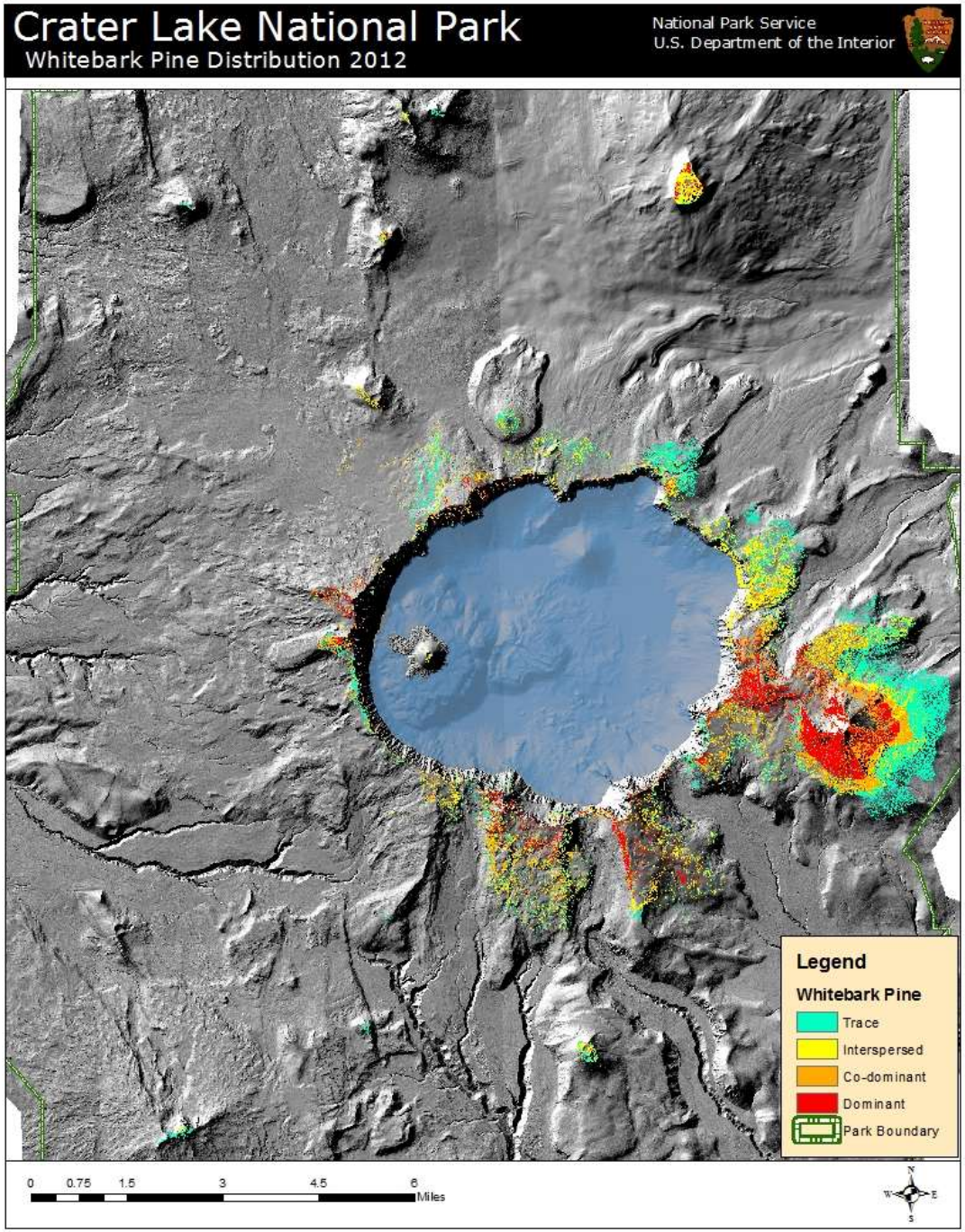
# Crater Lake National Park
# Whitebark Pine Conservation Program

# WBP at CRLA

- Declining for decades
- Blister rust confirmed at CRLA in 1941
- MPB is now the leading mortality agent
- Localized dwarf mistletoe impacts



# Blister Rust Infection Rates

- Murray & Rasmussen - active infection for all trees: 11% (2000)
- NPS Klamath Network -

active & inactive infection for trees > 15 cm DBH:

25% (2009)

- CRLA plots -

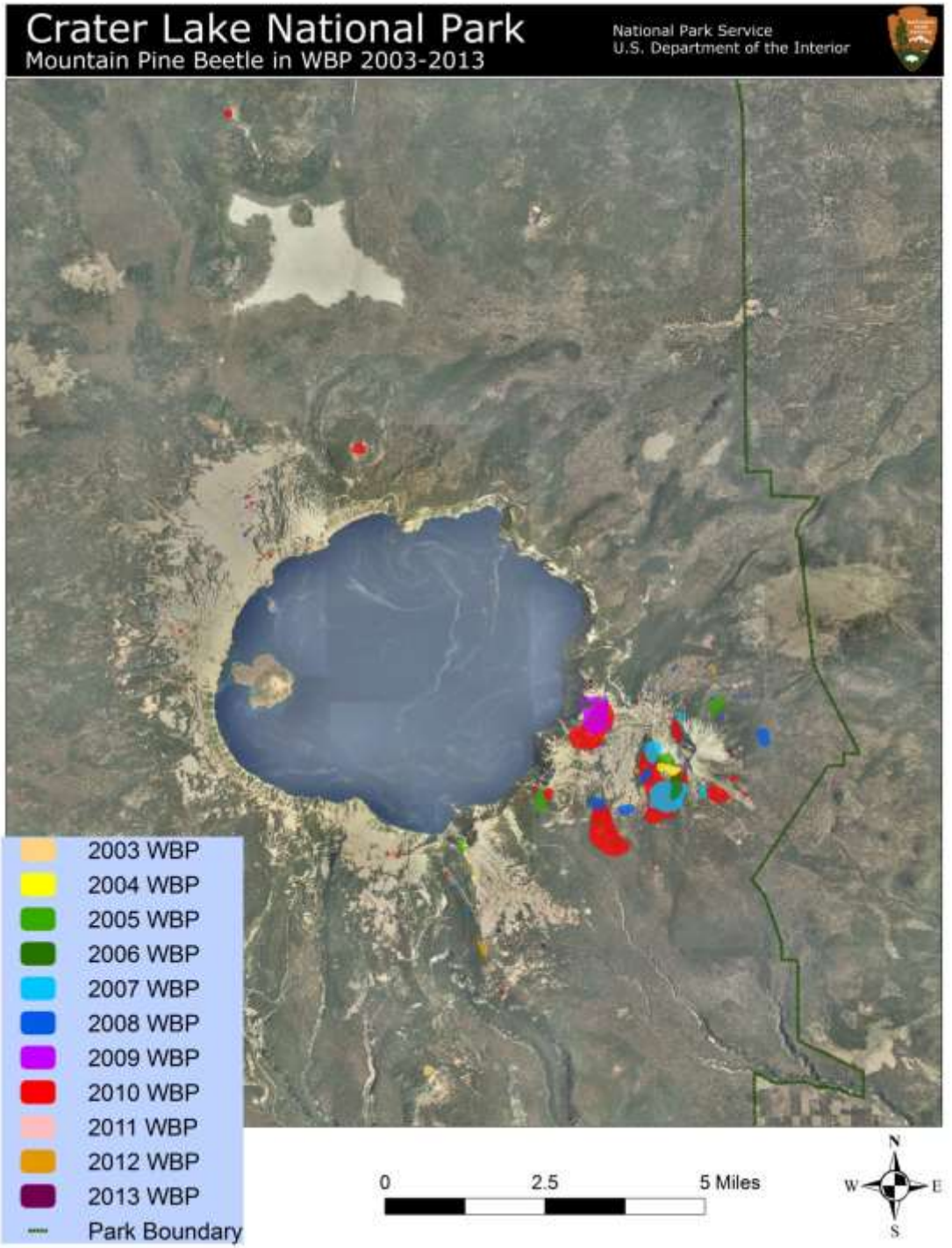
active & inactive infection for trees > 15 cm DBH

12.2% (2003)

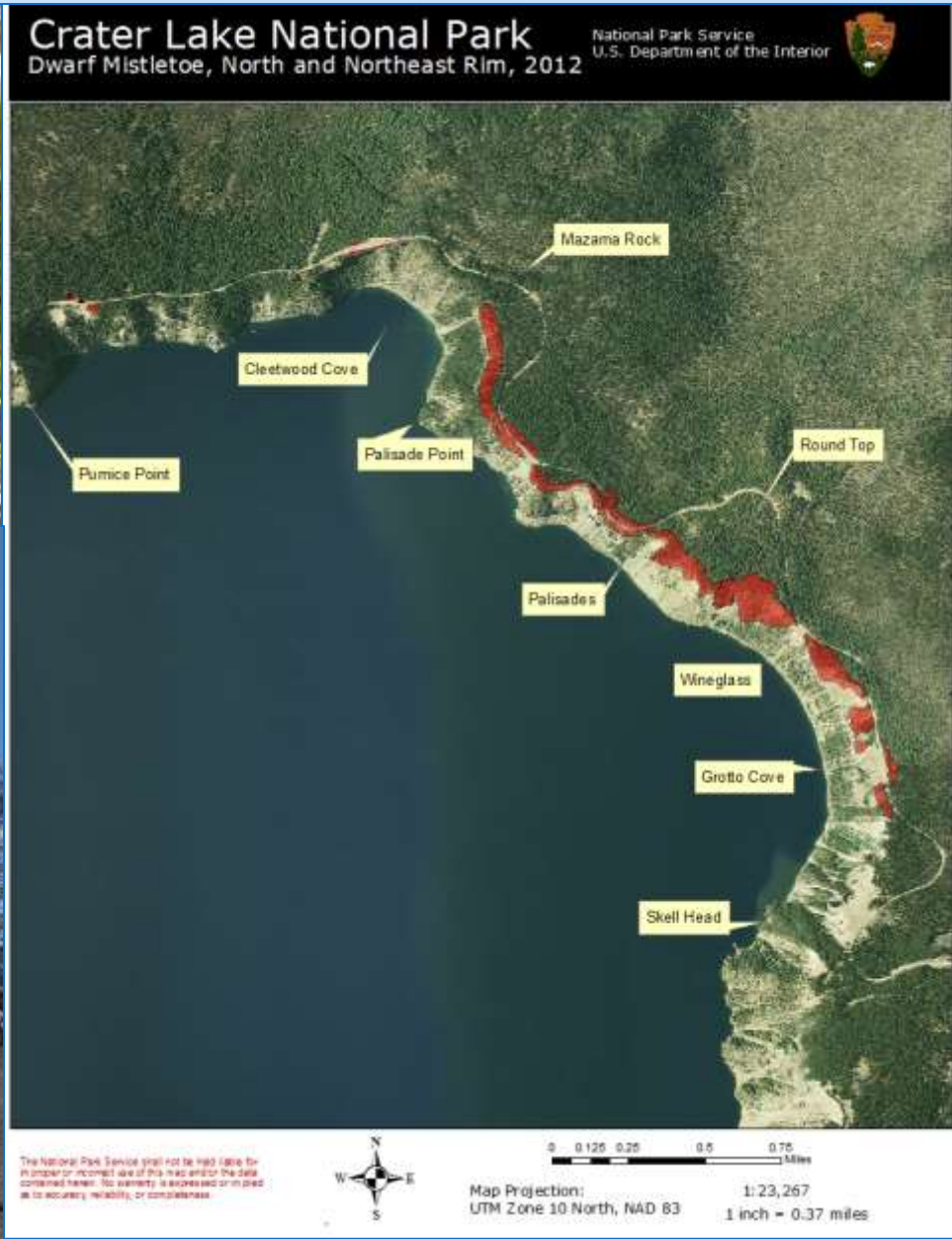
34.6% (2013)

# MPB in WBP

- Now the primary mortality agent in the park's WBP stands
- Attacks were ongoing through 2013



# Dwarf Mistletoe Impacts



# Whitebark Pine Conservation Program

- Program started in 2003
- WBP Conservation Plan (2014)
- Long-term monitoring plots (2 sets)
- Cone collection & blister rust resistance screening
- Restoration plantings (3)
- Collection tree monitoring
- Verbenone application
- “Sensitive” species parkwide
- Research and monitoring
- Outreach

# Goals of CRLA's WPCP

| Range-wide Principles (Keane et al. 2012) | PNW Region-wide Goals (Aubry et al. 2008) | CRLA Goals |
|---|---|---|
| Promote rust resistance | Increase blister rust resistance in whitebark pine populations | Facilitate development of rust resistance in whitebark pine populations |
| Conserve genetic diversity | Protect genetic resources through gene conservation | Protect genetic diversity of whitebark pine through integrated conservation strategies |
| Protect declining seed sources | | Increase resiliency and resistance of whitebark pine communities and facilitate adaptation to climate change |
| Employ restoration treatments | Restore degraded habitat<br><br>Increase our understanding of the threats to whitebark pine and develop practical and effective restoration techniques | Prioritize whitebark pine restoration actions and conduct treatments in areas of highest ecological need |
| | Evaluate the health and status of whitebark pine stands where lacking | Practice adaptive management by incorporating monitoring and research findings into management actions |
| | | Engage the public in whitebark pine conservation through education and outreach |

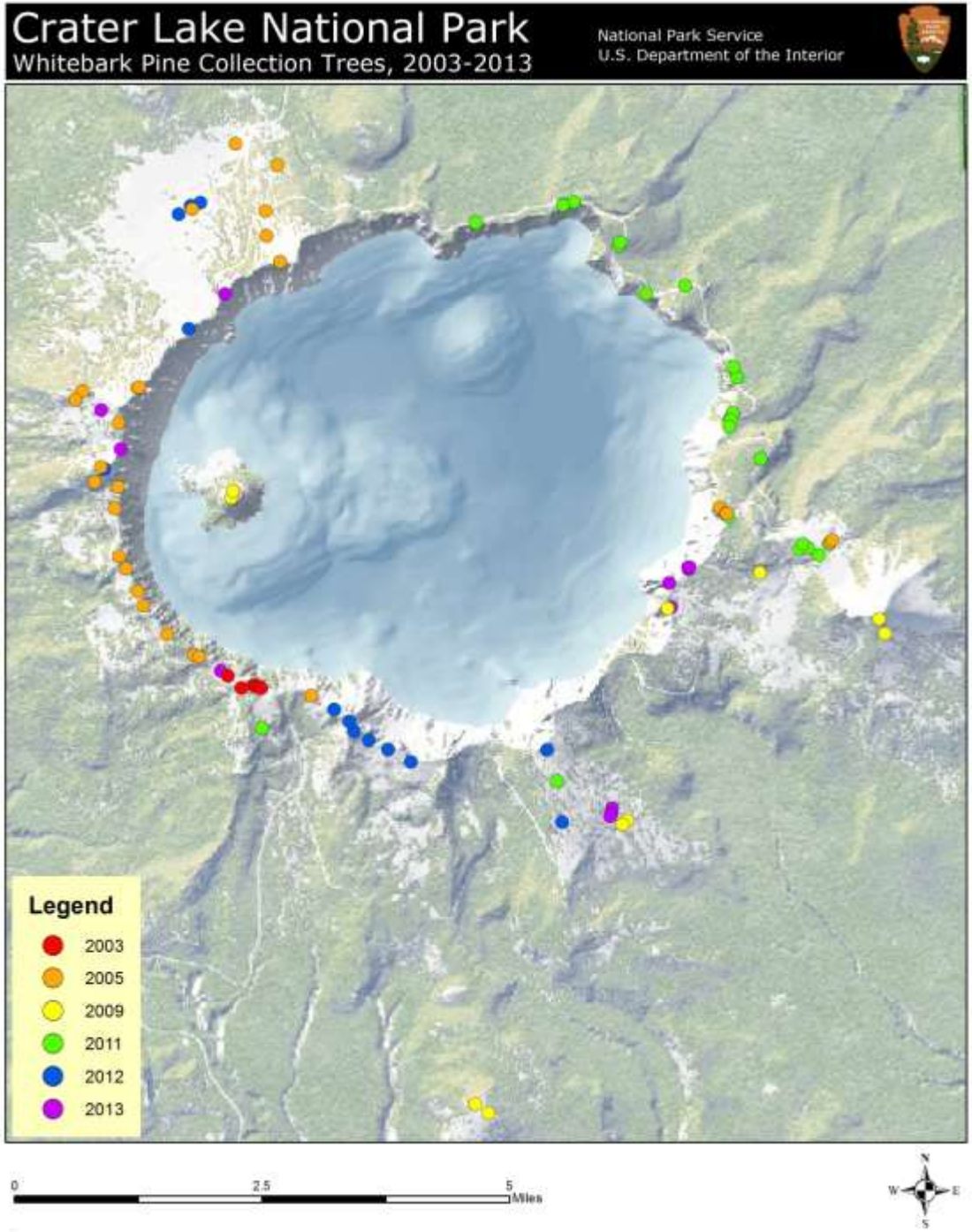
# Blister Rust Resistance Trials

- Send cones to Dorena Genetic Resource Center
- Dorena “grades” our seedlings:  A-F
- 2003 (10); 2005/6 (28); 2009 (11); 2011 (27); 2012 (13);2013 (12)
- Plus, Candidate, Susceptible = Collection trees



# Collection Trees

- 98 trees undergoing trials at Dorena
- 23 Plus trees so far – 22% have been killed by MPB
- Plus/Candidates monitored annually
- Verbenone
- 10/101 trees dead (8 MPB; 2 unk)



# 2009 Restoration Plantings

- Rim Village: 331 seedlings
- Mix of seedlings from Plus and Susceptible trees
  - Survivorship:

    97% (2010)

    91.5% (2011)

    91.2% (2012)

    90.6% (2013)
  - Most mortality due to pocket gopher predation
  - Trampling issues
  - First BR infection in 2013

# 2009 Restoration Plantings

- Horse Trail – 192 seedlings planted in 2009
  - Half treated with with beneficial “endophyte” that may assist with blister rust resistance
  - Inoculation was never proven to be successful – new research will attempt to do this
  - Mix of seedlings from Plus and Susceptible trees
  - Survivorship:
    85% (2010)
    83% (2011)
    79.2% (2012)
    77.6% (2013)
  - Most mortality due to pocket gopher predation

# 2012 Restoration Plantings

- First “wildland” plantings (no watering)
- 416 WBP seedlings planted at Dutton Ridge and North Junction sites
- All areas suffered high WBP overstory mortality
- Overall survival: 88.9% (2013)



# Future Plans

- Continue cone collections, rust screening, and monitoring of Collection trees, long-term plots, & restoration plantings
- WBP “release” treatment
- 2016 restoration planting & spot planting
- Planting of seedlings from FWNF, KNF?