

Carbon Sequestration

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Presentation

- Registries and Protocols
- Why forestry is a tough nut to crack
- Work in Maine
- Key ingredients . . .

Registries & Protocols

- Regional Greenhouse Gas Initiative (RGGI) & RGGR
- California Climate Action Registry (CCAR)
- Georgia Forestry Commission (GFC)
- Oregon Dept. Forestry
- Climate Trust
- WRI/WBCSD
- Chicago Climate Exchange
- NH Voluntary GHG Registry
- Wisconsin Voluntary Emissions Reductions Registry

Differences

- What's included
 - registry, protocol, trading platform, aggregator
- Emissions reporting & offsets approach
- Tests
 - Additionality/Baselines
 - Leakage, internal and external
 - Permanence

Regional Greenhouse Gas Registry (RGGR)



Cap and trade scheme to launch in '09

Guidance for registering emissions and offsets

Afforestation only

Projects must be:

- Eased
- Certified (FSC and/or SFI) & use native species
- Additional/Permanent

California Climate Action Registry (CCAR)

- **Protocols** for forestry sector and projects
- Baseline inventory → projections → measurement → reporting → monitoring → verification
- online reporting – simple interface
- Pools: **trees required**; soils, litter, **wood products optional**
- **Conservation easement** required
- “**Natural**” & **sustainable** forestry (native species and systems)

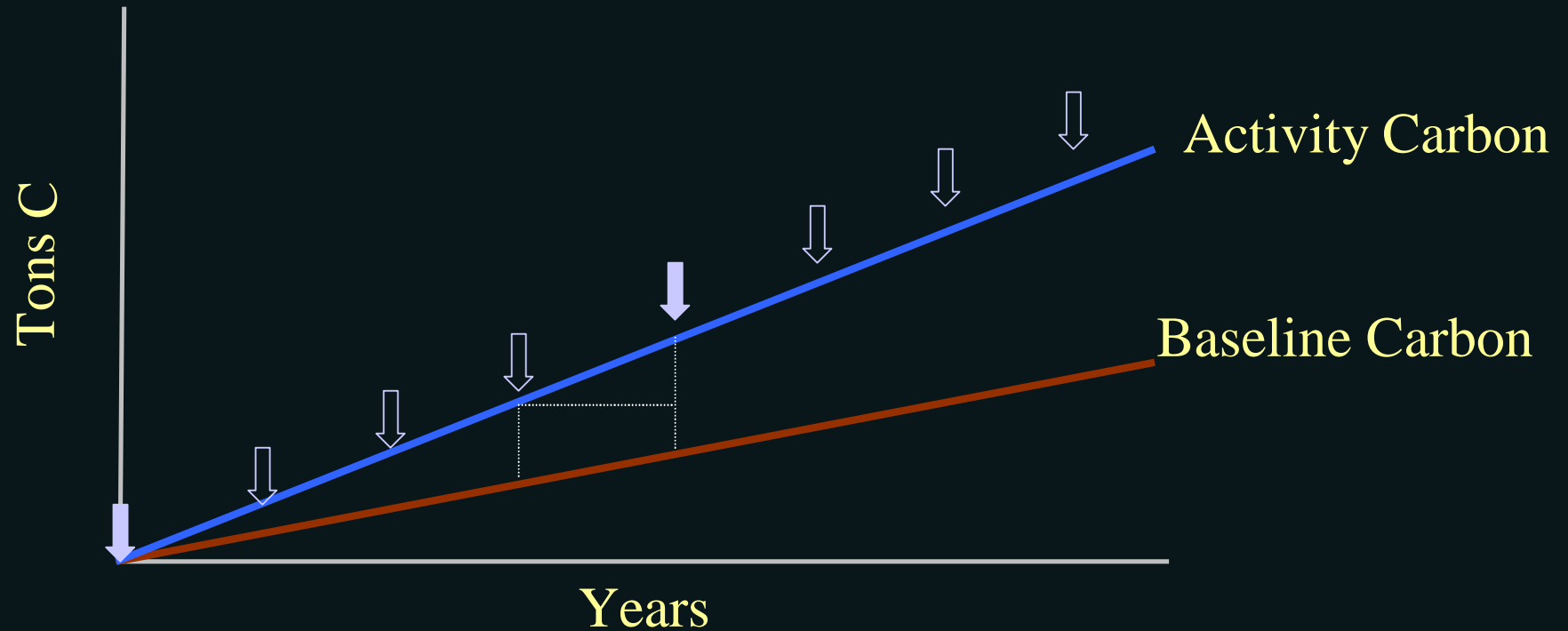
CCAR Accepted Activities

- **Conservation-oriented Forest Management:**
“...regeneration and harvest of native trees [through] natural forest management practices.”
- **Afforestation:**
“...restoration of native tree cover on lands that...[have not been forested in 10 years]...”
- **Conservation:**
“...specific actions to prevent the conversion of native forests to non-forests uses, ...”

CCAR Baseline

Qualitative and Quantitative “*what if* scenario”

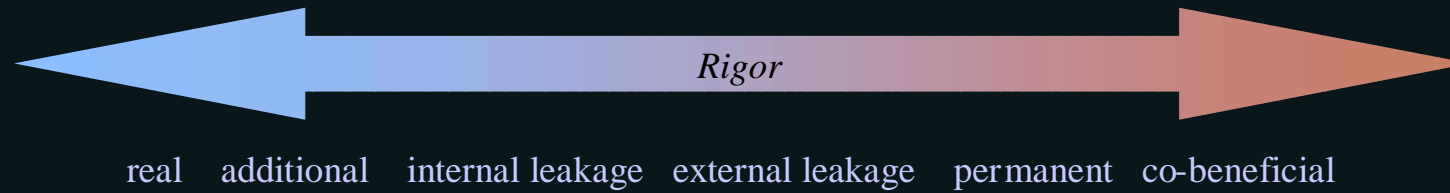
- e.g. **Conservation-Based Forest Management:** statutory guidance and limits (federal, county, state, local)
- e.g. **Conservation:** Local land-use trends (development pressure co. maps) *or* site-specific immediate threat (evidence)



Baseline Carbon = Projected from inventory using model

Activity Carbon = Additional to statutes, no onsite leakage, eased

Models



<i>Aggregator</i>	Iowa Farm Bureau	TNCF?→
<i>Registries</i>	1605B	CCAR RGGI
<i>Exchange</i>	CCX	

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Avoided Deforestation



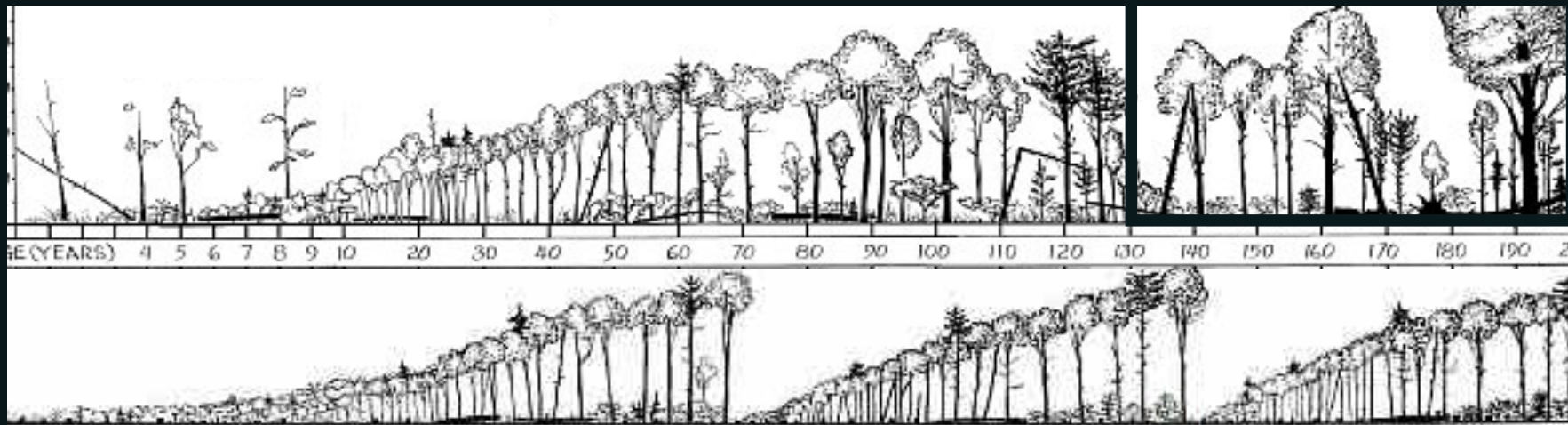
Pests & Pathogens



Afforestation

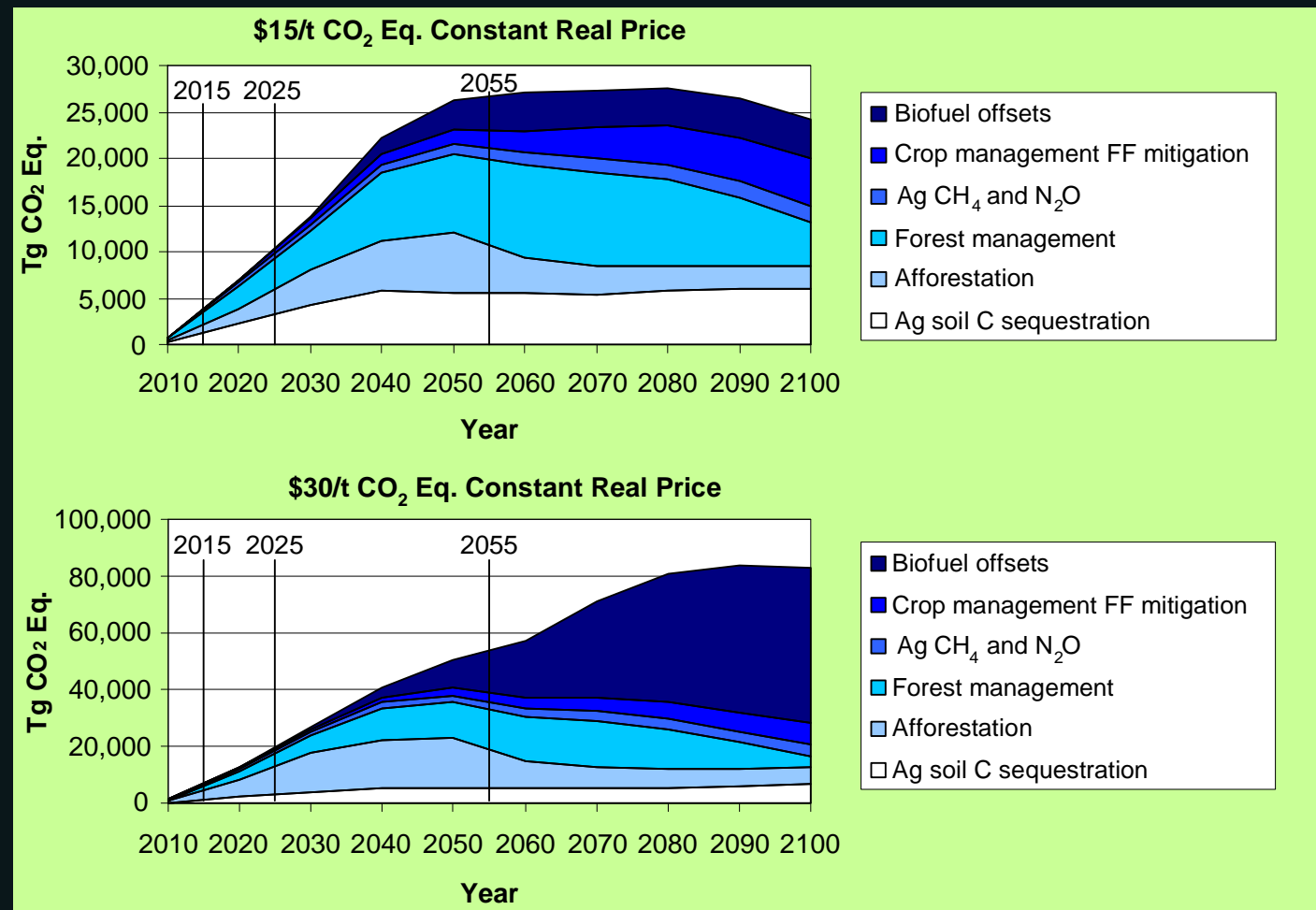


Forest Management & Wood Products



Reserves

Cumulative net emissions reductions below baseline



(Andrasko 2006)

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Activity	Representative Carbon Sequestration Rate in U.S. (Tonnes of CO ₂ per acre per year, unless otherwise indicated)	Time Over which Sequestration May Occur before Saturating (Assuming no disturbance, harvest, or interruption of practice)	References
Afforestation ^a	2.2 – 9.5 ^b	90 – 120+ years	Birdsey (1996)
Reforestation ^c	1.1 – 7.7 ^d	90 – 120+ years	Birdsey (1996)
Avoided deforestation	83.7 – 172.1 ^e	N.A.	U.S. Government (2000)
Changes in forest management	2.1 – 3.1 ^f	If wood products included in accounting, saturation does not necessarily occur if carbon continuously flows into products	Row (1996)
Reduced tillage on croplands ^g	0.6 – 1.1	15 – 20 years	West and Post (2002)
	0.7 ^h	25 – 20 years	Lal et al. (1998)
Changes in grazing management	0.07 – 1.9 ⁱ	25 – 50 years	Follet et al. (2001)
Cropland conversion to grassland	0.9 – 1.9 ^j	Non calculated	Eve et al. (2000)
Riparian buffers (nonforest)	0.4 – 1.0	Not calculated	Lal et al. (1998)
Biofuel substitutes for fossil fuels	4.8 – 5.5 ^k	Saturation does not occur if fossil fuel emission are continuously offset	Lal et al. (1998)

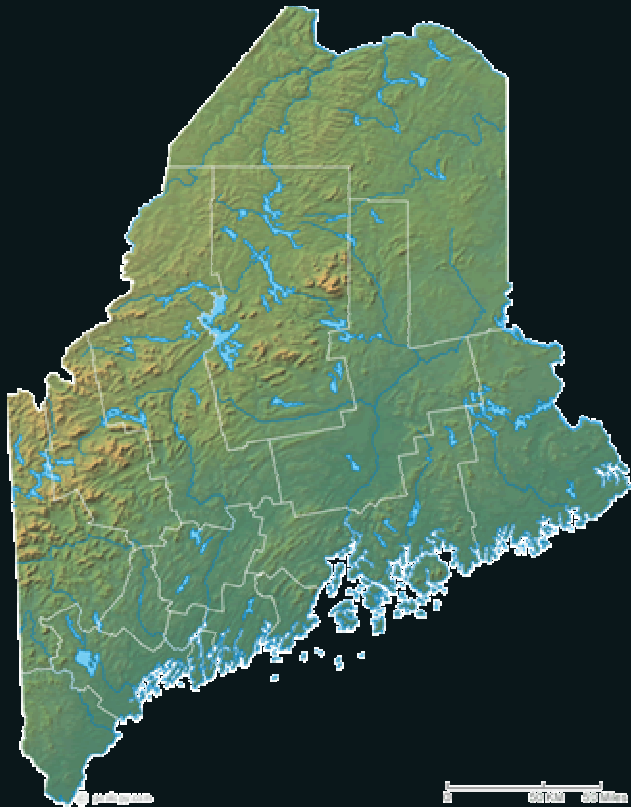
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How do you sequester more carbon here?

What we are demonstrating

- Credibility = additional & real
- Viability = low cost & easy
- Applicability = prescriptive
- Eligibility = CCX ready, prove to ECR
- Complementarity = co-benefits

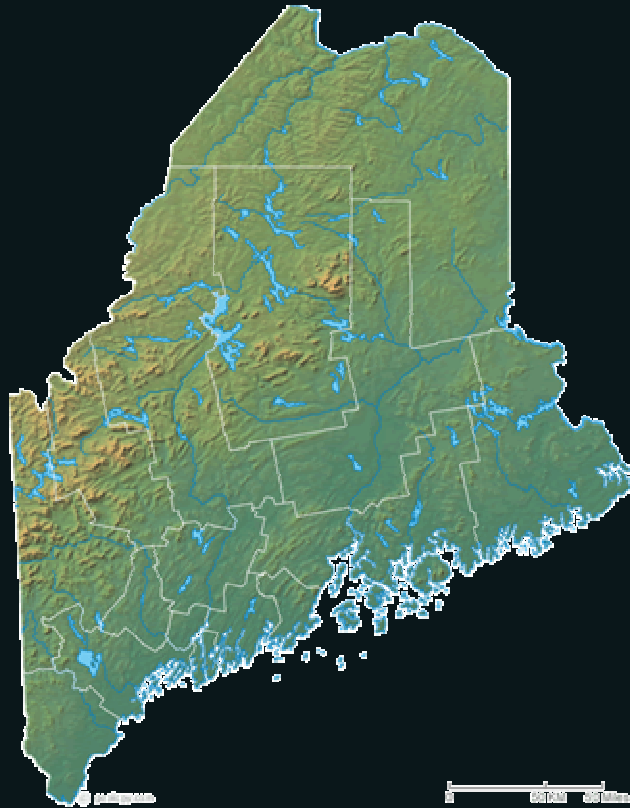
Demonstration



Maine

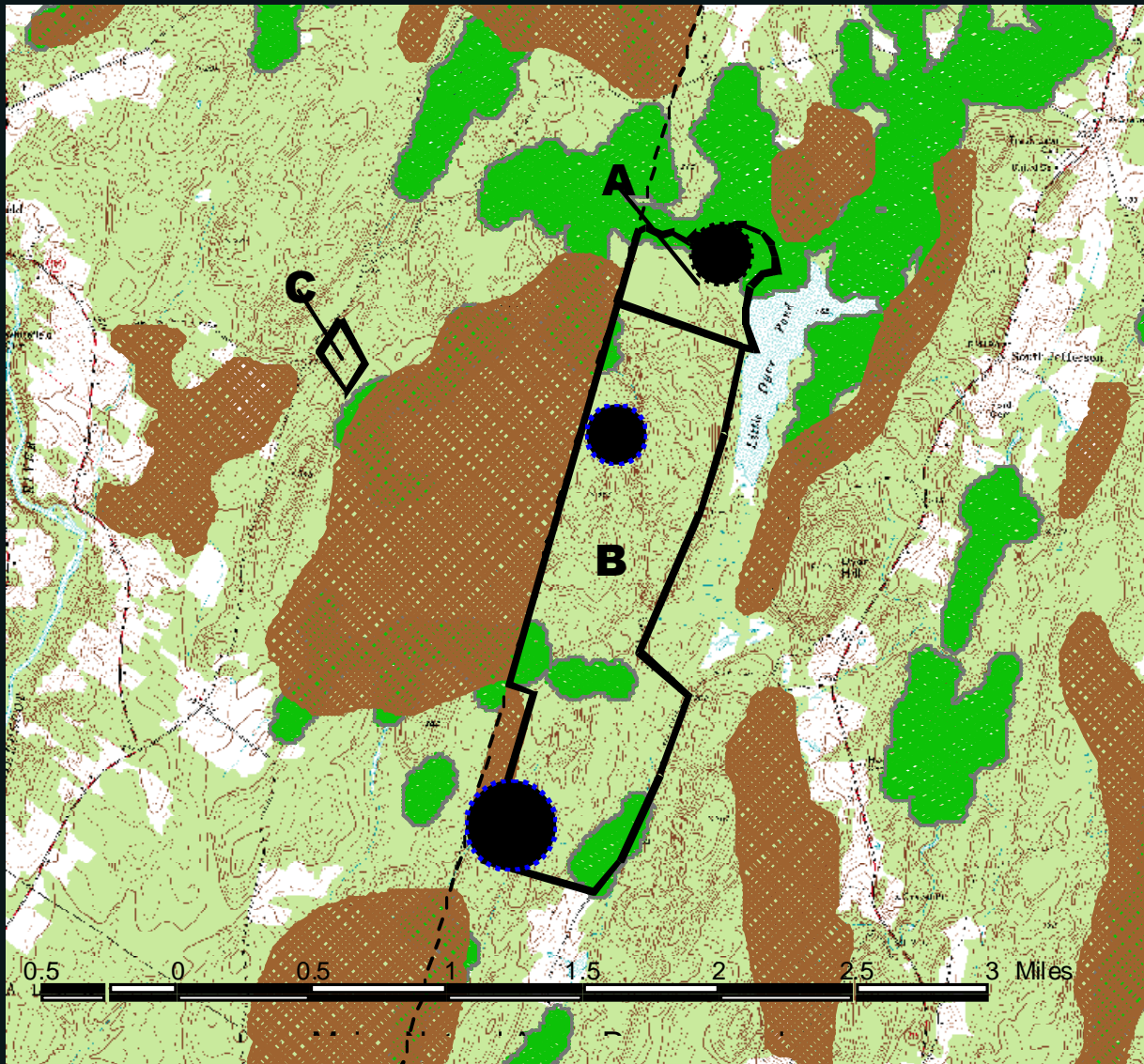
- Trust to Conserve
Northeast Forestlands,
Manomet, Environment
Northeast, Maine Forest
Service, PIC
- Presently 20 holdings
- FSC certified group
- All FSP (WoodsWISE)

Carbon Sequestration Activities



- **Reserves:** LSOG attributes and under-represented structure
- **Forest management:** thinning regime & wood products accounting
- **Extended Rotations**

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Stand A

Stand B

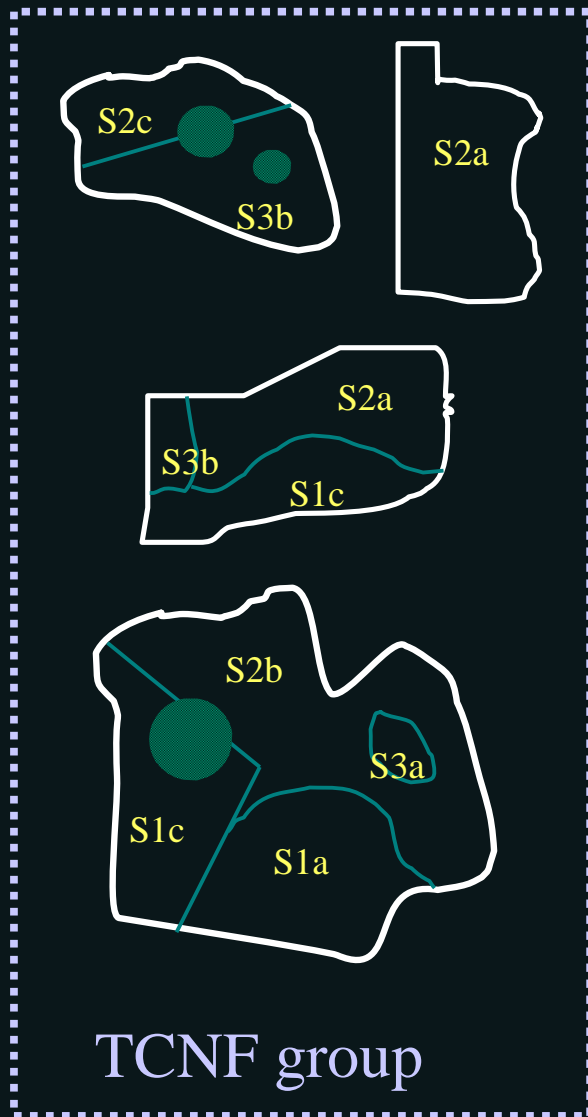
Stand C

Reserve Area

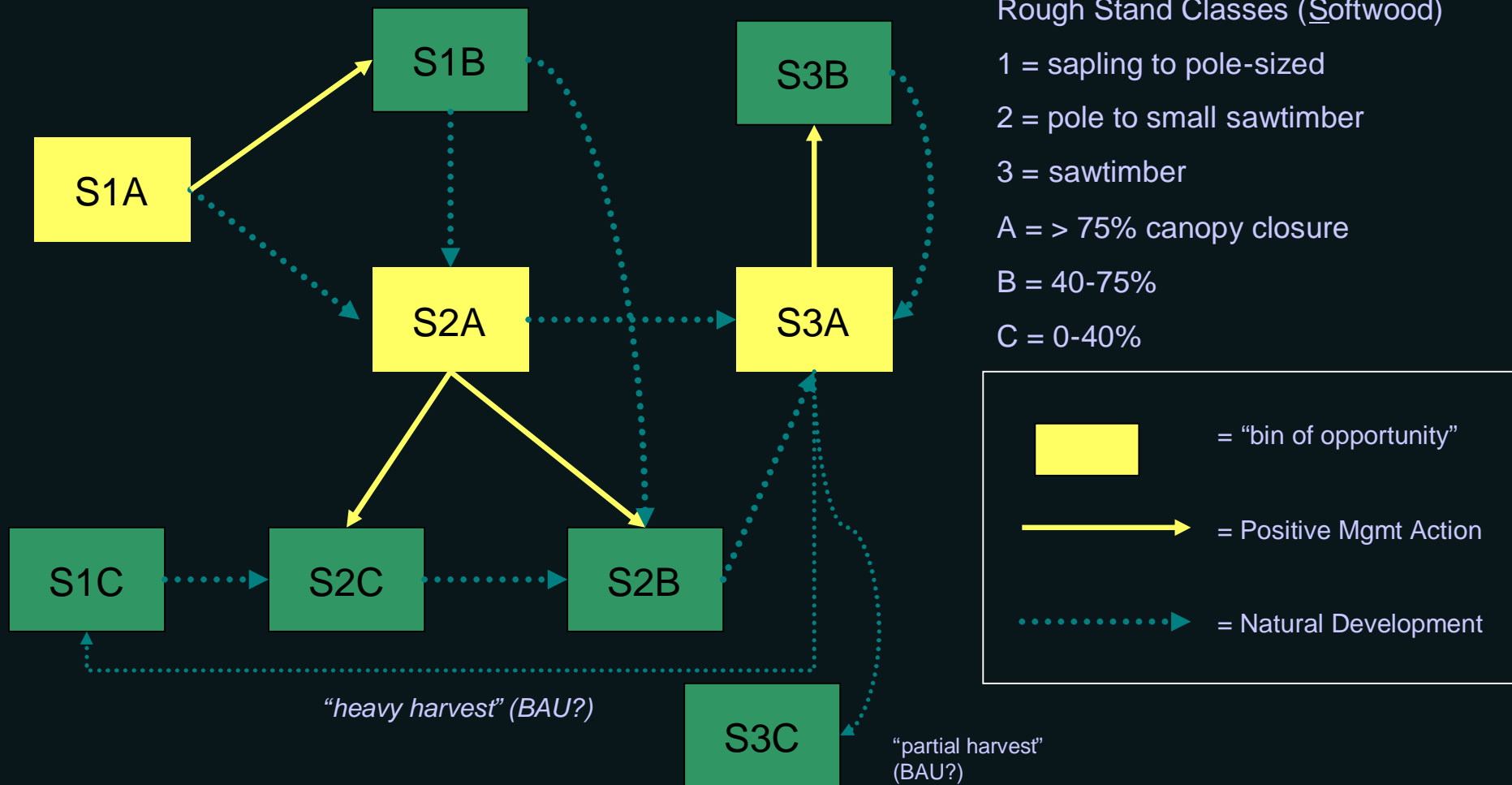


Program

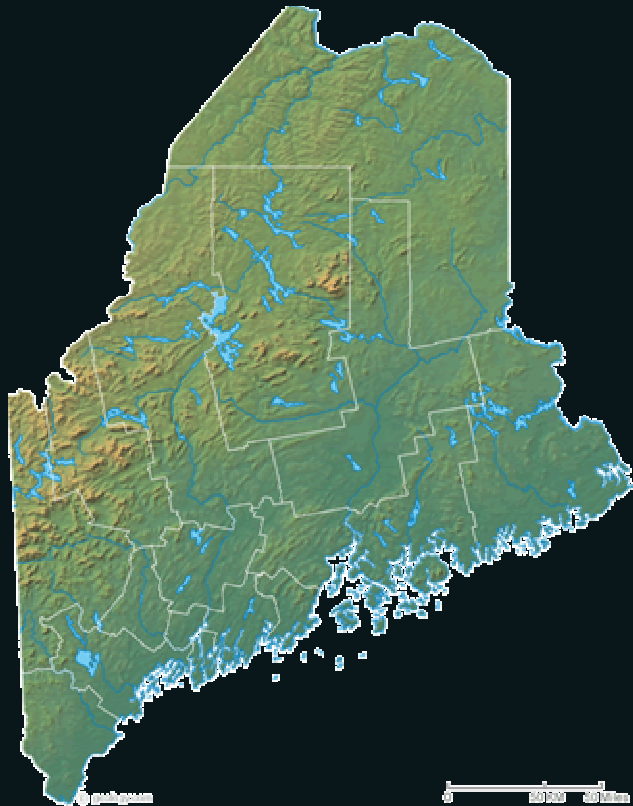
1. Commitment w/ landowners
2. Review inventory - sort into stands
 - LSOG Reserves*
 - Pre-commercial thin*
 - Early commercial thin*
 - Extended rotation . . .*
4. Group-wide stocks



Forest Management Sequestration Strategy



Forest Products & C Management MFS & ENE Studies

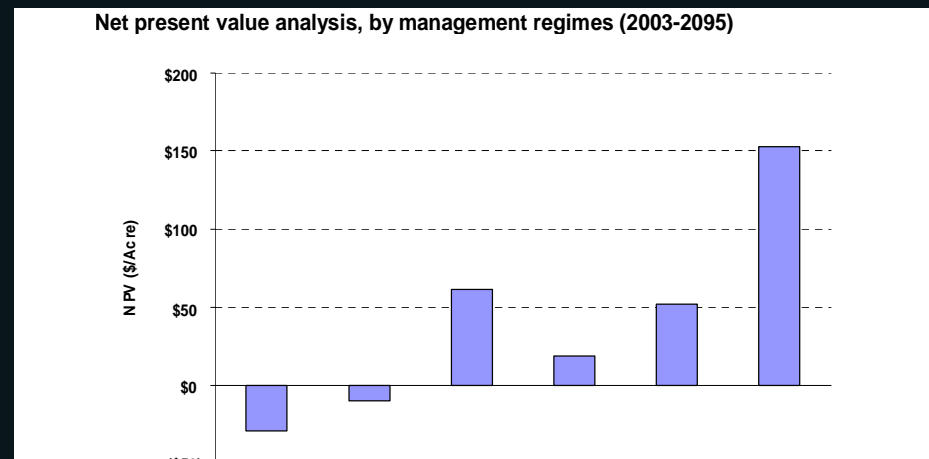
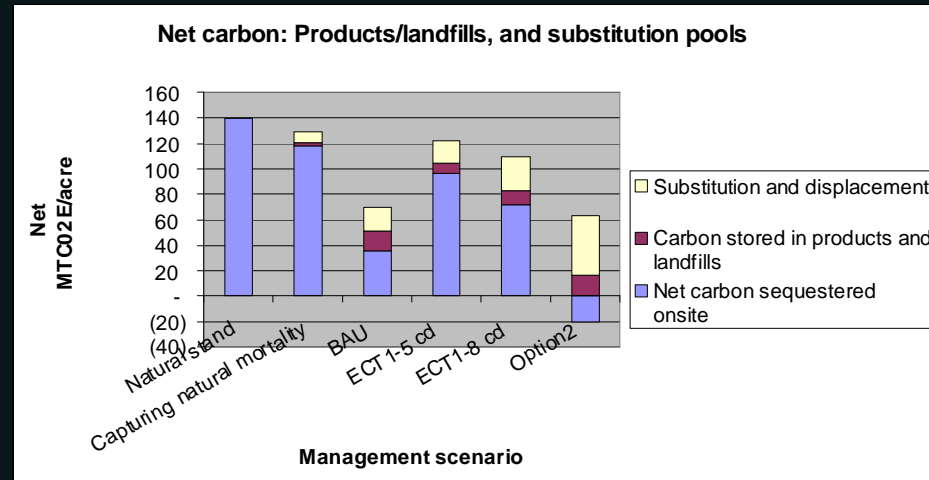


1. Determine specific forest harvesting practices
2. Assess potential for durable wood products to retain carbon

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- Natural Stand
- Capturing natural mortality
- Heavy cut, small sawtimber (BAU)
- ECT1-5 cd (Early commercial thin)
- ECT1-8 cd (Early commercial thin)
- Option 2 (Continued stand development, improved harvest values)

(Lichtenfels & Sosland, ENE 2006)



Key Ingredients ~ Design

1. **Credibility** - Develop Carbon strategies
2. **Viability** - Existing programs (make it simple)
3. **Applicability** - Model practices for each C strategy
4. **Complementarity** - Clear co-benefits
 1. Sustainable management
 2. Reserves where appropriate
 3. C - driven end-products
5. **Eligibility** - Link to RGGI dialogue

Key Steps

1. **Model:** What would MD do with more \$ to increase growth & yield?
2. **Define:** Where are these practices/strategies suitable?
3. **Deliver:** What existing/proposed programs could easily deliver?

Landowner Adoption

Annual report of the state geologist for the year 1899, Report on Forests (NJ)
Authors include Gifford Pinchot

“...owners of the forest are ready for any suggestions which will enable them to derive greater profit from their holdings, that they will not be slow to receive and adopt practical suggestions, . . .”

“...no amount of technical education is of force to save the forests unless the interest of the individual coincides with that of the state.”