



**WATER INFRASTRUCTURE**  
FINANCE AUTHORITY OF ARIZONA

# Source Water Protection in Arizona

NEIWPC – SRF for SWP Webinar

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**Lindsey Jones**

Water Infrastructure Finance Authority

Sr. Program Administrator

[ljones@azwifa.gov](mailto:ljones@azwifa.gov)



## SWP Activities Through Partnership with ADEQ

- ADEQ assists public water systems, local officials, and utilities in developing and implementing plans to protect source water
- **Benefits of establishing a source water protection program:**
  - Reducing the need to develop new drinking water sources
  - Reducing the costs for treatment of the drinking water to meet acceptable quality standards

# SOURCE WATER PROTECTION

## PROTECT YOUR DRINKING WATER SOURCES FROM CONTAMINATION

### SOURCES OF CONTAMINATION INCLUDE:



Septic Systems



Agriculture



Underground  
Storage Tanks



Superfund Sites



Marinas &  
Golf Courses

### BENEFITS OF SOURCE WATER PROTECTION:



**REDUCES**

Health Hazards



**INCREASES**

Public Confidence



**LOWERS**

Treatment and  
Cleanup Costs



**HELPS**

with SOC/VOC  
sampling waivers

### A SOURCE WATER PROTECTION PLAN

- Delineates a protection area around your well(s)
- Identifies potential sources of contamination
- Determines susceptibility from threats
- Develops Best Management Practices to protect your water source
- Implements protection activities and involve the community

**THE PLAN IS  
VOLUNTARY  
THERE IS NO  
ADDITIONAL  
REGULATION**

### FIND OUT HOW ADEQ CAN HELP (at no cost to you)

#### SMALL PUBLIC WATER SYSTEMS

We may be able to develop a Source  
Water Protection Plan for you

#### MEDIUM AND LARGE PUBLIC WATER SYSTEMS

We can provide guidance and review your  
Source Water Protection Plan



# Partnerships for Land Conservation

Because these projects seldom have associated income streams, they're usually paid for using a combination of funding mechanisms

Partnerships through the SRF allow the borrower to access WIFA incentives like forgivable principal, affordable technical assistance, project development, and planning

## **Potential repayment sources include:**

- Recreational fees (licenses, entrance fees)
- Donations or dues to non-profit organizations
- Revenue from sustainable timber or other forest products
- Dedicated portions of local, county, or state taxes

The image is a split-screen landscape. The left side, which is larger, shows a dark, moody scene with a deep blue lake and a heavy, dark purple and blue sky filled with clouds. A dark, silhouetted forest line is visible on the left side of the lake. The right side shows a bright, sunny scene with a clear blue sky and white clouds. The lake water is a vibrant blue, and a line of green trees is visible on the right shore. In the bottom right corner, there are some rocks and dry grass.

# Flagstaff's Watershed Protection Project



# Forest Thinning and Watershed Management

- Fires in heavily vegetated areas → catastrophic crown fires → flash flooding and mud flows
- Wildfires can lead to the devastating destruction of critical watersheds and drinking water supplies
- Preventative measures are crucial in protecting the health/integrity of Arizona's communities and resources
- Forest thinning practices are an effective strategy for preventing the significant environmental, financial, and social impacts from wildfires
- These projects are large in scale and expensive to execute, making it challenging to find sufficient funding.

Northern Arizona's forests have changed due to

# Fire Suppression



Management Action Point

# Schultz Fire, 2010

**15,000 acres**, Total impacts exceed **\$140M**

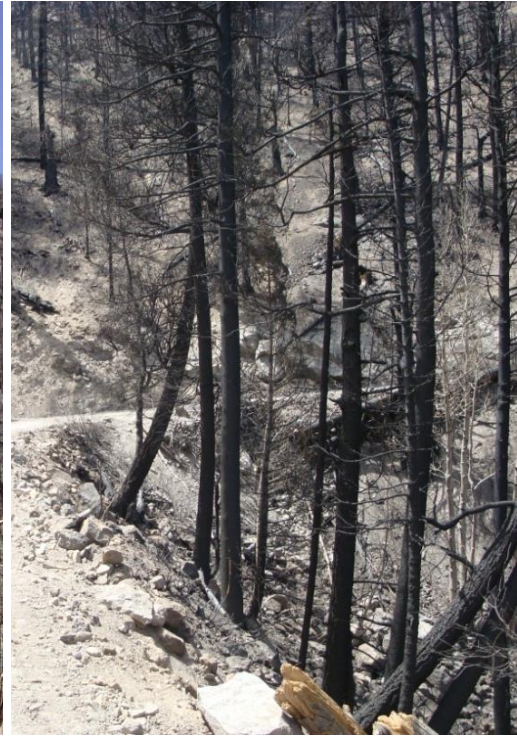
A Full Cost Accounting on the 2010 Shultz Fire

Ecological Restoration Institute, Northern Arizona University



2010

# Schultz Fire, Aftermath



Monsoon rainfall and the flooding

# Impacts of the Shultz Fire



# Flooding and Debris Flows Inundate Homes





# Challenges with debt

## **Debt aversion runs deep in Arizona, all the way to the state's constitution**

- The State can't issue General Obligation
- Voter approval is needed for revenue pledge in communities with a population over 150,000
- Voter approval is needed for General Obligation in all communities

## **The public regularly rejects all manner of essential service bond authorization**

- In the past election, many things did pass but there were several including, school, stormwater, roadway, and landfill projects rejected by Arizona communities

November 2012: Flagstaff voters approved a \$10M bond to support the FWPP– a partnership effort between the State, City and Coconino National Forest

**PROTECT**  
**Our Water...**  
**Property...**  
**and Lives!**

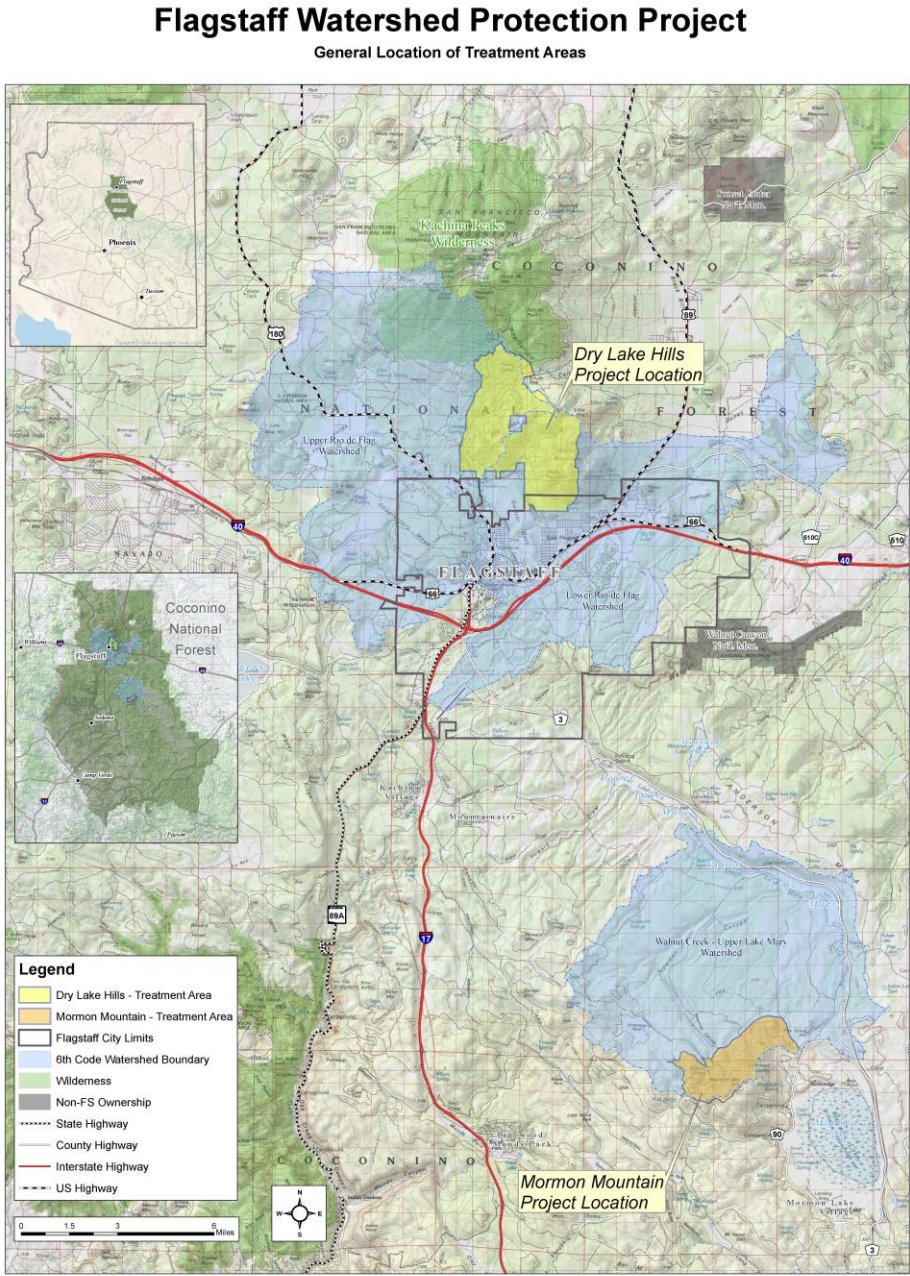
*"I'm voting YES ON 405 to help protect Coconino Estates, Downtown, Sunnyside, Continental, other Flagstaff neighborhoods, and NAU's campus from the consequences of big wildfires and severe flooding."*  
—Celia Barotz, Flagstaff City Council



[www.sites.google.com/site/yeson405](http://www.sites.google.com/site/yeson405)

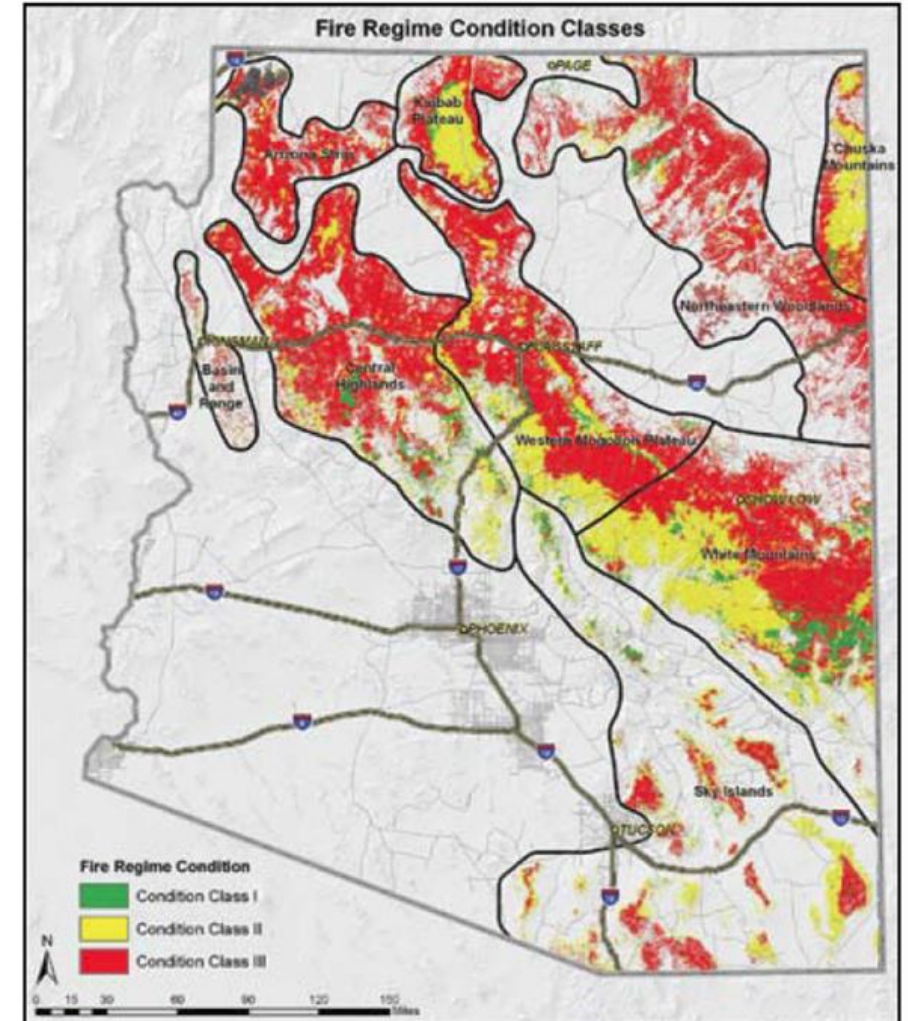
Forest Health and Water Supply Protection Project

**VOTE YES  ON 405**



# Assessing the triple bottom line

- Twenty eight percent of Arizona's natural landscape is comprised of thick pine forests and about 2.6 million people live within 50 miles of one of six National Forest areas in the state.
- Forest restoration/watershed protection projects cost money and do not put in place or directly enhance revenue generating assets (like a WWTP or new well)
- They are however essential, and must be paid for somehow...



Fire Regime Condition characteristics of forests across the state illustrate the unhealthy condition of Arizona forests. Areas in red have diverged significantly from their natural fire regimes, and unnaturally severe fires in these areas are likely to cause significant damage.



**WIFA provided a loan for \$6M with \$1M as forgivable principal to the City of Flagstaff to fund a portion of the forest thinning project.**

# NPS Pilot Project



# Making the case Economically

Communities need to convince the public that forest management is worth paying for, and we need to help them.

Following much of the incredible work that Flagstaff and others have done in the wake of recent fires, we had Northbridge help us create a simplified methodology to highlight the economic relationship between cost of treatment and cost avoidance.

Ten metrics of the environmental, social, and financial costs:

1. Wildfire suppression and rehabilitation costs
2. Damage to structures and contents
3. Damage and replacement costs of utilities
4. Costs to wildlife habitat and timber
5. Treatment costs at drinking water facilities
6. Source water protection
7. Recreational value
8. Local income, business revenue
9. Job creation
10. Property value

# Quantification, Implementation, and Valuation of Environmental Restoration (QUIVER)

- Triple bottom line approach to quantify the **environmental, financial and socioeconomic** impacts
- How do they benefit communities, businesses, utilities, individual households?
- Make the case for investing in ALL TYPES of nonpoint source project solutions by demonstrating economic value
- Use the data to create and customize powerful messaging and marketing collateral that resonates with stakeholders of any persuasion
- Scalable and capable of satisfying state-specific, regional, or national needs



## How do healthy forests affect my water bill?



Healthy forests help protect drinking water sources like rivers and lakes from contamination.



Wildfires destroy a forest's ability to  
**Stabilize soil**  
**Slow rain run-off**

There is a **direct link** between drinking water treatment costs and damaged watersheds



This results in  
**Flash floods**  
**Mudslides**  
**Debris flows**

The **more treatments** that is required to clean the water, the **higher your water bill!**



Cleaning polluted waters is  
**200 times more expensive**  
than preventing pollution of drinking water sources

Forest thinning helps protect healthy soil and root systems, reduces erosion, and can save money.



For every 10% increase in vegetation there is a  
**20% reduction in treatment costs**

**Healthy forests = clean waters!**

"If we talk utility infrastructure and water – we need to look at the source as important as anything. The forest we don't own is our infrastructure."

–Paul Summerfelt, City of Flagstaff

WIFA's Forest Thinning & Restoration Program



## How can healthy forests save you money?

If your drinking water comes from a river, lake or reservoir then healthy trees and vegetative cover on the forest floor have a direct impact on your water bill. Forest thinning helps to protect healthy soil and root systems from the ravages of wildfire, reducing the likelihood of flash floods, mudslides, debris flows, and erosion. All of these contribute to the pollution of drinking water resources and increase the cost of treatment at your water treatment facility. Those costs are passed on to you, the consumer!

**IF YOUR DRINKING WATER UTILITY SPENDS \$250,000 A YEAR ON TREATMENT, A FOREST WITH**

The damage caused by wildfire can persist for **5-10 years** and can be **more detrimental** to water supplies **than the fire** itself.

**10% VEGETATIVE COVER**  
may reduce costs by

**\$50,000**

**30% VEGETATIVE COVER**  
may reduce costs by

**\$120,000**

**50% VEGETATIVE COVER**  
may reduce costs by

**\$160,000**

## Why should we fund forest thinning projects in Arizona?



### It's good for the economy!

Here's what happened in Arizona's national forests in 2019...



6 million hikers generated  
**\$541 Million**

Healthy forests are a vital resource for Arizona's many outdoor recreation activities.



5.6 million lovers of wildlife, birds and nature viewing generated  
**\$420 Million**

Arizona has six national forests that hosted more than 13 million visitors in 2019!



1.2 million anglers generated  
**\$124 Million**

A large wildfire means the closure of forest lands, trails, and access to rivers and lakes.



1 million campers generated  
**\$110 Million**

Some facilities may be closed up to 10 years after a wildfire.



726,000 hunters generated  
**\$98 Million**

Closure as the result of wildfires could cost the Arizona economy BILLIONS of dollars in revenue!

WIFA's Forest Thinning & Restoration Program



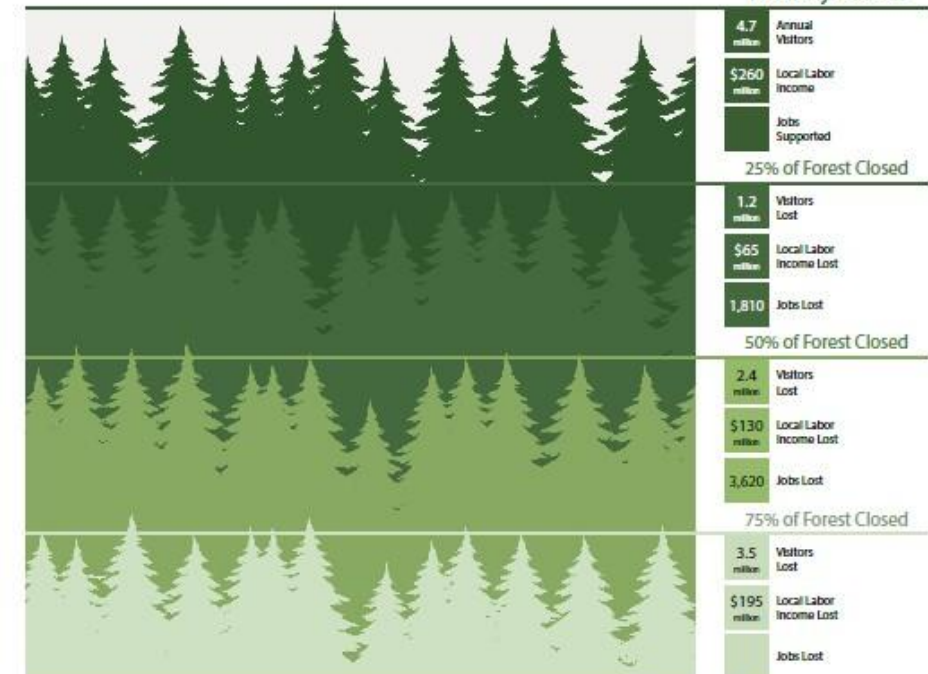
## How do Healthy Forests Support Arizona's Economy?

Arizona's forests support environmental biodiversity and bountiful recreational opportunities for residents and visitors alike. They are also a vital source of income and tax revenues, create jobs, and support the livelihoods of millions of Arizona families. Taking proactive steps to ensure the future health and integrity of these lands through vegetative management and forest thinning practices is critical to protecting the environmental and economic resources they provide.

How are Arizona's forests supporting local economies?  
What would happen if these forests were damaged by a large wildfire and had to be closed?

Recent wildfires in Arizona forests have closed recreational facilities for months — some for years!

### Recreational National Forest Area: Coconino



## How do wildfires impact local families?



**It can take years for a community to recover from a wildfire and its aftermath.**



Double Impact  
**Up to \$700 Million**  
In financial damages from catastrophic fire and post-fire flooding



Healthcare Costs  
**\$1,937**  
Average out-of-pocket costs to treat injuries and illnesses associated with post-wildfire impacts



Economic Stress  
**Up to \$1.2 million**  
in lost retail and tax for each day a wildfire is not contained



Quality of Life  
**Charred landscapes, poor air quality, polluted water supplies**

Flooding in a burn scar area following a wildfire can cause more catastrophic damage than the fire itself.

Destruction in the wake of a fire takes an **EMOTIONAL** and **PHYSICAL** toll on families and businesses.

Local economies can be ravaged over months or even days and may take a decade to recover.

The quality of life in communities touched by wildfire can be significantly diminished.

**Forest thinning is an investment in the health of local communities!**

## The Cost of Wildfire to Health and Economic Prosperity

Wildfire and post-fire flooding can wreak havoc on the economic health of communities at ground zero as well as many miles away. Some communities have lost millions in retail sales, tourism, and tax revenues without actually being directly impacted by fire and flood at all. Even though it was more than ten miles away, the Slide Fire cost the city of Sedona **over \$100 million in lost tourism revenue**.

### SCHULTZ FIRE: CITY OF WILLIAMS RETAIL REVENUE AT RISK

1 DAY FIRE	\$1,200,000
5 DAYS FIRE	\$6,000,000
10 DAYS FIRE	\$11,900,000

### FLOODING: CITY OF WILLIAMS RETAIL REVENUE AT RISK

LOW	\$13,000,000
HIGH	\$72,000,000

The Arizona Rural Policy Institute and Resource Center undertook a full-cost accounting to examine the post-wildfire economic impacts of the Schultz Fire. They surveyed local residents and found that about 10% of respondents reported a personal injury or accident, and 13% reported illness, mental stress, or psychological trauma. Though these impacts are more difficult to quantify in financial terms, they represent a significant cost that should be considered.<sup>1</sup>

<sup>1</sup><http://nar.edu/FPI/Banner/Schultz-Fire/>

**An investment in forest thinning can prevent hundreds of millions in economic, health, and emotional costs.**

**"WE ARE STILL SICK OVER IT. OUR LIVES AND LIFESTYLE IS FOREVER CHANGED." - Resident, City of Flagstaff**

# How do wildfires impact our



## Wildfire Damage to Utilities & Infrastructure



### Drinking Water Supply

Post-fire runoff can pollute reservoirs rendering the water supply unusable.

Many communication towers are located on mountaintops, making them vulnerable to wildfire. Arizona's Mormon Mountain and Mount Elden each host numerous communication facilities used by:



### Treatment & Distribution

Up to **\$37 million** to restore local drinking water infrastructure from post-fire runoff.



County Law Enforcement  
Cellular Phone Service  
Providers



Internet Providers  
Telephone Providers



### Emergency Response

Disruptions to critical communication infrastructure impacts **first responders**.



Television Stations  
FM radio broadcasters

A fire would disrupt or destroy communications such as cell phone service, Internet, radio, and public safety including law enforcement, fire and emergency medical services. The impact would be disastrous for personal communications, business operations and fire suppression efforts.



### The Value of Utilities

**\$84-224 million** in communications assets on two vulnerable mountains.

# How do wildfires impact our real estate and property?



## The cost of wildfire property damage &



### Property Values

Homes within 3 miles of a wildfire experience a 31% decline in value

Forest thinning is all about **COST AVOIDANCE**



### Property Damage

Damages from flash floods and mudslides average \$152,000

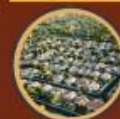
Though it cannot completely eliminate wildfire risk, it can significantly reduce the severity of wildfire events.



### Wildfire Suppression and Rehabilitation

Up to \$4,243 in recovery costs for every acre burned

Mitigating the range, intensity and velocity of wildfires is the best strategy to avoid substantial economic impacts to homeowners, businesses and communities.



### High Risk Areas

More than 174,000 properties in Arizona are in "high and extreme wildfire risk" areas

An ounce of prevention is worth a pound of cure!

# What's our home worth?



Meet the Mexican Spotted Owl, a threatened species that calls Arizona's forests home...



Arizona has  
**Hundreds of**

The federal government has established protected activity centers (PACs).



Each PAC is worth between  
**\$100,000 and \$4 Million**

These are areas of at least 600 acres each that can breed and sustain the owls.



Forests in the southwestern US have experienced more severe wildland fires since  
**1995**

LOSS OF HABITAT for these threatened species is one of the biggest wildfire concerns.



Wildfire could destroy this critical habitat valued in total at more than  
**\$1 Billion**

Intensifying drought cycles and climate variability could result in ever larger fires in owl habitat.

**WIFA's Forest Thinning & Restoration Program**



## The Intersection of Habitat & Commerce

The value of forests can be measured in different ways: environmental, social, and economic. One method is to determine the value of endangered species like the Mexican Spotted Owl that make their homes in the forest. Wildfire can decimate hundreds of acres of critical habitat for these species. Another key cost of wildfire is the lost value of timber sales that keep local economies afloat. How can we quantify the environmental and economic impacts of wildfire on these resources?

If there are  
**120,000**  
acres at risk  
in the Tonto  
National  
Forest area

**200**  
potential owl  
habitats may  
be impacted

### What's the value of Mexican Spotted Owl habitat in the at-risk forest?



### How does wildfire impact timber sales?

The potential loss in revenue and impact on local economies depends on the amount of forest utilized for a typical harvest.



# YOU BENEFIT FROM MORE THAN JUST BELOW-MARKET INTEREST RATES



INTEREST RATE SAVINGS UP TO 30 PERCENT



UP TO 20 PERCENT LOAN FORGIVENESS



30-YEAR REPAYMENT TERM



FUNDING FOR SMALL AND LARGE PROJECTS



YEAR-ROUND APPLICATIONS



NO APPLICATION FEES OR CLOSING COSTS



MOST PROJECTS EXEMPT FROM REQUIREMENTS (DAVIS-BACON WAGE RATES AND AMERICAN IRON AND STEEL)



PLANNING GRANTS MAY BE AVAILABLE



PERSONAL SERVICE & DEDICATED PROJECT MANAGER

MANY REPAYMENT OPTIONS  
WILL BE CONSIDERED

FINANCING FOREST RESTORATION  
PROJECTS CAN BE CHALLENGING.  
WITH WIFA, IT DOESN'T HAVE TO BE.

Have a viable project but not on this list? WIFA can fund projects on state and federal forestland, as long as the project is sponsored by an eligible jurisdiction. **Contact us to discuss your options.**

## PUBLIC JURISDICTIONS & TRIBAL ENTITIES ARE ELIGIBLE

- Cities
- Towns
- Special districts
- County improvement districts
- Sanitary districts
- Native American Tribes & Tribal Authorities



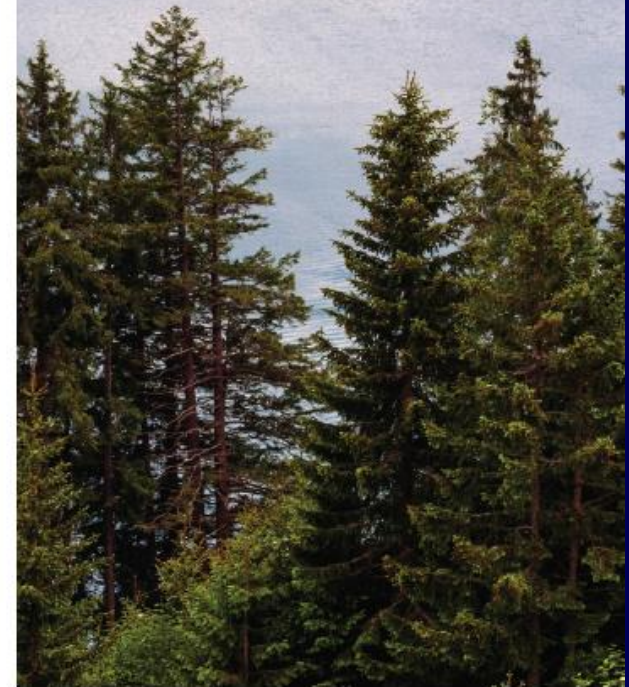
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100 N. 7th Avenue, Suite 130/Phoenix, AZ 85007  
Phone: (602) 364-1310 • E-mail: [ljones@azwifa.gov](mailto:ljones@azwifa.gov)

[WWW.AZWIFA.GOV](http://WWW.AZWIFA.GOV)

# FOREST THINNING & FIRE PREVENTION PROGRAM

Below-market loans for your forest  
restoration projects.



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# Thank You

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**Lindsey Jones**

Water Infrastructure Finance Authority

Sr. Program Administrator

[ljones@azwifa.gov](mailto:ljones@azwifa.gov)

