FOREST FUTURE SCENARIO ANALYSIS

Discussion on Plantations

Jakarta
March 17, 2004

SUMMARY FINDINGS
Implications for 4 Success Targets

Illegal Logging: Timber gap is best addressed through downsizing:

- GERHAN, HTI prod., faster planting & imports ➔ not enough

Industry Revitalization: needs investment & time for plantation growth:

- Pulp sector can grow > 8 yrs (2012), after new plantations produce
- Ply & Sawn sectors can grow > 15 yrs (2019), after new plantations

People's Welfare: Small holder land access can generate huge economic benefits & millions of jobs

Presentation Outline
November, 2004

- **Purpose, Approach, Data**
- **Scenarios & Assumptions**
- **Key Scenarios: Evolution Over Time**
- **Key Scenarios: Comparative Results**
- **Discussion of Assumptions on Plantations**
- **Summary Results**

Purpose & Approach

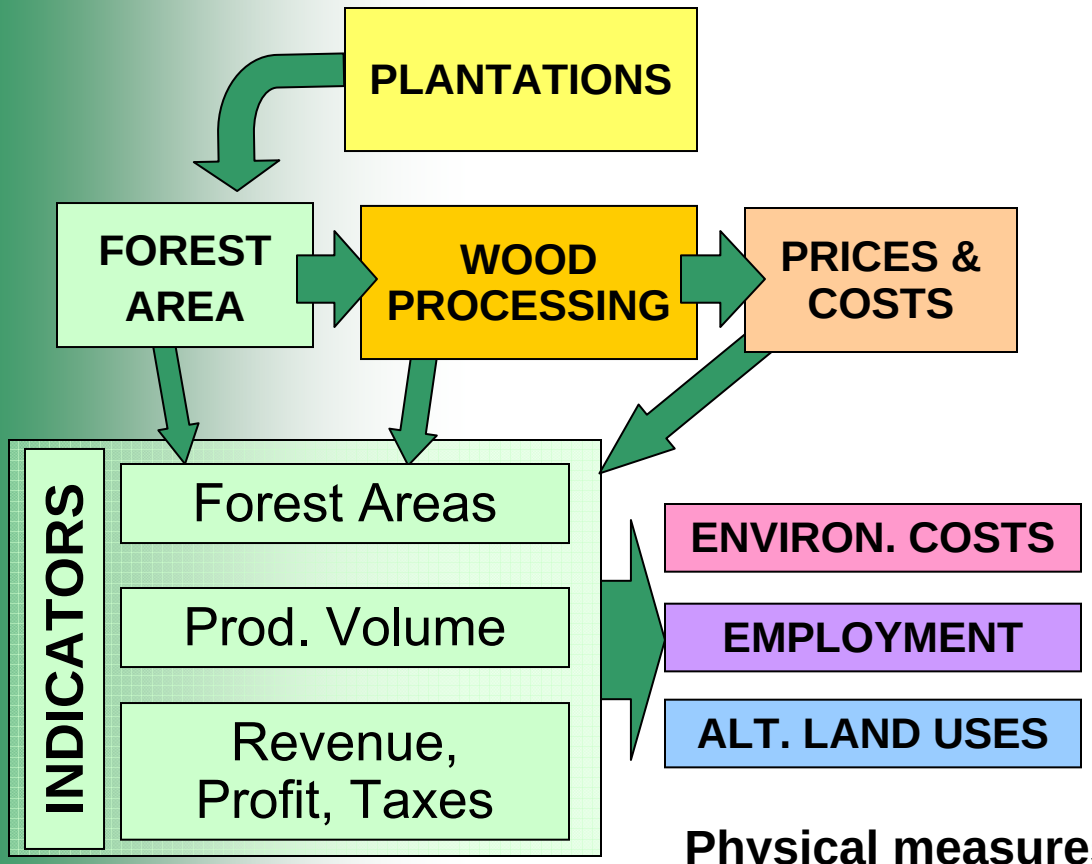
Purpose

- Produce analysis for national debate on role & future of NR
- Provide framework for analyzing implications of NR approaches
- Consider future trends of alternative scenarios, 20+ yrs
- Show ways to manage NR to maximize development potential

Analytical Approach

- General, consistent, interactive, simple, realistic framework
- Focus on a few key indicators, clear graphic comparison
- Compare “what if” scenarios for policy makers, menu
- Discuss & seek agreement with multiple groups

Overview Of Framework, Data, Outputs



Data Sources

- Neraca Sumber Daya Hutan
- Statistik Kehutan and BPS
- Respected published sources

Value (monetized) measures

- Timber harvest & processing
- Environmental services lost
- Production on alt. land uses

Physical measures

- Forest area & planting by forest type
- Timber harvest & volume of processed wood
- Gross revenue, tax revenue, profit
- Numbers of people employed
- Land area in alternative land uses

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DEVELOPMENT OF SCENARIOS

Beginning with Two Base Cases

- Over Harvesting
- Under-Planting
- High Short Run $ Value
- Long Run Environmental Costs
- High Illegal Earnings
- Unequal Benefits & Access

Crisis: What Changes Are Needed?

- Saves Forests
- Sustainable Over Time
- Lower $ Returns
- Lower Employment
- Large Industry Downsizing

Gap: What About Jobs & Revenue?

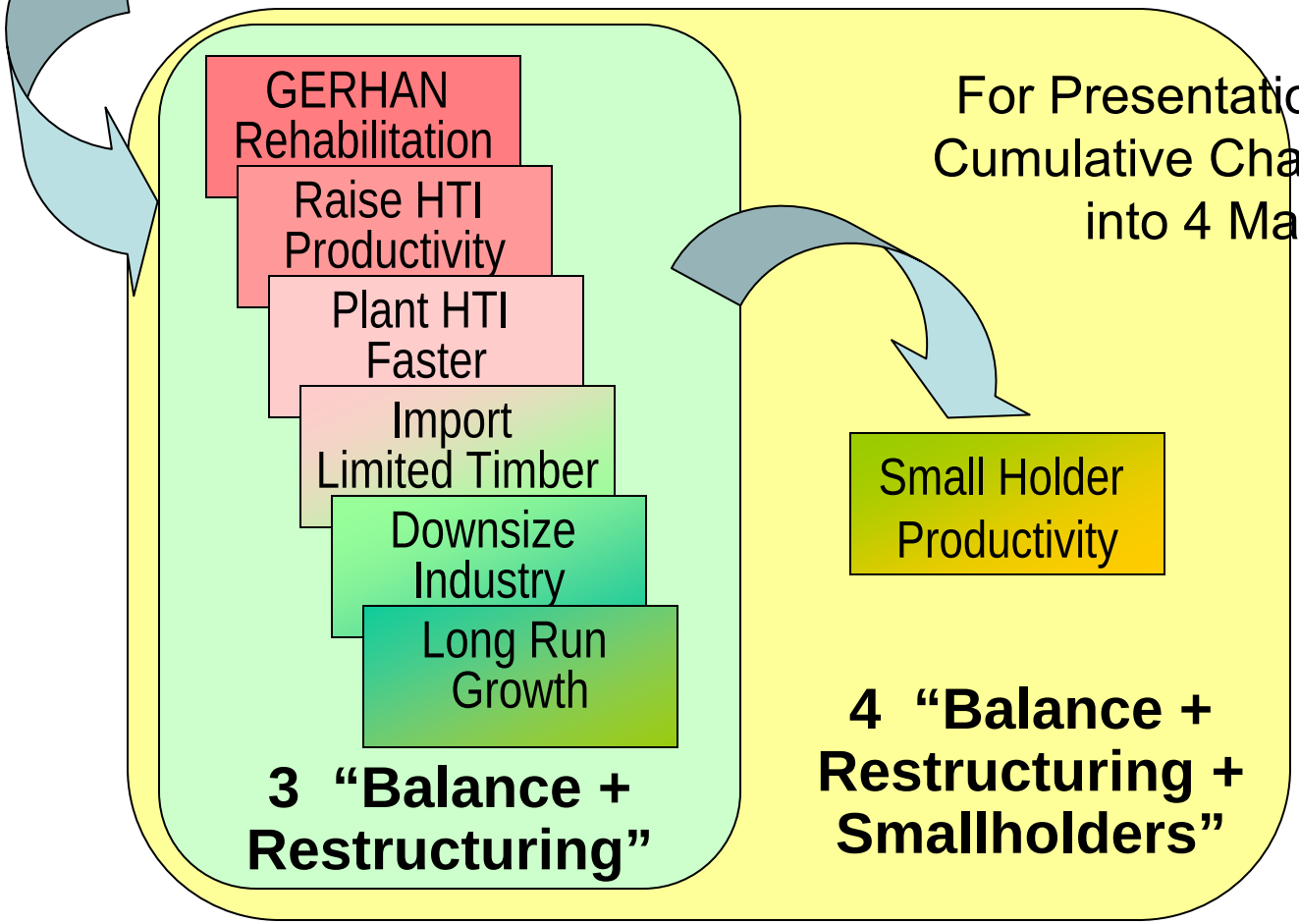
Is There A More Balanced Scenario Between These Extremes?

DEVELOPMENT OF SCENARIOS

1 CURRENT FOREST MANAGEMENT **"CFM"**

Cumulative Changes Were Evaluated Step-by-Step

2 SUSTAINABLE FOREST MANAGEMENT **"SFM"**



For Presentation & Comparison, Cumulative Changes are Grouped into 4 Main Scenarios

March 17: only discussing Scenario 1 and 3

KEY ASSUMPTIONS FOR EACH INTERVENTION

GERHAN Rehabilitation	300,000 ha/yr replanted for 5 years ("Forest Land") Non Forest Land not considered
Raise HTI Productivity	Increase productivity to 48% from current 12% (Best practice should achieve > 60%)
Plant HTI Faster	Increase HTI Planting from 100,000ha/yr to250,000 ha/yr Fill all 6.3 M Ha plantation land in 14 years, by 2018
Import Limited Timber	Pulp imports 1.7 M cum for 5 early years Timber imports 1.4 M cum for 10 years
Downsize Industry	Downsize Ply & Saw Mills 20%, 10% & 10% in 2005-7 Downsize Pulp Mills 10% in 2005
Long Run Growth	Increase Ply & Saw Mills 40% in 2019 (return to original size) Increase Pulp Mills 40% in 2012 & 33% more in 2020
Small Holder Productivity	Increase small holder land uses: 160,000 ha/yr for 10 yrs Hi productive type: employs 4 people/ha, yields $700/ha Subsistence type: employs 6 people/ha, yields $350/ha

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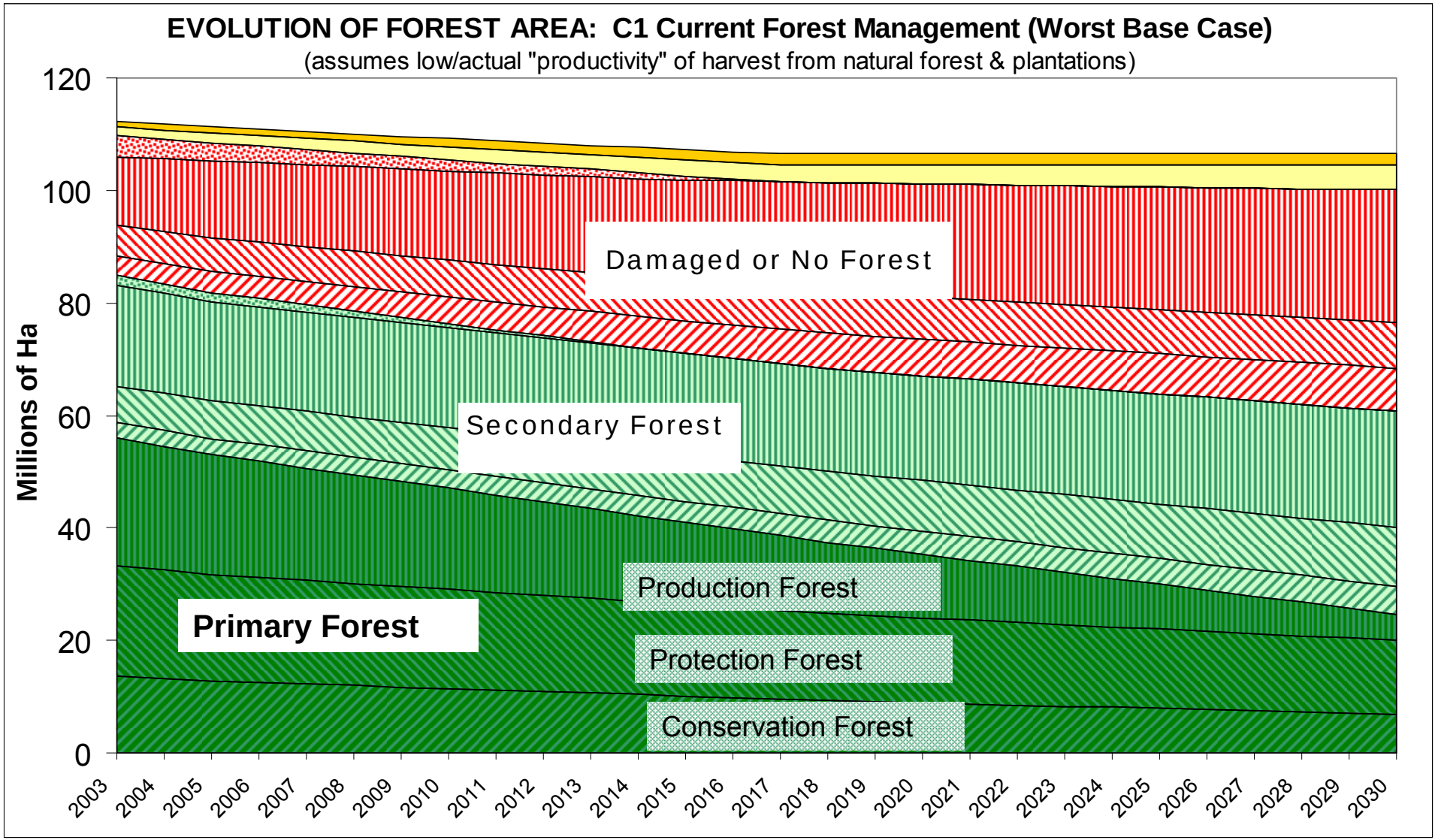
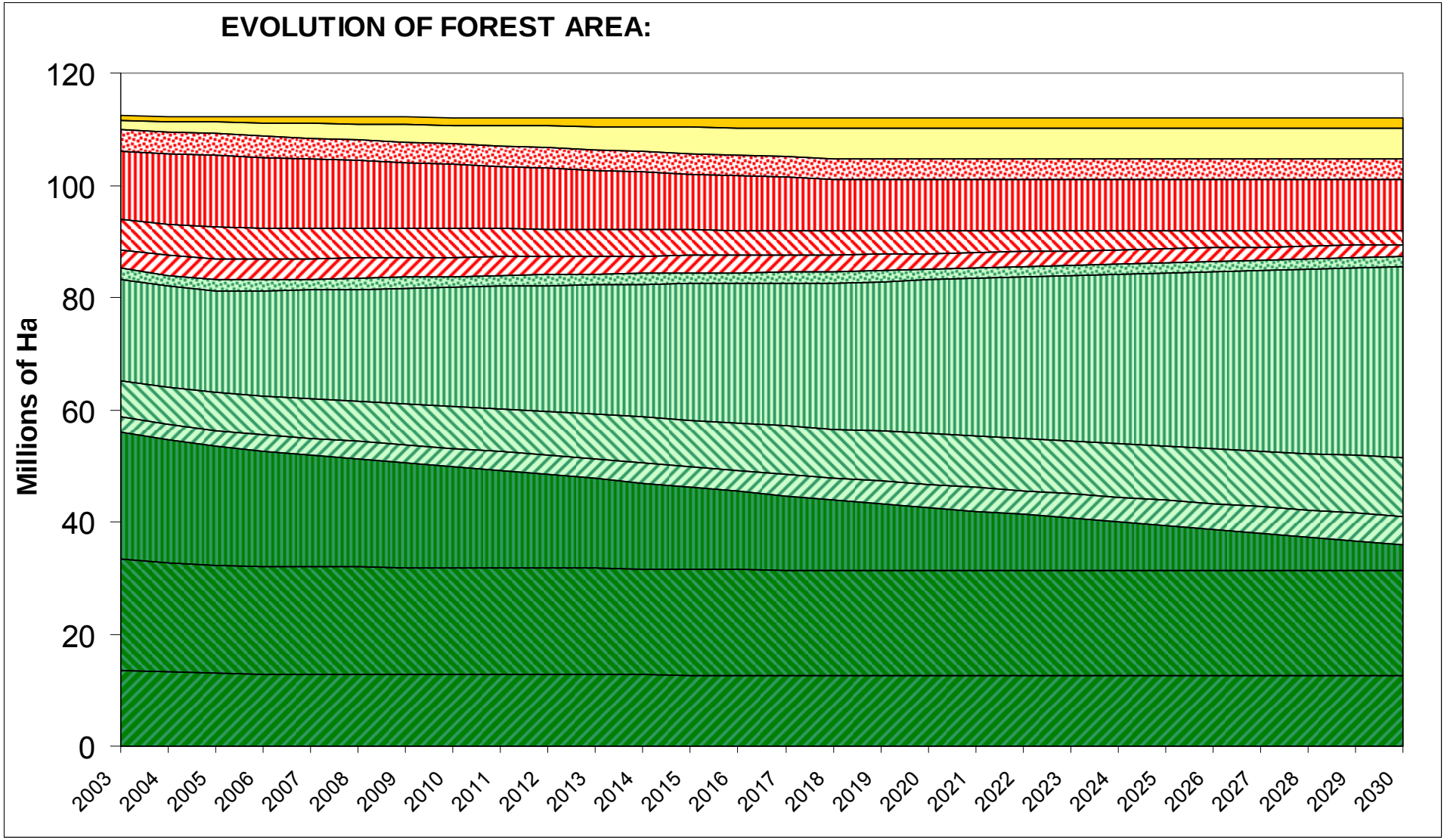
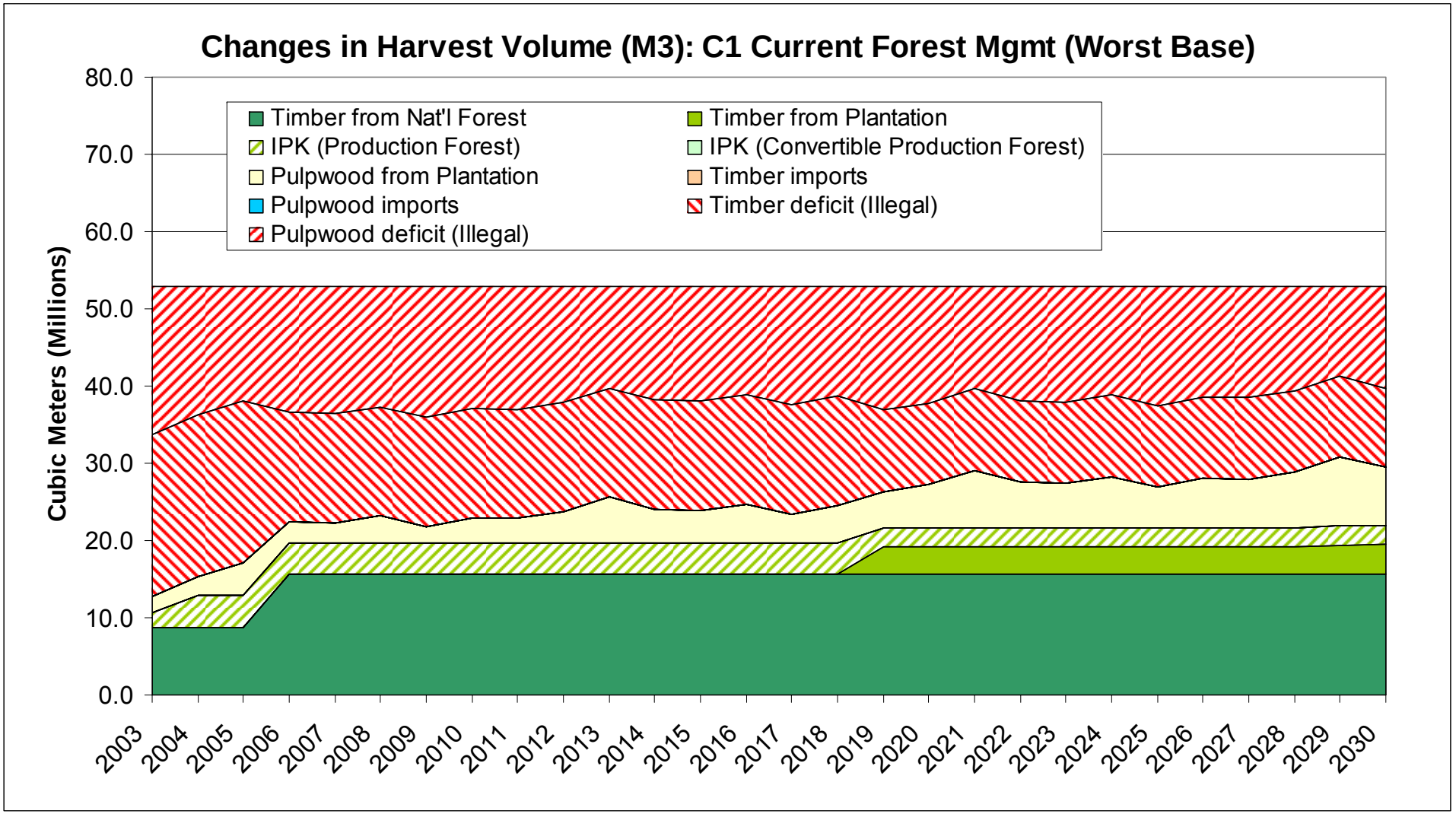
1 CFM - Current Forest Mgmt Over Time: Continuing Crisis



3 Balance + Restructuring Scenario: Balanced Interventions, Balanced Outcomes

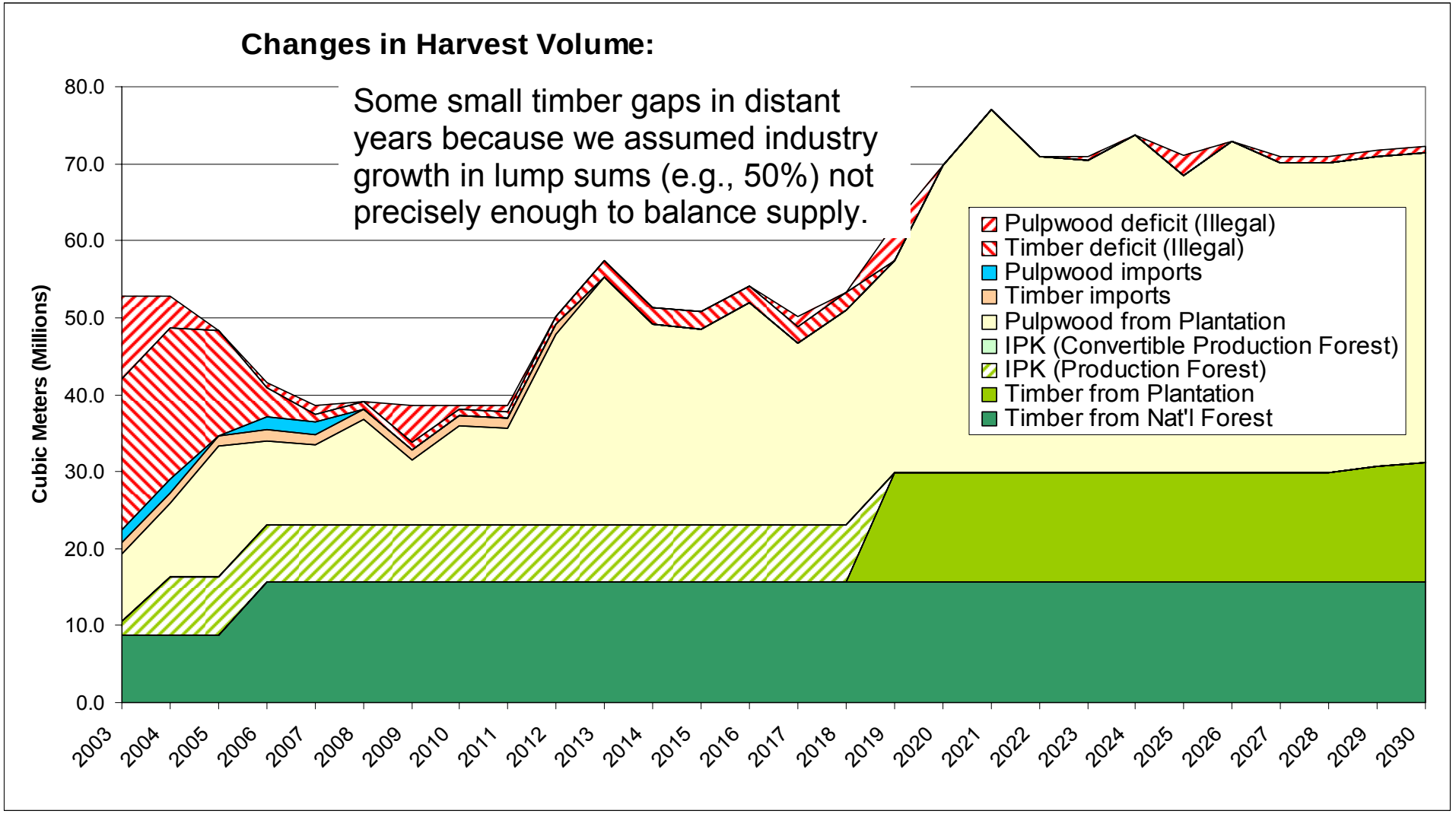


1 CFM - Current Forest Mgmt: Continuing Illegal Logging, Industry Demand > Available, Legal Supply



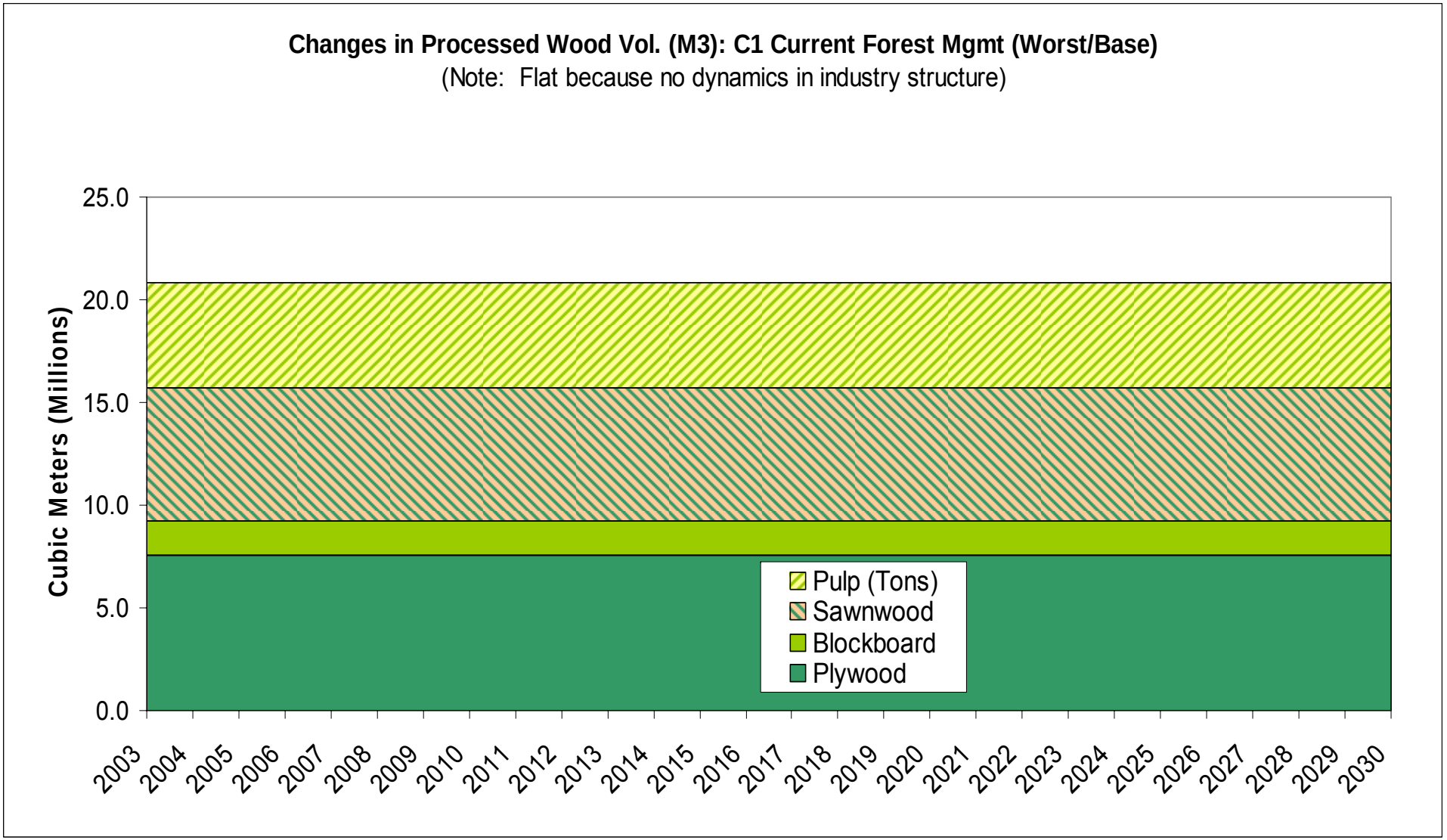
3 Balance + Restructuring Scenario:

Timber gap (illegal logging) reduced by plantation enhancment, imports, and industrial downsizing in short run. Long Run: Industry Growth with Legal Supply

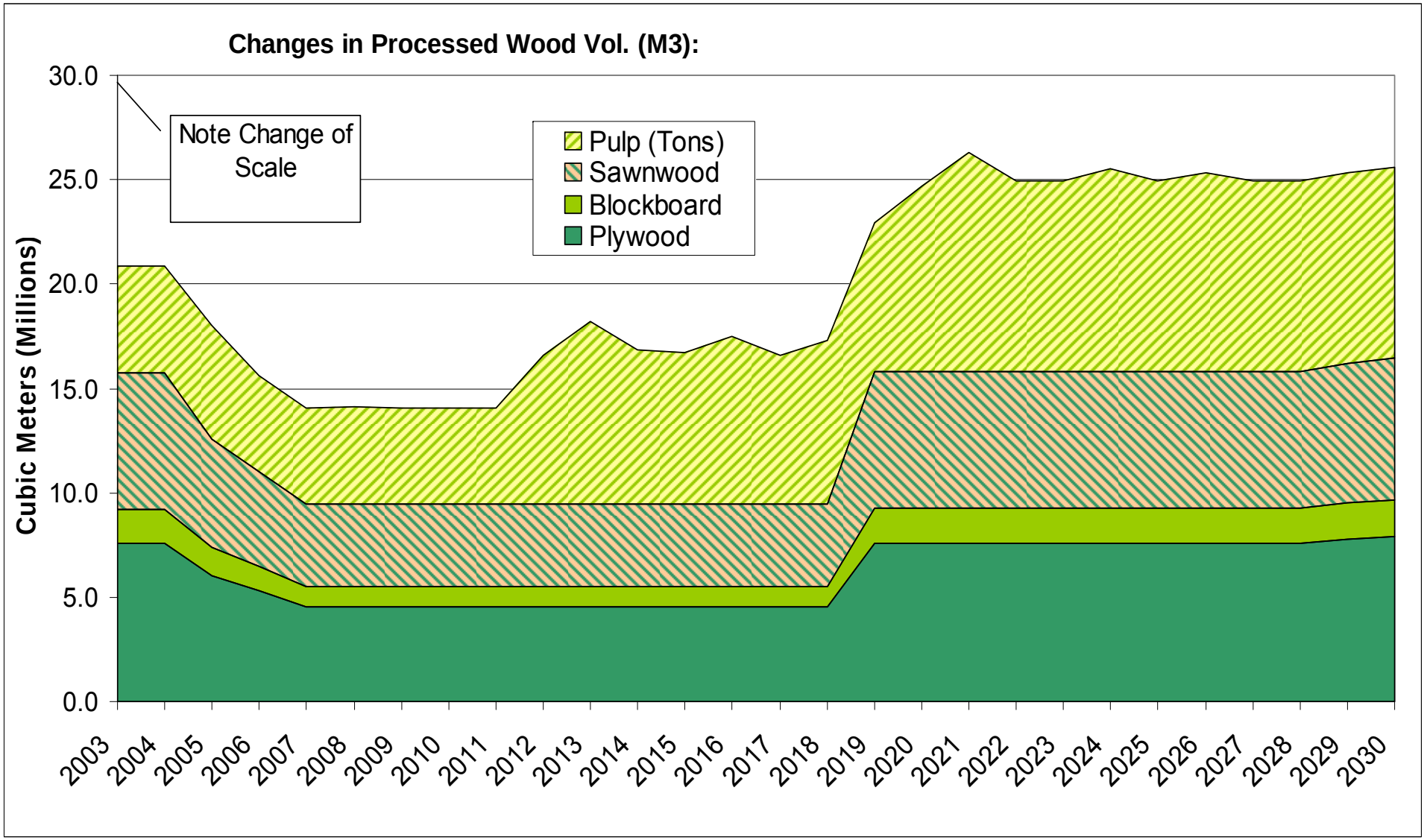


Again, Figure is Same as 4 "Balance + Restructuring + Smallholders"

1 CFM - Processed Wood Production / Output
Assumed no industry growth, just business as usual



3 Balance + Restructuring: Early downsizing, increased productivity, more plantations, long term growth



Same as 4 “Balance + Restructuring + Smallholders”

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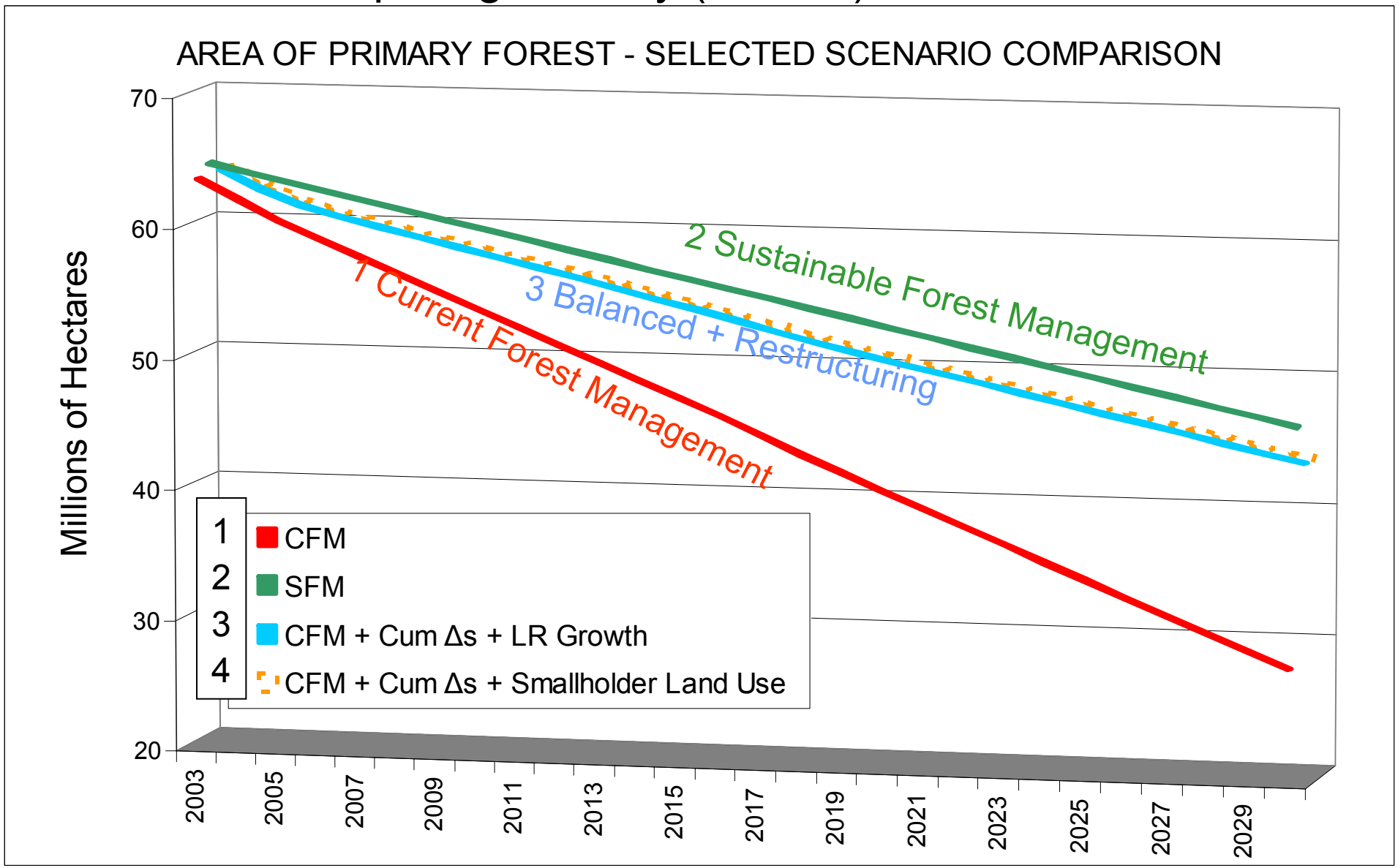
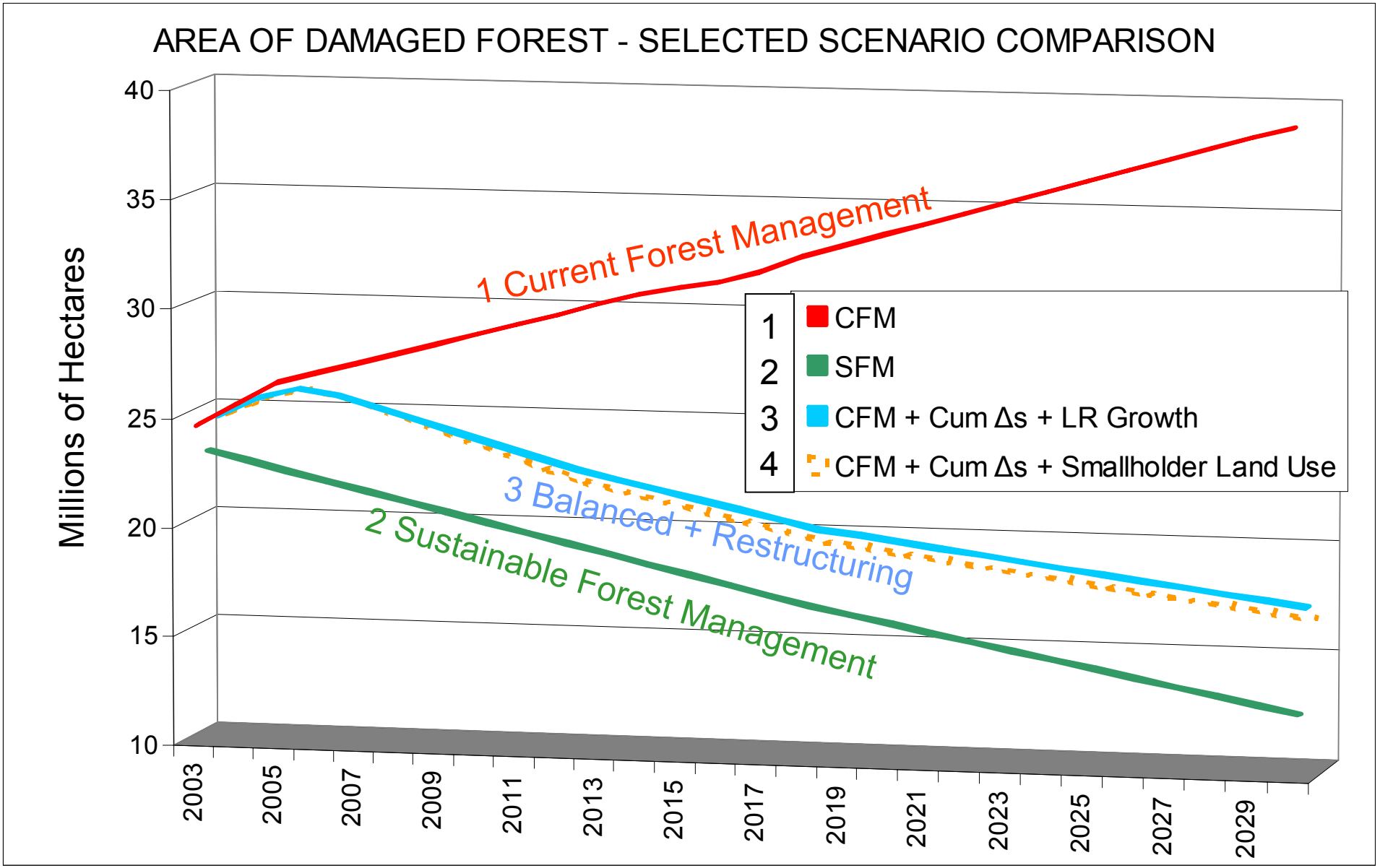
QUANTITY & QUALITY OF FOREST:
Comparing Primary ("Good") Forest Area



Forest Future Scenarios Analysis, p. 18

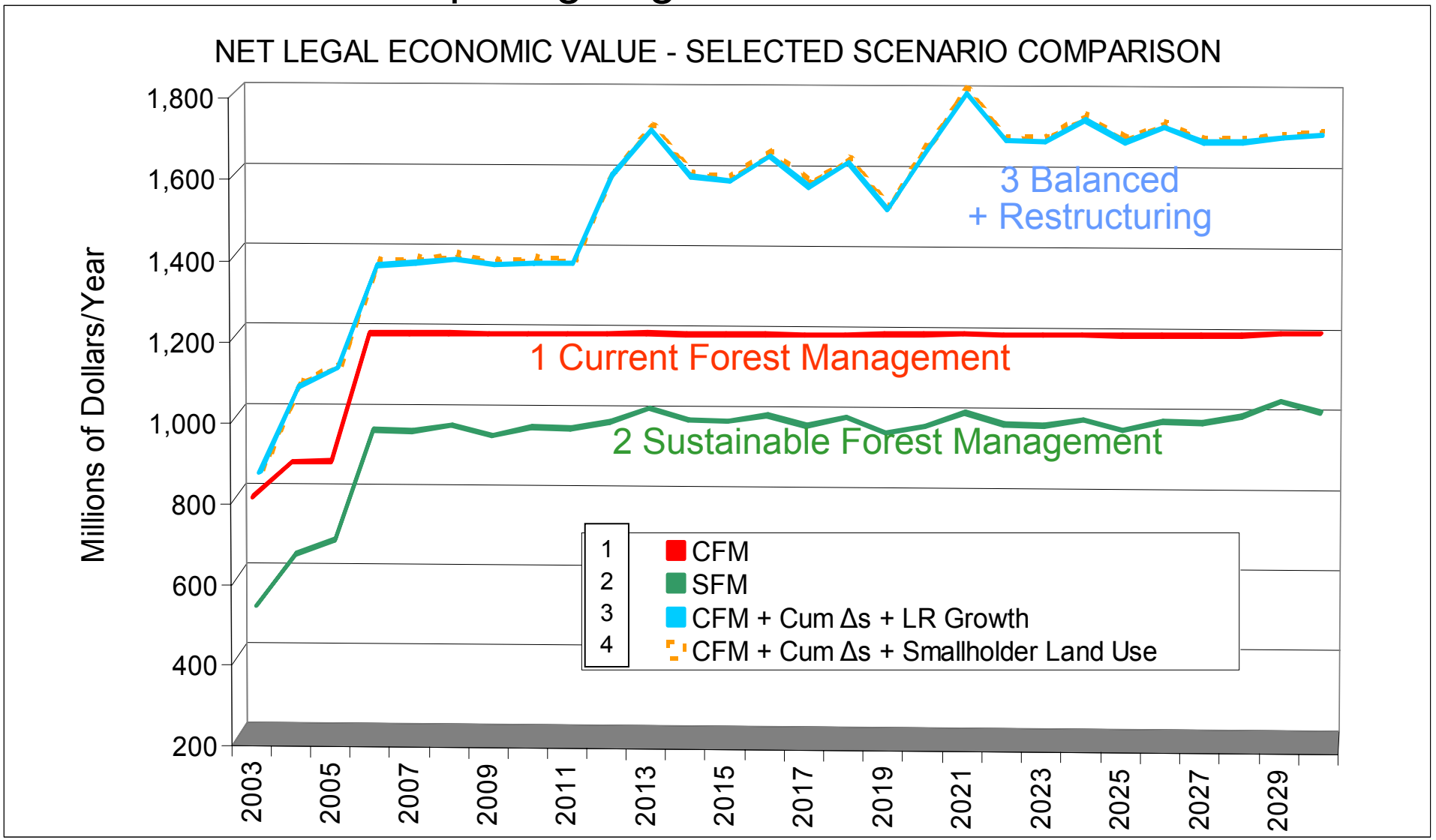
ILLEGAL LOGGING:
Comparing Damaged Forest Area



Forest Future Scenarios Analysis, p. 19

OVERALL ECONOMIC BENEFIT

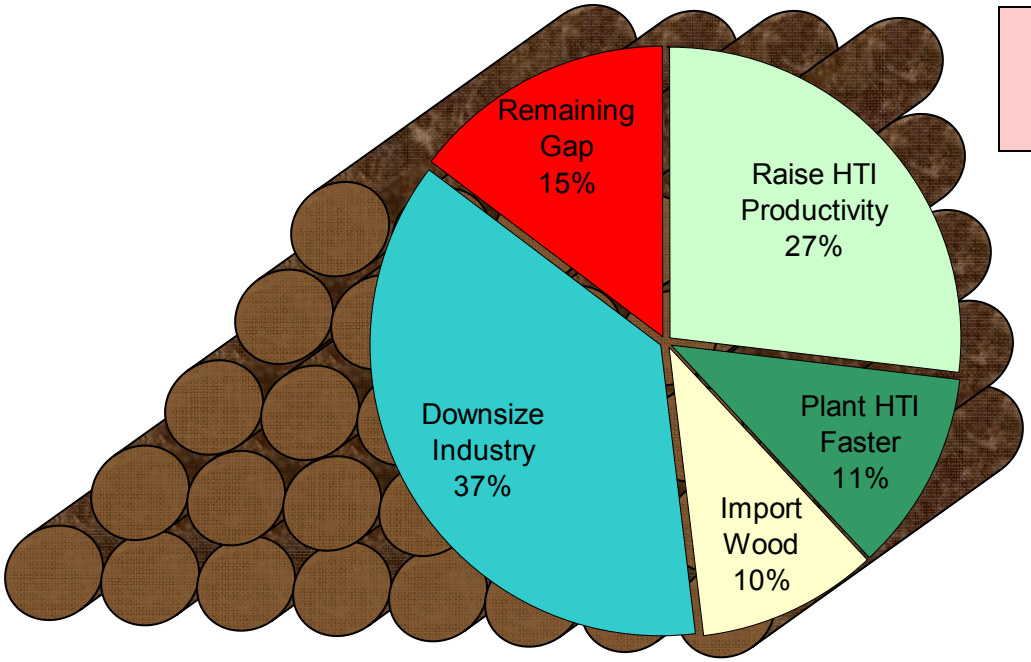
Comparing Legal Value Over Time



Comparing Scenarios: Illegal Logging
Removing the "Timber Gap" Step-by-Step

In 2006, with no change, Illegal Loggers will steal 30 Million m3
Each represented here by one log

What will each intervention achieve to reduce this?



Raise HTI Productivity — Reduces IL by 8 M m3 27%

Plant HTI Faster — Reduces IL by 3.4 M m3 11%

Import Limited Timber — Reduces IL by 3 M m3 10%

Downsize Industry — Reduces IL by 11 M m3 37%

All 4 interventions➔ 85% reduction in IL
Downsizing accounts for most of this

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DISCUSSION OF KEY ASSUMPTIONS FOR PLANTATIONS

Raise HTI Productivity

- Increase productivity to 48% from current 12%
- (Best practice should achieve > 60%)
- See discussion next page

Plant HTI Faster

- Increase HTI Planting from 100,000ha/yr to250,000 ha/yr
- Fill all 6.3 M Ha plantation land in 14 years, by 2018
- No need to plant more: sufficient for future growth
- No need to plant faster: can't grow enough in short run

Import Limited Timber

- Pulp imports 1.7 M cum for 5 early years
- Timber imports 1.4 M cum for 10 years
- A short run gap filler to reduce illegal logging

Plantation Timber Growth: Increasing Productivity?

Forest Futures Analysis Assumption:

- Plantation productivity increases from 12% to 48%
- Of the 200 cum/ha theoretical maximum
- With this 4X increase: can close timber gap after some growth

Is this realistic? Based on Comparative Evidence

- 48% is only what's needed to fill the gap
- 60% is considered "expected performance" or average
- 90% is considered possible by industry experts.
- Other countries achieve this 60% level regularly
- Well run Indonesian firms achieve 125-150cum/ha (64-75%)
    - Musi Hutan Persada, SumSel
    - Toba Pulp Lestari

Can we reverse the question:

- Why is current productivity 5 times too low?

Plantation Timber Growth: Increasing Productivity?

Is Increased Productivity realistic? What Practical Actions?

- Increase monitoring of land use and planting. Companies using GOI funds (DR), facilities (licenses, etc.), or land grants must demonstrate proper land mgmt & HTI maintenance
- Make companies more efficient and responsible in using land: pay attention to quality of plantation timber stand; use appropriate land/suitability (e.g., not peat swamps).
- [Companies care about land area not stand quality: harvesting natural forest is easier than [proper planting maintenance]
- Conduct training so best practices are replicated in poor performing firms (Public scrutiny of records might help…)
- Improve enforcement on recording and reporting, so companies cannot mis-report (falsify records) to avoid paying taxes

Plantation Timber Growth: Increasing Planting?

Basic assumption

- Past average annual HTI planting rate: 100,000ha/yr
- Increase annual planting to 250,000 ha/yr will
- Fill all 6.3 M Ha plantation land in 14 years, by 2018
- Ultimately yields 40 M cum/yr sustainably

If plant at higher rate 250,000 ha/yr, will

- Achieve abundance of pulp wood in 10 years from now.
- Achieve excess pulp wood after year 2020, which can be:
    - Exported
    - Used to expand capacity in pulp
    - Used for low quality sawn wood demand, not all product types
- Not solve the timber deficit problem in ply and sawn wood

Planting even faster will not fill gap sooner: trees take time

- Construction timber gap takes 15 ys to fill with plantations

Can plan for change in industry structure over 15 yrs

- Pulp and sawn wood are much bigger shares of the total

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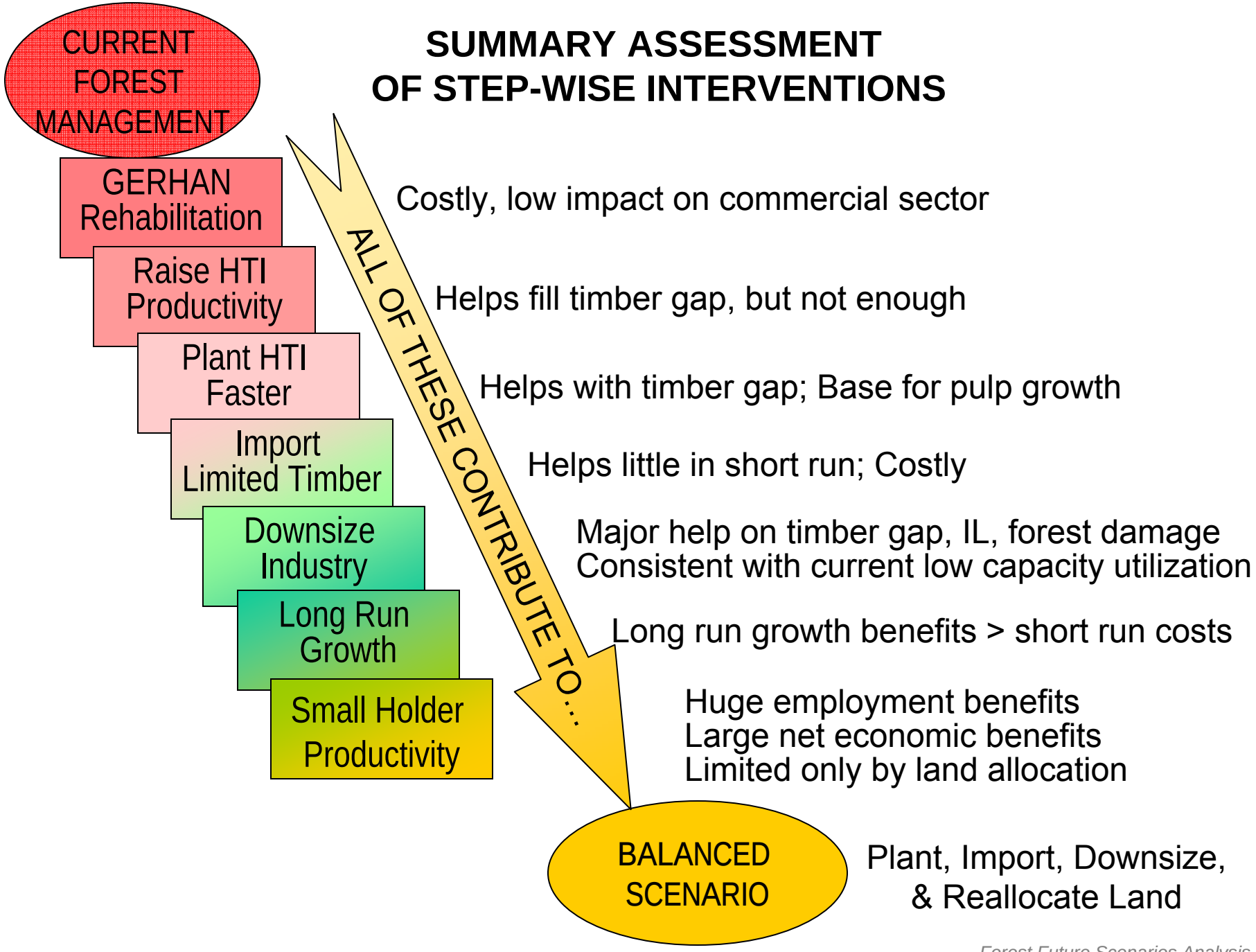
SUMMARY ASSESSMENT OF STEP-WISE INTERVENTIONS



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- Additional Discussion of Plantations

Forest Products Industry: Dynamic Evolution

- Pulp is the fastest growing sector of wood use
- Plywood has been in decline in production & earnings
- Particle board is replacing plywood in many other countries
- Conversion forest (IPK Wood) is the fastest growing source of supply
- Market trends toward value added, downstream wood processing, diversified products
- International competition drives commodity prices down, need value added to survive

Forest Products Industry: National Competitiveness

- Illegal harvesting “subsidizes” timber supply, distorts incentives for efficiency, market adjustment, re-investment
- Low cost, undervalued timber mainly subsidizes foreign consumers of exported wood products and pulp
- Balancing industrial demand with a stable, secure supply (through plantations and SFM) will enhance longevity of industry
- Removing indebted, inefficient, or lawless firms will enhance the competitiveness of the rest – both locally and internationally

Competitive Position Enhanced By (both sector & firms:

- Investing in long term, renewable sources of supply: plantations
- Linking wood quality & type to production technologies, end uses
- Decreasing dependence only on large old growth timber

Uses for Plantation Grown Timber

Plywood Plants:

- International market, competition with many products & qualities
- Long rotation plantations: can meet some plywood/particle board needs
- Modify ("re-tool") the mills → technological changes or diversification on size, species, products, value added

Sawn Wood

- Domestic construction needs
- Furniture (high value added, good for exports)
- Building components (high value added, good for exports)

Pulp Mills:

- No technical need for natural forests
- Are pulp mills planting, using plantation wood?

Enhancing Supply: Plantation Timber Growth

If 1 ha of plantation produces 200 m3 of timber over 8 years…

- Then 5 million ha of plantation can produce 5/8*200 =
- 125 million m3 of wood fiber/year sustainably
- (Half of this is already planted)

- Twice Indonesia's current use of wood (48-60 million m3/yr)
- Even if only half that productivity were achieved, still enough

Yet, 1.6 million ha are being deforested/year: not replanted

- If even half were replanted to timber only 3 years running
- 2.4 million of new plantations
- Indonesia's wood supply would be secured forever