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University of Idaho

GREENWOOD RESOURCES

Managing Poplar Nutrition on a 20,000 ac. Estate

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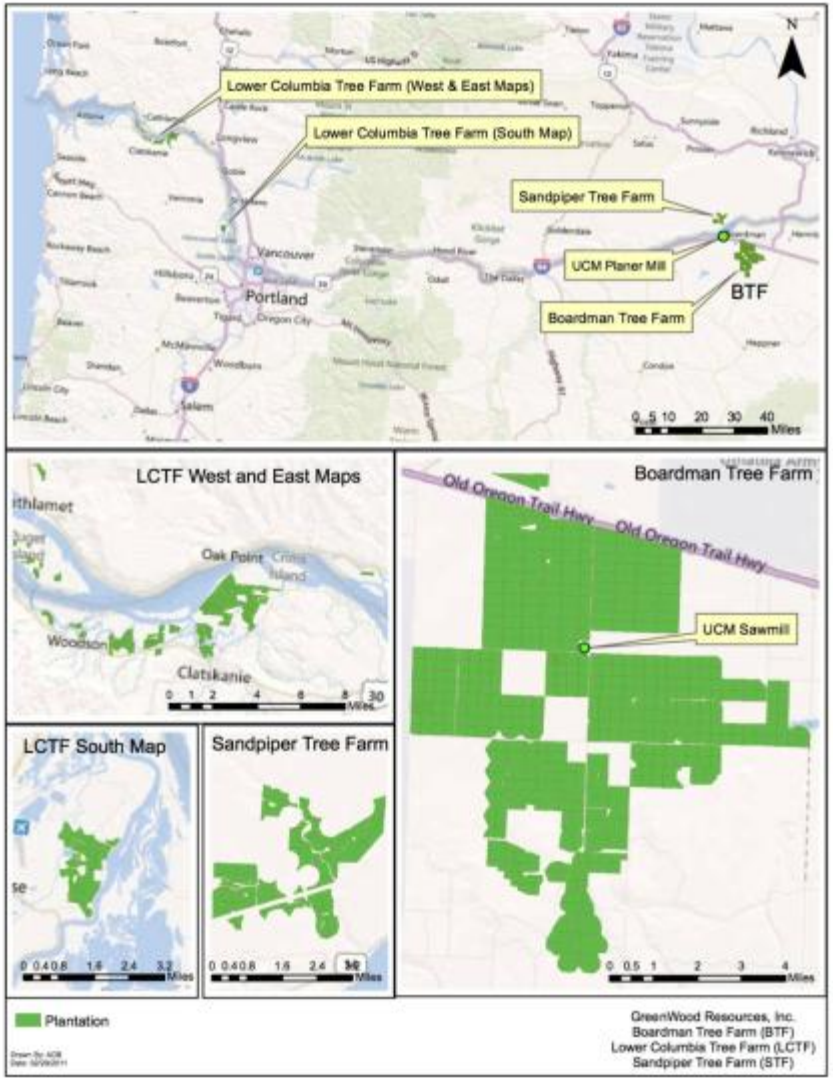
University of Idaho

Jose Zerpa
GreenWood Resources

November 28th , 2012

GreenWood Tree Farm Fund, LP



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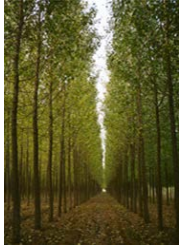
GWR Boardman Tree Farm



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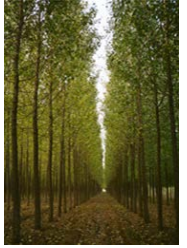
Background




- Managed by GreenWood Resources for GTFF since 2007
- Phase I: Pulp production (1992 to 2000)
  - 600 TPA
  - Intensive fertilization except for a few control blocks (60, 90, 120, 150 kg N/ha on yrs. 1, 2, 3, 4 respectively), plus P and Zn.
- Phase II: Sawlog production (2000 to present)
  - Conversion and thinning of stands from 600 to 218 TPA
  - Review of nutrition program (2007) observed lack of response to fertilization
  - No fertilization except for a few blocks starting in 2008
- Phase III: Sawlog production and intercropped planting for bioenergy

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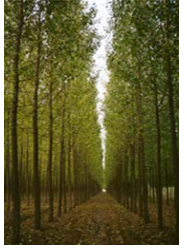
Phase II (Sawlog production)



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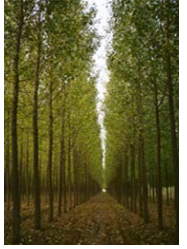
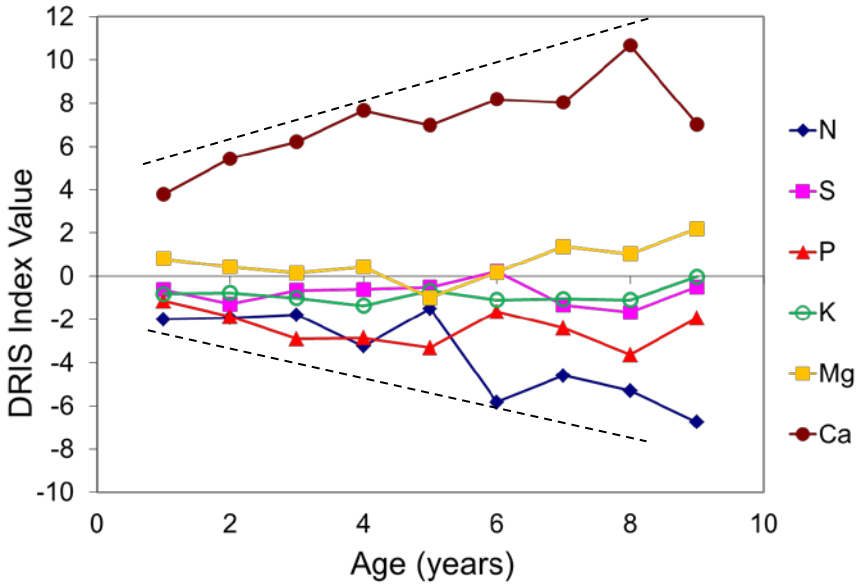
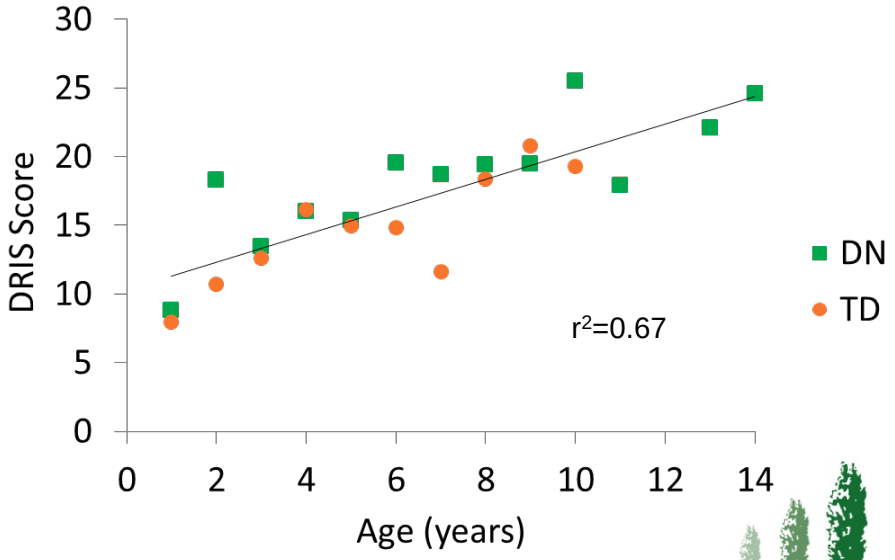
Phase II




- Monitoring
  - Growth (84 growth monitor plots)
  - Foliar Nutrients
- DRIS using norms for poplar (Leech and Kim, 1981)





DRIS Score = Σ |DRIS Index|

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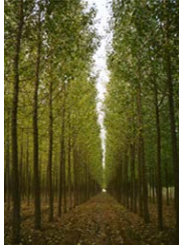
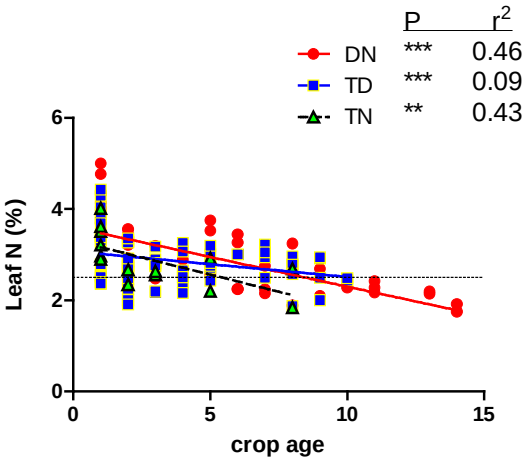
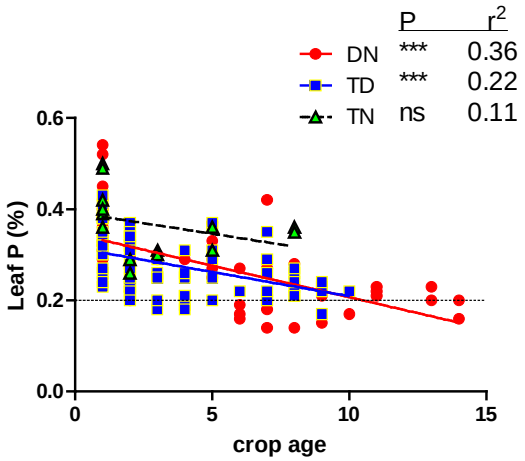
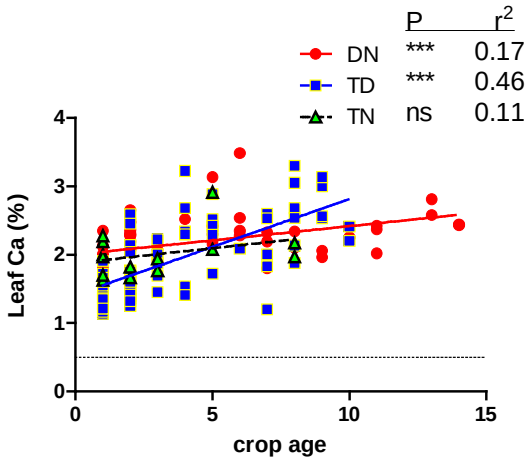
Phase II




- Foliar nutrient concentrations vary with age







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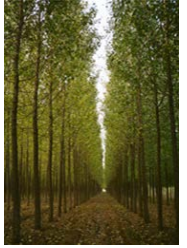
Phase II




- Growth and foliar nutrition

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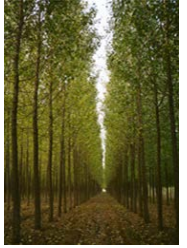
Phase II

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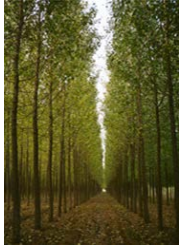


- Fertilization effect on leaf N concentration

Leaf N (%)

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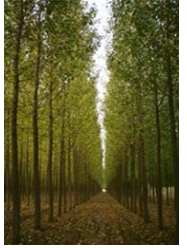
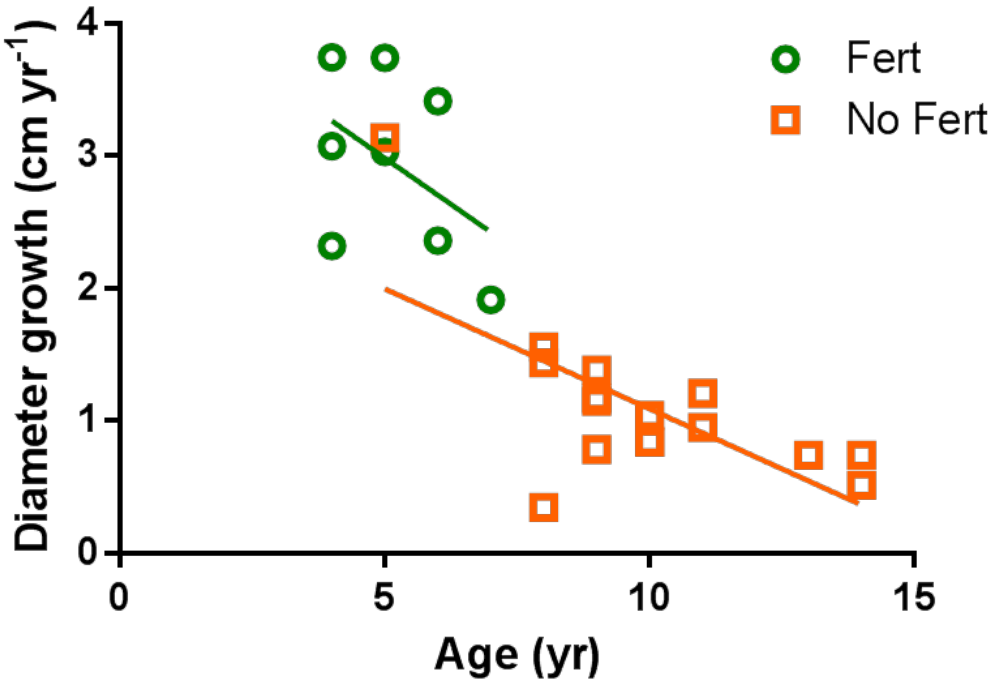
Phase II




- Fertilization effect on tree growth



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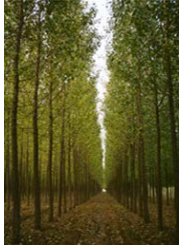
Phase II (Summary)




- Foliar N and Ca show greatest variation with age
- Nutrient imbalance increase with age (DRIS scores)
- Nutrient imbalance is negatively correlated with growth
- Positive correlation of growth and foliar nutrition
- Marginal effect of fertilization on foliar nutrition
- No definitive effect of fertilization on growth
- DRIS indices & scores have been useful so far for fertilization prescriptions
- More data needed to fully assess DRIS as a monitoring tool

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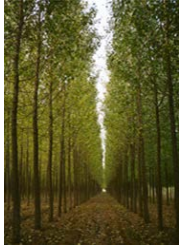
Phase III




- Future plans:
  - Improve monitoring (fill in gaps in data)
  - Develop LAI vs. Growth relationships
  - Fertilization Trials

- Challenges:
  - Clone effects
  - New products/production systems

	Sawlogs	Biomass
▪ Stocking (TPA):	218	1100
▪ Rotation length (years):	12	3
▪ Nutrient removal rates:	?	?

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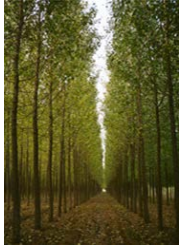
Phase III
(Intercropped bioenergy planting)



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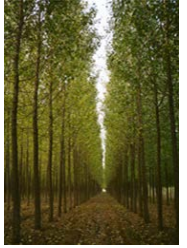


Thank You!

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