Project Subject/Title: Hail Damage Monitoring – Brule River State Forest
County: Douglas
TRS: T45, 46N, R11W various sections

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Type of Prescription: Monitoring
Year Initiated: 2002

Abstract/Prescription:
During the summer of 2000 a hailstorm damaged 4,000 forested acres of the Brule River
State Forest. A monitoring project was established to follow the recovery of this area. A
total of 33 plots were established in a variety of cover types: 21 in the damaged area and
12 in the control areas. The cover types selected were red pine, swamp conifer, aspen
(mature and young). Eight trees from each plot were selected to monitor over several
years for a total of 168 trees in the damaged area and 96 trees in the control were
measured. The species include red pine, cedar, white birch, balsam fir, black spruce,
quaking and big tooth aspen. A variety of tree measurements were taken including DBH,
total height, crown ratio, crown dieback and crown density. Tree core samples were taken
from each plot and analyzed. Each plot was documented using a GPS receiver.
Regeneration plots in young, damaged aspen were also conducted.
All raw data was entered into Excel spreadsheet and Oracle database format. It was then
briefly analyzed. Statistical evaluation will occur when more than one year of data is
obtained. Annual monitoring will occur up to 5 years

Results
Results for 2002:
- Dieback of >40% occurred in only 28 of the 168 trees in the damaged area.
- Extreme dieback was documented in trees that had signs of long-term stress
  (suppressed and diseased).
- Extreme dieback was documented in the swamp conifer plots, showing signs of slow
  growth over the last 20 years documented in tree ring analysis.
- Dieback was most significant in swamp conifer forest type followed by aspen and red
  pine.
- There was no correlation between the density of the stand (BA) and the amount of
  damage.
- Overall, slower growth rates were documented in the last 2 years (in the tree ring
  analysis) for all species in both control and damaged samples noting that it may be a
  variety of factors i.e. climate, forest tent caterpillar.
- In the tree ring analysis, it was apparent that the drought of '87 and '88 affected all
  species showing decreased growth rates.
- One core sample taken from a control plot was from a 139 year old white cedar.

Silviculture Trials

Discussion/Needs

The initial establishment of permanent plots took a bit of time. On an average day field personnel established 3 plots per day depending on the location and other factors. Crown assessments were, in part, difficult to conduct. In general, crown assessments can be very subjective, thus having at least two estimators at each plot is recommended. However, looking at the overall data on crown assessments, between the control and damaged trees documented, seemed consistent when compared to the other data from the site. Visiting plots soon after full leaf out is critical. Field personnel made a point to monitor recovery from forest tent caterpillar damage before tree assessments were obtained.

Site statistics:
Habitat Type: various
Covertype: Red Pine, Aspen, Swamp conifer

Damage on Jack Pine top caused by hail impacts.