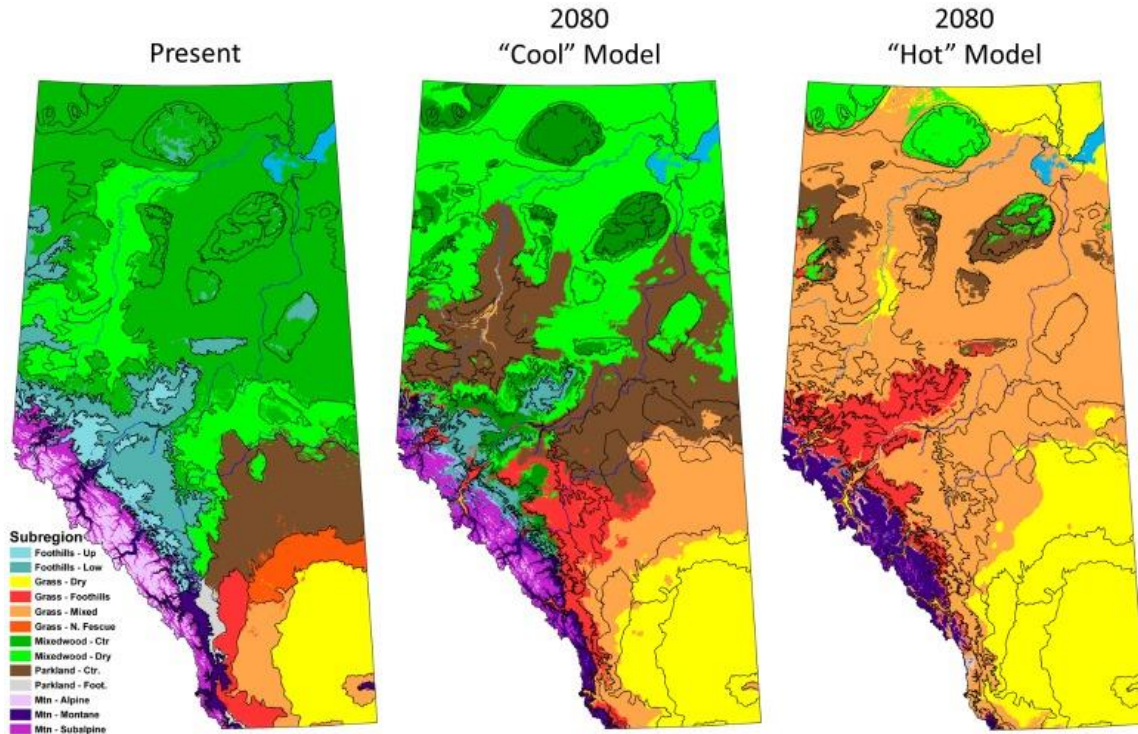


CLIMATE CHANGE IMPACTS: the Good, the Bad, and the Bug-ly.

Ward Strong, BC MoFLNRO
CCEMC/TIA Field Day
Grande Prairie, AB
May 26 2014

I. SHIFTS DUE TO CLIMATE CHANGE.

- Measureable climate metrics. Predictable changes with quantifiable error.



- Specific stressors: drought, flooding, heat, climate extremes.
- Winter low extremes may be more common due to arctic winter outflows.
- Ecosystem effects: much less predictable.

II. RESPONSES OF PESTS TO CLIMATE CHANGE:

- Endemic pests:
 - Range expansion.
 - Increase in severity.
 - Local extirpation.
- Exotic pests: invasion will generally be northward.
- Insect movement and adaptation:
 - Insects move at variable rates; trees stay put.
 - Pests have short generation times: adapt faster than trees.
- Anticipating new pests of concern:
 - Seed orchards in the Pacific Northwest may provide advance warning.

- AMAT & Illingworth trials may provide info on potential threats.



- Non-pests in current range could become pests in new range.

III. TREE RESPONSES TO CLIMATE CHANGE.

- Individual trees: stress decreases resistance.
- Population responses:
 - Phenotypic plasticity.
 - Migration.
 - Adaptation.

IV. IMPLICATIONS FOR FOREST GENETICS AND SEED ORCHARDS.

- Assisted migration increases rate of migration.
- Selective breeding increases rate of adaptation.
- Gene Resource Management:
 - Conserving genetic diversity more important than ever.
 - Clone banks are at risk.
 - LOCKSS (Lots Of Copies Keeps Stuff Safe).
- Monitor seed orchards closely for:
 - expected new pests.
 - increased severity of existing pests.
 - Unanticipated new pests that no-one saw coming.
- Stressed plants often increase cone production to a point.
- Seed orchards have a productive life of about 25 years.
- Plan to adopt "assisted migration" concept to seed orchard.