



**POTENTIAL CARBON SEQUESTRATION
ON PUBLIC AND PRIVATE TIMBERLANDS
IN THE UNITED STATES:
RESULTS OF MODELING STUDIES**

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DIMENSIONS OF DISCUSSION

- FOCUS ON “POTENTIAL” OR APPROXIMATE OUTCOMES
 - ABSENCE OF REAL WORLD OBSERVATIONS
 - MAJOR ROLE OF MODELS IN RECENT POLICY DEBATE
- ELEMENTS OF INTEREST
 - PRIVATE AND PUBLIC SEQUESTRATION OPPORTUNITIES
 - AFFORESTATION AND MANAGEMENT
 - EFFECTS OF DIFFERENT POLICIES
 - PRIVATE CARBON OFFSET SALES
 - RANGE OF POTENTIAL PRICES: NO PRICE ELASTICITY (YET)
 - DIFFERENT SALES CONDITIONS: MANDATORY, VOLUNTARY
 - PUBLIC HARVEST POLICIES
 - IS THERE OPPORTUNITY FOR GAIN FROM PUBLIC AND PRIVATE COORDINATION?

FOREST CARBON MODELS

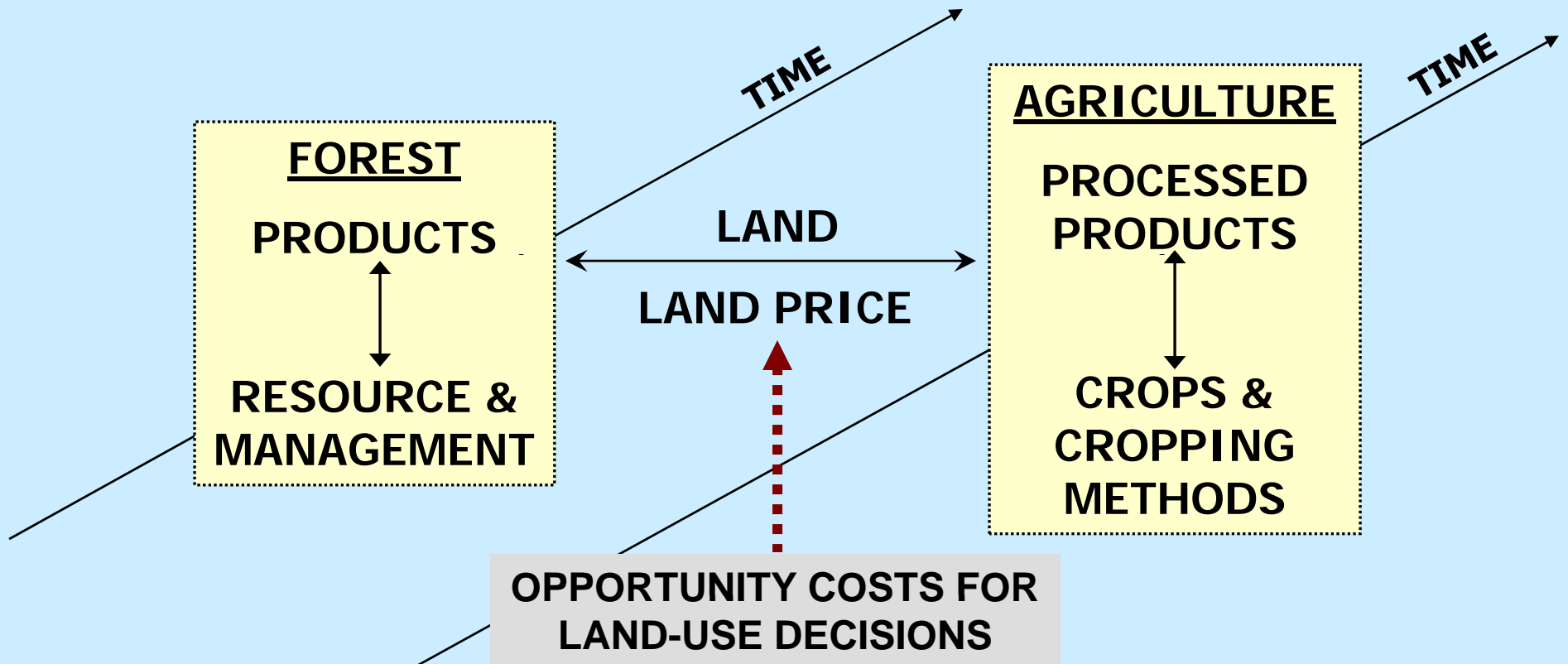
- RANGE OF APPROACHES IN ECONOMIC COST STUDIES

<u>MODEL TYPE</u>	<u>FOCUS</u>	<u>INVESTMENT AND MARKET ADJUSTMENTS</u>
"ENGINEERING"	AFFORESTATION (SOME MANAGEMENT)	STATIC
ECONOMETRIC, LAND-USE	AFFORESTATION	STRUCTURED ADJUSTMENT
OPTIMIZING MARKET	AFFO + MANAGEMENT	SIMULTANEOUS / PERFECT

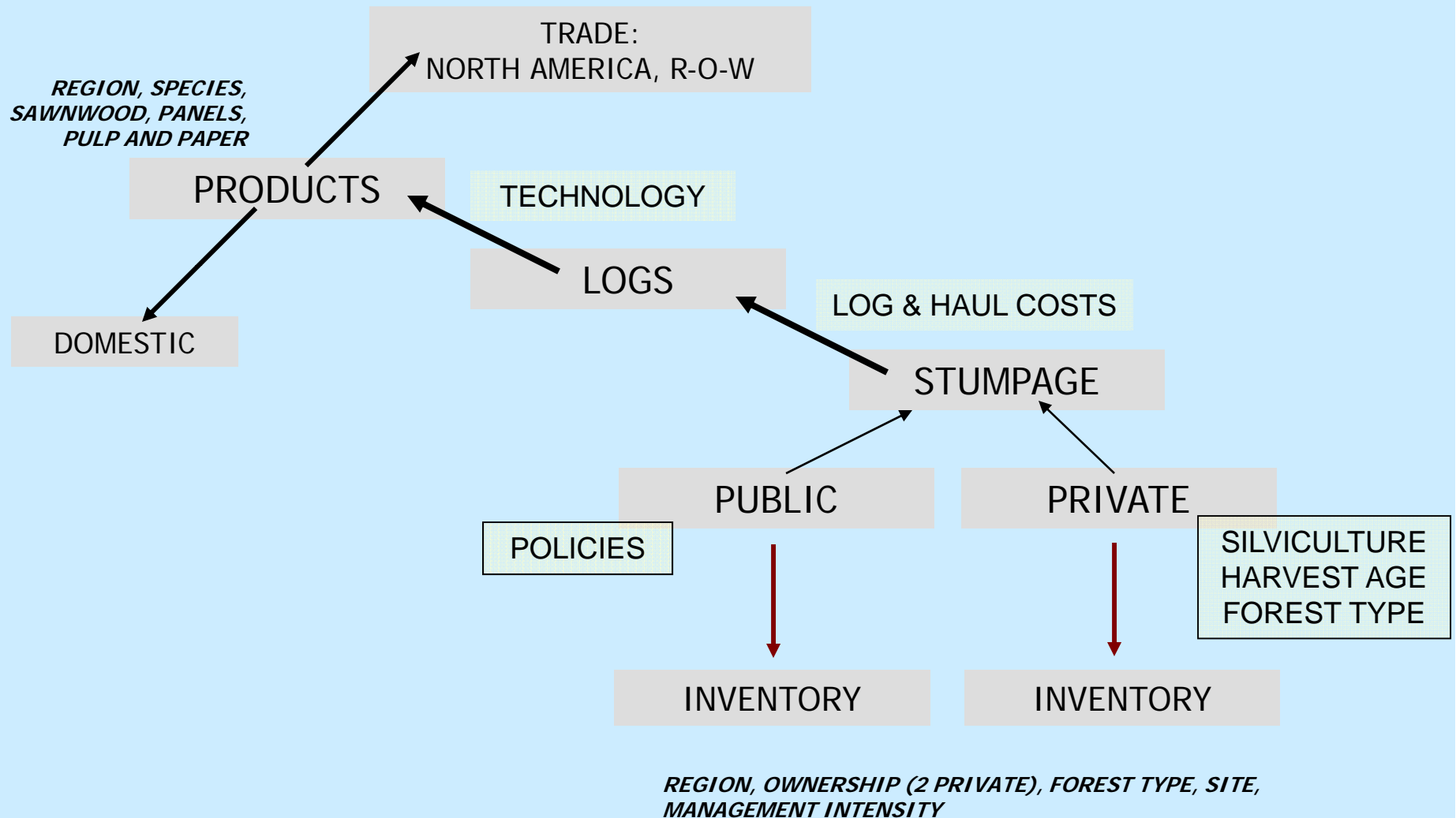
- BIOLOGICAL MODELS TO SIMULATE CARBON STOCKS AND FLUX UNDER FIXED ASSUMPTIONS

FASOM-GHG

FOREST AND AGRICULTURAL SECTORS OPTIMIZATION MODEL: GREEN HOUSE GASES



FASOM-GHG: FOREST SECTOR DETAIL



FASOM-GHG: CARBON FOREST ACCOUNTING



FOREST CARBON POOLS

- TREE: LIVE AND DEAD – ABOVE AND BELOW GROUND
- FOREST FLOOR: CWD
- UNDERSTORY VEGETATION
- LITTER AND DEBRIS
- ORGANIC SOIL (1m)

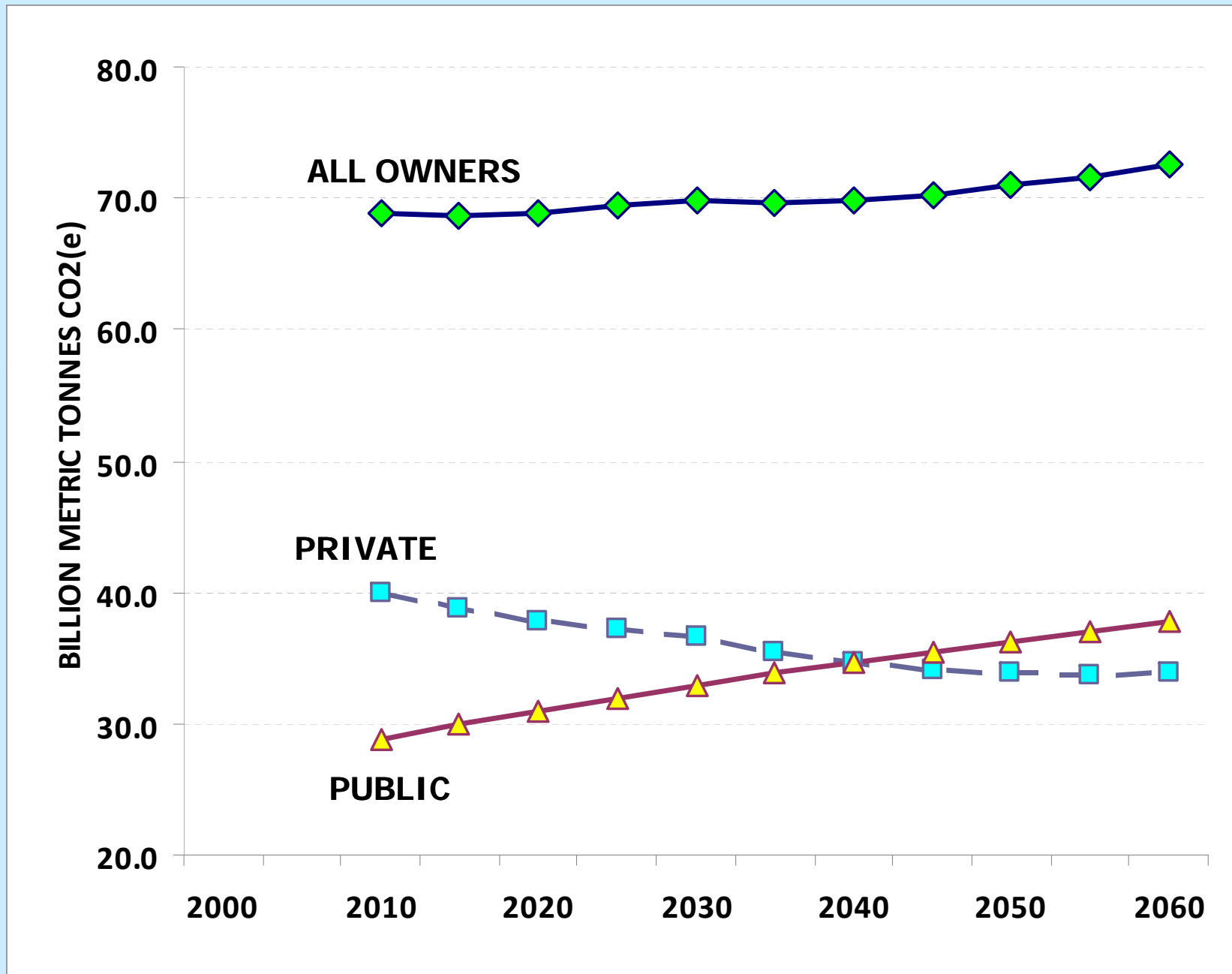
FASOMGHG: SOME SPECIFICS

- **TIMBERLAND NOT FORESTLAND**
- **LIMIT POOLS TO “NON-SOIL FOREST ONLY”:**
 - PRODUCT AND LAND-FILL POOLS
 - SOIL POOL
 - “SUBSTITUTION”
- **IDEAL “MEASUREMENT” CONDITIONS**
 - EFFECTS OF MANAGEMENT
 - EXACT BASELINE FOR ADDITIONALITY
 - ACCURATE FLUXES

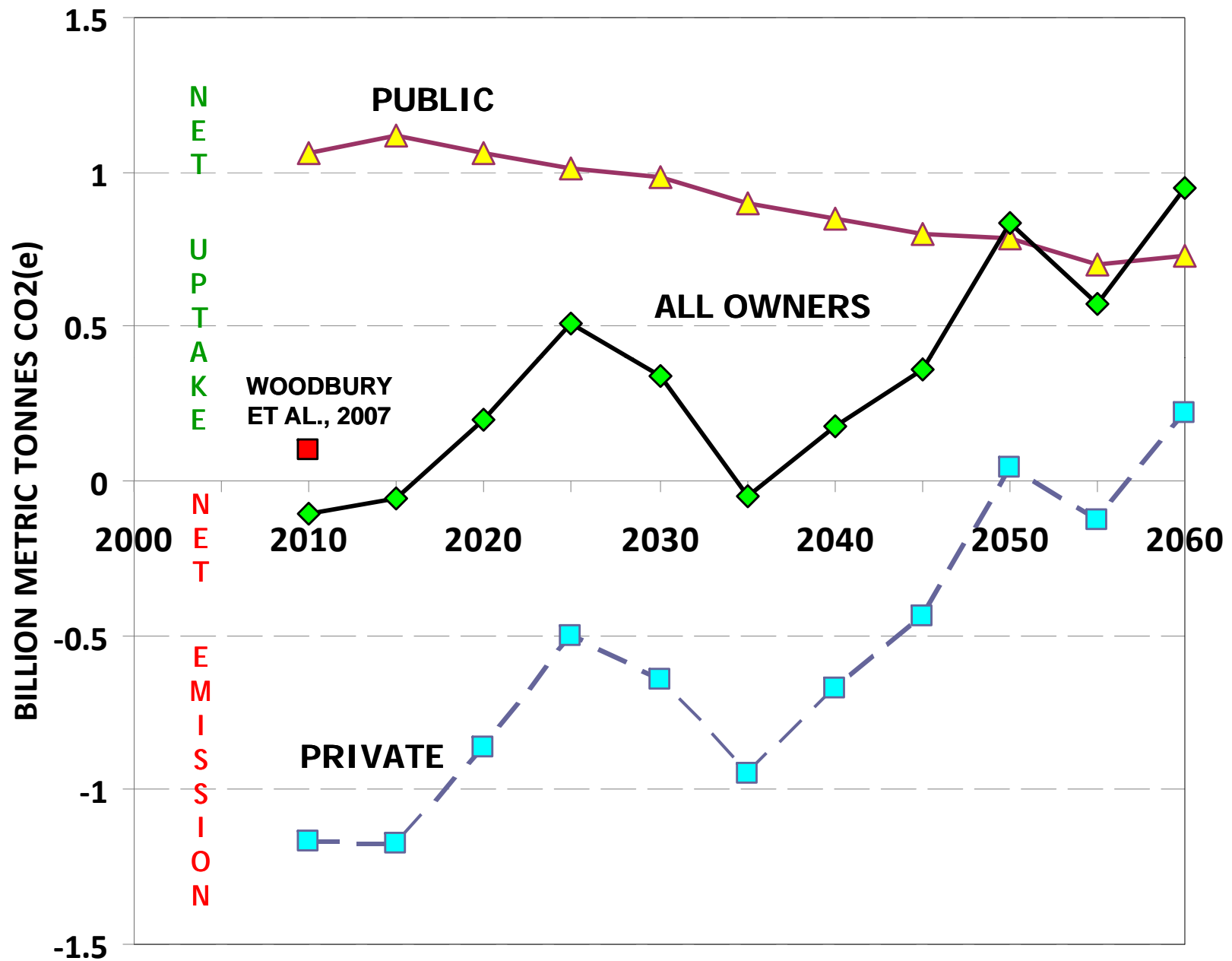
SCENARIOS TO EXAMINE

- “BASELINE” OR BUSINESS AS USUAL
 - COMPARE WITH OTHER STUDIES
 - LOOK A OWNER BEHAVIOR
- PRIVATE SECTOR RESPONSES TO CARBON OFFSET SALES
 - MANDATORY (SUBSIDY/TAX) SYSTEM
 - VOLUNTARY SALES
- PUBLIC SECTOR RESPONSE TO POLICY CHANGES
 - ZERO HARVEST
 - MAXIMUM “NON-DECLINING EVEN FLOW”
- COMBINED PUBLIC AND PRIVATE POTENTIAL
- OPPORTUNITIES FOR “COORDINATED STRATEGIES” BETWEEN PUBLIC AND PRIVATE LANDS - AN EXAMPLE FROM THE PNW

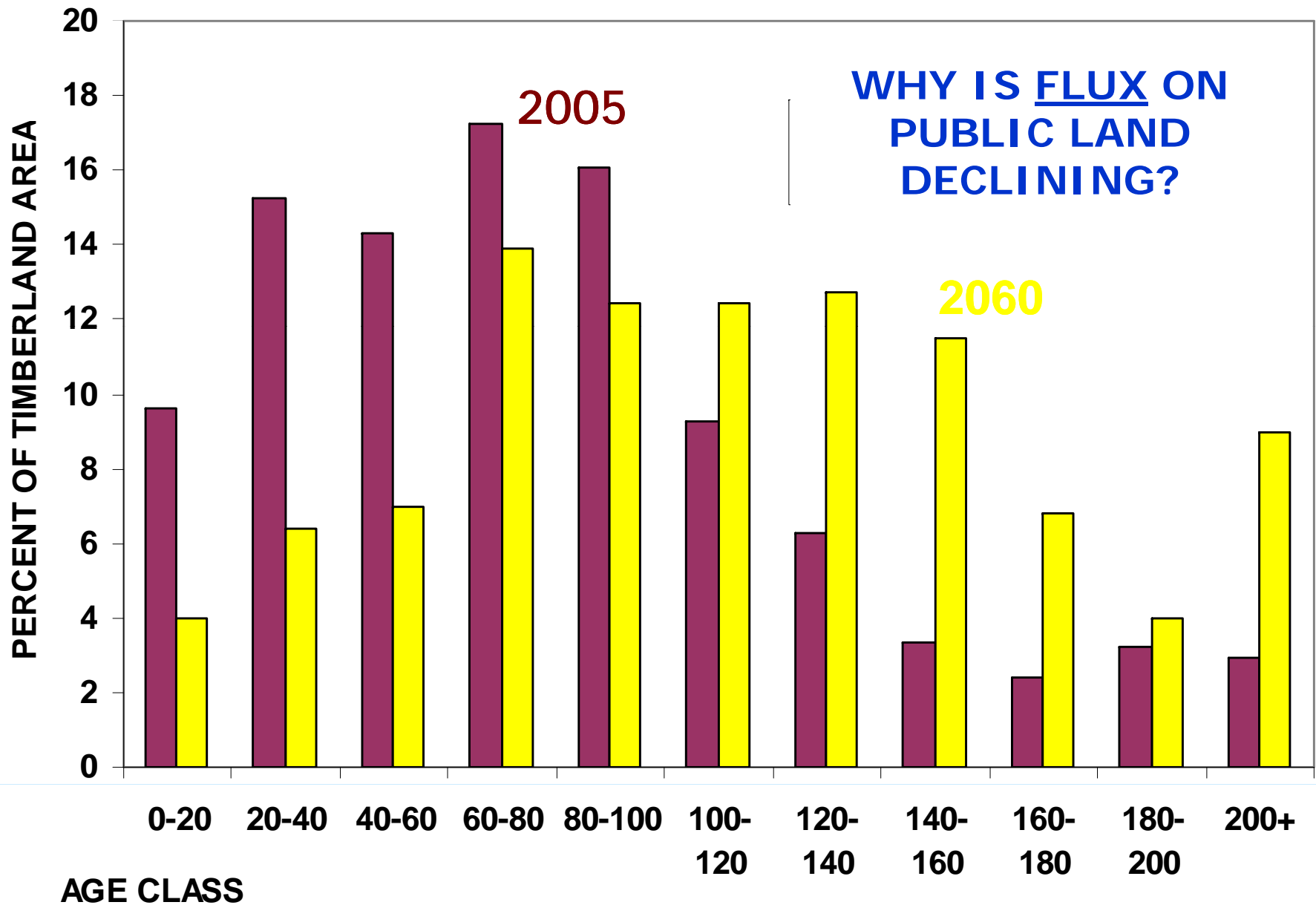
FOREST CARBON STOCKS – “BASELINE” CASE

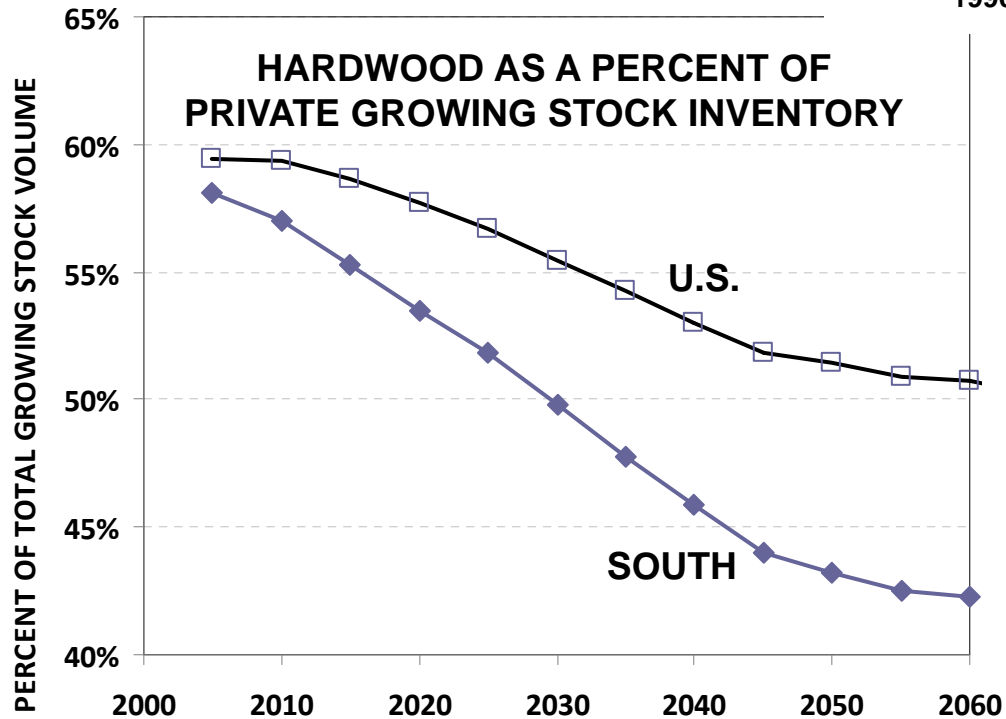
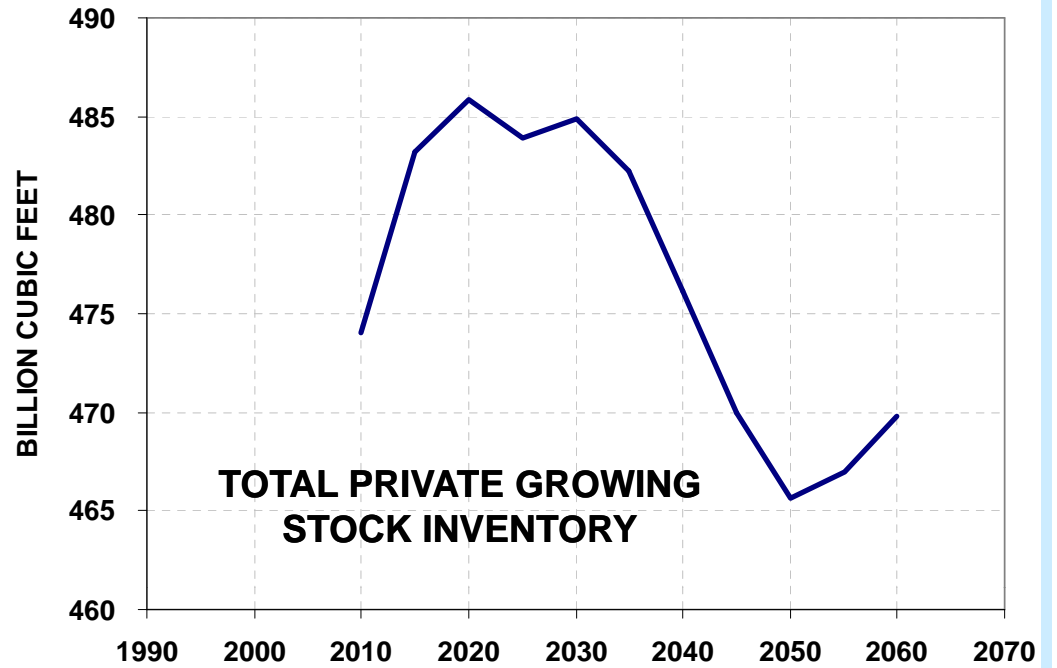


FOREST CARBON FLUX – “BASELINE” CASE



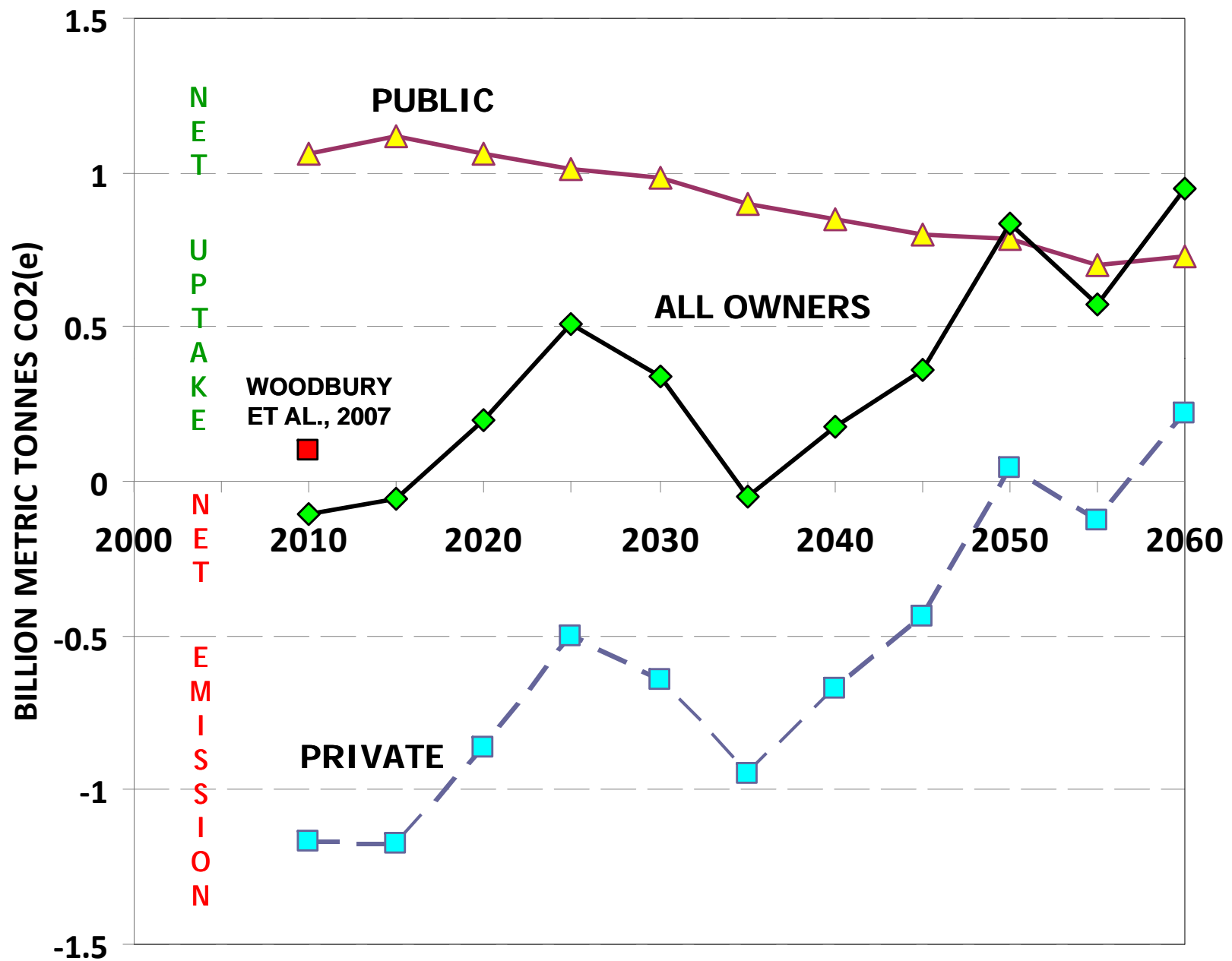
AGE STRUCTURE OF TOTAL PUBLIC INVENTORY





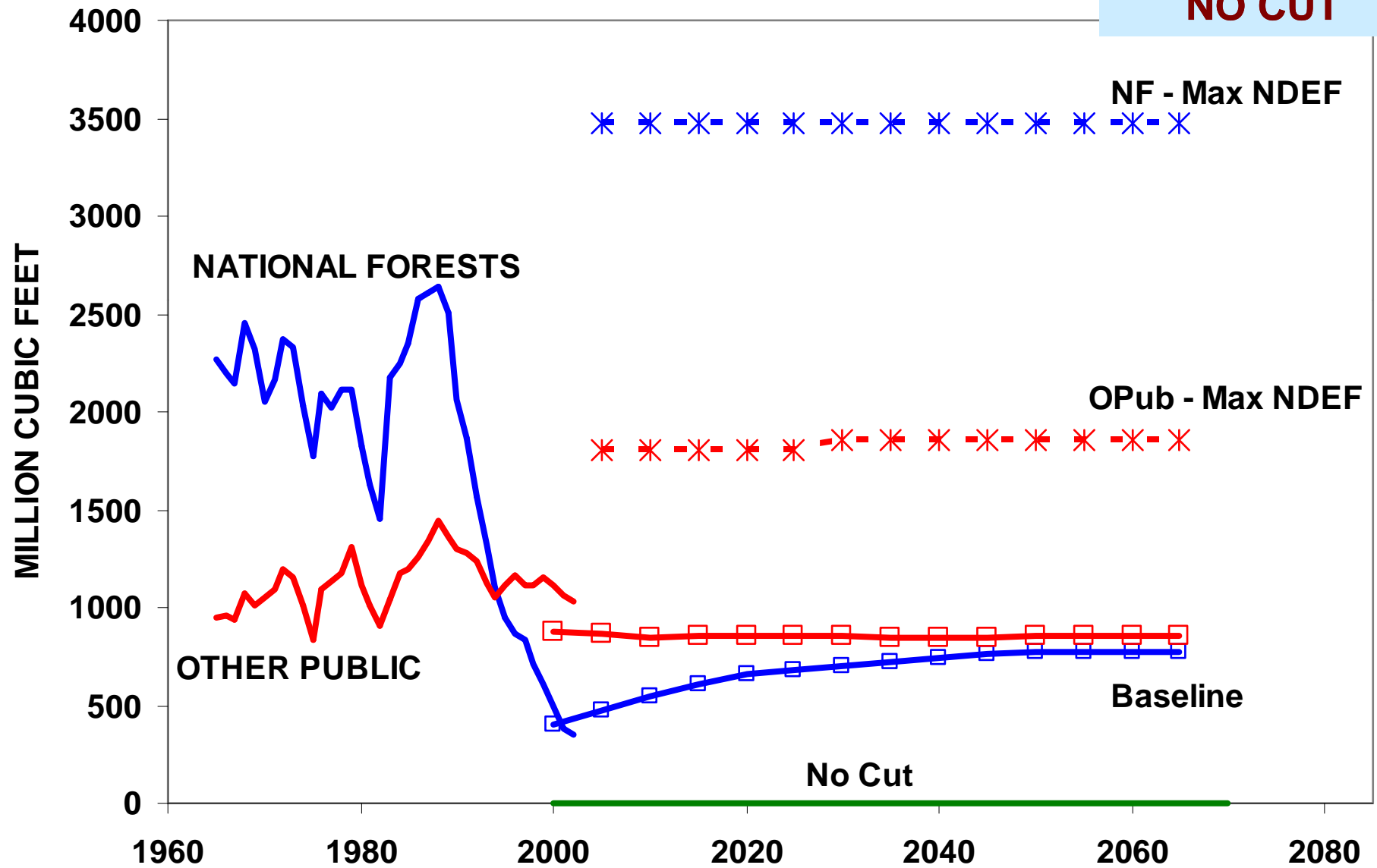
WHY IS THE PRIVATE FOREST CARBON STOCK DECLINING?

FOREST CARBON FLUX – “BASELINE” CASE

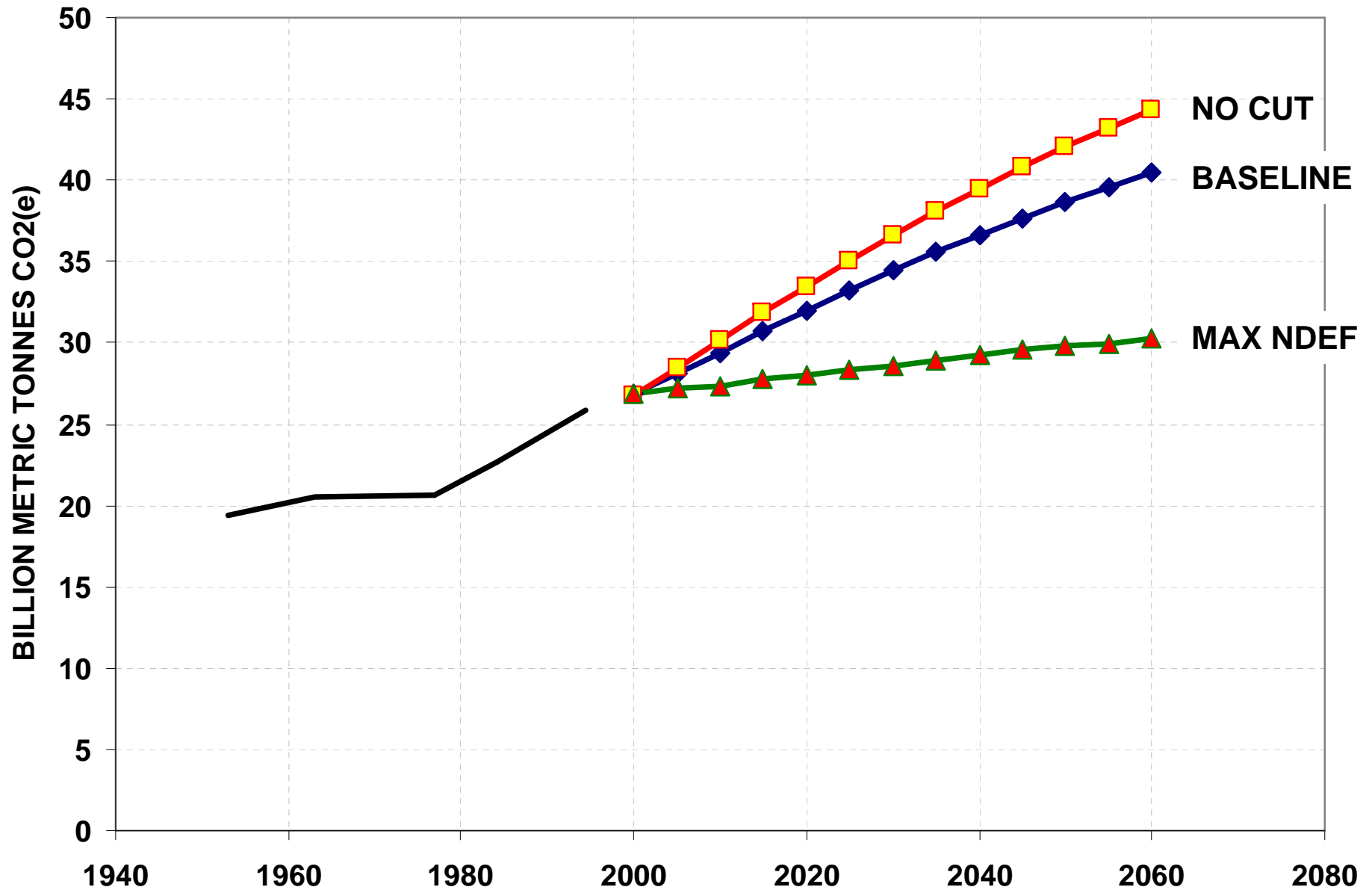


PUBLIC TIMBER HARVEST SCENARIOS

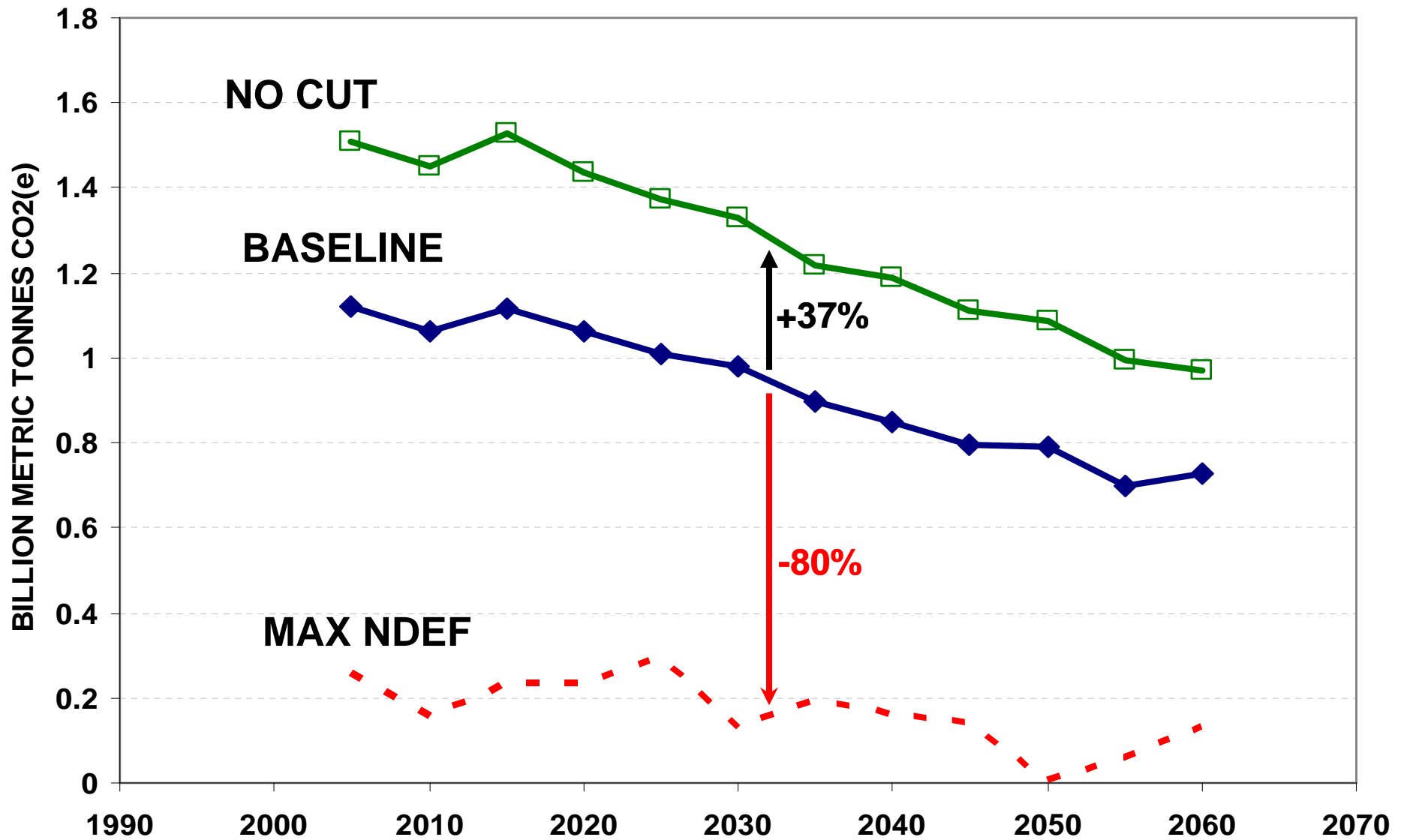
MAX NDEF
BASELINE
NO CUT



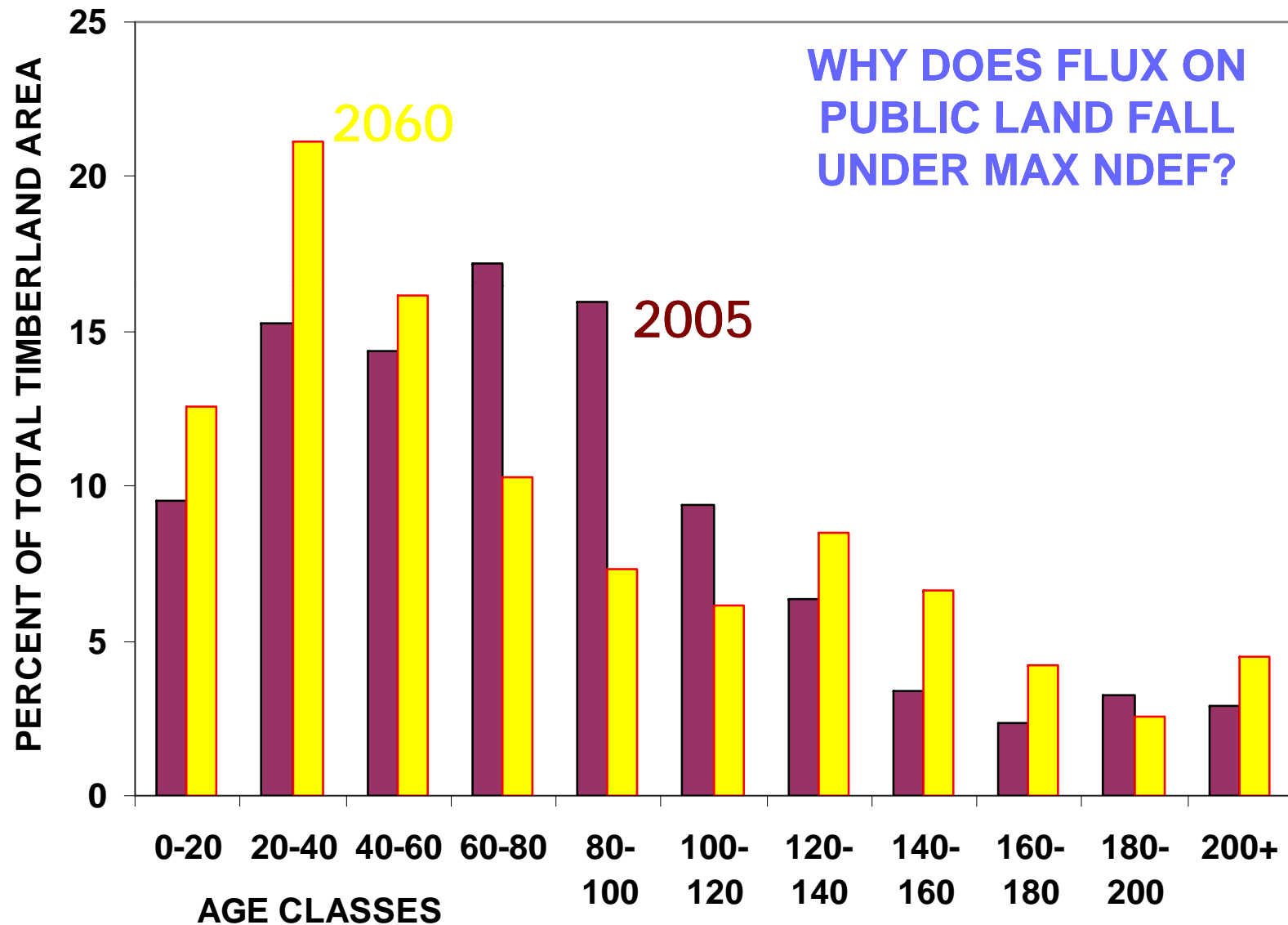
PUBLIC CARBON STOCKS UNDER THREE SCENARIOS



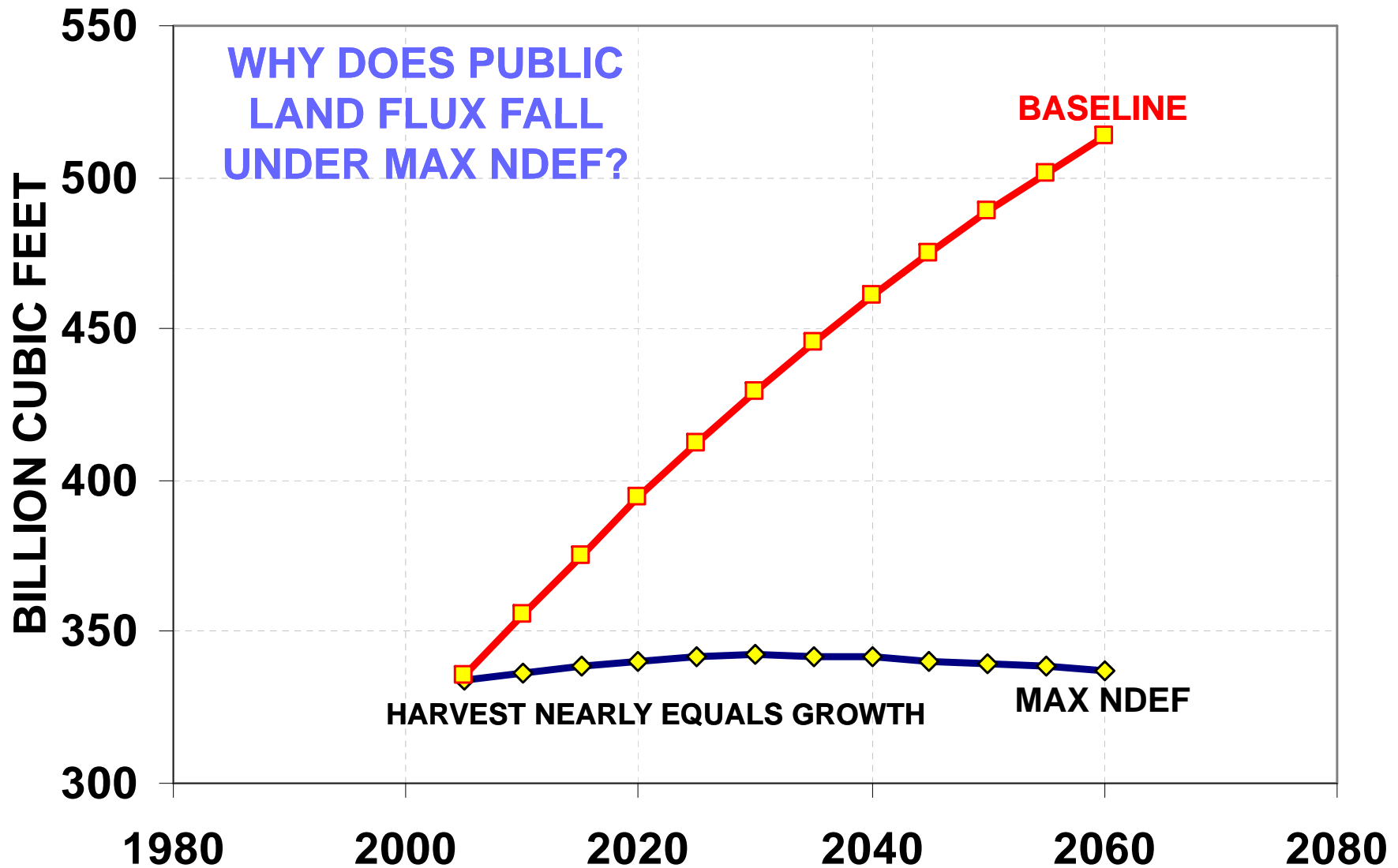
CARBON FLUX ON U.S. PUBLIC FOREST LANDS: THREE SCENARIOS



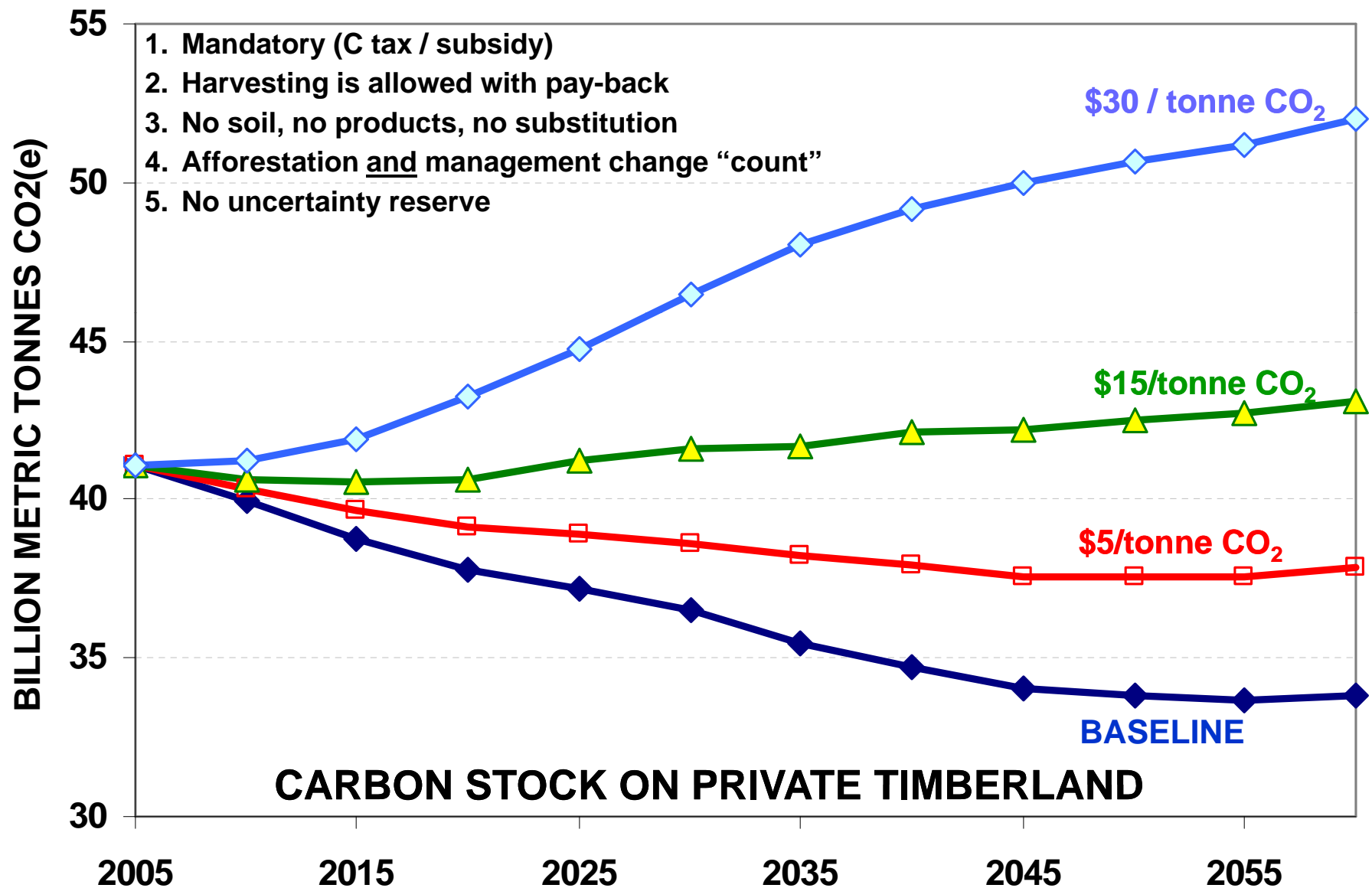
AGE CLASS STRUCTURE ON PUBLIC LANDS: BASELINE AND MAX NDEF



PUBLIC GROWING STOCK INVENTORY: BASELINE AND MAXIMUM NDEF SCENARIOS

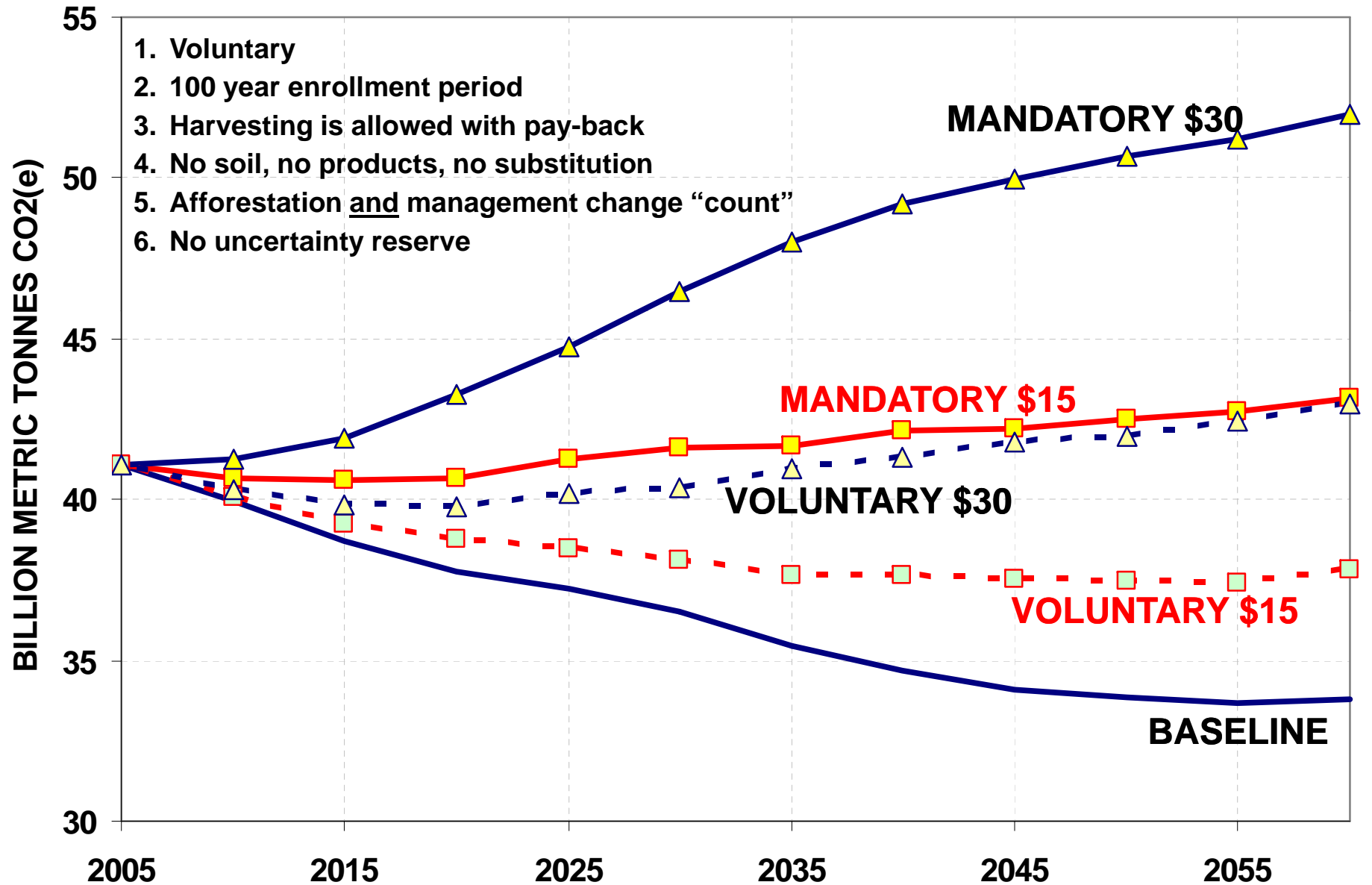


SEQUESTRATION OPTIONS ON PRIVATE LANDS: CARBON OFFSET SALES

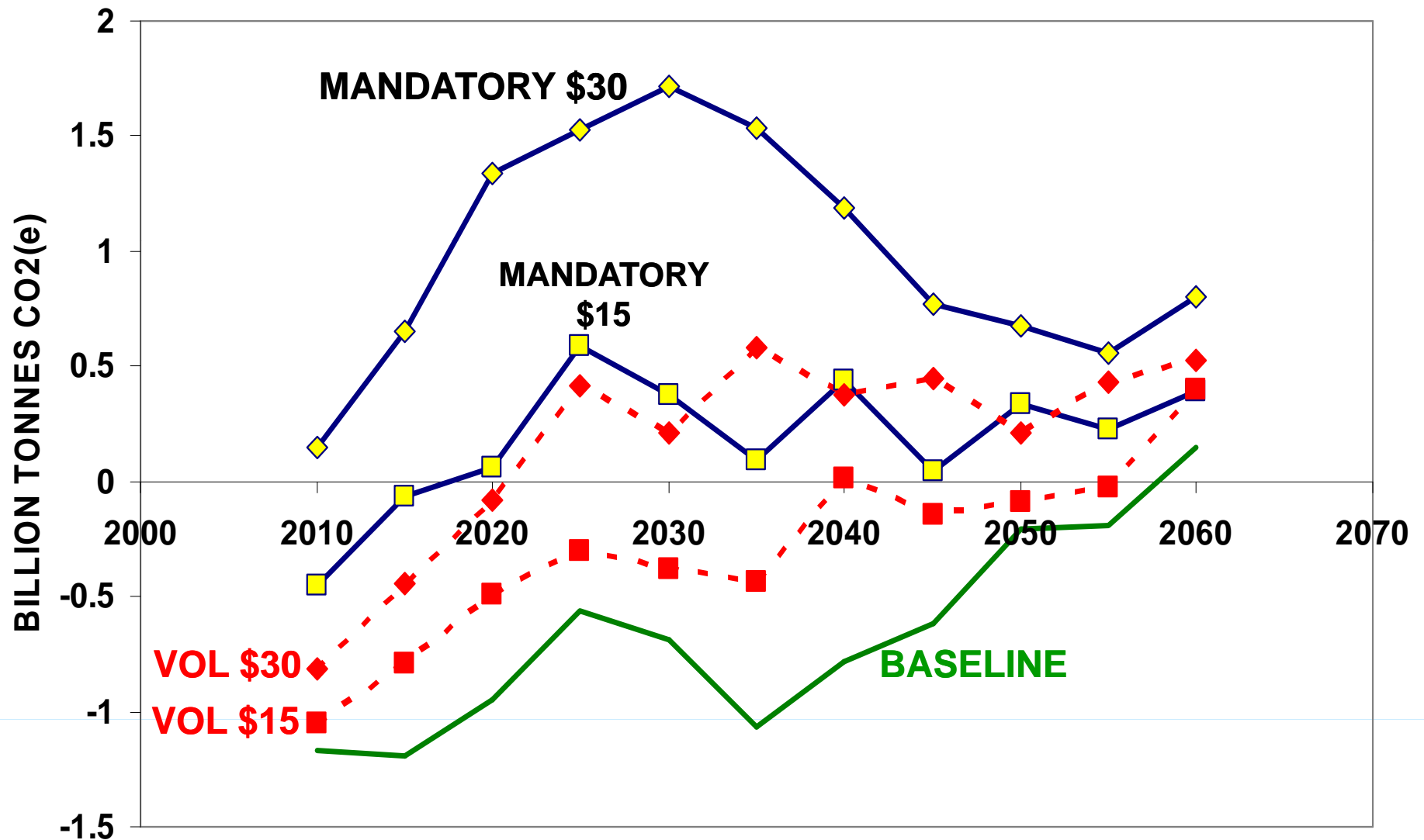


PRIVATE TIMBERLAND CARBON STOCK

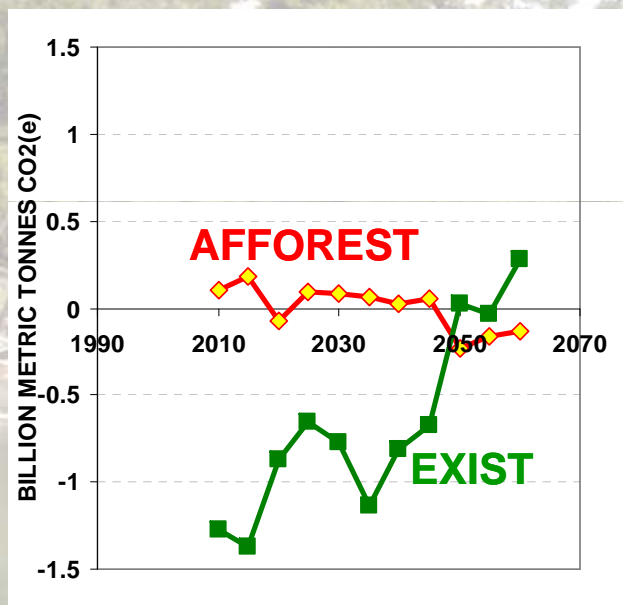
VOLUNTARY versus MANDATORY ENROLLMENT



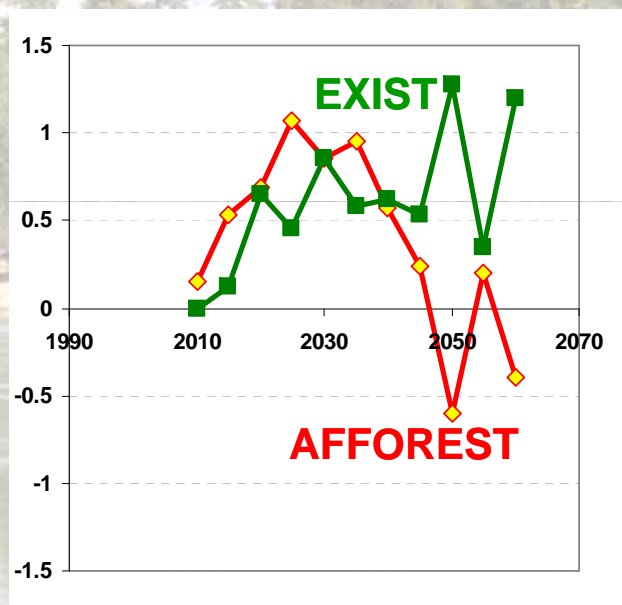
CARBON FLUX ON PRIVATE TIMBERLAND: MANDATORY AND VOLUNTARY SCENARIOS



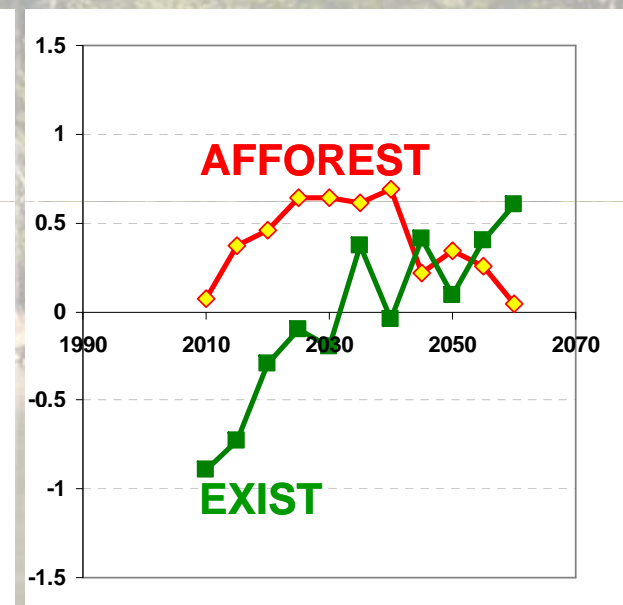
CONTRIBUTIONS OF AFFORESTATION AND MANAGEMENT CHANGE IN EXISTING STANDS TO TOTAL FLUX ON PRIVATE LANDS



BASE

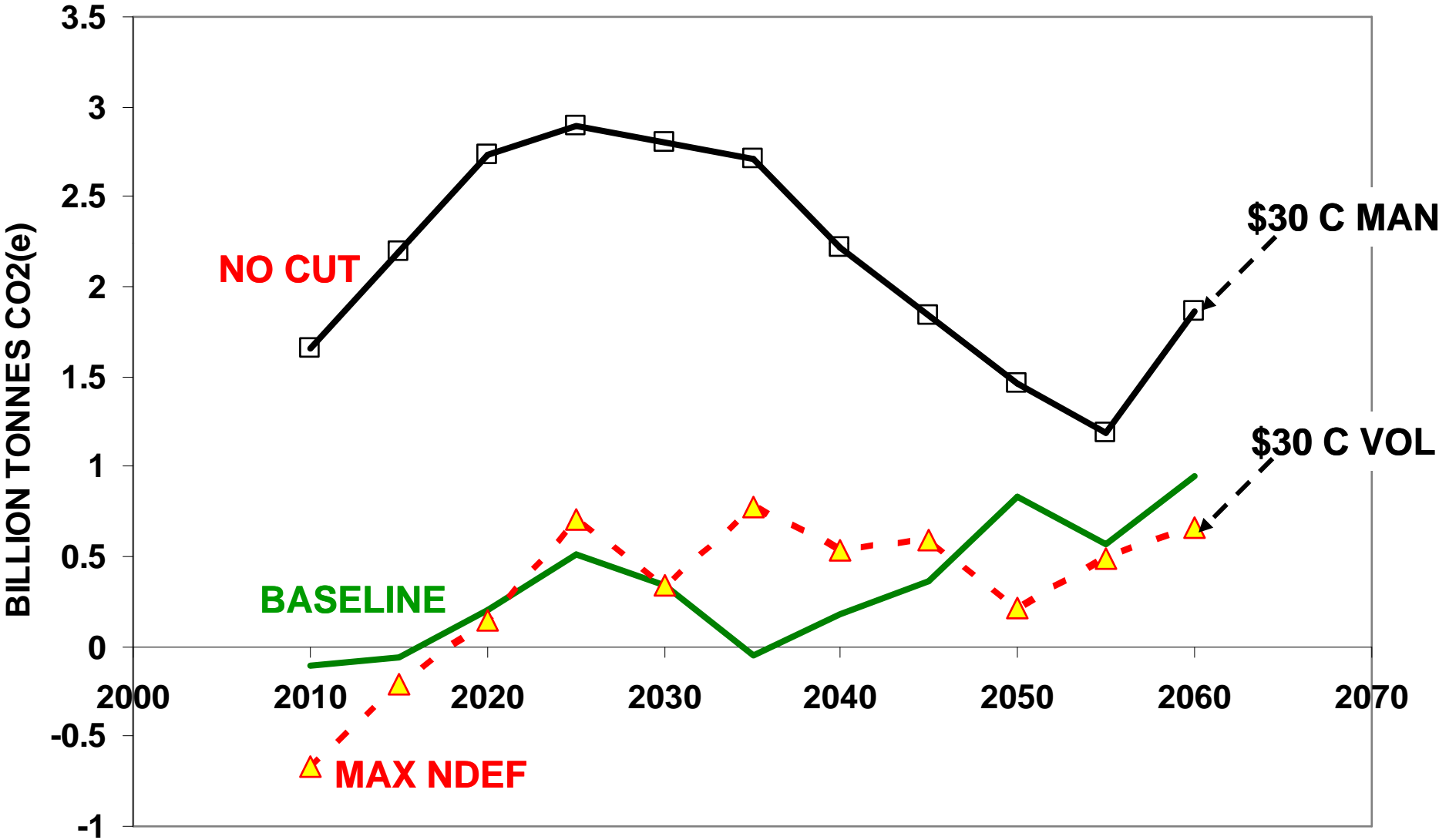


**\$30 C
MANDATORY**

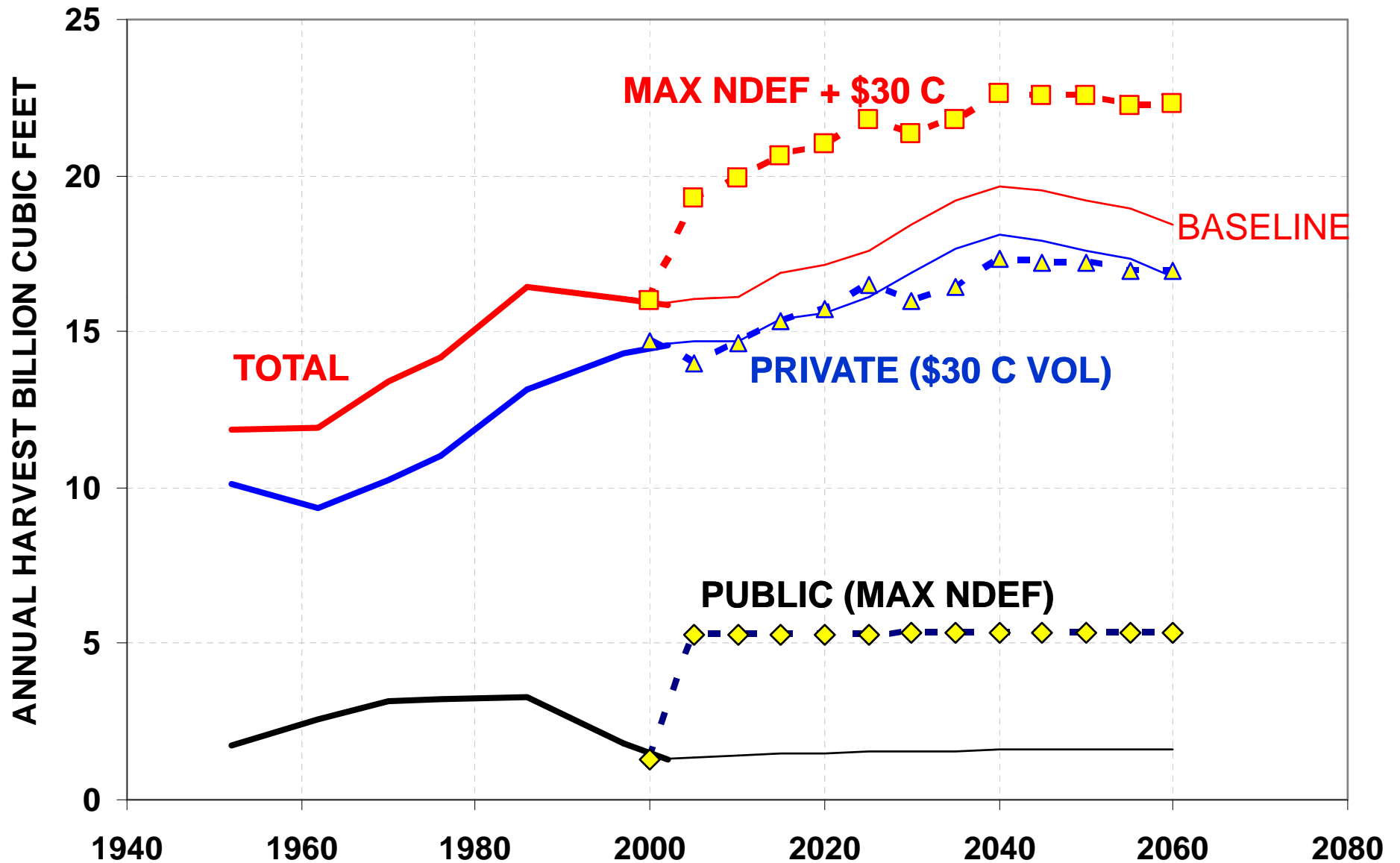


**\$30 C
VOLUNTARY**

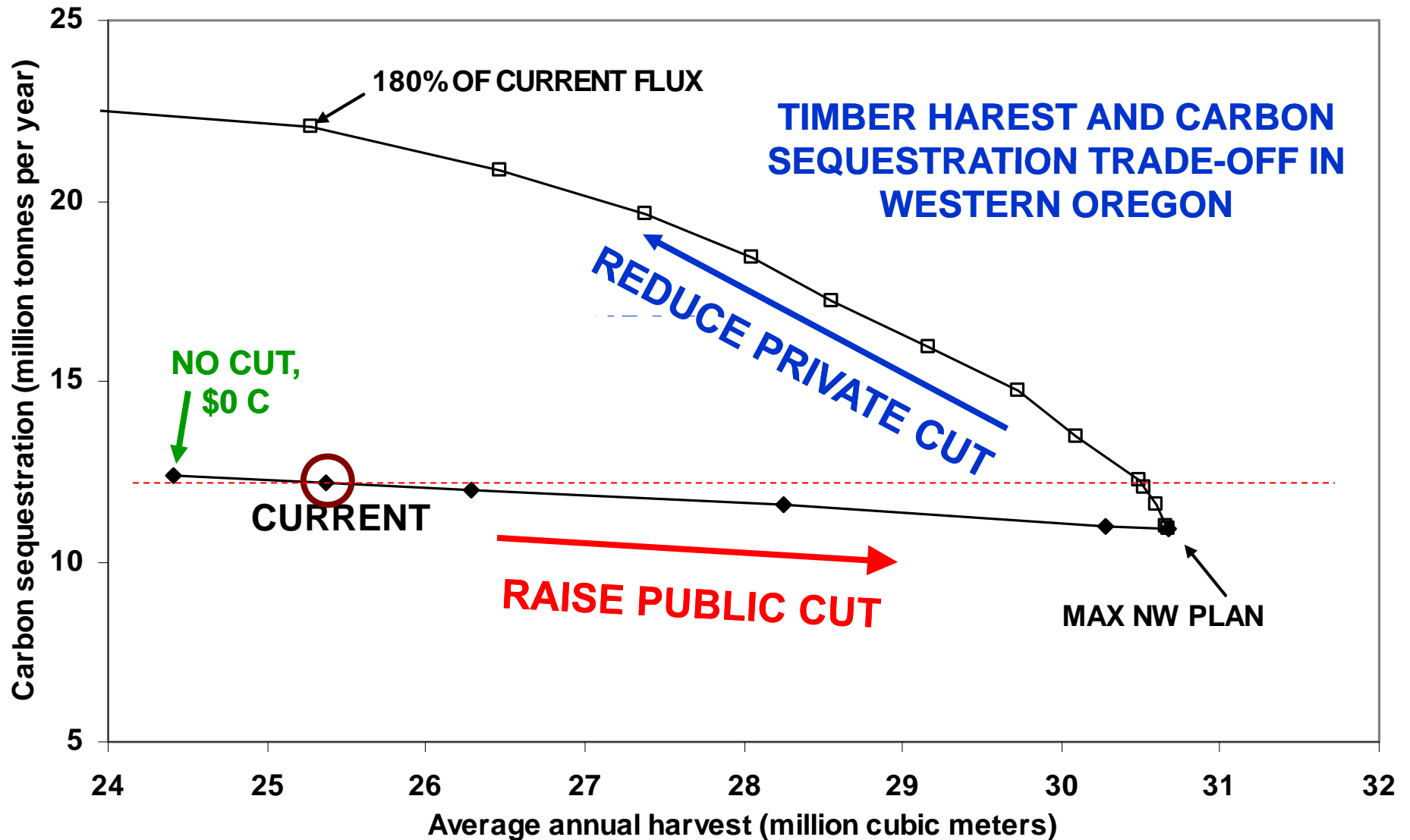
COMBINED PUBLIC AND PRIVATE SEQUESTRATION



TOTAL GROWING STOCK REMOVALS IN THE U.S. BY OWNER: BASELINE AND MAX NDEF/\$30 VOLUNTARY C SCENARIO



AN EXAMPLE OF THE CARBON SEQUESTRATION “ALLOWABLE CUT EFFECT” IN WESTERN OREGON



SUMMARY

- RESULTS FROM ONE TYPE OF MODEL
 - TIMBERLAND ONLY
 - NON-SOIL (READILY VERIFIABLE) POOLS
- UNDER CURRENT CONDITIONS OVER NEXT 50 YEARS:
 - PRIVATE LANDS ARE A SOURCE
 - PUBLIC LANDS ARE A SINK
- ZERO PUBLIC CUT SCENARIO
 - 37% INCREASE IN SEQUESTRATION RELATIVE TO BASE (.2+ Bill tonnes)
 - DECLINES OVER TIME
- MAX NDEF SCENARIO
 - STABILIZE INVENTORY (INCREASE CUT BY 4 Bill CF / year)
 - SHARPLY LOWER SEQUESTRATION
- MANDATORY PRIVATE PARTICIPATION IN C SALES
 - OVERSTATES CONTRIBUTION OF PRIVATE LANDS (up to 1 Bill tonnes)
 - VOLUNTARY SCHEME HAS LESS IMPACT ON AFFORESTATION, MORE ON EXISTING FORESTS

SUMMARY, CONCLUDED

- PUBLIC AND PRIVATE CONTRIBUTIONS COMBINED
 - ZERO PUBLIC CUT + \$30 C MANDATORY RAISES FOREST SECTOR FLUX BY NEARLY 2 Bill tonnes / year (1/3 of US gross emissions)
 - ZERO PUBLIC CUT + \$30 C VOLUNTARY LEADS TO SAME FOREST SECTOR FLUX AS BASELINE
- OPPORTUNITIES FOR A “COORDINATED” PUBLIC-PRIVATE CARBON PROGRAM
 - MAX NDEF PUBLIC + \$30 VOLUNTARY PRIVATE
 - SAME CARBON AS BASELINE, MUCH HIGHER HARVEST
 - WESTERN OREGON EXAMPLE

