

Land Management and Carbon Market Opportunities



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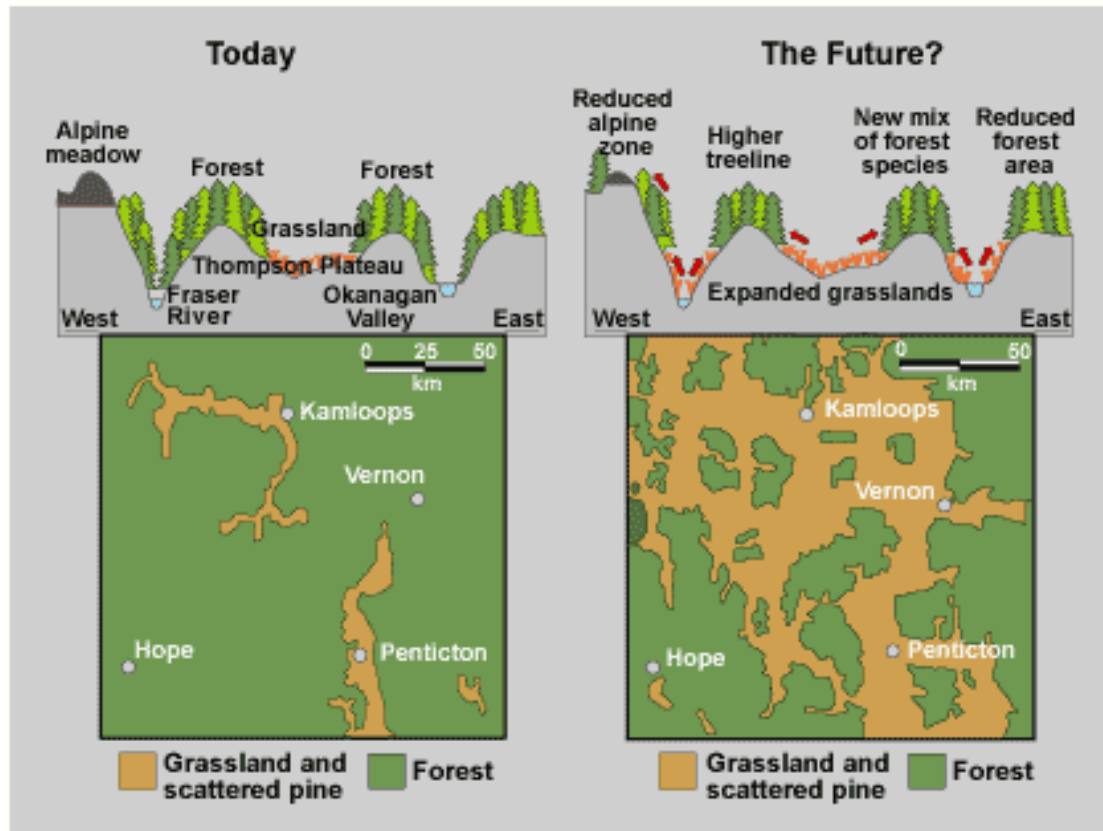
Presentation Road Map



- ❑ **Forests and Climate Change**
- ❑ Greenhouse Gas Mitigation
 - Regulatory Carbon Markets
 - Voluntary Carbon Markets
- ❑ Climate Change Adaptation
- ❑ Summary



Forests and Climate Change



(Source: Hebda, 1997)

Taken from Canadian Forest Service

□ Climate Change on Forests

- Higher treeline
- Reduced alpine zone
- Expanded grassland and scattered pine

Forests and Climate Change

▣ Forests (and Forestry) on Climate Change

■ Increase greenhouse gases



■ Decrease greenhouse gases



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Greenhouse Gas Mitigation

- Climate Change Mitigation: *Lowering the level of greenhouse gases in the atmosphere*
 - Carbon markets
 - Reducing carbon footprint
 - Carbon sequestration

Greenhouse Gas Mitigation

- ❑ Reduce Emissions
- ❑ Offset Emissions



- Additionality – Beyond business as usual
- Permanence – Longevity of offset activity

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Regulatory Carbon Markets

- Regulation to reduce greenhouse gas emissions
- Cap and Trade
 - International
 - Kyoto Protocol
 - Domestic
 - Northeastern States (RGGI)
 - California (Global Warming Solutions Act)

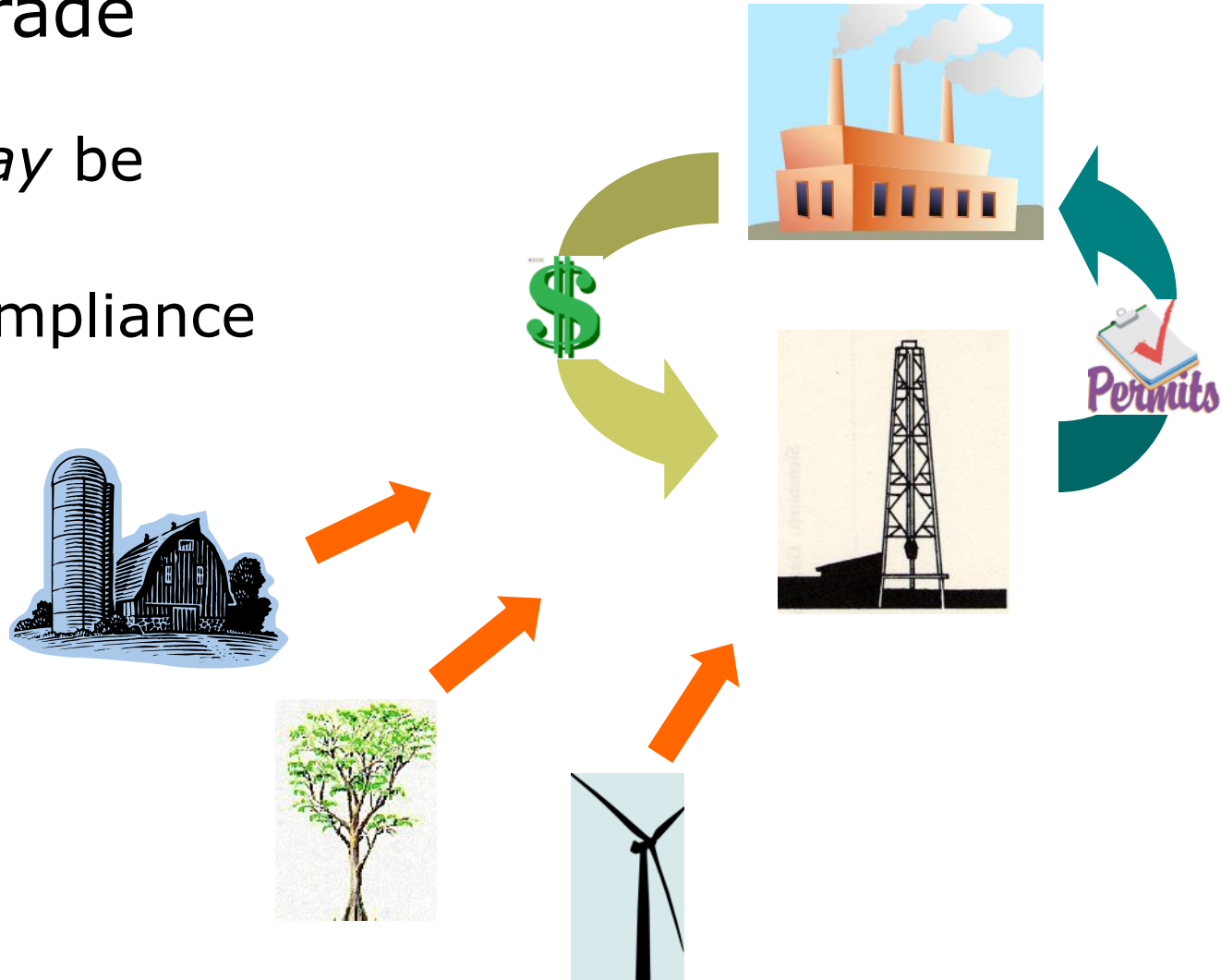
Regulatory Carbon Markets

- Cap and Trade
 - Defines regulated “sectors”
 - Transportation, Energy, Manufacturing, etc
 - Government allocates pollution permits
 - Firms can buy and sell permits



Regulatory Carbon Markets

- Cap and Trade
 - Offsets *may* be included
 - Lowers compliance costs



Regulatory Carbon Markets

Forest-based carbon as offsets

- Kyoto
 - Largely excluded
- NE States (RGGI)
 - Afforestation
- California
 - Afforestation, reforestation
 - Forest management
 - Forest preservation



Regulatory Carbon Markets

Federal Level

□ EPA

- Drafting rules to regulate greenhouse gases
- Pushing congress to draft new legislation

□ Congress: Waxman – Markey

- Lead proposal
- High domestic offset limit
 - Good for forestry, agriculture, landfill and coal mine methane

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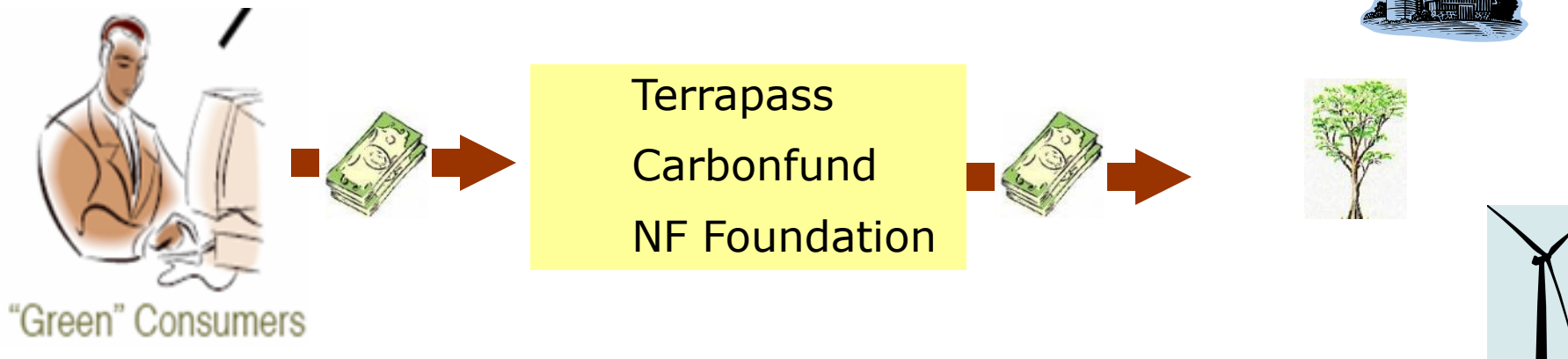


Voluntary Carbon Markets

- ❑ Voluntary efforts to offset greenhouse gas emissions
- ❑ Industries, organizations, individuals
- ❑ Motives: altruism, green marketing, pre-compliance
- ❑ Over-the-counter providers, Chicago Climate Exchange (CCX)

Voluntary Carbon Markets





- Over-the-counter market
 - 100+ providers
 - Web-based, carbon calculators
 - Invest in “offset” projects
 - Unregulated
 - Buyer beware



Voluntary Carbon Market

- Is this really a “market?”

10 items found for: carbon offset [\(Save this search\)](#)

List View Picture Gallery		Sort by: <input type="text" value="Best"/>
Item Title	Bids	
 Help Reduce Carbon Footprints - Carbon Footprint Offset	 Buy It Now	
 Carbon Offset / Credit 4 Laptop PC -Go Carbon Neutral!!	 Buy It Now	

Voluntary Carbon Market



- ❑ Carbon Capital Fund: Partnership between US Forest Service and the National Forest Foundation (NFF)



- ❑ Fund three “demonstration” projects on National Forests

Voluntary Carbon Market



- Biological Additionality: Limited natural regeneration
- Forest Vegetation Simulator (FVS)

YEAR	20	40	60	80	100
Natural regeneration	.8	.6	.5	.5	.4
Planting w/typical mgmt	1.8	8.3	17.5	19	24
Additional carbon per acre (offsets)	1	7.7	17	18.5	23.6 (87 mT CO ₂) ¹

————— Cumulative —————>

Voluntary Carbon Market



- Hypothetical market scenario (voluntary or regulatory)

YEAR	20	40	60	80	100
\$10/t	\$35/ac	\$230/ac	\$570/ac	\$630/ac	\$840/ac
\$20/t	\$70/ac	\$460/ac	\$1040/ac	\$1260/ac	\$1680/ac

- Possible fees: insurance, aggregation, verification, etc

Voluntary Carbon Markets

- The Chicago Climate Exchange
 - Voluntary, but legally binding
 - Members: large corporations, utilities, universities, municipalities
 - Forest-based offsets: reforestation, managed forests, wood products
 - Land owners enter through an aggregator (i.e. National Farmers Union, etc)
 - \$2.00 - \$4.00/ton
 - Texas State Forest Service – verification role

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Climate Change Adaptation

- ❑ Climate Change Adaptation: Adjustments in response to effects of climate change
- ❑ How will forests be management change under different conditions?
 - ❑ Warmer temperatures
 - ❑ More precipitation as rain than snow
 - ❑ Earlier runoff
 - ❑ Wildfire frequency
 - ❑ Wildlife: Corridor protection, etc
 - ❑ Increase of invasive plants

Climate Change Adaptation

□ Funding Adaptation

■ Cap and Trade – mitigation focus

- Adaptation Fund could be created by revenues raised by permit auction

■ Appropriations

■ Be prepared

- Projected impacts for your area, for your forests
- Integrate adaptation into business model (forest plans, etc)

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Summary



- Voluntary markets for carbon
 - Over-the-counter, Chicago Climate Exchange

- Regulatory markets for carbon
 - California (2011), NE states (now)
 - High chance of Federal legislation around greenhouse gases
 - Offsets likely included

- Funding for adaptation