

Biomass Energy – An Opportunity to Address Forest Health in Oregon

Presentation to Federal Forest Advisory Committee
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1. What are the important factors contributing to the forest health problem?

- The unnatural increase in forest density and shift in species composition
- Major contributing factors:
  - Successful fire suppression over many decades in fire-adapted ecosystems
  - Historical logging practices
  - Grazing practices introduced non-native grasses and weeds
  - Lack of active harvesting program on federal lands, last 15+ years
  - Climate trends – longer, hotter, drier summers
- Consequences:
  - Increase in intensity and extent of wildfires
  - Increase in insect and disease susceptibility and outbreaks
  - High risk of loss of ecosystems, biodiversity & wildlife habitat

Sources: Fitzgerald (2002), Emmingham (2006)

Oregon's forest biomass accumulation

- Oregon's forests are adding more than 4 billion board feet of volume each year:

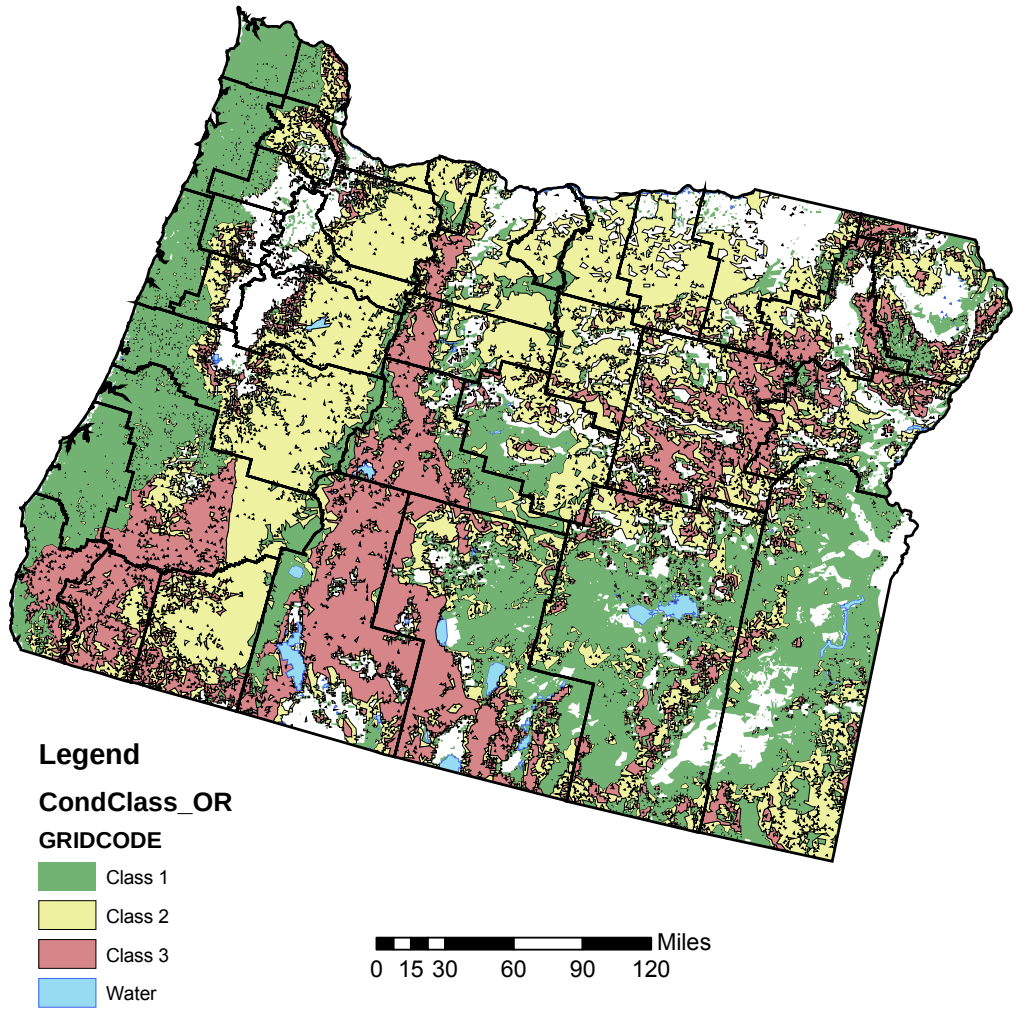
	Statewide	Eastern OR Federal Lands
	Million Board Feet	
Gross Growth	10,294	1,759
Removals	-3,898	-184
Mortality	-2,011	-775
Net Change	+4,385	+800

Source: Hovee and Jordan (2005). Data is for 1990-2004

- That's over 1,000,000 log truck loads!

Risk of uncharacteristic wildfire grows…

- 21 million acres of forests and woodlands in Fire Regime Condition Classes 2 and 3
- 13 million acres are on public lands outside Roadless & Wilderness
- Fire regimes have been moderately or significantly altered from historical range
- Moderate to high risk of losing key ecosystem components



Source: Mcdonald et al. (2006)

2. What are the possible solutions to the problem?

"Scientists do not dispute the need to reduce the risk of fire. The problem is well understood. Fires need heat, oxygen and fuel to burn… Of these factors, only fuel can be controlled. The solution to the forest fire problem is well known: active or intensive forest management to reduce fuel accumulation."

Jay O'Laughlin, Professor
Dept. of Forest Resources
University of Idaho

- "Let nature take its course"
- Treat with prescribed fire or "wildland fire use"
- Mechanically thin and pile, burn piles
- Mechanically thin, remove biomass from site and utilize it to produce something

Utilization of Small Diameter Logs & Biomass

- Small log products
  - Small dimension lumber
  - Posts & poles
- Wood pellet manufacturing
- Electrical generation
  - Direct combustion
  - Stand-alone generators
  - Combined Heat & Power
- District heating
- Transportation fuels
  - Cellulosic ethanol
  - Biodiesel
- Bio-chemicals

What are the consequences of the potential solutions?

Alternative Options to Address Excess Forest Biomass Accumulation	Effectiveness at Reducing Wildfire, Insects & Disease	Smoke Production / Air Quality Impacts	Greenhouse Gas Emissions / Climate Change	Short-term Risks to Wildlife & Biodiversity	Long-term Risks to Wildlife & Biodiversity	Short-term Risk of Damage to Soils & Water	Long-term Risk of Damage to Soils & Water	Offset Fossil Fuel Use / Provide Renewable Energy	Long-term Fire Supression / Recovery Costs	Cost of Implementation	Opportunity to Offset Treatment Costs	Risk to Life & Property	Job & Income Production
	Environmental Consequences								**Economic & Social Consequences**				
Let nature…	None	Most	Most	Least	High	Least	Highest	No	High	None	None	Highest	None
Prescribed fire	Some	Moderate	Moderate	Some	Minimal	Some	Minimal	No	Moderate	Low	None	Moderate	Minimal
Thin, Pile, Burn	More	Moderate	Moderate	More	Some	More	Some	No	Moderate	Moderate	None	Less	Minimal
Thin, Remove, Utilize	Most	Least	Least	Most	Some	More	Some	Yes	Least	High	Moderate	Least	Most

Green (light gray) = best alternative
Red (dark gray) = worst alternative

Potential for Biomass Energy Production from Oregon's Forests – OFRI 2006 Report

- Study Area
  - 20 counties in eastern & southwest Oregon
  - 14.9 million acres of timberland
  - 12.4 million acres of FRCC 2 & 3 (90%)
  - 70% Federal, 30% private

Source: Lord et al. (2006)

Potential for Biomass Energy Production from Oregon's Forests – OFRI 2006 Report

- Assessment Method
  - USFS Fuel Treatment Evaluator
    - Parallel to Western Governor Association's regional study
    - Forest Inventory & Analysis sample plot data
- Process
  - Identify fuel treatment needs
  - Simulate fuel reduction treatments
  - Estimate biomass volume removed
  - Estimate harvest costs
  - Estimate haul cost to closest of 8 hypothetical processing plants
    - Bend, Grant's Pass, John Day, La Grande, Roseburg, Warm Springs, Wallowa
  - Estimate energy generation potential and costs

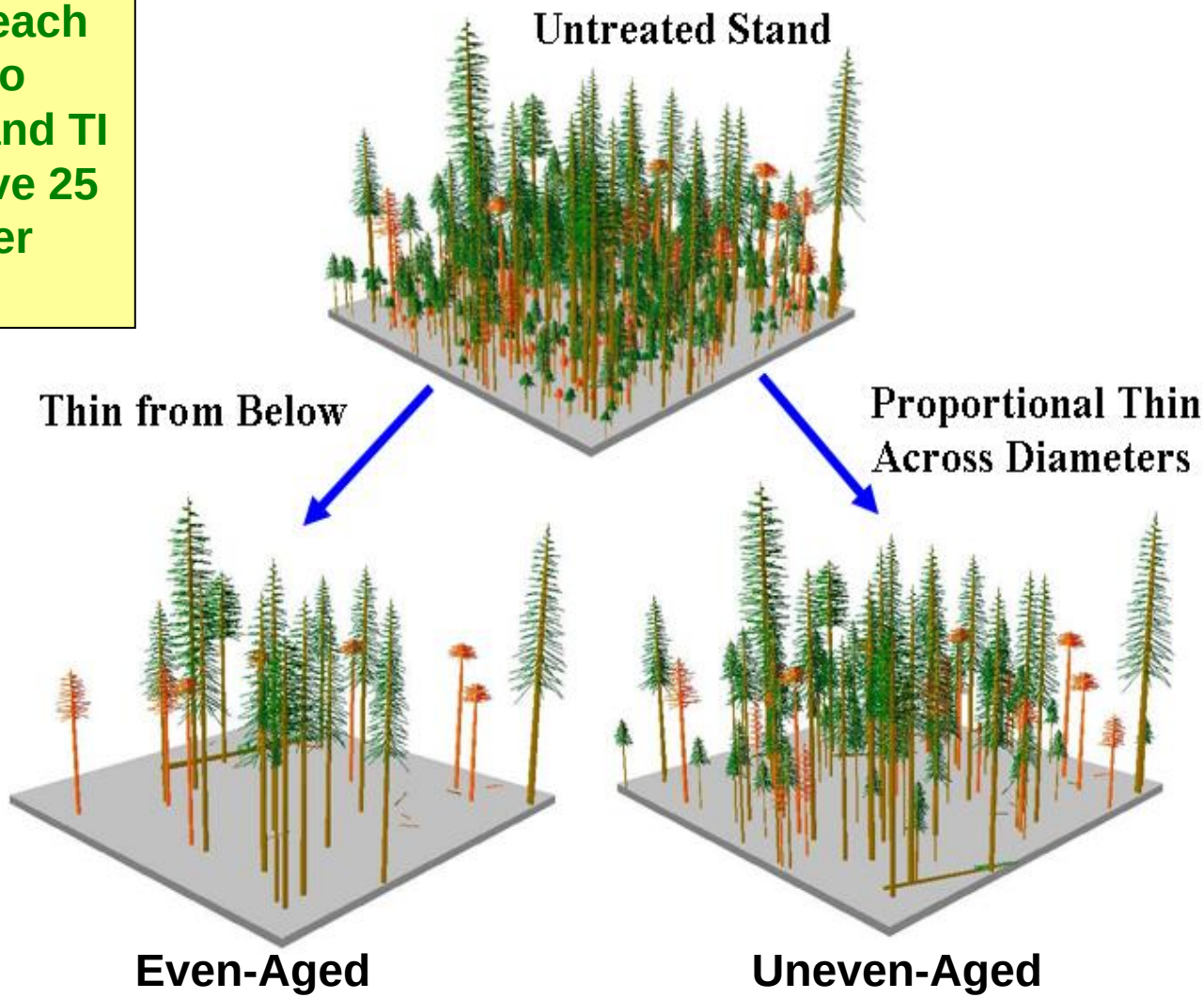
Potential for Biomass Energy Production from Oregon's Forests – OFRI 2006 Report

- Screen landscape for fuel reduction treatment need
  - Exclude Roadless Areas, Wilderness, and parks
  - High fire risk:
    - Fire Regime Condition Class 2 or 3
    - Torching Index or Crowning Index < 25 mph
  - 4.25 million acres eligible for fuel reduction treatment
    - 29% of total

- Torching Index (TI)
  - The wind speed at which a crown fire is expected to initiate in the specified fire environment. Less than 25 is high risk.
- Crowning Index (CI)
  - the wind speed at which an active crown fie is possible for a specified fire environment. Less than 25 is high risk.

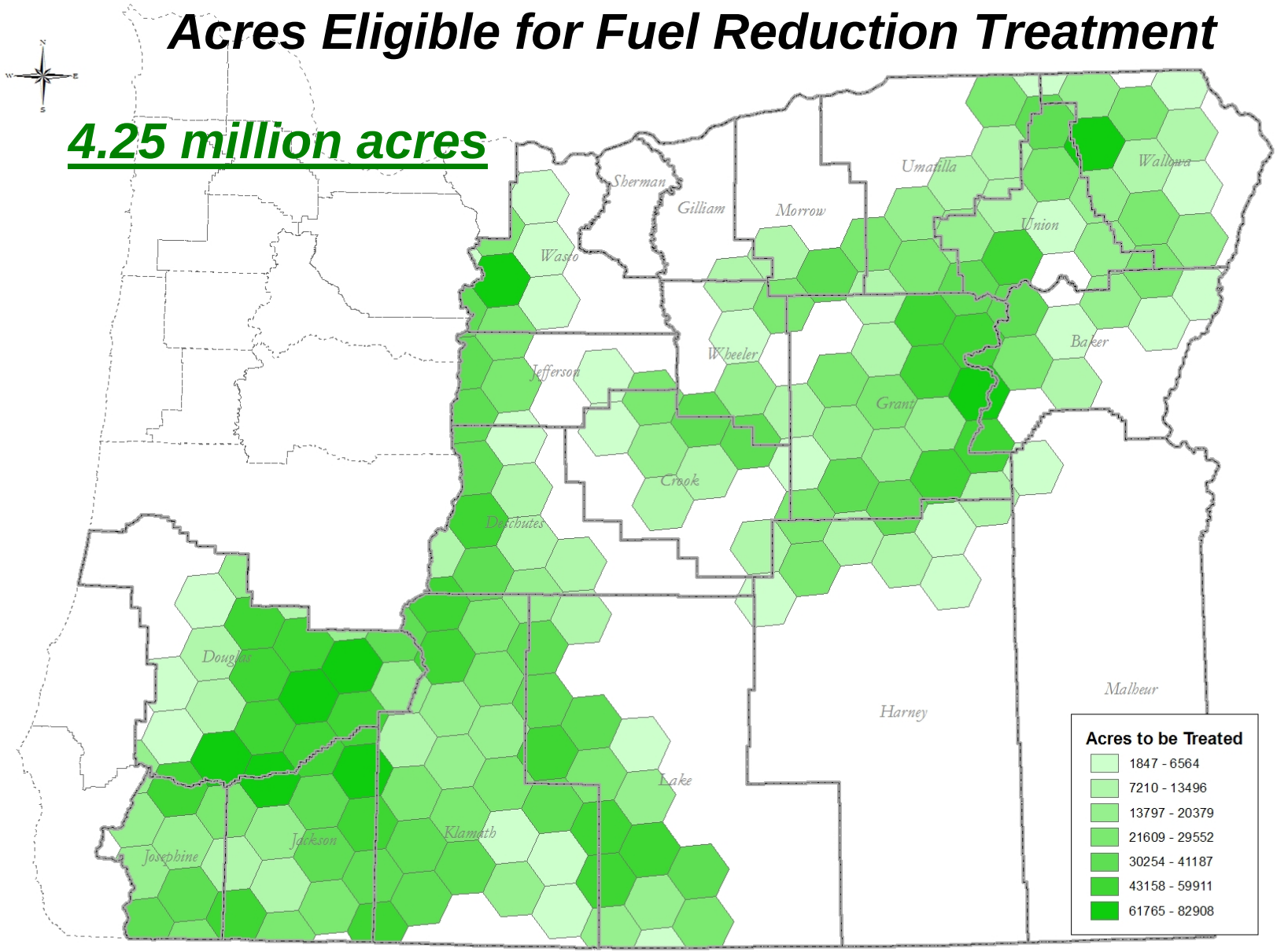
Alternative thinning treatments

Objective of each treatment is to thin until CI and TI are both above 25 or CI is greater than 40.



Acres Eligible for Fuel Reduction Treatment

4.25 million acres



Each hexagon represents approx. 160,000 acres

Miles 0 40 80

Km 0 50 100

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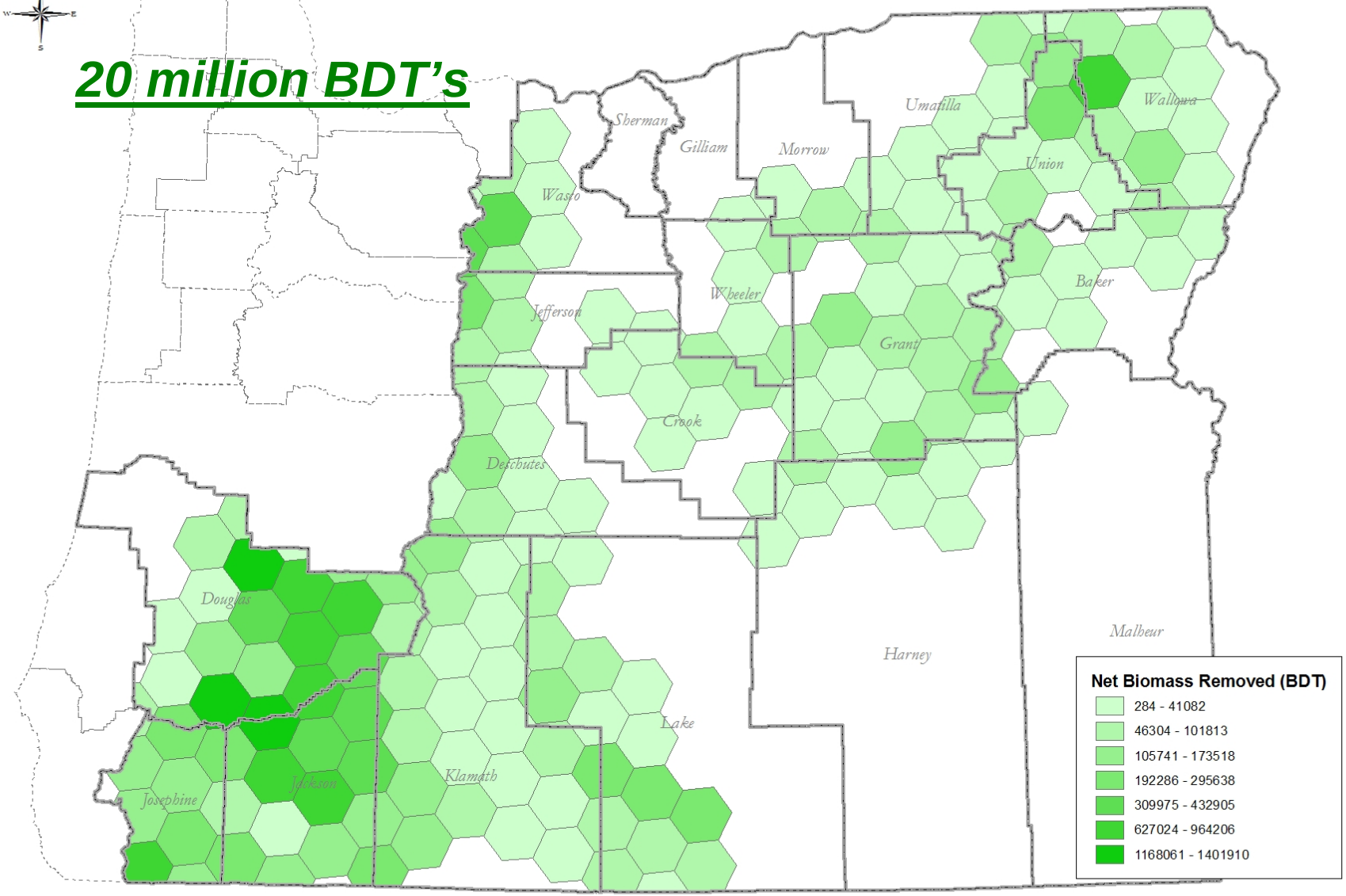
15 March 2006; EPA_BDT_map1_revise_acre.mxd

Net Biomass Removed by Fuel Treatments

20 million BDT's



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Consequences of treating 4.25 million acres

- If treated over 20 years, 212,500 acres would be treated annually across all ownerships
  - 151,000 acres of federal lands
  - 61,000 acres of private land
- Net biomass supply available for energy production would be (conservatively) 1 million bone dry tons annually
- This could produce…
  - 150 MW of electricity at an average cost of 8.1¢ per kWh, or
  - 63 million gallons of ethanol per year

Consequences of treating 4.25 million acres

- In addition, this level of treatment would yield 410 MMBF of sawtimber; a 31% increase over current harvest in the 20-county region

- Across the landscape, the revenue from the sawtimber produced is sufficient to cover direct treatment costs (harvest and haul costs)

Consequences

- This analysis represents just one possible scenario, focused on the acres most in need of treatment
  - Currently highest fire risk based on stand conditions
  - May be considered “low-hanging fruit”
- Other analyses have called for more aggressive scales of treatment
  - 447,000 acres annually for 25 years on public lands (Nature Conservancy[1])
- Ultimately, it depends on
  - What part of the landscape will be treated?
  - How will it be treated?
  - Over what time period?

[1]Mcdonald et al. (2006)

4. What are the barriers to implementing your suggested solution?

- Gaining public acceptance
- Secure, long-term, affordable biomass supply
- Competitiveness in, and access to, energy markets
- Public policy barriers
- Institutional issues
- Technical issues

These are detailed in the OFRI report.

I will focus on those related specifically to federal land management…

Secure, long-term, feedstock supplies

- To get financing, a developer must demonstrate a "bankable" fuel supply for the lifetime of financing
  - Usually 10-15 years
  - Demonstrate primary and secondary supplies to cover contingencies
  - Generally look for a total supply that is 3 to 5 times expected consumption

- Uncertainty of supply from federal lands is *the major challenge* since 70% of biomass is on these lands

Federal land management agency policies

- Woody biomass utilization is not a budgeted agency program
- Biomass utilization policies and plans at national level have not filtered down to field
- Lack of consistency in policy and actions within and across agencies
- Performance goals not aligned to maximize biomass utilization

Federal policies – some examples

- NEPA process costly and time consuming
  - Categorical Exclusion under Healthy Forests Initiative limited to ≤ 1,000 acres for mechanical treatment and ≤ 4,500 acres for prescribed fire – too small for landscape-scale treatment
- National Fire Plan reporting requirements are disincentive to biomass utilization
  - Acreage-based performance measures
  - Double-counting of accomplishments for multi-entry treatments
  - No credit for biomass utilization
- "I can burn it, but I can't pay someone to haul it away."
  - Current regulations require charging at least a minimum rate for any product that is removed for commercial purposes.

Federal policies – some examples

- Stewardship Contracts
  - Great in concept, but…
  - Slow to catch on in Oregon
  - Most have been small-scale
  - Contracts are multi-year but funding is annual
  - Without "teeth," they are not bankable as a reliable supply
  - Provide no revenue sharing to counties
  - Agencies lack resources to plan and implement

- A positive example: White Mountain Stewardship
  - 150,000 acre, 10-year contract on Apache-Sitgreaves NF (2004)
  - Provides raw material for wood pellet, animal bedding facility
  - 467,000 acre Rodeo-Chediski fire (2002) may have been a factor

Federal land management agency capacity

- Lack of resources (staff, budget) to ramp-up to a landscape scale restoration effort
  - NEPA planning & project development
  - Collaborative planning and monitoring
  - Implementation and monitoring of on-the-ground work
  - Multi-year funding of stewardship contracts
  - Communication of best practices, success stories, what works and what doesn't
- Currently, attention to biomass utilization depends on a "champion" at the district level who is willing to advocate for it

Summary

- The conversion of woody biomass to energy in Oregon presents a unique opportunity to simultaneously address three challenging needs:

  ☑Restoring forest health, fire resiliency and wildlife habitat

  ☑Finding renewable energy alternatives

  ☑Revitalizing rural economies

Summary

- Some guiding principles for moving ahead…
  - Use collaborative, transparent decision-making processes
  - Rely on best available science and adaptive management
  - Start small and monitor the results
  - Assure a sustainable level of development
  - Promote the highest value use of forest biomass
  - Reduce market risk to attract private investment
  - Environmental benefits of biomass energy should be paid for by the beneficiaries

Recommended Reading

- *Biomass Energy and Biofuels from Oregon's Forests* (OFRI, June 2006)
  - http://www.oregonforests.org
- *State of Oregon Forest Biomass Working Group Report to the Governor's Renewable Energy Working Group* (January 2007)
  - http://egov.oregon.gov/ENERGY/RENEW/docs/ForestBiomassWorkingGroupDraftFinalReport7.pdf
- *Southwest Oregon Interagency Biomass Utilization Strategy* (Draft) Medford BLM & Rogue River – Siskiyou National Forest
  - http://www.blm.gov/or/districts/medford/files/Biomass.pdf
- *Western Governor's Association Biomass Task Force Report* (January 2006)
  - http://www.westgov.org/wga/initiatives/cdeac/Biomass-full.pdf
- Mcdonald, et. al. 2006. The Condition of Oregon's Forests and Woodlands: Implications for the Effective Conservation of Biodiversity. The Nature Conservancy.
  - http://conserveonline.org/docs/2006/03/Forest%20Restoration%20White%20Paper.pdf
- *Statement of Robert H. Davis, President, Forest Energy Corporation to the Joint Oversight Hearing, Subcommittee on Forests and Forest Health Subcommittee on Energy and Mineral Resources, House Resources Committee On The Effects of High Energy Costs on Jobs and The Potential for Expanded Use for Biomass Energy, February 8, 2006*
  - http://www.sustainablenorthwest.org/pdf/policy/testimony/rdavis02082006.pdf

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