



# Whitebark Pine on the Flathead Indian Reservation: Re-evaluating the resource for the 21<sup>st</sup> Century

16 September 2016  
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# Today's menu:

- Some background..
- Why the Confederated Salish and Kootenai Tribes (CSKT) are interested in managing higher elevation forests
- Why research is beginning in many aspects of higher elevation fire regimes
- The cooperative effort between CSKT Forestry and Salish Kootenai College looking at what the state of the Whitebark Pine Resource is...

# CSKT Resource Management Drivers

- Development of a New Forest Management Plan superceding the year 2000 edition
  - Whitebark restoration planning
  - High elevation non-commodity forest management
- CSKT Climate Change Strategic Plan (2013)
  - Planning for climate change impacts
- Strong cultural connection with Whitebark pine (and other 5-needle pines)



09 / 13 / 2006

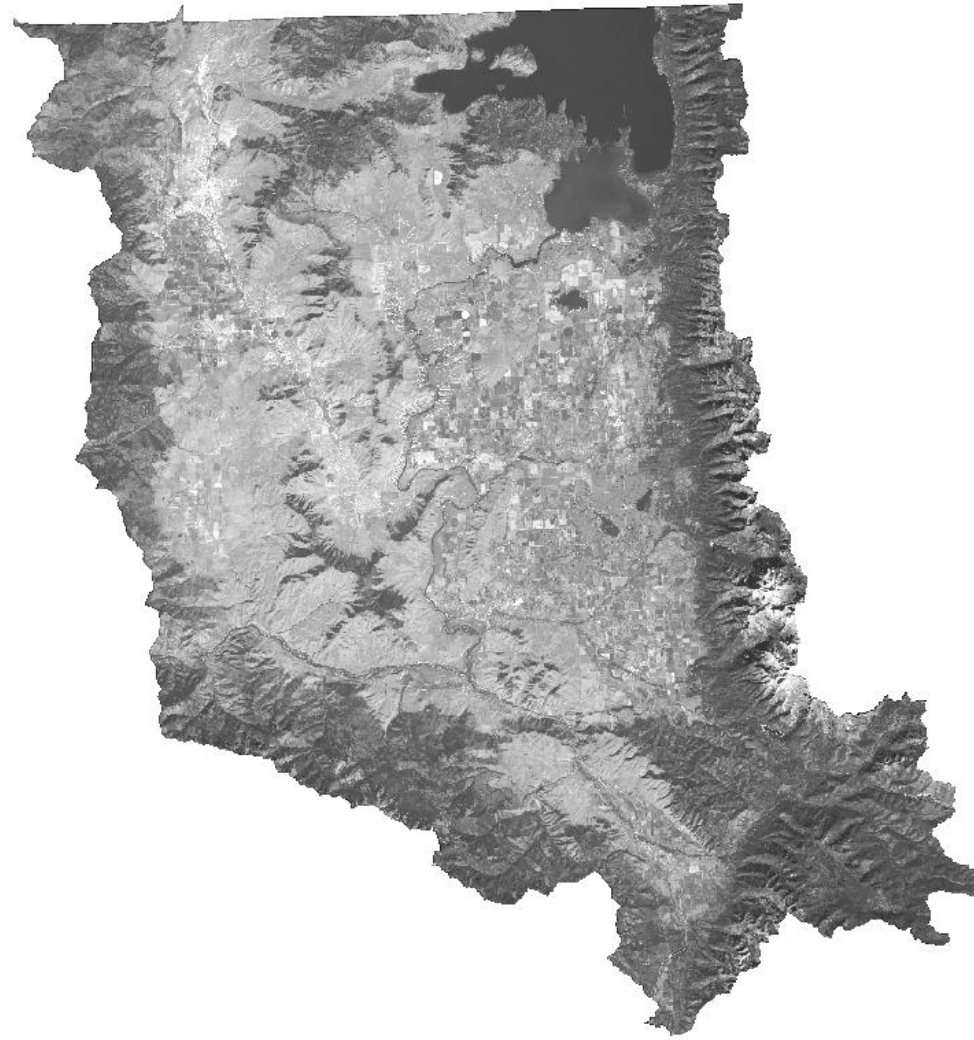




# My drivers:

- There are still unanswered or unaddressed research questions concerning forest and fire ecology in western North American Ecosystems
- Increasing Tribal College student and infrastructure research capacity is gaining prominence as a priority issue at TCU's
- At Salish Kootenai College, we've been increasing student research capacity and skillsets, while addressing research questions, and working to frame these research problems towards providing Tribal Forestry with answers to new management problems

So, what's up?

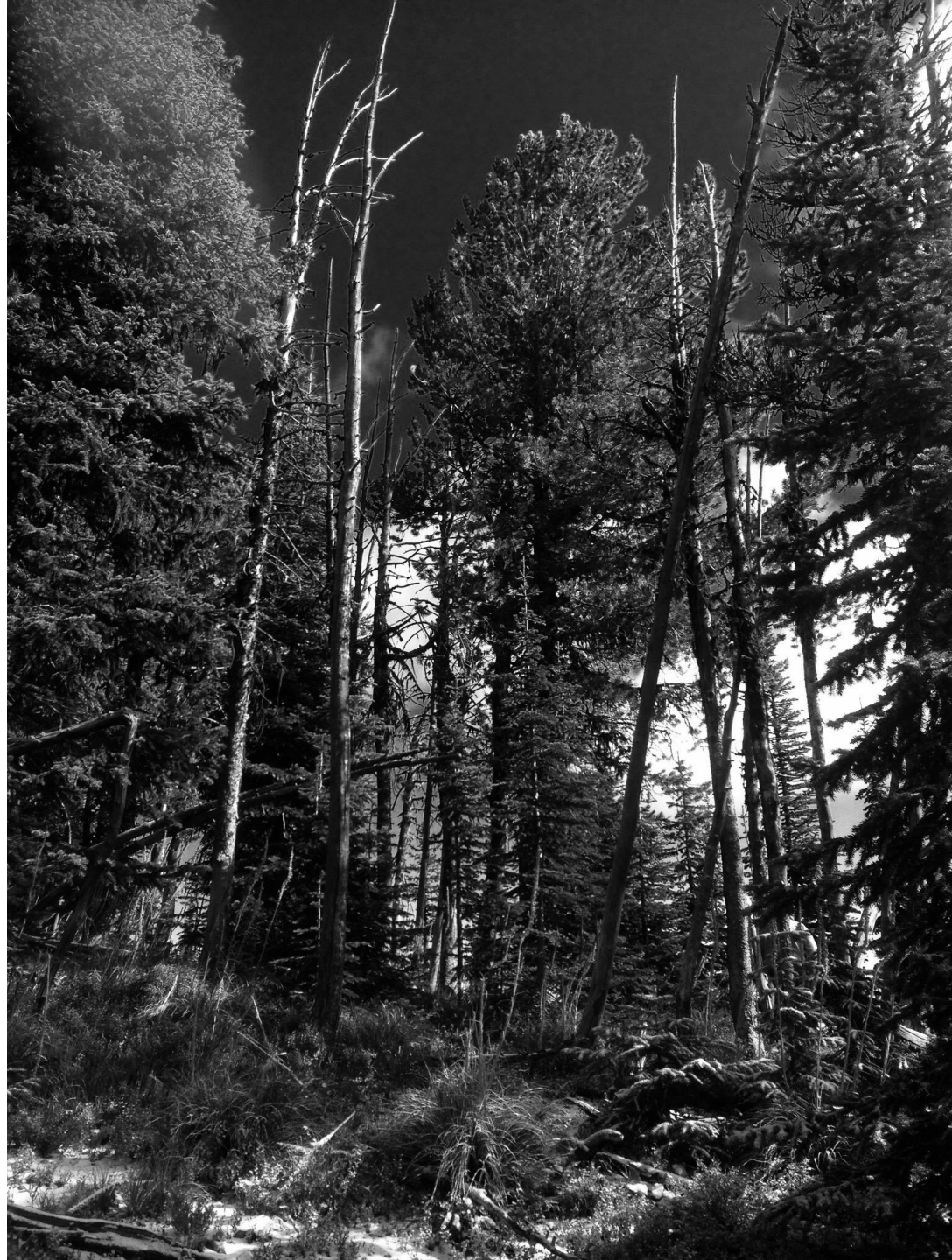


0 5 10 20 Kilometers



# What about Whitebark Pine?

- We know it's a tree species of major concern
  - White pine blister rust
  - Mountain Pine beetle
  - Habitat loss / alteration
  - Population decline(s)
  - Changing climate
  - Suppression practices
  - Wildlife loss
  - Cultural concerns
  - Fire Regimes: very few studies





- There are major management shifts concerning the species
  - Restoration
  - Conservation
  - Non-commodity forest management
- CSKT Forestry is re-writing their 2000 Forest Management Plan
  - More information is needed for the species, and it's timberline forest
  - Higher-profile focus on the species
  - Future management very different...
- Salish Kootenai College Department of Forestry
  - Beginning WBP fire regime research
  - Mimics 2014-15 mixed conifer project (hey...the protocol was in place...)

# Research?

- Not easy to study, comparatively speaking
- Read: rarely studied. Just tough to do!
- Would spatial reconstruction (patch size)) be a question?
- And so it began...

- What kind of fire regimes?
  - WBP is extant in forest types with 3 differing fire regimes
    - Non-lethal surface
    - Spatially and temporally varied mixed severity
    - Lethal





## Lethal...

38" 124' WBP individual, Candidate  
'Plus' tree, Boulder

Segueing from mixed lethality regime  
to lethal regime



# Problem 1: how much WBP is there?

- Aerial photo interpretation from the 1970s indicated roughly 36000 acres
  - No notes, job description, choices appear to be harvest-derived
  - Fails to describe the extent of PIAL in the landscape
  - Interpreter may have had problems with WBP ID (recurring theme...)
- Newer management of non-commodity high-elevation forests called that into question

*Older Information:*

# Flathead Reservation

1,317,438 acres total

## White Bark Pine



WBP Dominant

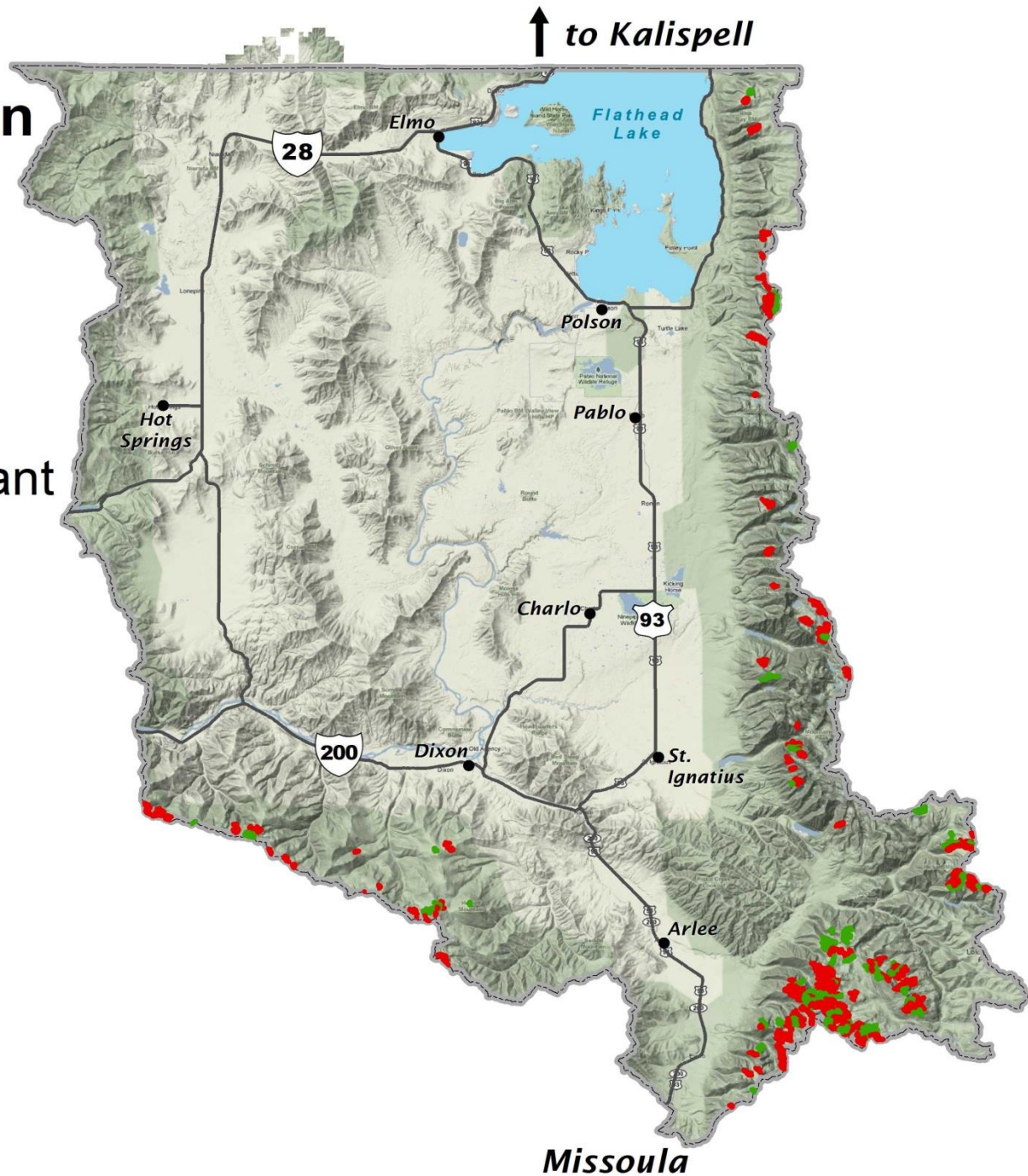


WBP Sub-dominant



0 5 10 20 Miles

0 5 10 20 Kilometers







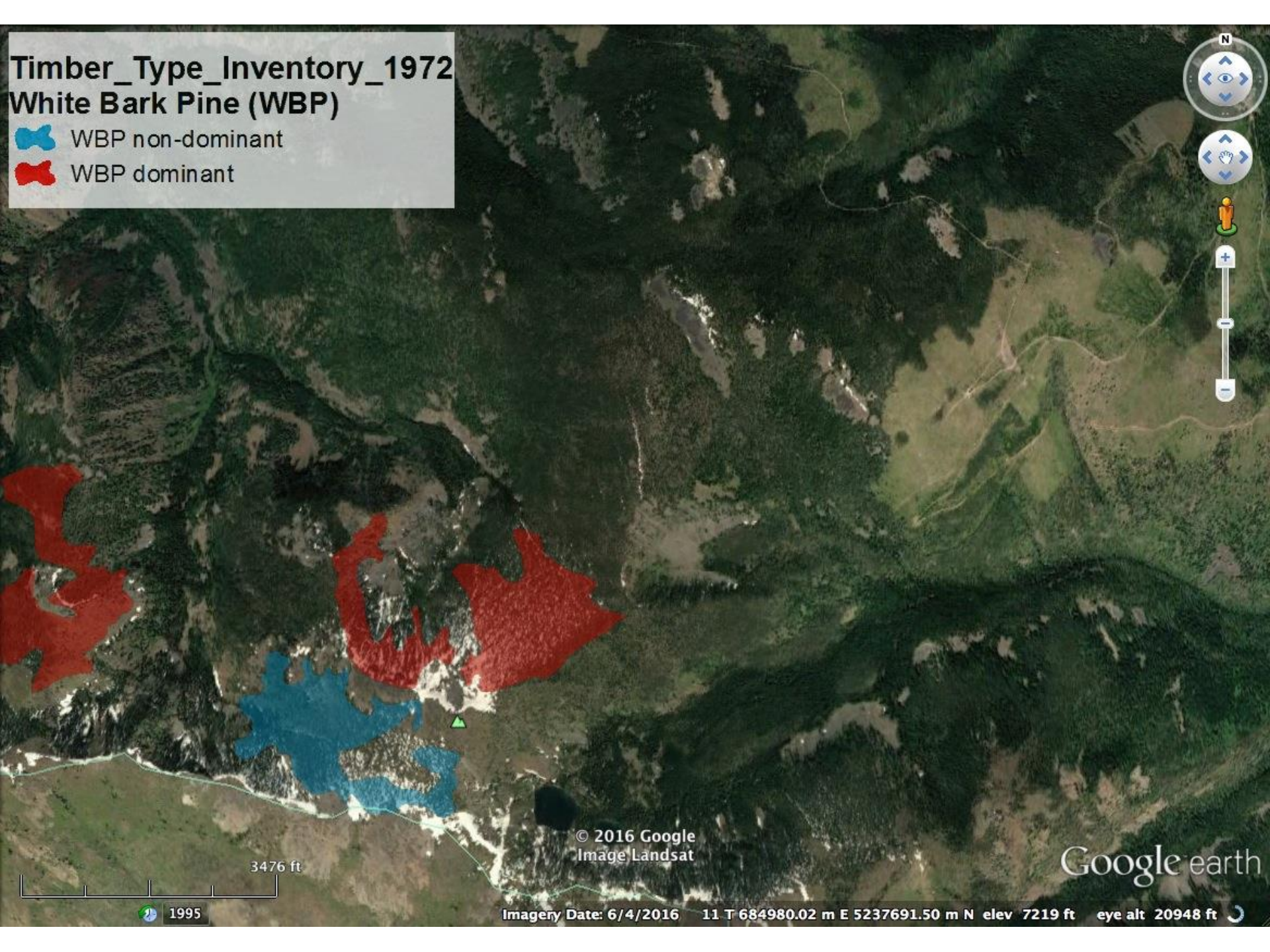
# Big Question: Where's Whitebark?

- Extant data from CSKT Forestry presented to me in in 2013:
  - Roughly 35000 acres (~ 2.6%) of reservation land
- 1972 polygons recognized as not encompassing entire range of tree on FIR
  - There was some question about it
- May reflect many different practices of the time
  - This kind of survey often targeted:
    - Easily identifiable stands
    - Stands that merit harvest targets at the time
    - Stand which lend themselves to entry (distance, engineering, etc.)

# Timber\_Type\_Inventory\_1972

## White Bark Pine (WBP)

-  WBP non-dominant
-  WBP dominant





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Image Landsat

Google earth

# Timber\_Type\_Inventory\_1972

## White Bark Pine (WBP)

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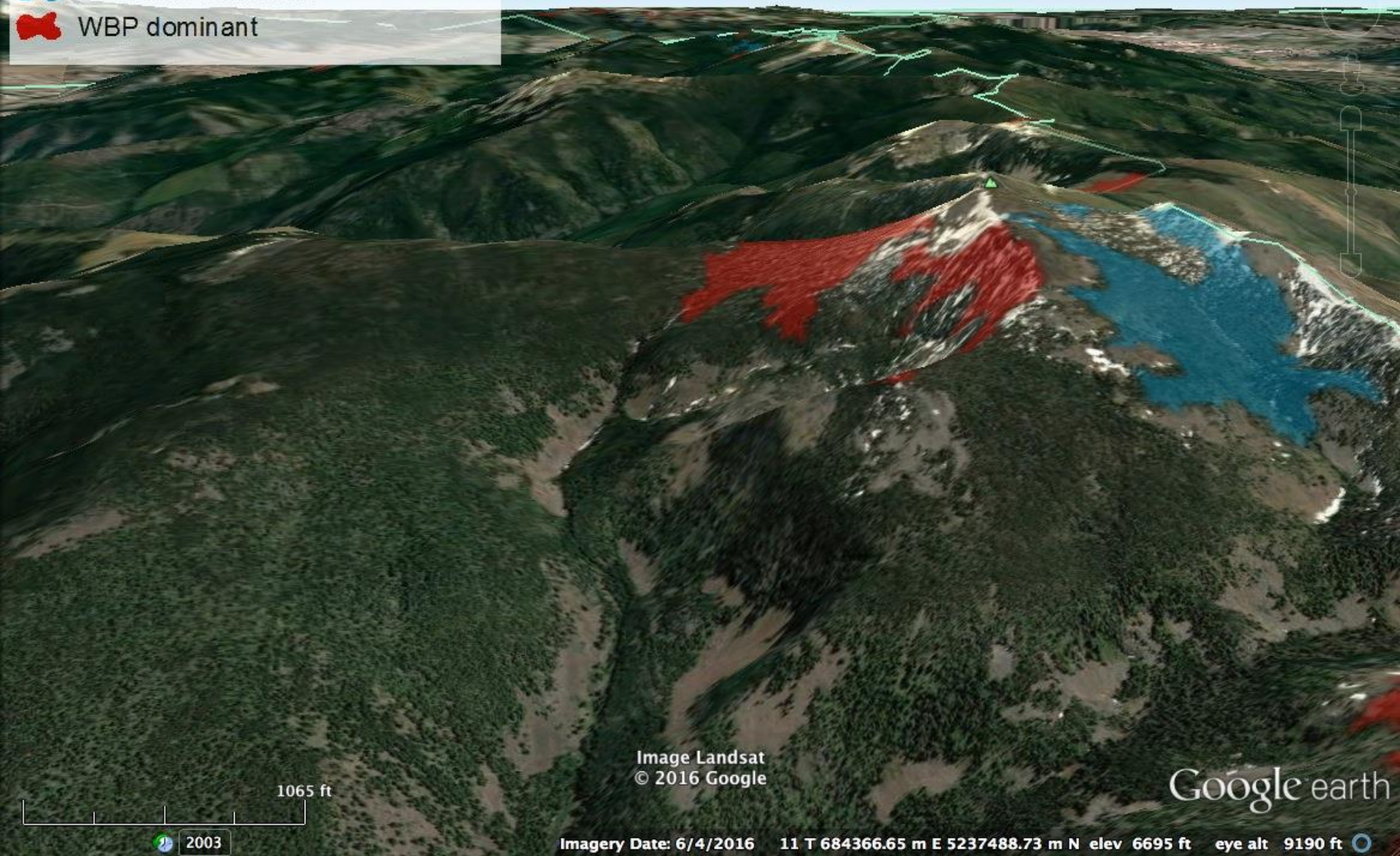


Image Landsat  
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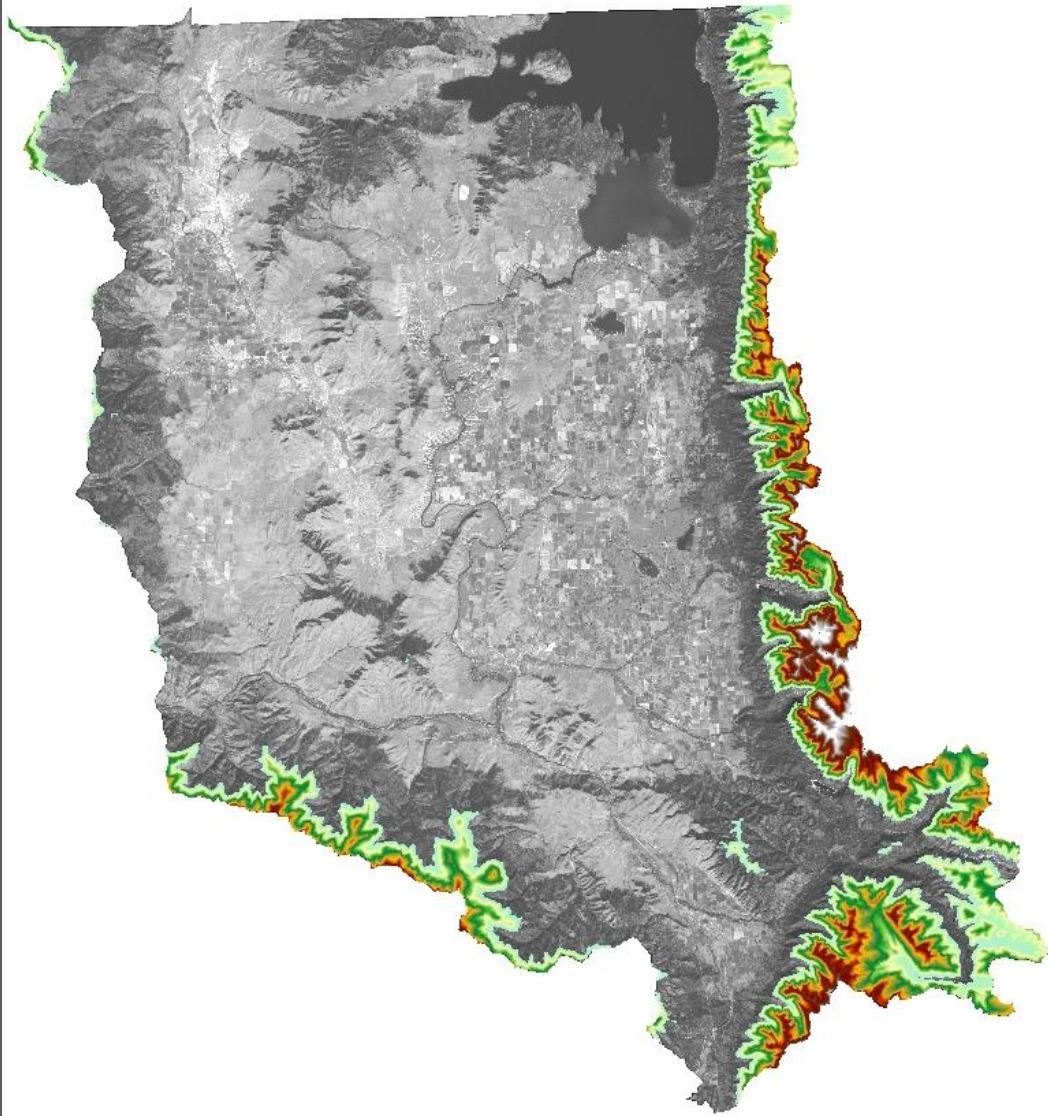
1065 ft  
2003

Imagery Date: 6/4/2016 11 T 684366.65 m E 5237488.73 m N elev 6695 ft eye alt 9190 ft

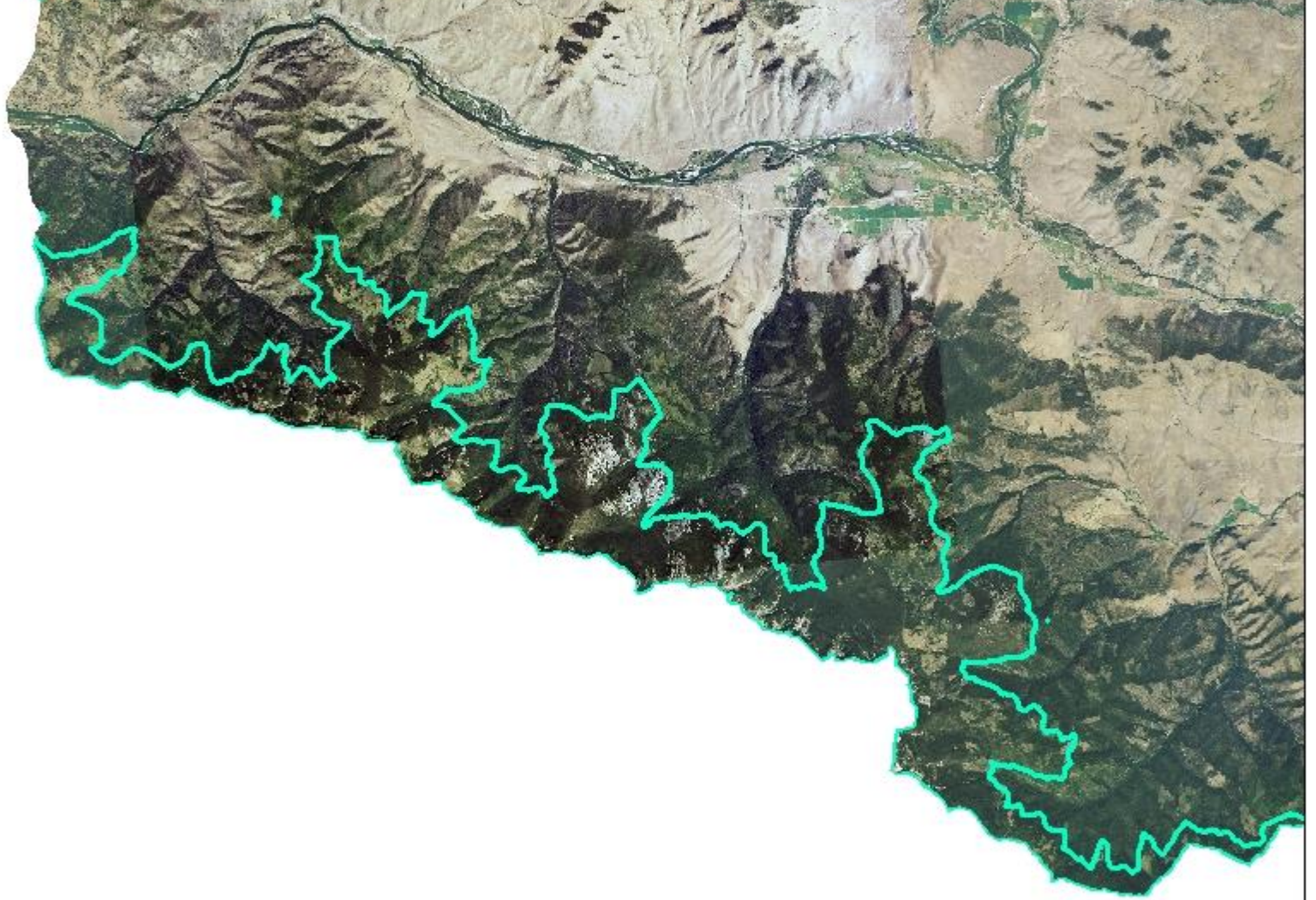
*OK: the old records don't meet the standards needed to develop a sampling protocol*

- What to do to assess where to sample?
  - Go old school: walk around and see
  - Try to develop a predictive model
    - I'm kinda limited to available software and time
      - ARCGIS
      - Noodling time
      - Bored grad students
  - Best Option: BOTH! Walk around and try a model...

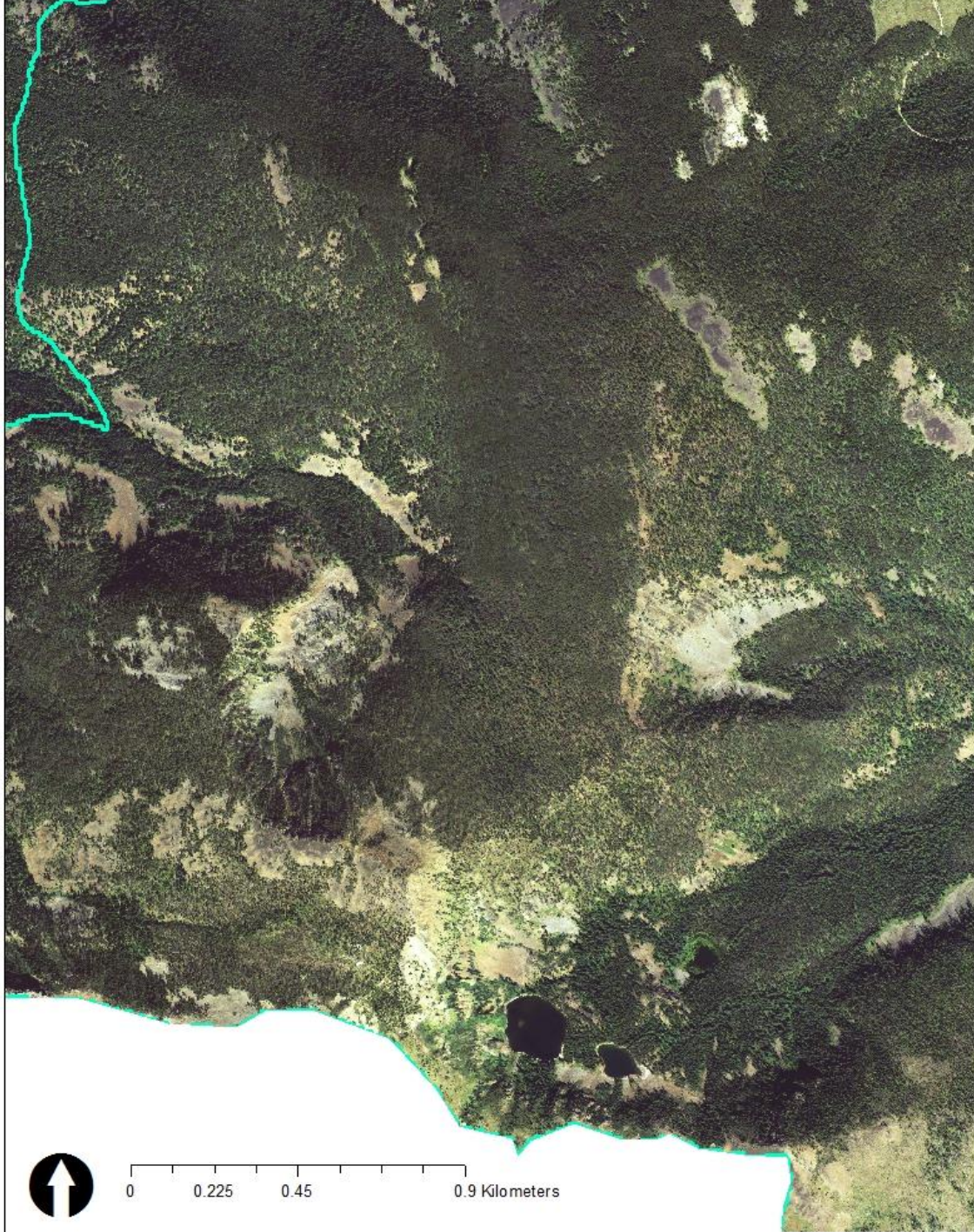
- Walked around first (2014 & 2015)
  - Shown access & known stands by CSKT staff
- Then
  - ARCGIS Spatial Analyst
    - Tweaking an elevation/slope/aspect/etc model of actual species coverage
      - >5900' elevation
      - < 60% slope
      - No bareground-rock
      - Etc – this is changing as new remote sensing becomes available



- Result:
  - WBP projected Coverage above 6000'
  - All three types of fire regimes represented
  - MOST areas confirmed by on-the-ground recon
  - One fail: Pistol Creek
    - +/- too much rainfall
- Estimated acreage:
  - June 2016 Maximum:
  - 173392 acres suitable for WBP
  - Increase from 2.6% of Reservation Lands to 13.1%



0 3.5 7 14 Kilometers





# Problem 2: WBP Sampling

- Access?
  - A lot of 1960's and 1970's salvage roads get close to some forest types
  - Nonlethal hardest to get to...
- Protocol
  - Will follow extant mixed conifer protocols, especially spatial reconstruction
  - 200m grid spacing, tree demography & fire scar dendrochronology
  - Can we get all three fire regimes?
    - Not right off – Nonlethal will have to wait



3 Lakes



Shotgun Snag Lunch -  
Overview site

Image Landsat

1328 ft

Google earth



N

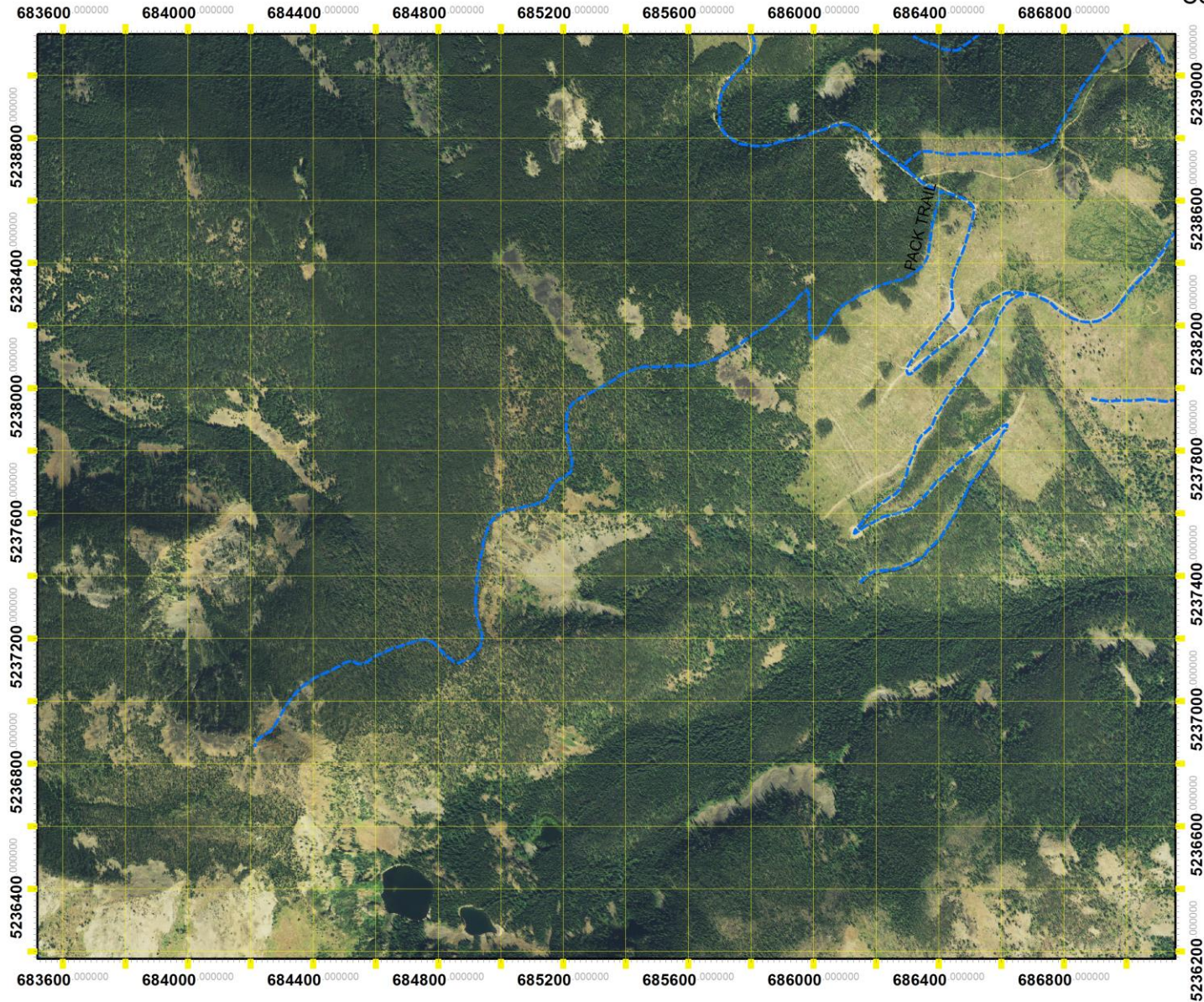
138 ft

1995

Google earth

Imagery Date: 7/23/2013 lat 47.261634° lon -114.560071° elev 7182 ft eye alt 7944 ft





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**Legend**  
--- CSKT\_rds\_Trails











There are older ancient individuals around...





## What's the dynamic?

- There's much more resource than previously thought
- This changes the approach to high-elevation non commodity forests in the future

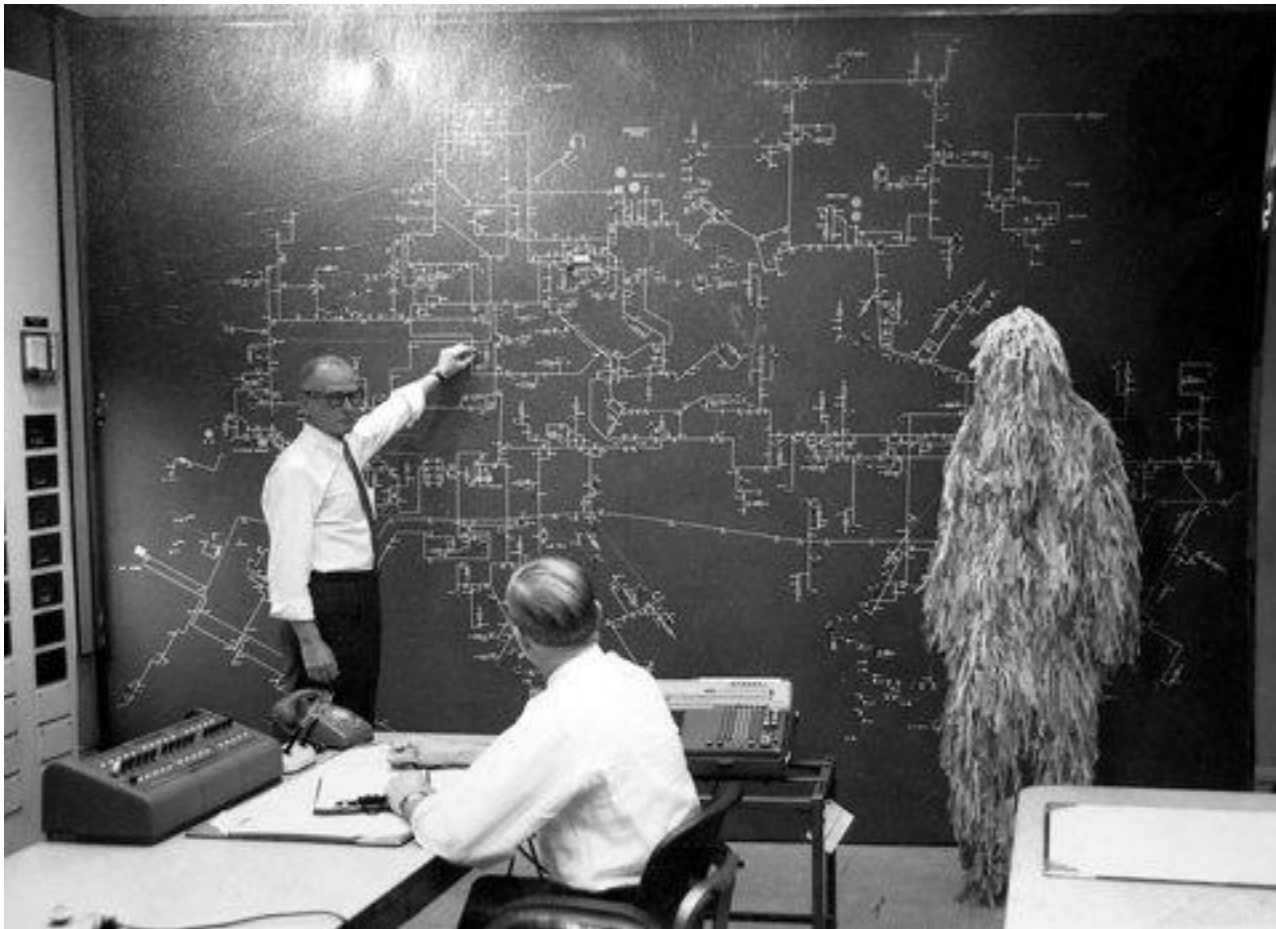


# Next question?

- Depends...
- Model needs refining
- Will need to see how much WBP is actually sampled in 2016
  - FLASH: 2 sites, both with Lethal & Mixed Severity Regimes: Three Lakes Peak & Boulder Creek (almost finished!
  - Additional funds are out there...
  - Overall: it's critical to backstop active restoration efforts with solid fire ecology and fire history data – that's the way I'd like to see SKC carry the research – use the unique forest resource

# Grants/Cooperators

- USDA-NIFA Tribal Colleges Research Grant “Collaborative Research: Multi-scale reconstructions of human-climate-fire interactions in mixed conifer forests of the Northern Rockies”
- USDA-NIFA Tribal Colleges Research Grant “Collaborative Research: Reconstructing climate and fire-driven ecological effects on a keystone subalpine tree species: Whitebark Pine (*Pinus albicaulis*)”
- NSF-GSS Grant “Collaborative Research: Climate, fire, and people: Implications of ancient and recent forest management for future forests of the northwestern U.S
- Greg Peterson, USGS
- Dave McWethy, MSU
- Emily Heyerdahl, RMRS Fire Lab
- Tribal agencies:
  - CSKT Tribal Forestry
  - CSKT Natural Resources
  - CSKT EPA
  - CSKT Cultural Heritage Preservation
  - Salish Kootenai College
  - Tribal Elder Committees
  - Tribal Council



Thanks:

- CSKT Forestry
- Tony Harwood, Jim Steele & Ron Swaney