Leafminers in Alaskan birch

Stephen J.Burr, USDA, Forest Service, Forest Health Protection

Three European sawfly species (Hymenoptera: Tenthredinidae), the birch leafminer (*Fenusa pusilla*), the late birch leaf edgeminer (*Heterarthrus nemoratus*) and the amber-marked birch leafminer (*Profenusa thomsoni*) are infesting birch in the Interior, Southcentral, and Southeast Alaska. The yellowing "blotches" on birch leaves are produced by feeding larvae. Eggs are oviposited in slits on leaves and, once hatched, larvae feed inside leaves, creating expanding blotches. Evidence of feeding becomes prominent at the end of July/beginning of August. Surveys conducted in the Alaska Interior road system this summer indicate that leafminers are prominently located in and around the cities of Fairbanks and North Pole.

Efforts have been made to reduce sawfly populations. Stingless parasitoid wasps (*Lathrolestes thomsoni*), native to North America and known to attack leafminers, have been released in Alaska. Efforts are now underway to determine the extent of establishment of this parasitoid species and to determine the impact (if any) it is having on leafminer populations. Even if parasitoids are successful in reducing leafminer populations, it is unlikely to remove this insect from the Alaska landscape. Once an invasive species becomes established in a new system it is extremely difficult to eradicate it completely.

Defoliating insects can disrupt a tree's ability to conduct photosynthesis, and stressed trees are more susceptible to additional insects and pathogens, but to date no birch mortality has been recorded in Alaska because of these insects. The lack of mortality is likely due to the relatively late occurrence of leafminer damage during the growing season. Losses in net photosynthesis rates in August are likely mitigated by large amounts of photosynthesis occurring during long daylight hours earlier in the season.

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Stephen J. Burr
Entomologist, FHP

Invasive Birch leafminers

Sawflies (Hymenoptera:Tenthredinidae)

<u>3 species in Alaska</u>

- Amber-marked birch leafminer (*Profenusa thomsoni*)
- Late birch leaf edgeminer (*Heterarthrus nemoratus*)
- Birch leafminer (*Fenusa pumila*)

Digweed *et al.* 2009

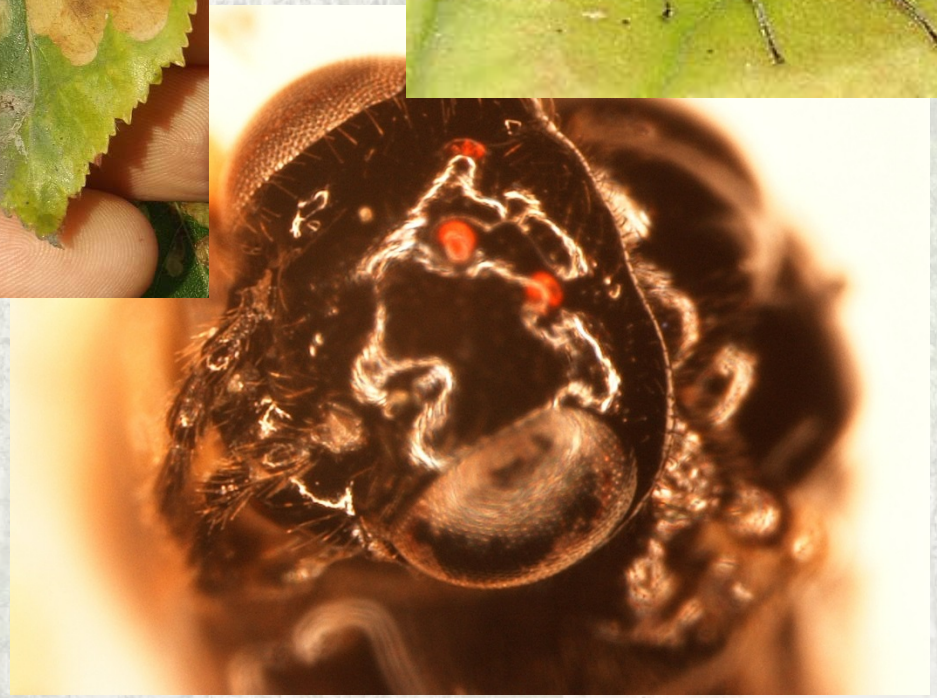
Introduction to Alaska

Invasive birch leaf miners

- Native to Europe
- Feed on all Birch species in AK
- 5 species in North America
- 3 species in Alaska
- Discovered in Haines in 1991
- High density in Anchorage 2003-2006

Amber-marked birch leafminer (AMBLM)

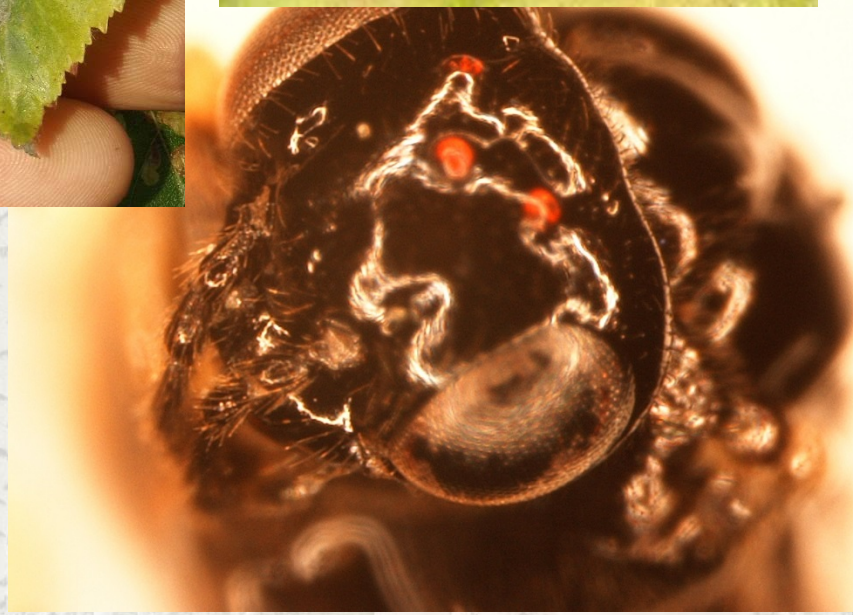
- Parthenogenesis
- Univoltine
- Activity: temperature and moisture dependent



Amber-marked birch leafminer (AMBLM)

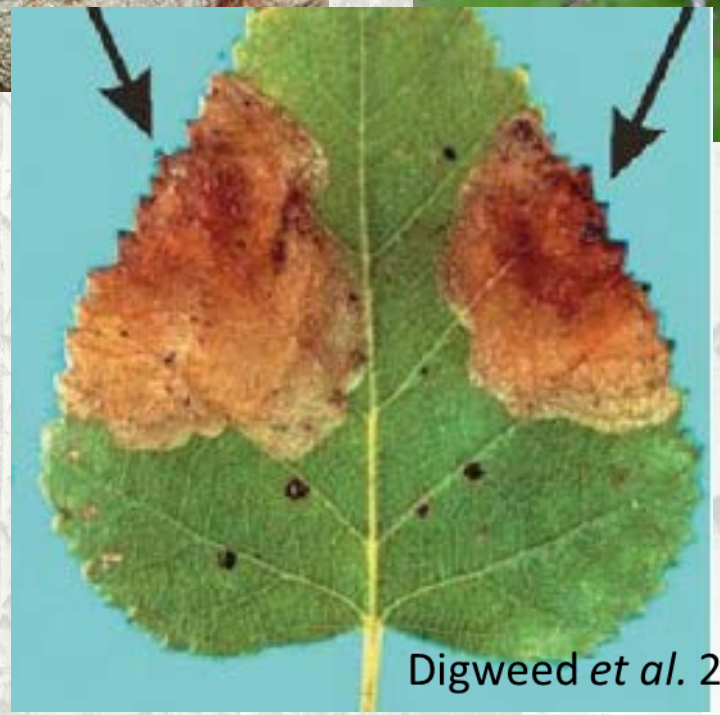
<u>Biology</u>

- 1-20 eggs/leaf
- Requires 5.3 cm^2 of leaf area
- Feeds in palisade layer
- 6 instars (5 feeding)
- Overwinters in duff layer



Late birch leaf edgeminer

- Parthenogenesis
- Univoltine
- Feeds in palisade layer
- 6 instars (5 feeding)
- Overwinters in leaf



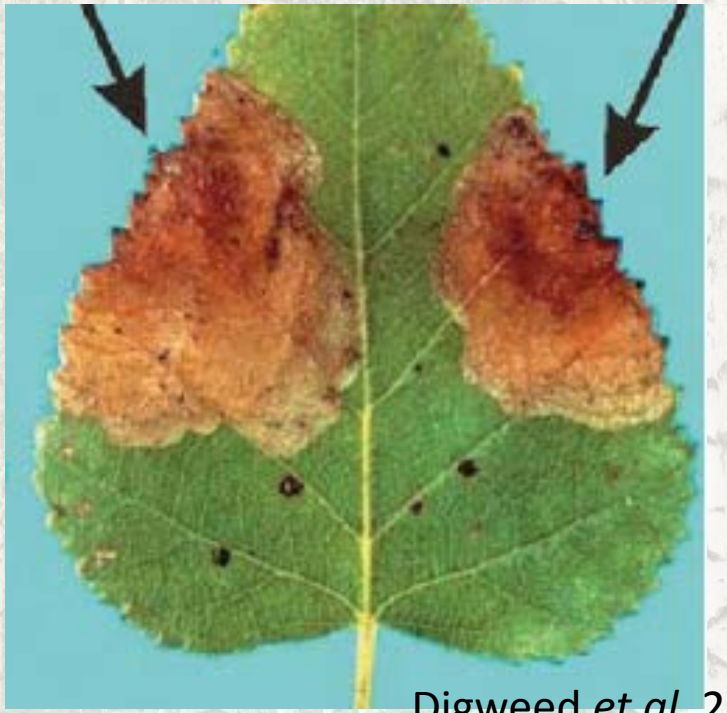
Digweed *et al.* 2009

Compare

Amber-marked birch leafminer

Digweed *et al.* 2009

Late birch leaf edgeminer



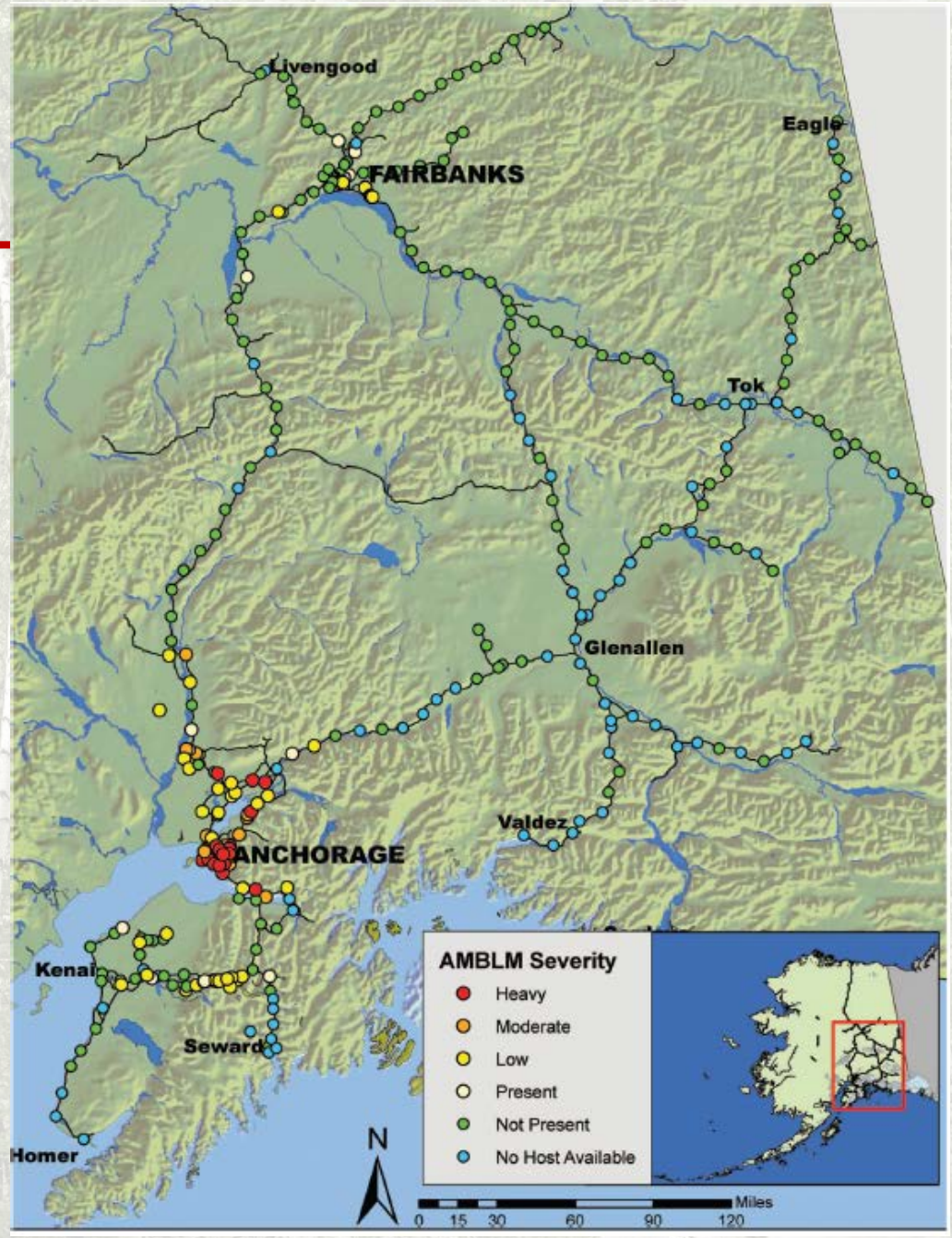
Digweed *et al.* 2009

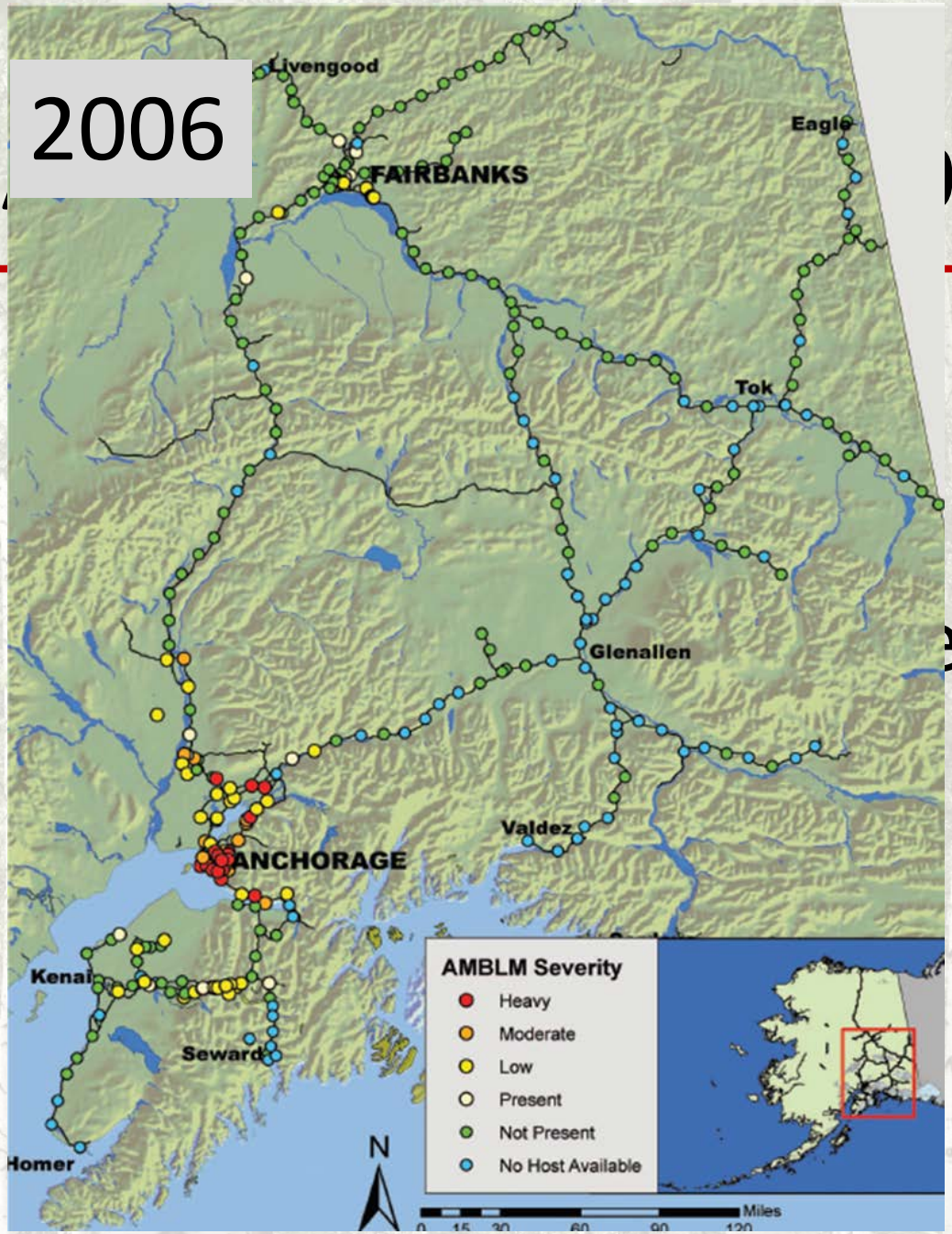
Birch leafminer

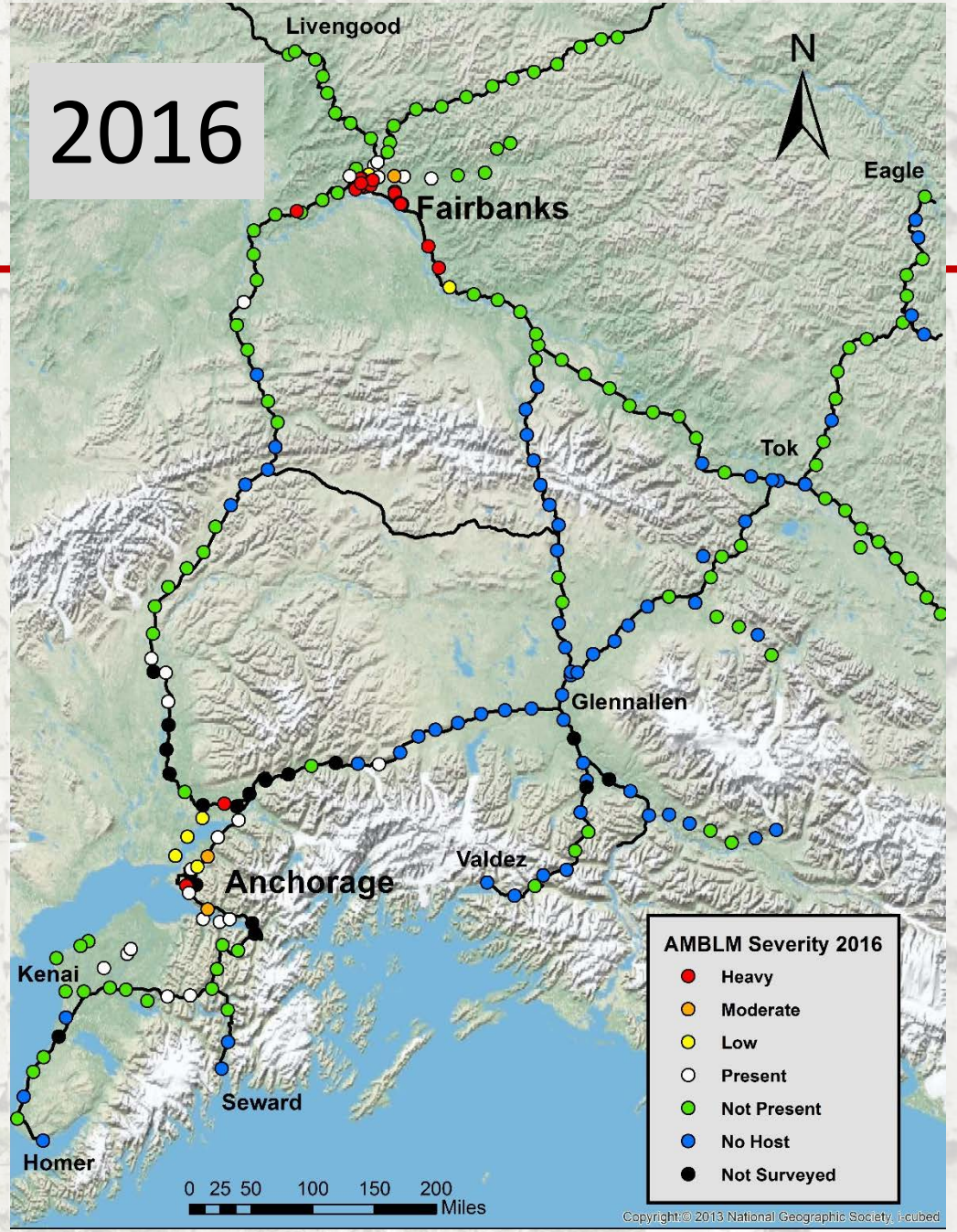
- 1st to enter North America (1923)
- Sexual reproduction
- Multivoltine
- Oviposition on long shoot leaves
- 5 instars (4 feeding)
- Overwinters in duff

AMBLM Distribution 2006

- Snyder *et al.* 2007
- Road survey
- High in Anchorage area
- Present/low in Fairbanks




2006
Livengood
FAIRBANKS
Eagle
Tok
Glenallen
Valdez
ANCHORAGE
Kenai
Seward
Homer
AMBLM Severity
Heavy
Moderate
Low
Present
Not Present
No Host Available
N
Miles


2016
Livengood
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Valdez
Anchorage
Kenai
Seward
Homer
AMBLM Severity 2016
Heavy
Moderate
Low
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No Host
Not Surveyed
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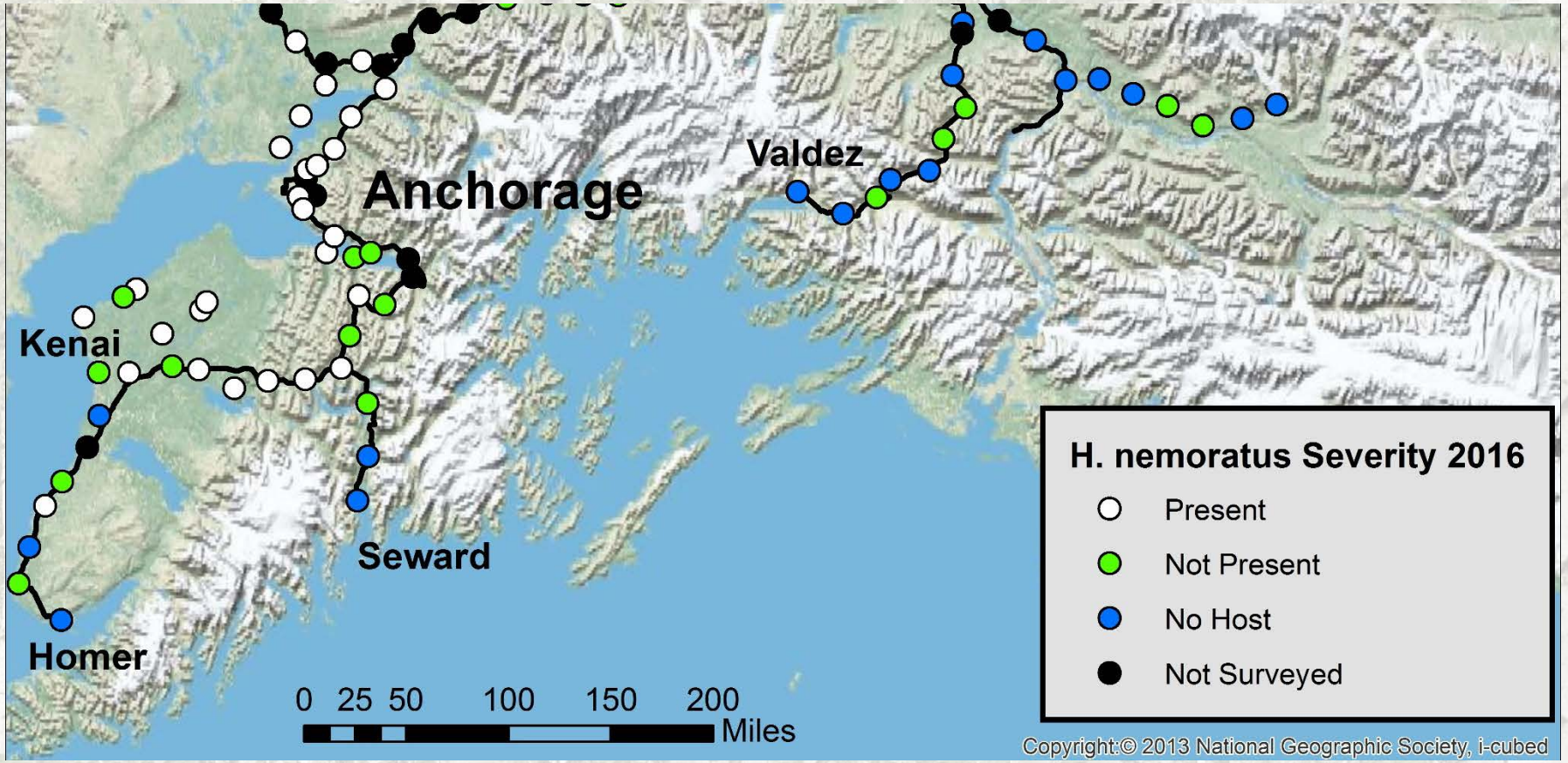
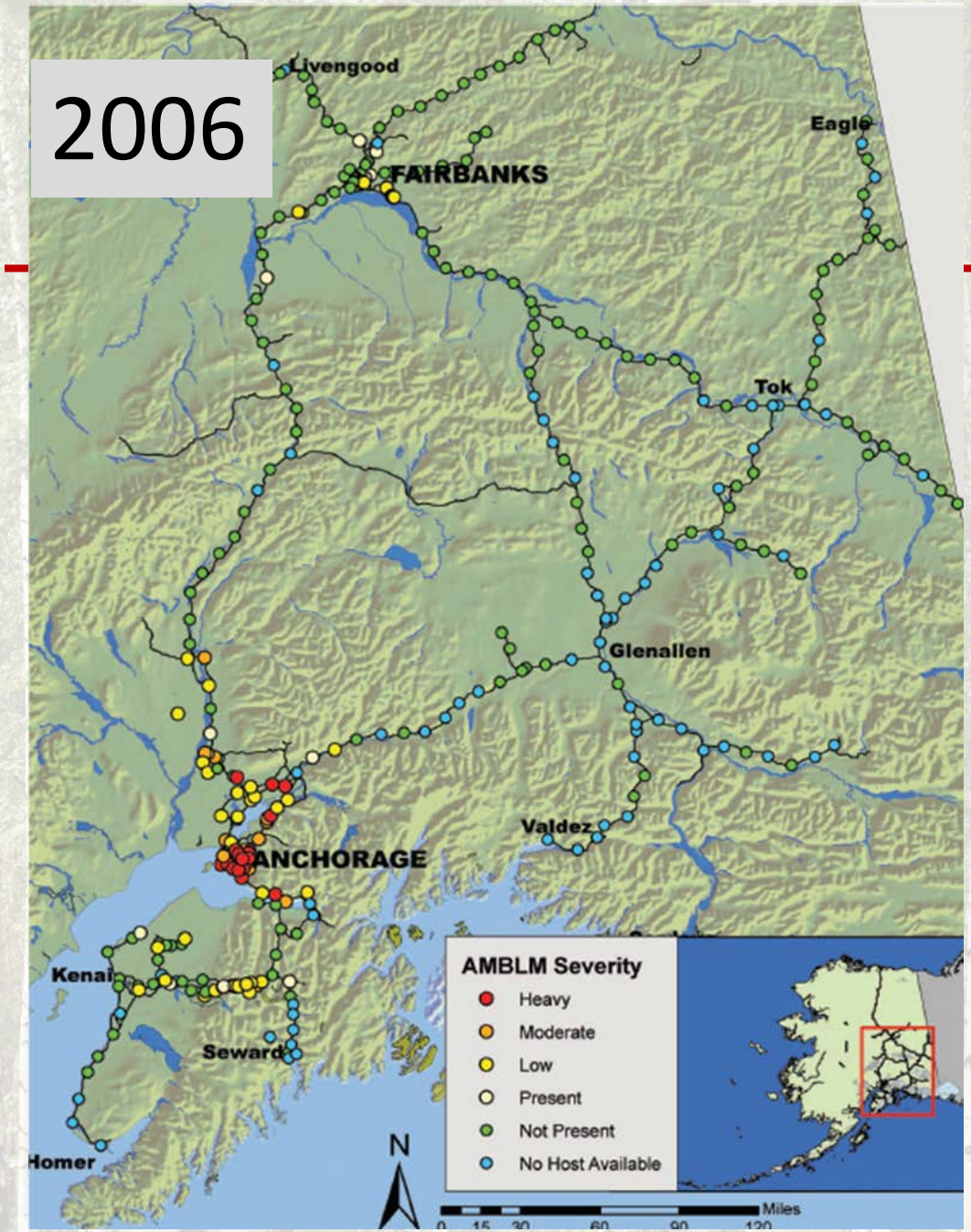
Late birch leaf edgeminer Distribution



Management & control efforts

- Release of *Lathrolestes thomsoni* (2004-2008)
- Hymenoptera: Ichneumonidae
- 3600 released
- 9 sites (6-Anchorage, 1-Soldotna, 2 Eielson AFB)

Photo credit: Anna Soper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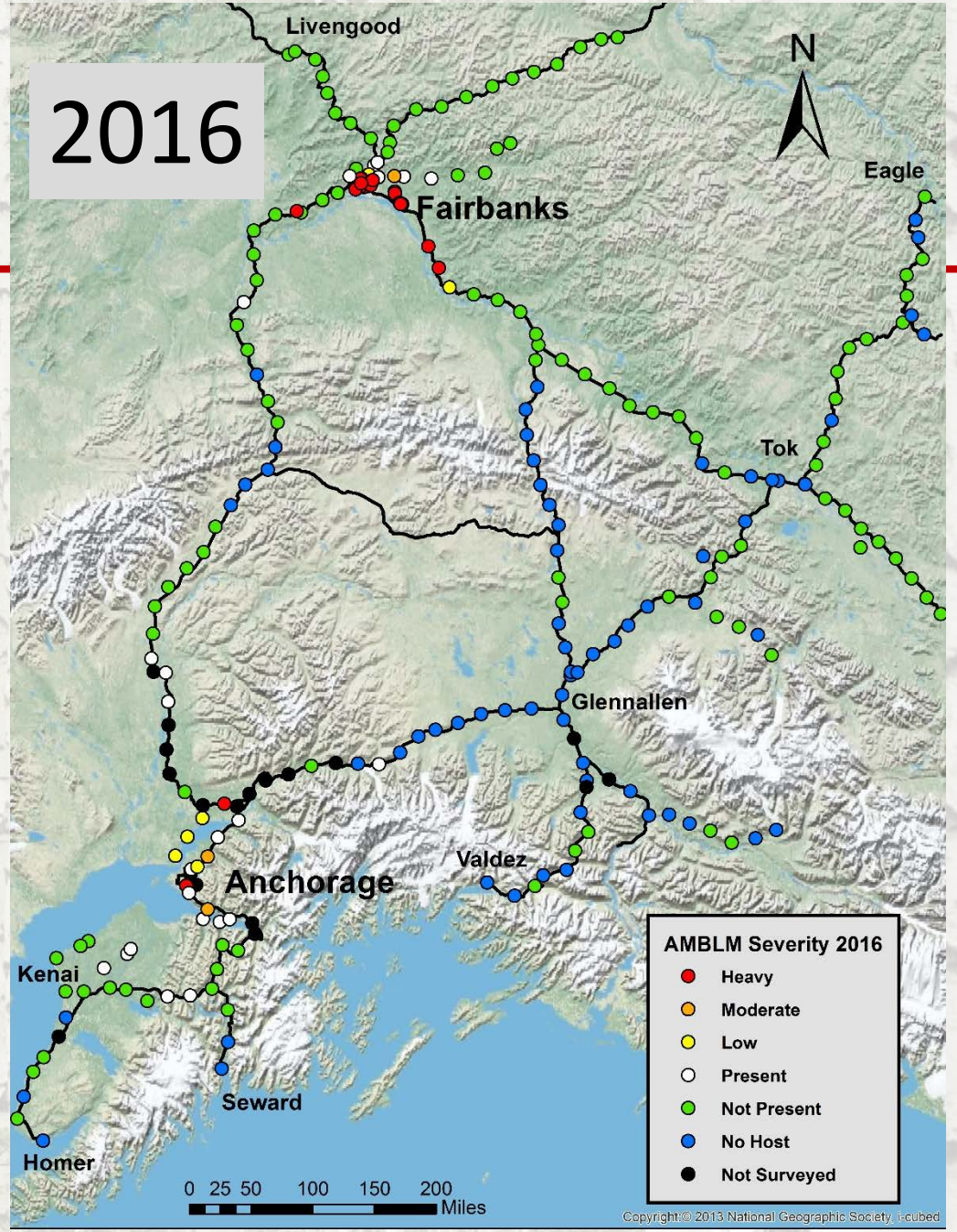
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No Host
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0 25 50 100 150 200
Miles
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- Release of *Lathrolestes thomsoni* (2004-2008)
- Hymenoptera: Ichneumonidae
- 3600 released
- 9 sites (6-Anchorage, 1-Soldotna, 2 Eielson AFB)
- Trunk injection: TREE-äge

Photo credit: Anna Soper

5453940

Damage to host

- Aesthetics
- Reduce photosynthesis
- Early leaf drop

- No mortality observed in Alaska

Thank You