Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- Single-tree, distance independent growth and yield model
- 4 Variants
  - SWO (Southwest Oregon)
  - NWO (Northwest Oregon)
  - SMC (Stand Management Cooperative)
  - RAP (Red Alder plantations)
- Variants should be applied to areas appropriate to same species mixture, stand structure, and maximum ages as modelling data set.

Session 1 – Background and Model Description

Slide 1

Overviews
FPS
FVS
ORGANON
Summary

ORGANON

- SWO Oregon
  - Even and uneven-aged stands
  - 20% of Basal Area in 5 major conifer species
    - DF, GF/WF, PP, SP, IC
    - Minor species include WH, RC, JP, PY, PM, GC, TO, BO, WO, LO, BM, RA, PD, WI
  - Wide Age range (5 – 250+)
  - 529 Stands Measured

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

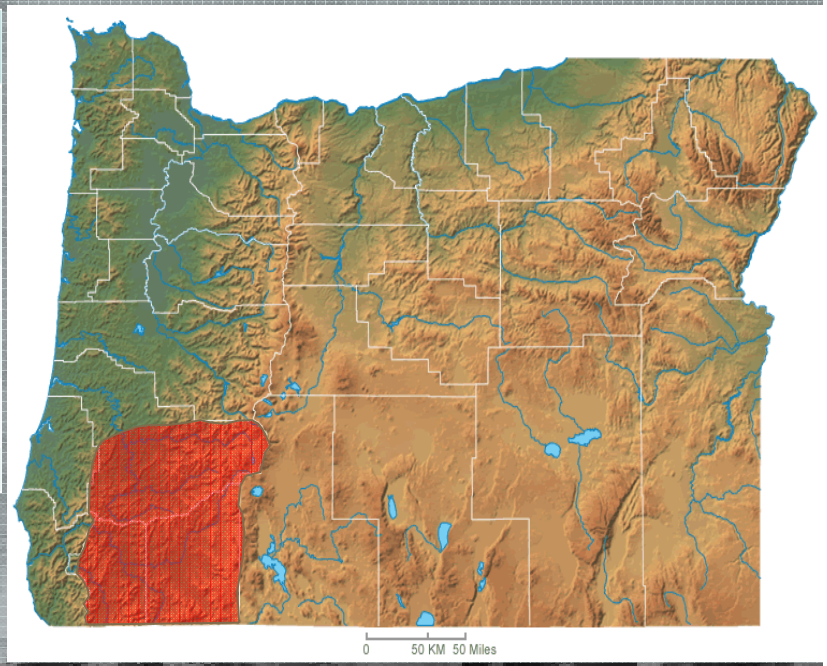
ORGANON

Summ

ORGANON

- **SWO Oregon Geographic Coverage**

Species	Number of trees	Diameter growth	Height growth	Felled trees	Sectioned trees	Site trees
Douglas-fir	17,541	12,403	2,436	1,401	843	97
grand/white fir	3,170	1,951	699	342	253	0
ponderosa pine	1,297	1007	239	171	140	41
sugar pine	426	413	115	103	92	0
incense cedar	1,842	1,276	318	185	141	0
other conifer	214	183	47	0	0	0
hardwoods	4,397	3,468	0	0	0	0



Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- NWO Oregon
  - Even aged stands
  - 80% of Basal Area in 3 major conifer species
    - DF, GF, WH
    - Minor species include RC, PY, PM, WO, BM, RA, PD, WI
  - Wide Age range (< 120)
  - 136 Stands (DF, GF), 43 Stands (WH)

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

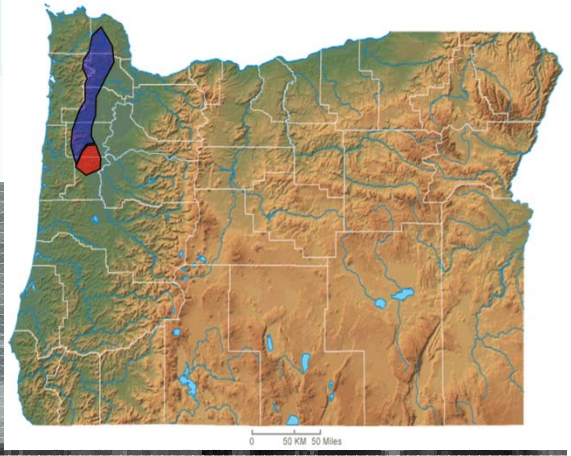
ORGANON

Summary

ORGANON

- **NWO Oregon Geographic Coverage**

Species	Number of trees	Diameter growth	Height growth	Felled trees
Douglas-fir	12,777	9,526	866	723
grand fir	2,218	595	0	0
western hemlock	3,146	2,031	145	145
other species	8,237	0	0	0



Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- SMC Variant
  - Even aged stands
  - 80% of Basal Area in 3 major conifer species
    - DF, GF, WH
    - Minor species include GF, RC, PY, PM, WO, BM, RA, PD, WI
  - Wide Age range (< 120)
  - 136 Stands (DF, GF), 43 Stands (WH)

Session 1 – Background and Model Description

Slide 1

Overviews
FPS
FVS
ORGANON
Summary

ORGANON

- **SMC Variant – Control and Treatment Data (3,359 research plots)**

Species	Diameter Growth	Height Growth	Mortality Trees
		(Control Plots)	
Douglas-fir	17,242	3,200	153,660
Western Hemlock	2,836	873	44,354
		(Thinned Plots)	
Douglas-fir	12,891	6,608	141,250
Western Hemlock	434		40,871
		(Fertilized Plots)	
Douglas-fir	15,713		112,618
Western Hemlock	2,408		65,644

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- **SMC Geographic Coverage**
  - **“appropriate” stands from SW BC, western WA and northwest Oregon**

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- Review – single tree / distance independent model
- Can predict development of:
  - Single & Mixed species stands
  - Even and Uneven-aged stands
  - Single or Multi-storied stands
  - Thinned & Unthinned
  - Fertilized
  - Pruned

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- Data Requirements
  - For Each tree
    - Species
    - DBH
    - Total Height
    - Crown Ratio
    - Expansion Factor
  - Site Index
  - Plot/Point Numbers

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- Data must characterize the stand
  - Full Range of diameters, heights, crown ratio
  - All species
  - 50+ sample trees for homogenous stands
  - 100+ sample trees for heterogenous stands

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON

- Dynamic Equations
  - Diameter Growth
  - Height Growth
  - Change in Height to Crown Base
  - Mortality
- Static Equations
  - MCW, LCW, Crown Profile
  - BT, CFV, Taper,
  - H:D, HCB, SI (Dom. Height)

Session 1 – Background and Model Description

Slide 1

Overviews
FPS
FVS
ORGANON
Summary

ORGANON

- Each Equation
  - Has parameters specific to
    - Each version of Organon
    - Each species in each version
  - Parameters fitted
    - To modelling data sets
    - With linear and nonlinear regression
- Each dynamic Equation
  - Predicts development of the stand for five-year growth cycles

Session 1 – Background and Model Description

Slide 1

- Overviews
- FPS
- FVS
- ORGANON
- Summary

ORGANON – The Basic Operation

Session 1 – Background and Model Description

Slide 1

Overviews

FPS

FVS

ORGANON

Summary

ORGANON – Alternatives

- **Native**
- **LMS**
- **Assisi**
- **DLL**
- **FVS implementation (Erin?)**

www.cof.orst.edu/cof/fr/research/organon

Session 1 – Background and Model Description

Overviews

FPS

FVS

ORGANON

Summary

		Models		
		FPS	FVS	ORGANON
Model Attributes	Individual Tree-Based	Y	Y	Y
	Spatial Category	DD	~DI[1]	DI
	Equations	N	Y	Y
	Dbh-Driven	N	Y	Y
	Height-Driven	Y	N	N
	Support/Updates	Y	Y	N
	Relational DB	Y	Y	N (DLLs)[2]
	Extensions	N	Y	N
	Age Invariant	Y	Y	Y
	Time Steps	Variable[3]	Variable[4]	5 years (RAP is 1 year)
	Applicable Area	Western States +	US	NWO, SWO, SMC, RAP
	Young Stand Growth	Y	Y	N[5]
	Ingrowth Model	Y	Y	N
	Cost	Variable[6]	Free	Free
	Source Code Available	N	Y	Y
	Calibration Possible	Y[7]	Y	Y

1: semi-DI since some FVS variants use plot level densities (plotBAL or plotBA) in the growth equations

2: Dynamic Link Library files allow users to call ORGANON routines from spreadsheets and databases

3: a growth step is years to 20' height growth with linear interpolation to specified time steps

4: recommended 5 or 10 year growth step depends on variant, but can specify number of years in steps

5: heights must be > 4.5', an even age stand must be a minimum age of fifteen years

6: FBRI membership fee is currently $0.03/acre with a $1,500 minimum and $35,000 maximum

7: Survival and height growth to 20' can be "calibrated" in a silvics regime via PctSur and PctHt