

The image shows a vast landscape with a dense, dark green forest covering the lower slopes of a mountain. In the background, several jagged, rocky mountain peaks rise against a clear blue sky. Some of the peaks have patches of snow or light-colored rock. The text "Options for managing Douglas-fir beetle" is overlaid in the center of the image in a bold, yellow font.

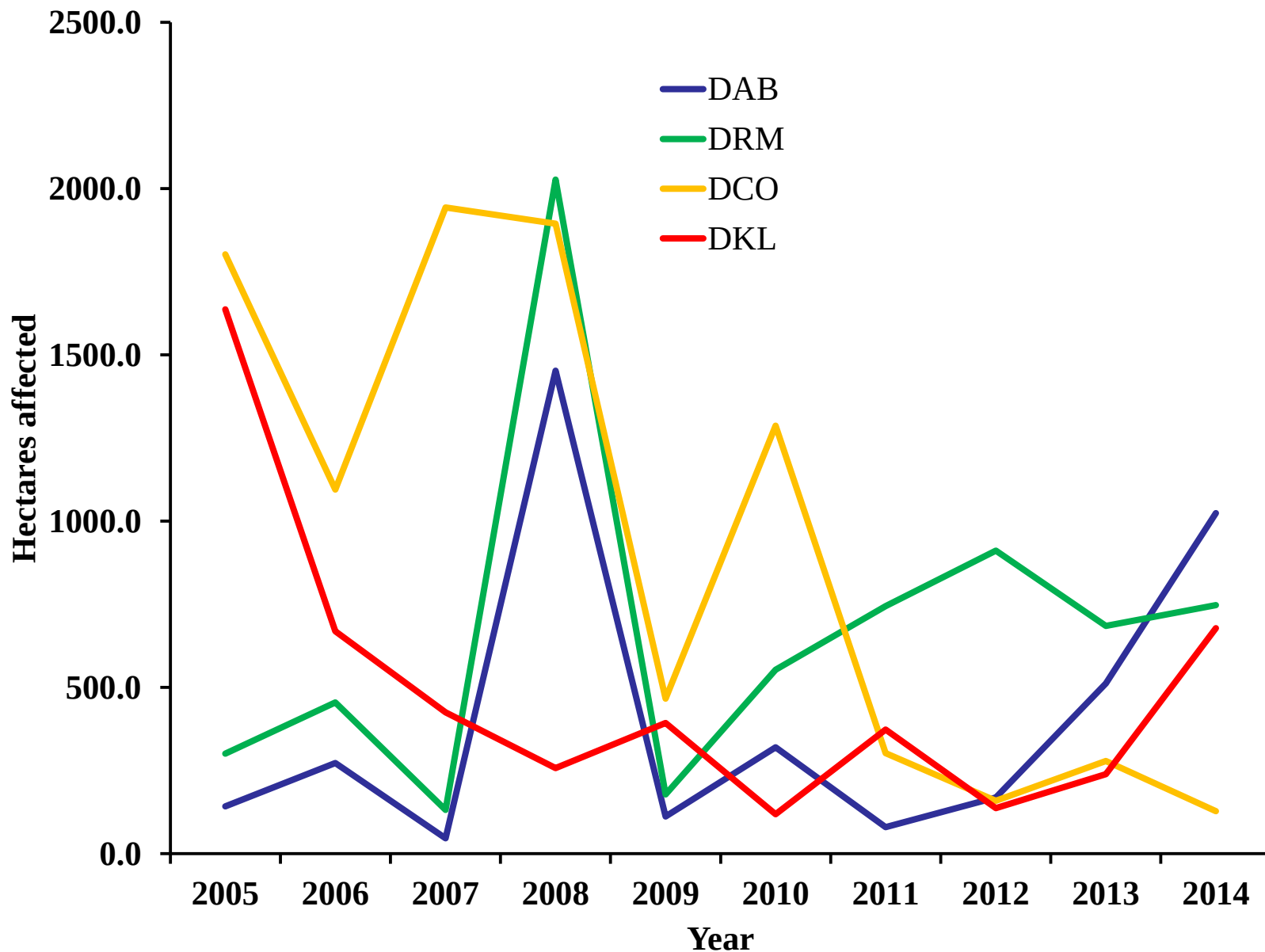
Options for managing Douglas-fir beetle

An aerial photograph of a dense forest. Most trees are green, but there are several trees with orange and brown foliage, indicating autumn. The word "Agenda" is written in yellow text at the top center.

Agenda

- **Aerial survey results**
- **Life cycle, population dynamics**
- **Ground surveys**
- **Management Options**

Douglas-fir beetle ha affected, by old districts, RKB overview, 2005-2014



Douglas-fir beetle life cycle

- *Dendroctonus pseudotsugae* Hopk.
- Overwinters as (mostly) young adults, some mature larvae (20%)
- Overwintering larvae emerge later in summer.
- Flight begins in early May (April), continues through July (August)
- Ambient temperature $\geq 18^{\circ}$
- Preferred host is recently moribund material

Endemic populations

Then:

- **Widely scattered small spots**
- **1-5 trees centered around recent disturbance**
- **Windthrow, lightning, root disease, drought**

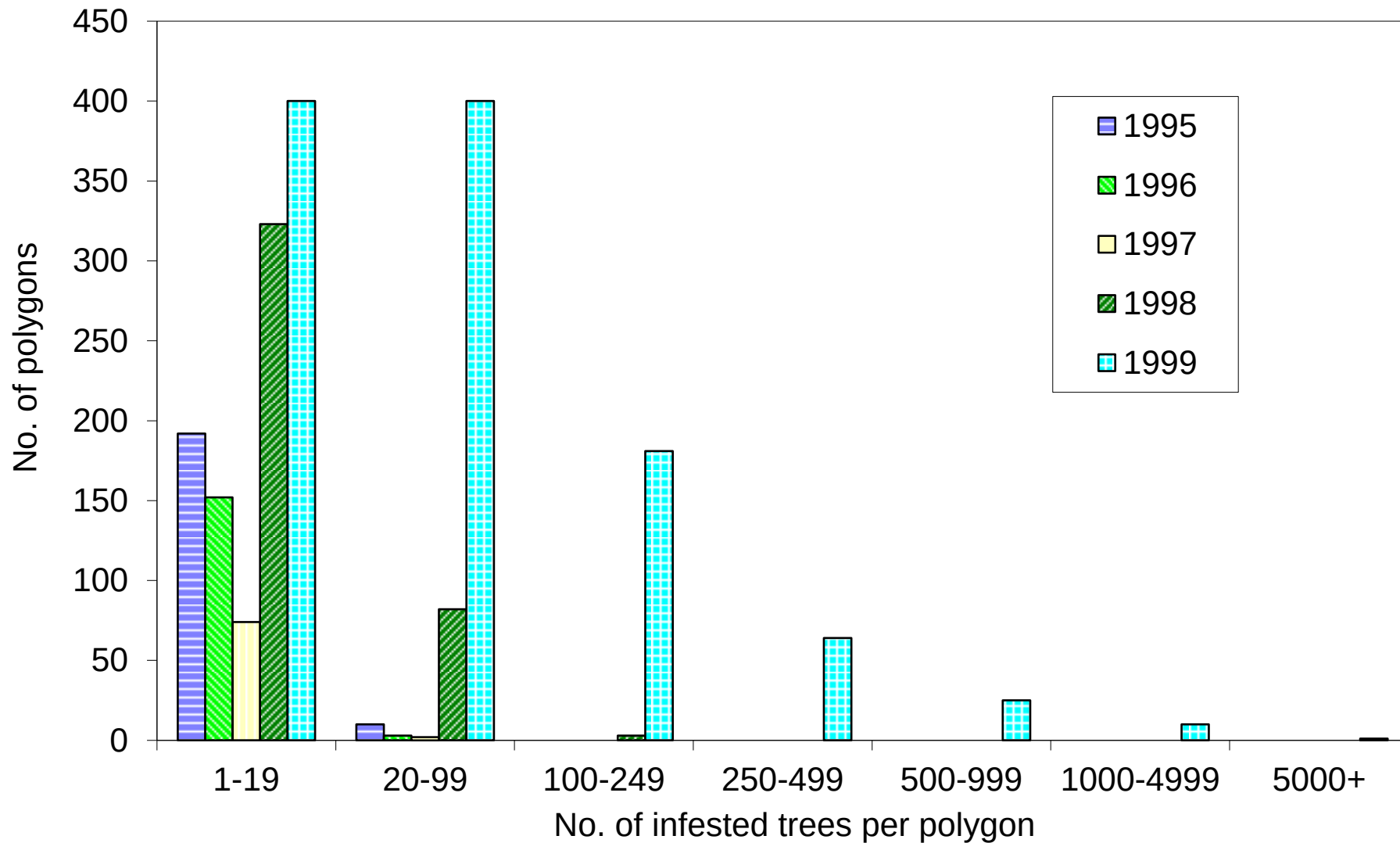
Now:

- **As above, but also dry rocky sites and rich wetter sites, with high levels of cumulative damage.
Therefore, high background population levels.**

Epidemic populations

- Population buildup usually follows large accumulations of windthrow, snow events, logging debris, **fire damaged trees**
- Subsequent attack on standing trees generally targets larger, older trees
- Duration of attack cycle
 - Possibly 6-10 years in south-east BC, 5 years in central BC.

Number and size of Douglas-fir beetle infestation polygons, Idaho Panhandle National Forest, 1995-1999



Drought kill and DFB, Kalamalka Lake



Ground surveys



Ground survey issues - 1

- **Success of DFB cannot be determined with great accuracy from the ground.**
 - Of trees with frass on the bole, 88% will be successfully attacked.
 - Only 30 % of trees will have attack at DBH (except that % appears to be higher in IDF vs ICH?).
 - attack is best estimated using frass above 2 m, and considering woodborers at dbh as indicators.
- **Look up for pitch streams, frass.**
- **Aug-Sept is better:** More frass is more visible.

Ground survey issues - 2

- **“Pouch fungus” at entrance holes.**
 - Commonly occurs in the March following attack in the interior wet belt of south-east BC. Commonly occurs 1 or 2 years following attack in the dry east Kootenays.
 - **Distance of new attack from previous year attack centres:**
 - Unpredictable, 50 – 200 m away in south-east BC, seldom farther than 50 m away in central BC
- OR**
- Reduced dispersal may occur as population vigour declines. Use grid surveys to estimate populations.

Ground survey issues - 3

- **Double attacks are “common”.**
 - Attack at midbole is difficult to see from the ground, these trees will die, and may (often?) sustain a later attack that fills up available bark surface area.
 - This may be a symptom of declining population vigour.

Management Options - Harvesting

- **Harvest infested trees (tree baits).**
 - **Low stumps (peel or burn?).**
 - **Avoid damage to residual trees.**
 - **Remove infested debris, no long butting.**
 - **Hot mill if appropriate.**

Management Options – Trap trees

- Large
- Healthy
- Shaded
- Unlimbed
- Unbucked
- (Decks)
- Can saturate
- Spillover
- ♀ (♂)



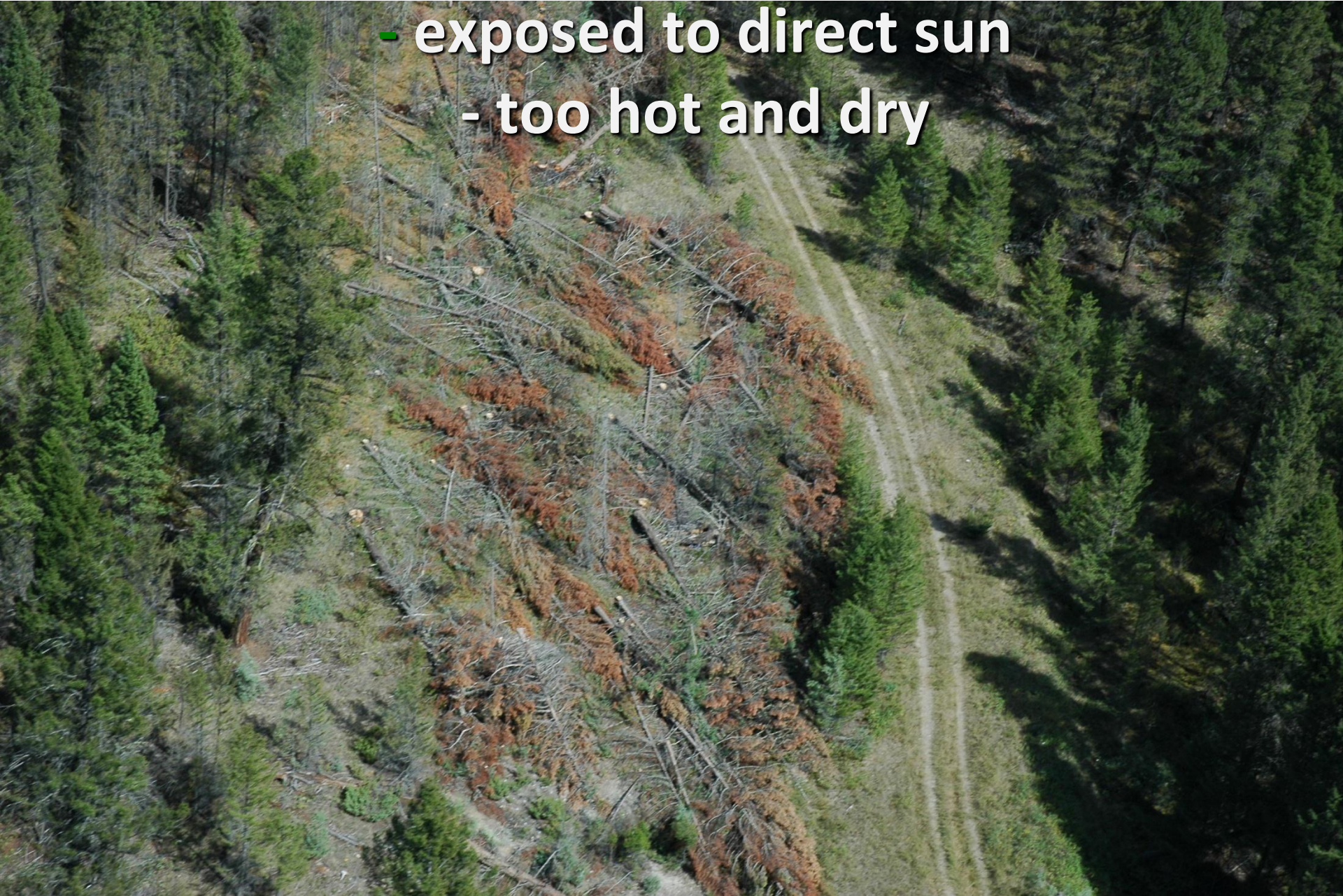
Good Trap Tree Site

- Fall in shade
- One trap tree for every four current attack
- Pre-fell skid trails or landings
- Max radius 400m



Poor Trap Tree Site

- exposed to direct sun
- too hot and dry



Management Options – Funnel trapping

- 100m from live Fd
- Maintain bi-weekly
- New baits in mid-June (?)
- Mostly males
- Can run all summer



Management Options – Repellent (MCH)

- High value trees or stands (blowdown).
- Easy to apply, effective.



Management Summary

- **Harvest**
- **Trap trees**
 - Most effective in reducing DFB population
 - Least cost
 - Fall Douglas-fir in spring & harvest them in fall / winter
- **Funnel traps**
 - Time commitment to maintain during the summer
 - Use to reduce DFB populations if inoperable (i.e. too steep, too expensive to harvest, poor wood quality)
- **Repellents**
 - Use on private land or seed trees in UWR
 - Minimal cost
 - Reduced risk of losing high value Douglas-fir

Planning

- **Felling trap trees – March 28 to April 15**
- **Deploying repellents – April 4 to 15**
- **Deploying funnel traps – April 11 to 15**
- **Maintaining funnel traps – April to August**
- **Harvesting beetle attacked trees – fall/winter**
- **Repeat**



?s