Whitebark Pine Assessment and Restoration in North-Central Rockies National Parks

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Grand Teton National Park
How science and monitoring are conducted in National parks

• In late 1980’s most National Park Service (NPS) scientists became employees of the USGS, the primary research agency in the Department of the Interior. Much research in parks is conducted by USGS Scientists.

• Cooperative Ecosystem Study Units (CESUs) provide a more direct link between parks and universities – through the CESUs the parks solicit proposals for needed research, the CESUs also award small grants.

• Parks also work closely with the US Forest Service Research Stations, and with individual USFS

• Individual park units support and conduct resource surveys, monitoring, and applied research.
Recent Strategies

• In the late 1990’s the NPS identified the need for long term monitoring and assessment in parks – thus the beginning of the *NPS Inventory and Monitoring Program*, each park is a member of one of the 32 networks.
  – Baseline inventory needs were identified and executed
  – Vital Signs Monitoring plans were created to guide monitoring of key resources which would be used to examine the health of the park
  – Protocol development includes NPS, USGS and university scientists.

• *Science Learning Centers* have been established in several parks – these make science and resource monitoring information on member parks readily available to the public. These SLCs have generated interest from additional researchers, as well as citizen science and student groups.
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Blister Rust 1990’s

• In 1997 Kate Kendall reported that in Waterton and Glacier 30-50% of the WBP trees were dead and >50% of the remaining live trees were lethally infected with WPBR.

• Mortality reported in Grand Teton was 7%, infection rate 10-15%. For Yellowstone 7% mortality and 4-5% infection of live trees.
Blister Rust Monitoring 2000+

- GYCC Whitebark Pine Sub-committee
- Interagency Grizzly Bear Study Team
- Greater Yellowstone Inventory and Monitoring Network (GRYN)
- Forest Health Protection
- Montana State University
- Funding provided by the GRYN, GYCC, FHP
- Became the “Greater Yellowstone Whitebark Pine Monitoring Working Group”
Blister Rust

- Monitoring protocol designed with probabilistic sampling to provide inference across the GYE
- Presence of WPBR
- Severity of WPBR
- Now part of Vital Signs Monitoring for GTNP and YNP, sampled across all GYE units with Whitebark
• Infection rates range from 0 to 84 cankers per tree.
• 90% of transects have blister rust
• more than 20% of trees have blister rust
• 84% of cankers are branch cankers

This is overall throughout GYE – conditions in Grand Teton National Park are somewhat different – as might be expected from Kendall’s work.
2007

24 transects
Grand Teton National Park

100% transects infected
45% individual trees infected
Grand Teton National Park transect data n=24 in 2007, n=26 in 2008
Monitoring in Glacier NP

- Surveyed 55 plots (2,181 trees) in 2003-4
- Mortality in whitebark: 45% (Kendall 45%)
- WPBR Infection rate: 54-65% (Kendall 73-79%)
- Crown loss 32% (Kendall 26%)

- This was not an exact duplication of Kendall et al stands, however results are similar in mortality, lower in infection rate, and with increased crown loss as compared to 1997.
Conserving Genetic Diversity

- Collections generally require climbing trees twice to cage and collect cones.
Restoration Efforts in Glacier

- 1998-2000 seed collection and propagation, working with Waterton Lakes, Blackfeet Tribe on both Limber and Whitebark Pine
- 6,000+ seedlings outplanted since 2000
- Funding sources including NPS grants, Forest Health Protection, BAER (burned area emergency rehabilitation), Y2Y-Wilberforce grant partner with Waterton Lakes, Glacier Fund.
- 61 “plus” trees identified and monitored.
Glacier Plus Tree Monitoring

- Plus trees identified and assessed in 2007
- Trees monitored in both 2007 and 2008 showed a doubling of the number of WPBR cankers – both active and inactive cankers.
- Discouraging but informative result
Glacier Seedling Survival Data

- 2001 planting:
  Year 1: 45% Survival
  Year 4: 39% Survival
  Year 5: 34% Survival
- 2002 planting:
  Year 3: 49% Survival
  Year 4: 46% Survival
- 2007 planting:
  Year 1: 71% Survival
Yellowstone Restoration

• Turned road project into learning opportunity for planting and monitoring survival and conditions for WBP seedlings
• Kay Izlar used this site as part of thesis research - provides information that may help guide future restoration plantings
Roads to Research
Yellowstone Dunraven Pass Planting

- 4000 seedlings
- 2-year-old
- Planted along road corridor
- Variety of Sites
- 273 seedlings monitored
- Monitored - June 2007
- 68% survival
Dunraven Seedling Survival was affected by environmental conditions

- Microsite
- Mycorrhizal associates
- Habitat type

From K. Izlar 2008
Laying the foundation for whitebark pine restoration in the NPS Intermountain Region
Grand Teton Restoration

• Protection and seed collection on 10 Plus Trees in Grand Teton, assist with 6 Plus Trees in Yellowstone.
• GIS work for prioritizing sites for restoration and protection in GYE
• Regeneration study to examine distribution and abundance in GYE, influence of fire and burn severity on regen and characterize sites which support regeneration.
• Share information with NPS managers at park and regional level
Getting the Message to Management

• Park managers want reliable information:
  – work with researchers to focus efforts
  – science-based decisions supported by data
• To compete well for funding restoration projects must demonstrate a high likelihood of success and their importance widely recognized.
• Technology transferability from one project to another
Restoration in Parks – can it be?

- Glacier, Grand Teton, and Yellowstone contain no designated wilderness, but most backcountry is proposed or recommended and is MANAGED AS WILDERNESS.
- Poses challenges but not impossibility.
- Restoration of native species is consistent with NPS policy, and with NPS National Wilderness Steering Committee guidance.