


**WPEF, Sept. 20, 2018
Stanley, ID**

The National Whitebark Pine Restoration Plan: A multi-agency collaborative effort to rescue a high elevation foundation and keystone forest species

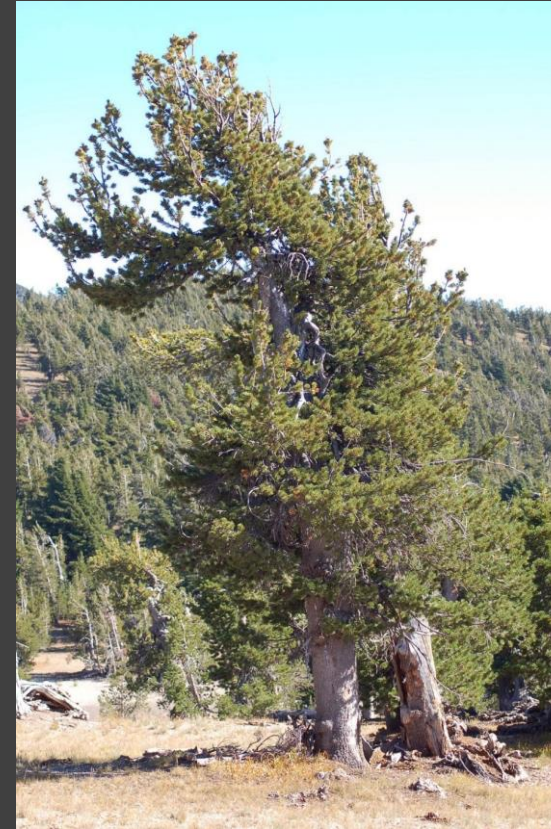
Diana F. Tomback
Whitebark Pine Ecosystem
Foundation, Missoula, MT;
Univ. of Colorado Denver 



Eric Sprague
American Forests
Washington, D.C.

Robert E. Keane
USFS Rocky Mountain
Research Station,
Missoula, MT

David Gwaze
Leslie Weldon
USFS Washington, D.C.



Back story

Whitebark pine WP (*Pinus albicaulis*) health is deteriorating range-wide.

- In 2011 the U.S. Fish & Wildlife Service designated WP as a candidate species under the ESA.
- In 2012 Canada listed WP as endangered under SARA.

WP restoration poses logistical and fiscal challenges, given the pine's geographic range.

- Constraints argue for a strategic approach to restoration, emphasizing “core” areas.

In 2016, the WPEF and AF proposed a collaboration with the USFS to develop and implement restoration planning.

This model is potentially valuable for recovery planning for other widely-distributed threatened/endangered species.

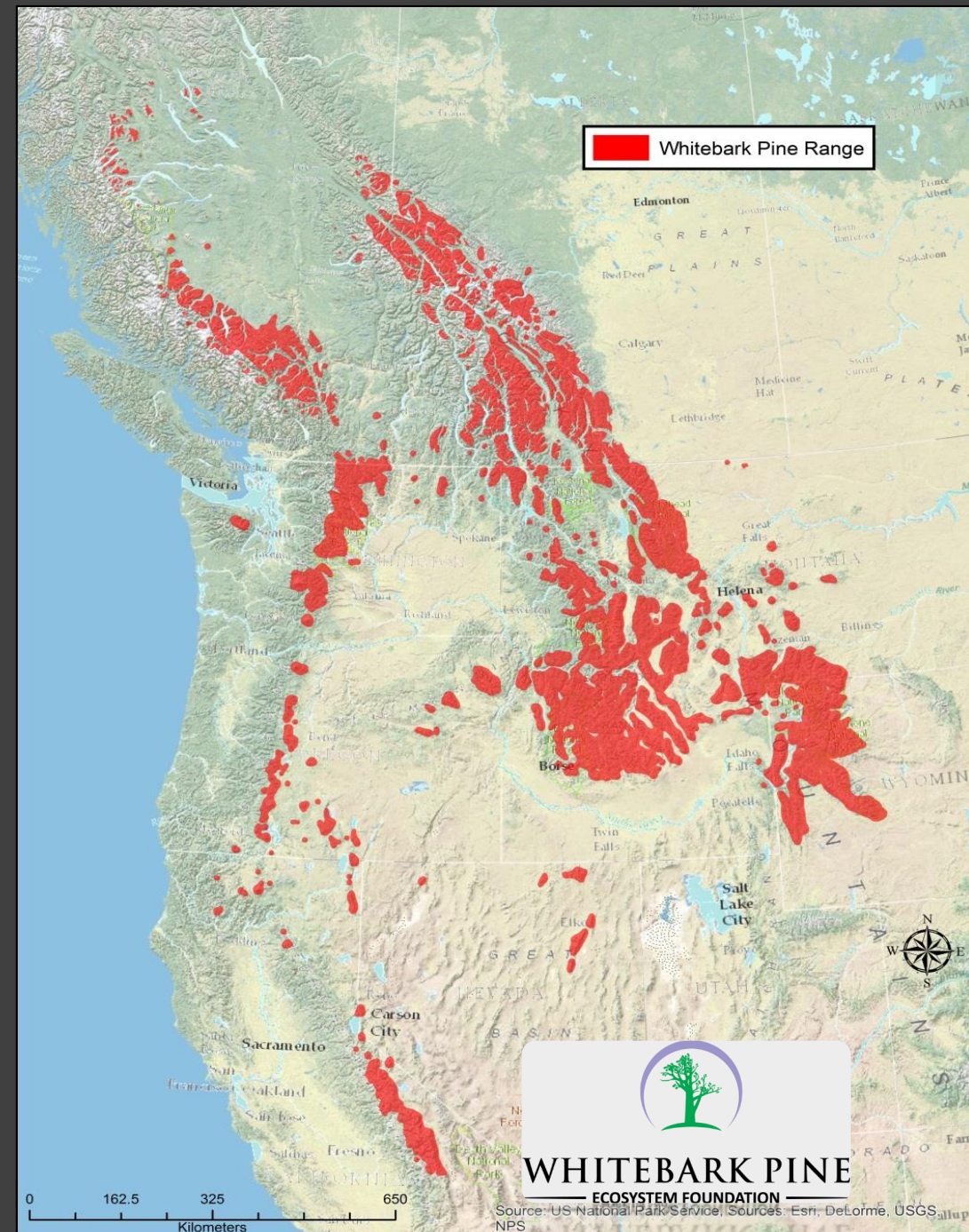


Background

Whitebark pine range

- Western U.S. and Canada.
- Subalpine and treeline zones.
- 96% of the U.S. distribution is on federally managed lands.
- Estimated U.S. areal coverage:
5,770,000 ha (14,252,000 acres)

Keane et al. 2012, Table 4.1



Whitebark pine community types

- Successional communities.
- Climax communities.
- Treeline communities.



Whitebark pine depends on Clark's nutcracker for seed dispersal



Tomback 1978, 1982; Hutchins and Lanner 1982

Keystone species

Promotes biodiversity

- 7 recognized SAF cover types.
- Provides high elevation wildlife habitat, shelter, and nest sites.
- Seeds are important wildlife food.



D.Pigott

Foundation species

Defines ecosystem structure and function

- Establishes rapidly after disturbance.
- Provides protection on harsh sites for other plants.

Dayton 1972, Ellison et al. 2005

Ecosystem Services

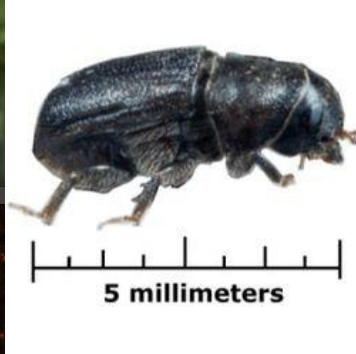
Grows at the highest elevations.

- **Redistributes snow.**
- **Protracts summer snowmelt.**
- **Stabilizes soil.**
- **Stabilizes snow.**

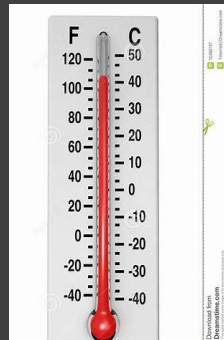
The four major threats to whitebark pine



<https://imgur.com/gallery/OPa7e>

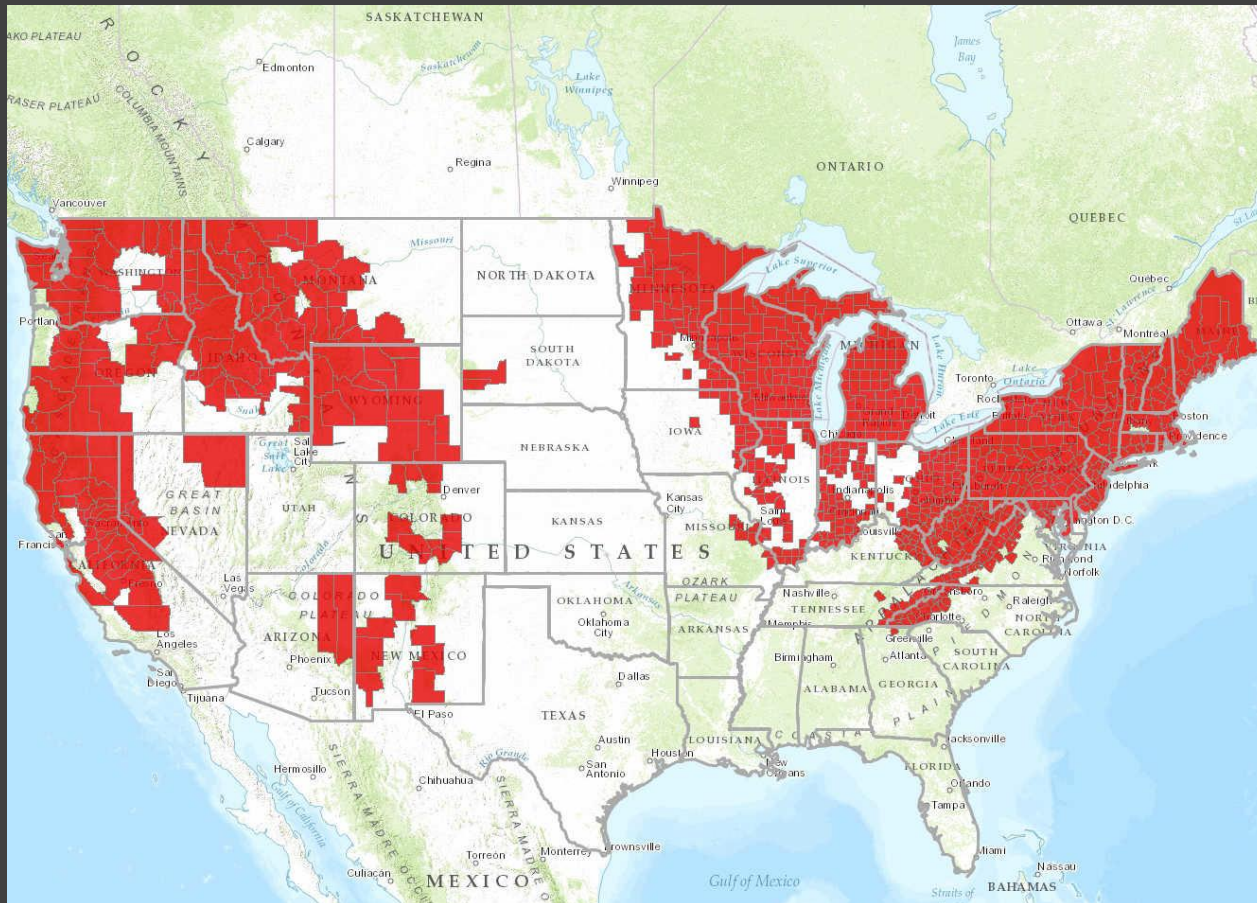


- ***Cronartium ribicola***—causes white pine blister rust WPBR.
- **Mountain pine beetle** (*Dendroctonus ponderosae*)—kills mature trees.
- **Altered fire regimes**—historical fire exclusion. Future increase in frequency and severity.
- **Climate warming**—bark beetle outbreaks, drought stress, driving more frequent and severe fires, altered distribution.

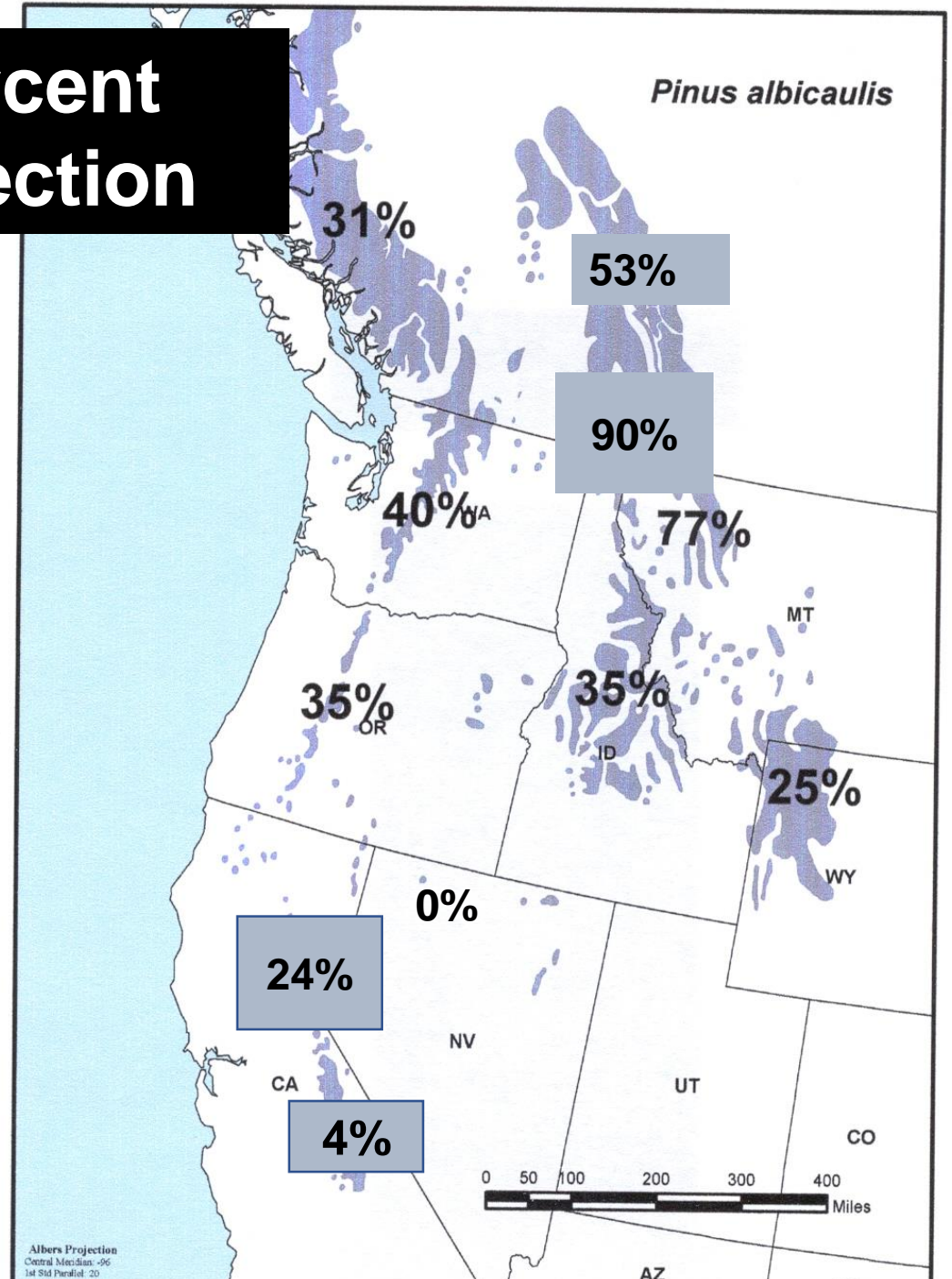


https://en.wikipedia.org/wiki/Mountain_pine_beetle

White Pine Blister rust (WPBR): naturalized to North America



Estimated percent blister rust infection



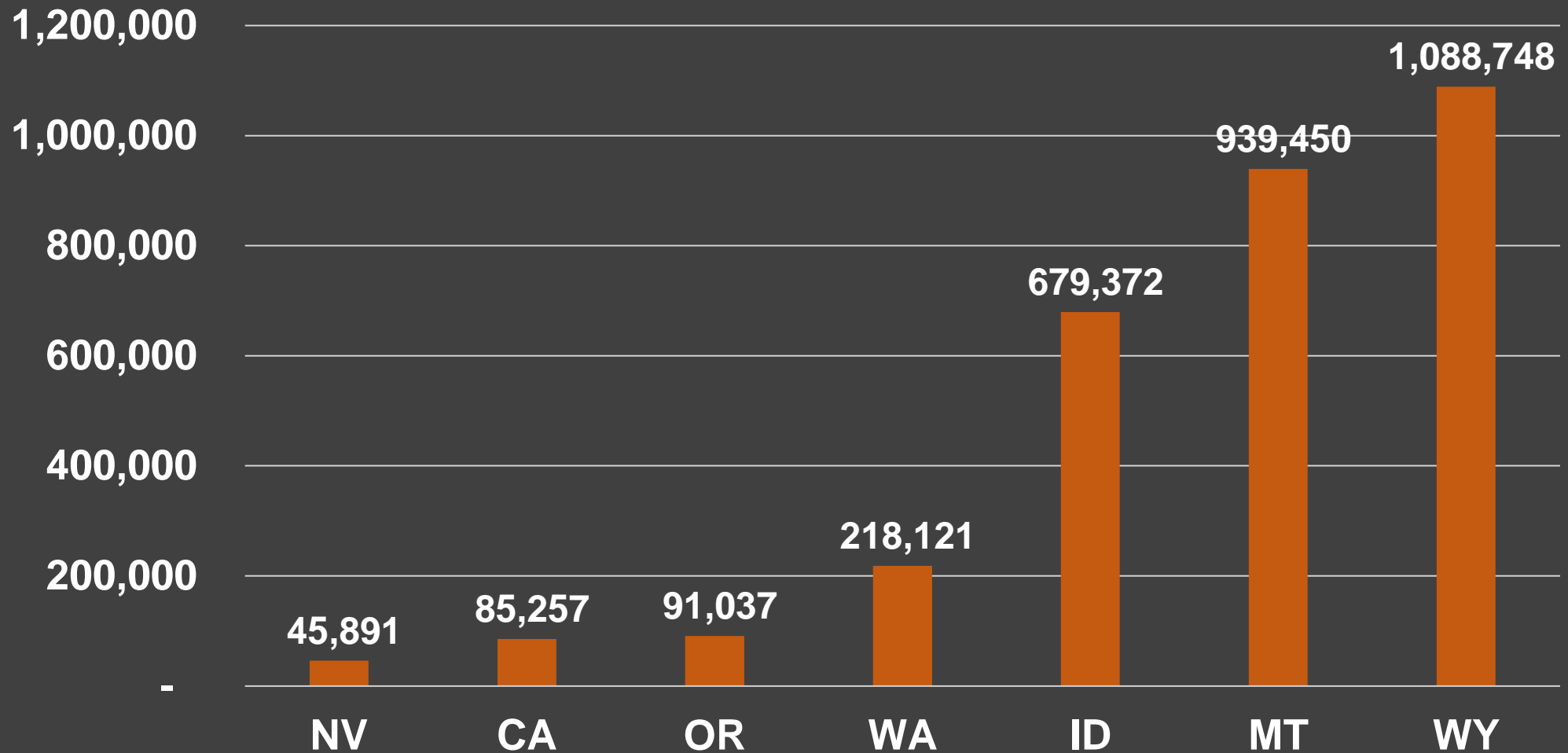
Mountain Pine Beetle

20 year outbreak

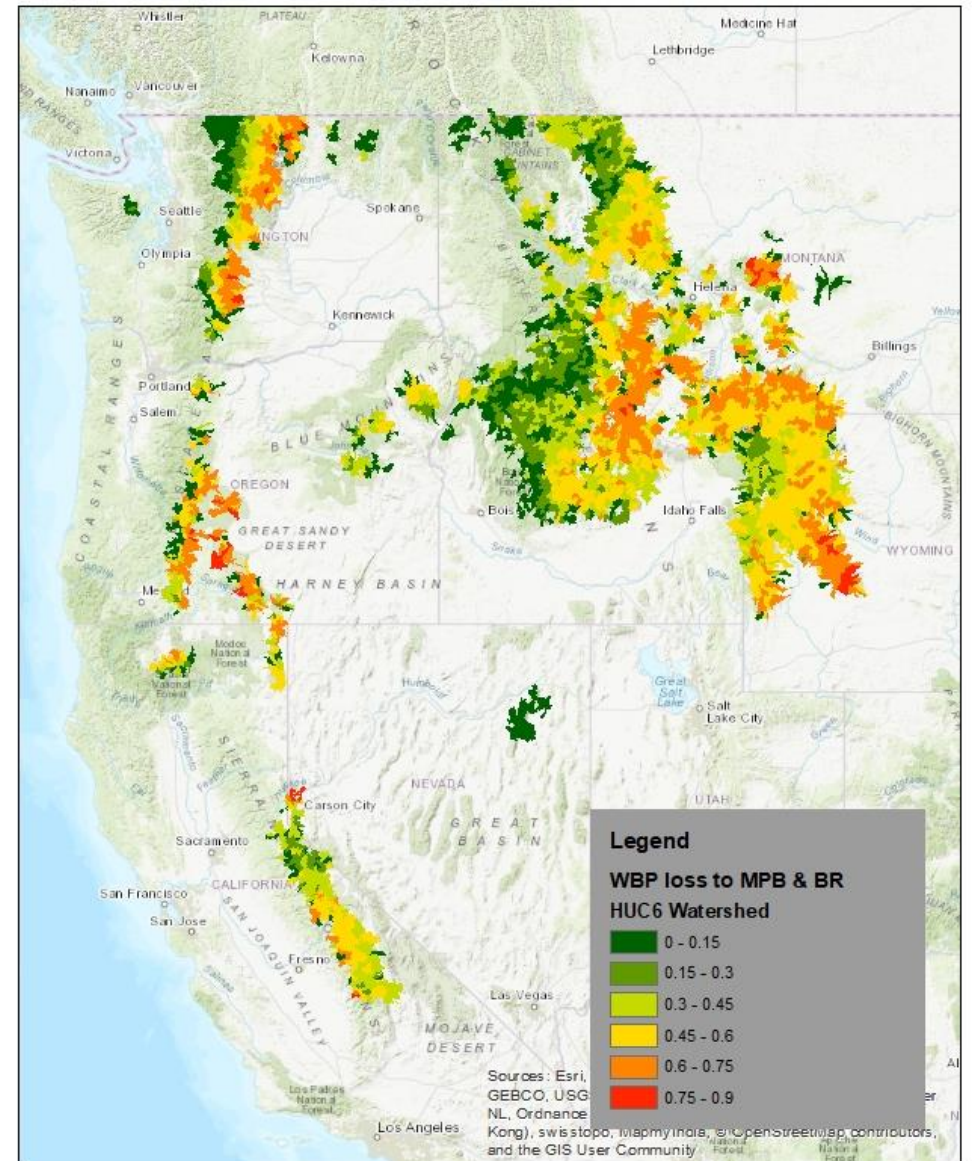
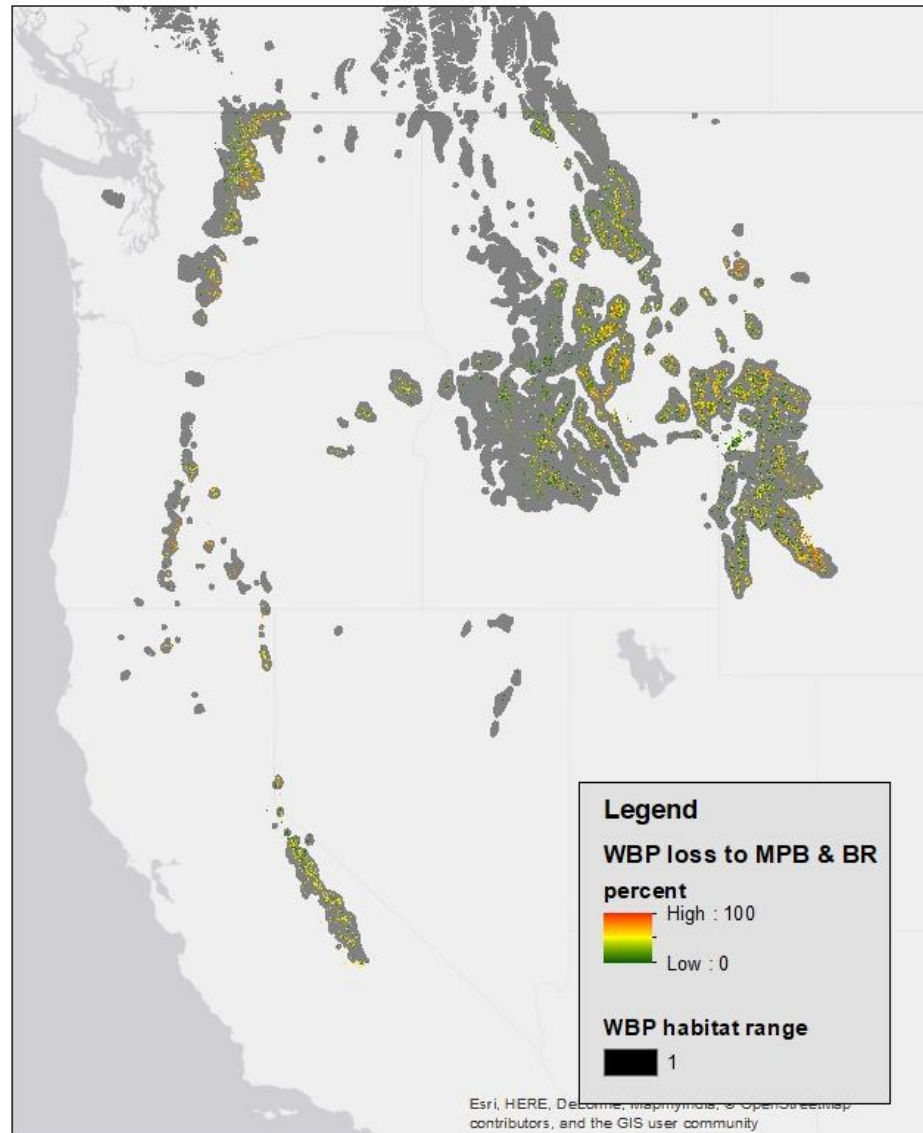
in the West



1997-2016 Cumulative Whitebark Pine MPB Footprint:
Total 3,147,876 Acres (~25% range)



Combined mortality from MPB and white pine blister rust



Climate change Impact on distribution e.g., Greater Yellowstone Ecosystem

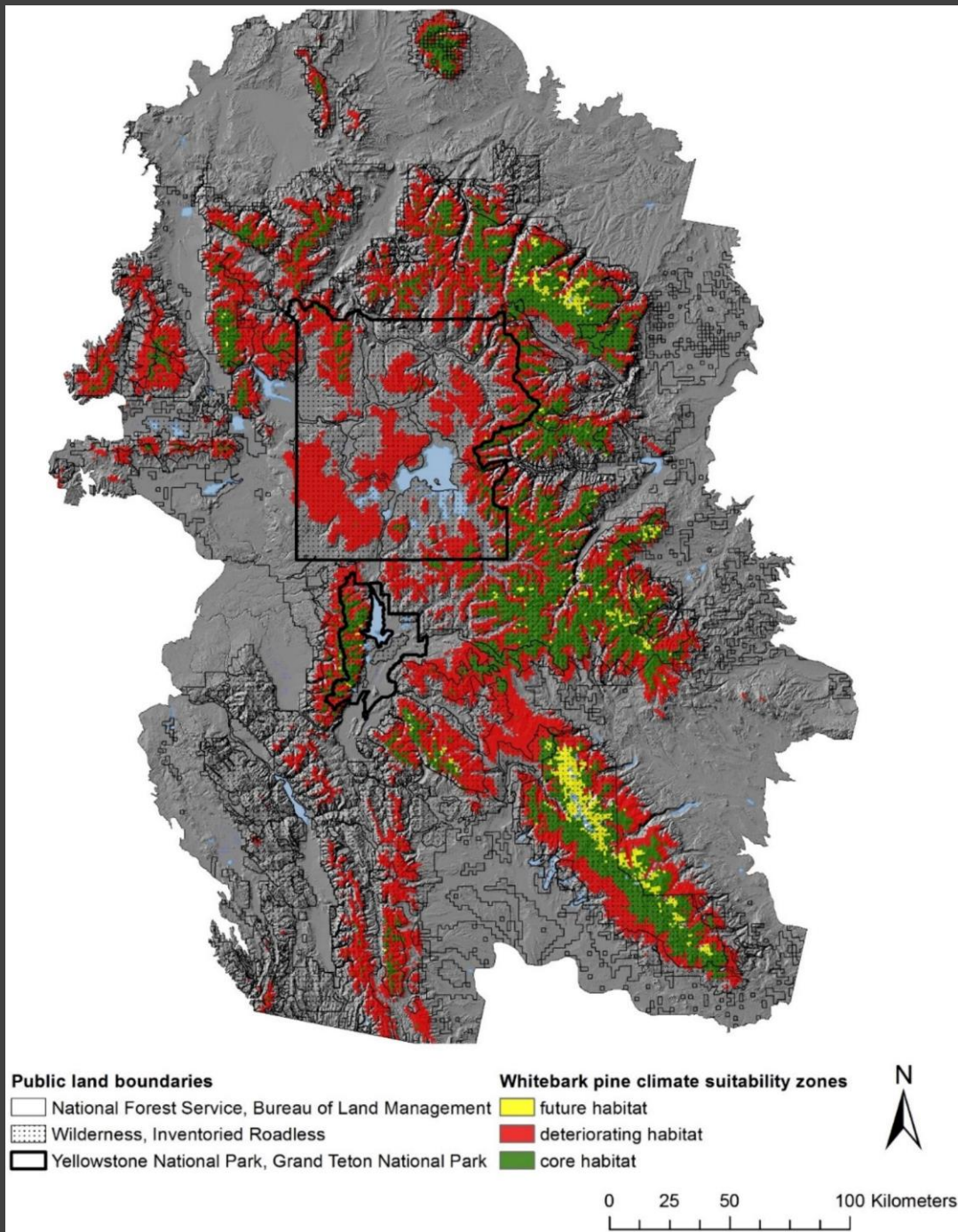
Whitebark pine distribution 2040-2070
under Moderate warming scenario, GCM
AR5 RCP 4.5.

Red = deteriorating habitat

Green = core habitat, 34% of current range

Yellow = future habitat

- Climate change can be considered in restoration actions.
- Healthy whitebark pine required to respond to change in distribution.



(Hansen et al. 2016)

Whitebark pine restoration: actions

- Speed up natural selection by developing and planting blister-rust resistant seedlings.
- Protect against mountain pine beetle.
- Renew successional stands.
- Mitigate climate change.



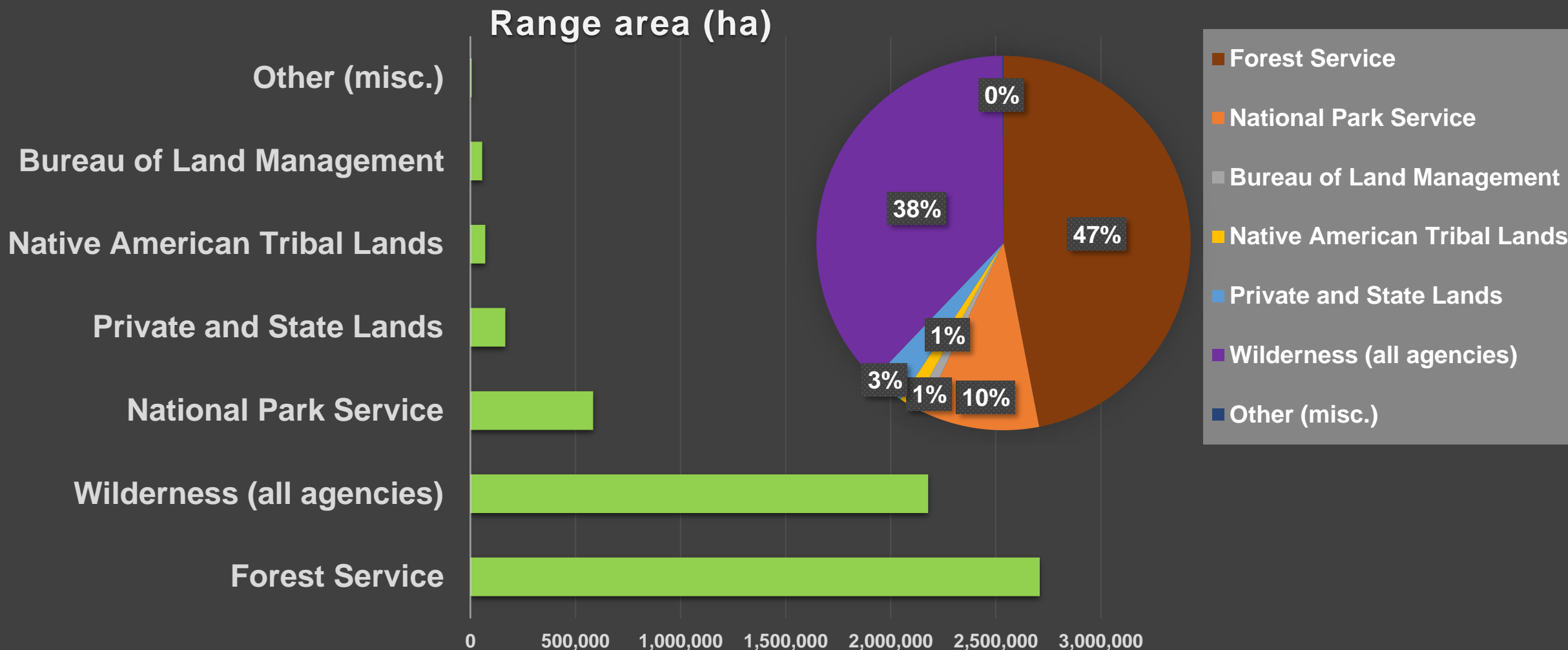
The restoration plan

A photograph of a dense forest of evergreen trees, likely spruce or fir, with some trees showing signs of being dead or dormant (brown needles). The forest is viewed from an elevated position, looking down into the canopy. In the background, a mountain range is visible under a hazy sky. The text "The restoration plan" is overlaid in the upper center.

Henderson Mtn., Custer Gallatin NF, MT

Whitebark Pine Area by Government Jurisdiction

Total estimated area ~ 5,770,000 ha (>14 million ha)



Data from Keane et al. 2012, Table 4.1

What do we bring to the table?

- American Forests contributes outreach and fund-raising capacity and a long track record in forest restoration projects.
- The WPEF has disseminated whitebark pine science and application through multiple outlets and networked for 20 years.
- The U.S. Forest Service brings resource management expertise, personnel, and infrastructure; can facilitate work across agencies:
 1. National Park Service
 2. Bureau of Land Management
 3. U.S. Fish & Wildlife Service
 4. State Land Agencies
 5. Bureau of Indian Affairs as well as various tribes.
- Guidance now provided by a multi-agency Liaison Advisory Committee.

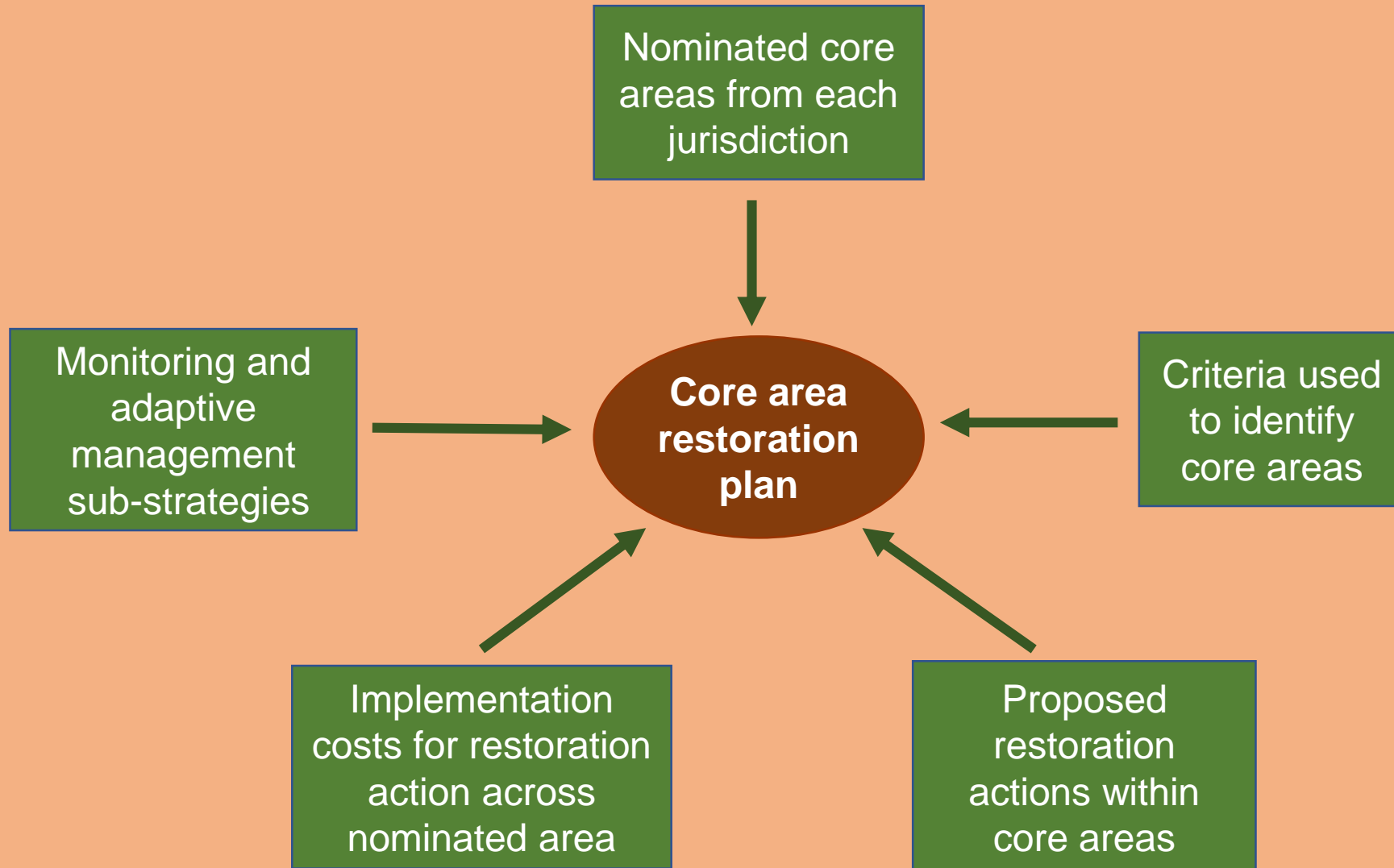
Anticipated components to the plan

- This is a geographic restoration plan relying on nominated core areas from different agencies.
- Nominated core areas will represent about 20% to 30% of whitebark pine's distribution.
 - 20-30% of each unit within an agency.
 - or, 20-30% across units within a region.
- Why 20-30%? More may be difficult logistically and in cost.
- Less will lead to widespread losses in ecosystem function and services.
- Selections will be guided by biological criteria and principles of conservation biology.
- We are breaking new ground.

Vision: Restored forests will serve as dissemination centers



Components to plan



Overview of process



Data Call 1:

Distribution and health status information

Essential core areas in need of restoration and proposed restoration actions are primary inputs to the NWPRP. But not all agencies or units within agencies have equally good distributional information or health status information.

Data Call 1 requests new and updated distributional and health status information, which will be used as follows:

- To fill in distributional gaps, correcting areas where whitebark pine is currently absent;
- To revise the current coarse-scale (1 km²) layer made available to agencies; and
- To develop other layers incorporating health status.

Data Call 1: Data types requested

There are two data types requested:

Spatial layers

- GIS layers of whitebark pine distribution and abundance submitted using GEOTIFF or zipped shapefiles.

Plot data

- Georeferenced plot-based field measurements of whitebark pine abundance and health across its range
- Data submitted using the Hi5DB format (U.S. Forest Service, Rocky Mountain Research Station, High Elevation Five-Needle White Pine Data Base).

Detailed instructions for submitting data and accessing the Hi5DB are available at the following link: <http://whitebarkfound.org/data-call-1/>

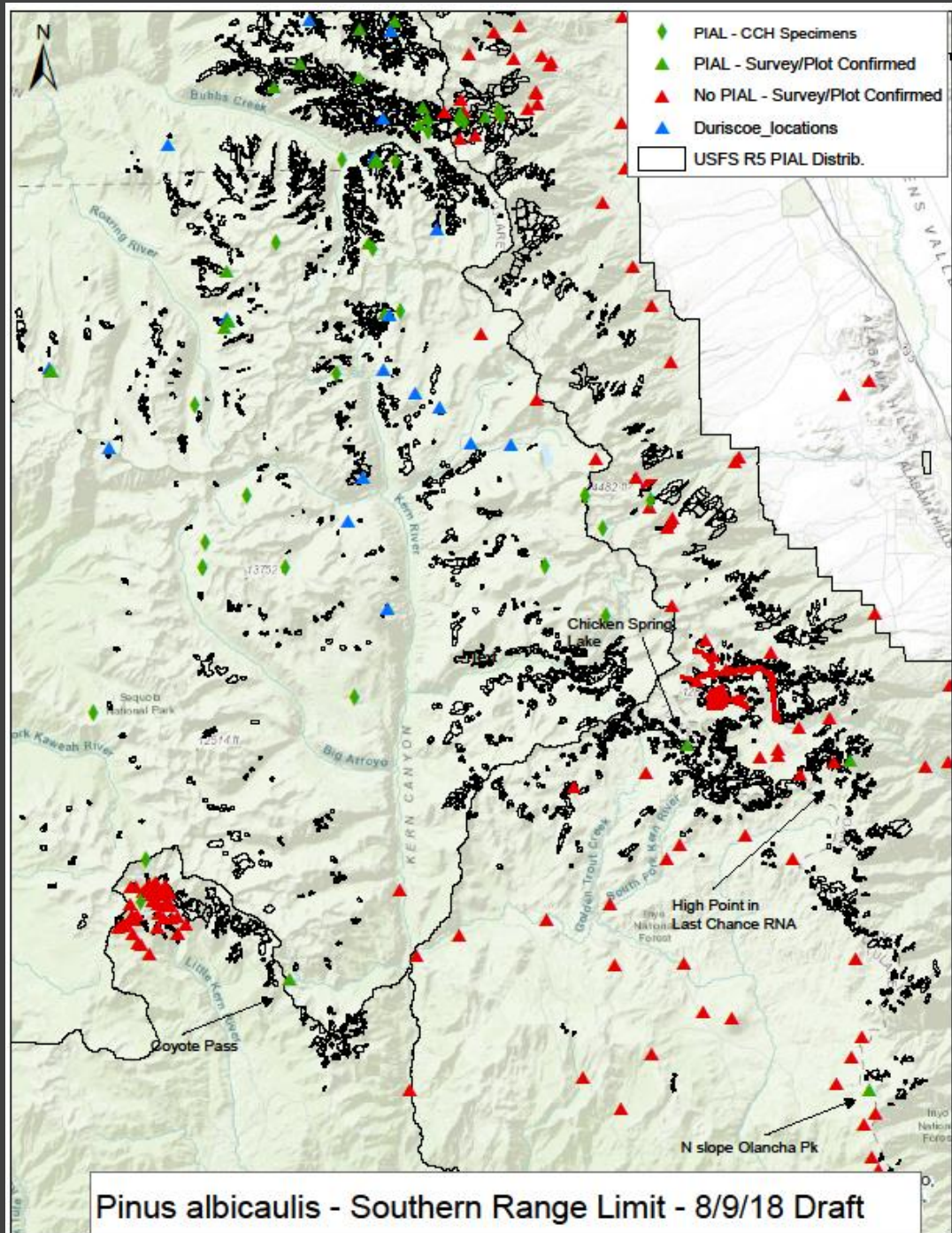
- ❖ Any distributional data that agencies provided the U.S. Fish and Wildlife Service in response to their recent data call has been shared with us.

Target deadline for Data Call 1 was May 15, 2018 but we will accept data through mid-November. Target deadline for a revised map: Dec. 2018.

Example: Region 5, Inyo National Forest

New distributional data from the southernmost end of whitebark pine's range in the Sierra Nevada.

- Provided by Michele Slaton, GIS expert, based in Bishop office.
- Distributional information in south needs ground-truthing by USFS personnel.



Data Call 2A:

Request for core area nominations, criteria, and health status

At the request of the NWPRP Liaison Committee, this data call was divided into two phases:

Data Call 2A

- GIS shapefile of each nominated area polygon.
- Whitebark pine health status for each nominated polygon.
- Criteria used for each polygon nomination.

Target deadline for submission: May, 2019

Data Call 2B

Proposed restoration action(s) for each nominated polygon.

- Estimated implementation costs by area polygon.
- Monitoring and adaptive management sub-strategy for different restoration actions.

Target deadline for submission: December, 2019



USFWS Species Status Assessment Framework

U.S. Fish and Wildlife Service. 2016. USFWS Species Status Assessment Framework: an integrated analytical framework for conservation. Version 4.3 dated August 2016.

This framework guides both the Whitebark Pine Species Status Assessment and, if whitebark pine is listed, the Whitebark Pine Recovery Plan.

- The nomination of core areas should be based on the underlying conservation biology principles now used by the USFWS.
- In addition, the Liaison Committee recommends that nominations reflect biological criteria that pertain to conservation and restoration of whitebark pine.

The 3Rs: Resiliency, redundancy, and representation

- **Resiliency** entails healthy populations with the ability to withstand environmental fluctuations and infrequent disturbance events. Resiliency requires connectivity, demographic, and genetic health of populations.
- **Redundancy** depends on the existence of multiple populations of a species, as well as their resilience, so that a catastrophic event or series of events will not result in extinction.
- **Representation** entails adaptive diversity, which requires conserving populations in all ecological settings. This diversity is maintained through genetic diversity.

These three principles are deemed essential to the long-term viability of species.

Biological criteria for prioritization

- Climate change refugia
- Heads of watersheds (hydrology, protection)
- Successional status
- Connectivity
- High levels of genetic resistance to white pine blister rust
- Mature trees and high cone production
- Genetic diversity
- Most unhealthy
- Most healthy (proactive restoration—building resilience)
- Successional status (late succession)
- Recently burned (planting opportunity)
- High MPB mortality

Support information and guidelines for Data Call 2A

Support information will be available by October 1, 2018, for Data Call 2A at: <http://whitebarkfound.org/nwprp-data-call-2a/>

- Background
- Rationale
- Size and format for core area nominations
- Size and format for health status information
- Application of the 3Rs to core area selection.

Final products: 2020-21

- **Conservation Restoration Management Actions: Best Management Practices summary-WPEF**
- **General Technical Report: National Whitebark Pine Restoration Plan-WPEF**
- **Summary for public outreach-AF**

These products should provide the basis for a strategic prioritized restoration approach for each federal agency and tribal jurisdiction.

- Products signal the initiation of focused restoration action.
- This will include a fund-raising strategy from AF.
- Restoration implementation will still require collaboration, partnerships, and outreach.
- Restoration timeframe 10-15 years.

>>The final products are just the beginning of the real work.



Thanks to

- The NWPRP Liaison Committee for guidance and input.
- Gregg DeNitto, Annalisa Ingegno, Frank Sapio – USFS, R1 Forest Health Protection.
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- Julee Shamhart, Glenda Scott, Rob Mangold, Cyndi Smith – Whitebark Pine Ecosystem Foundation.
- Rebecca Turner, Scott Steen, and numerous staff – American Forests.