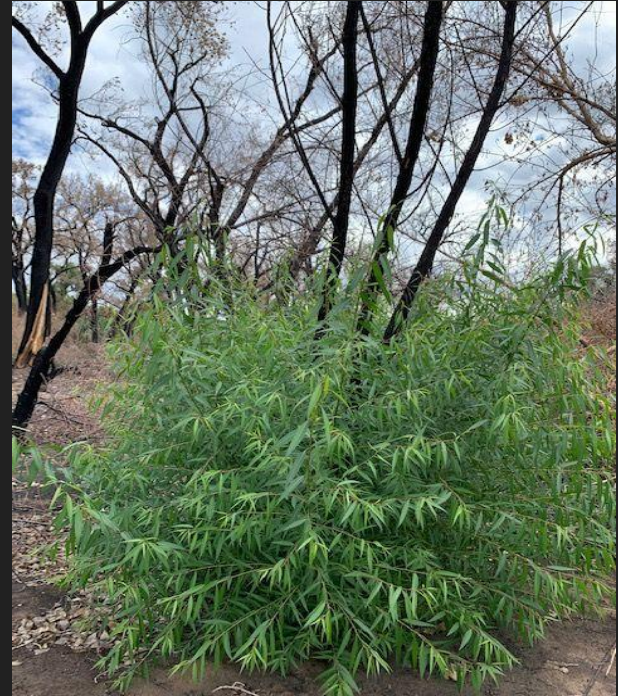
# New Mexico Olive and Black Willow

## Total Sprouts

New Mexico Olive:264



Black Willow:173



# Tree of Heaven and Russian Olive

## Total Sprouts

Tree of Heaven: 880

Russian Olive: 718





# Salt Cedar

Total Sprouts: 436





# Suggestions

- Educate public on fire damage and restoration efforts, esp. Safety & fire prevention issues
- Educate about ecological services the bosque provides (DBH -> economic value of trees being calculate)
- Cut down & remove, not chip, dead Cottonwoods (protect new Cottonwood sprouts)
- Removal of invasive species, (not necessarily remove all exotic)
- Plant native plants
- If possible temporarily flood area to assist Cottonwood/create shallow divots to get closer to groundwater
- Removal of down and dead woody material
- Continue: monitoring/adaptive management - BEMP



# Citations

Stuever, Mary C. *Fire induced mortality of Rio Grande cottonwood*. Diss. University of New Mexico, 1997.

Ellis, Lisa M., Manuel C. Molles Jr, and Clifford S. Crawford. "Influence of experimental flooding on litter dynamics in a Rio Grande riparian forest, New Mexico." *Restoration Ecology* 7.2 (1999): 193-204.

Eichhorst, Kim D., et al. "Bosque Ecosystem Monitoring Program (BEMP) Comprehensive Report: 1997-2009." *Albuquerque: Department of Biology, University of New Mexico* (2012).



# Acknowledgements

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Sean O'Neil, Livingston Maclake, Donny Kelly-Currins, Smokey Bear\*, & Gorgonzola Tigrinum

(\* Happy 78<sup>th</sup> Birthday)

# Questions?



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