

Climate Change in the 2010 Sustainability Report

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Two major reports in 2010

- ▶ The *National Report on Sustainable Forests—2010* will report on
 - A snapshot of current forest conditions and an evaluation of recent trends
 - Using 64 defined indicators
- ▶ The *2010 Resources Planning Act (RPA) Assessment* will report on
 - Current conditions and trends for 5 renewable natural resources => forests, rangelands, water, wildlife & fish, and outdoor recreation
 - Projections of conditions 5 decades into the future
- ▶ 2 similar reports, but with **key** differences

Two major reports (cont)

- ▶ RPA largely an integrated projection modeling effort
 - More cohesive and focused than Sustainability Report
 - But perhaps less rich in data detail
 - Also less focused on data infrastructure development in long run
 - Based on IPCC climate scenarios
- ▶ Still with parallel processes and personnel

Why We Need to Reduce Concentration of CO₂

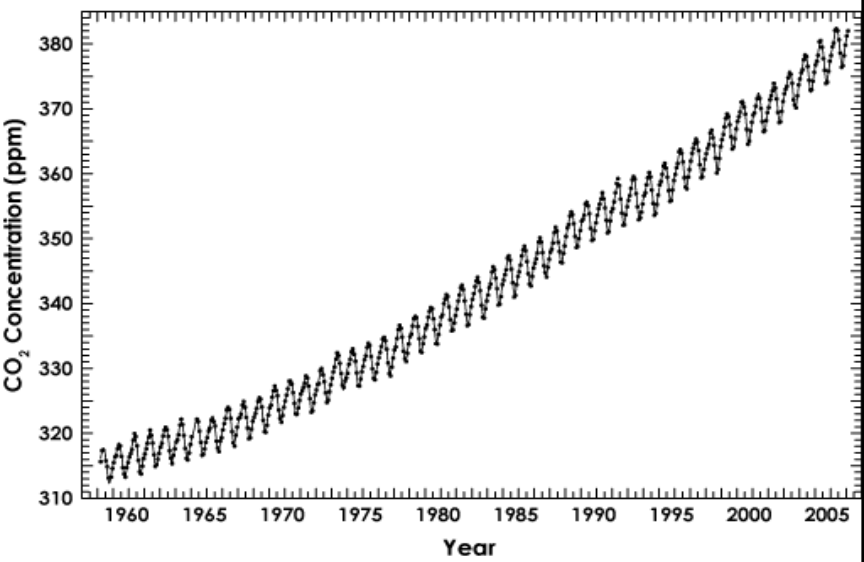
380 ppm now

Temperature and CO₂ concentration in the atmosphere over the past 400 000 years (from the Vostok ice core)

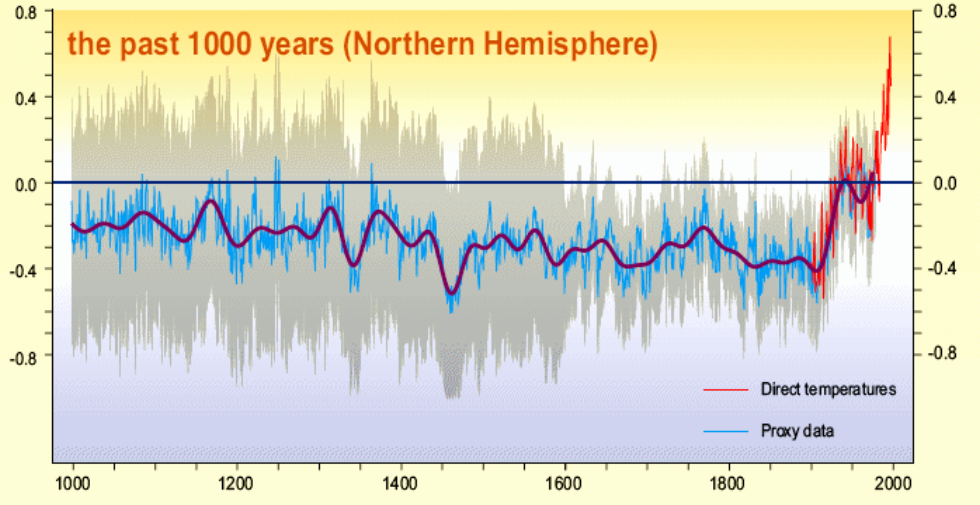


280 ppm pre-industrial

Mauna Loa Record



Departures in temperature in °C (from the 1961-1990 average)



Three Approaches Planned for the 2010 Sustainability Report

- ▶ Direct measurement in Criterion 5: Maintenance of forest contribution to global carbon cycles
- ▶ Indirect measurement in other criteria
 - Biological diversity, productivity, health & disturbance
- ▶ Syntheses
 - Partner reports
 - Use of C&I information in other reports

Direct Measures

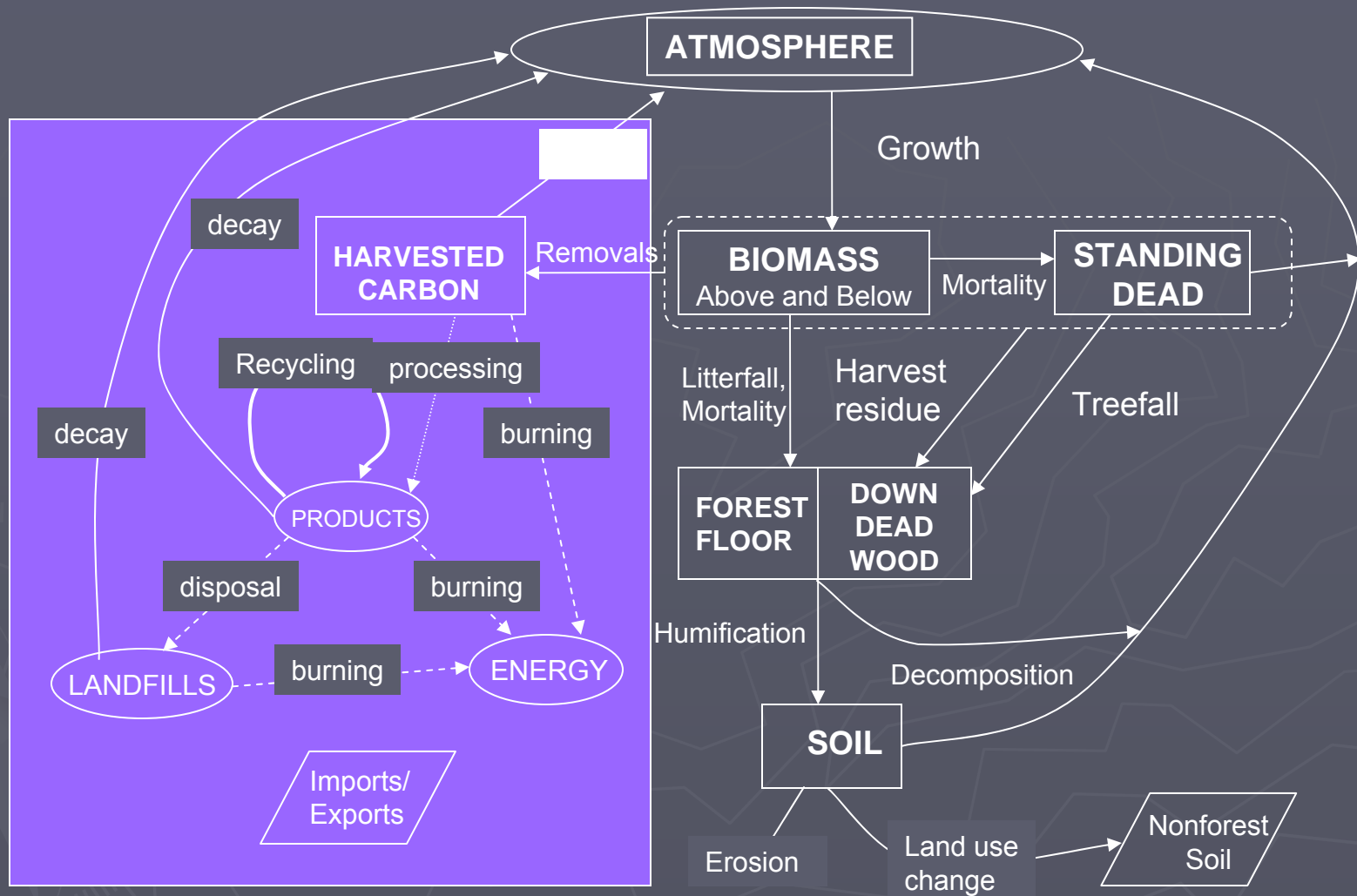
- ▶ Criterion 5—carbon was chosen as a focus because carbon pools and fluxes are seen as discretely reportable
 - Reporting on temperate and rainfall changes was seen as superfluous
 - Developing a set of indicators to report on all the dimensions of the impacts of climate change on forests was seen as too complex and difficult

Direct Measures (cont.)

MP Criterion 5. "Maintenance of forest contribution to global carbon cycles"

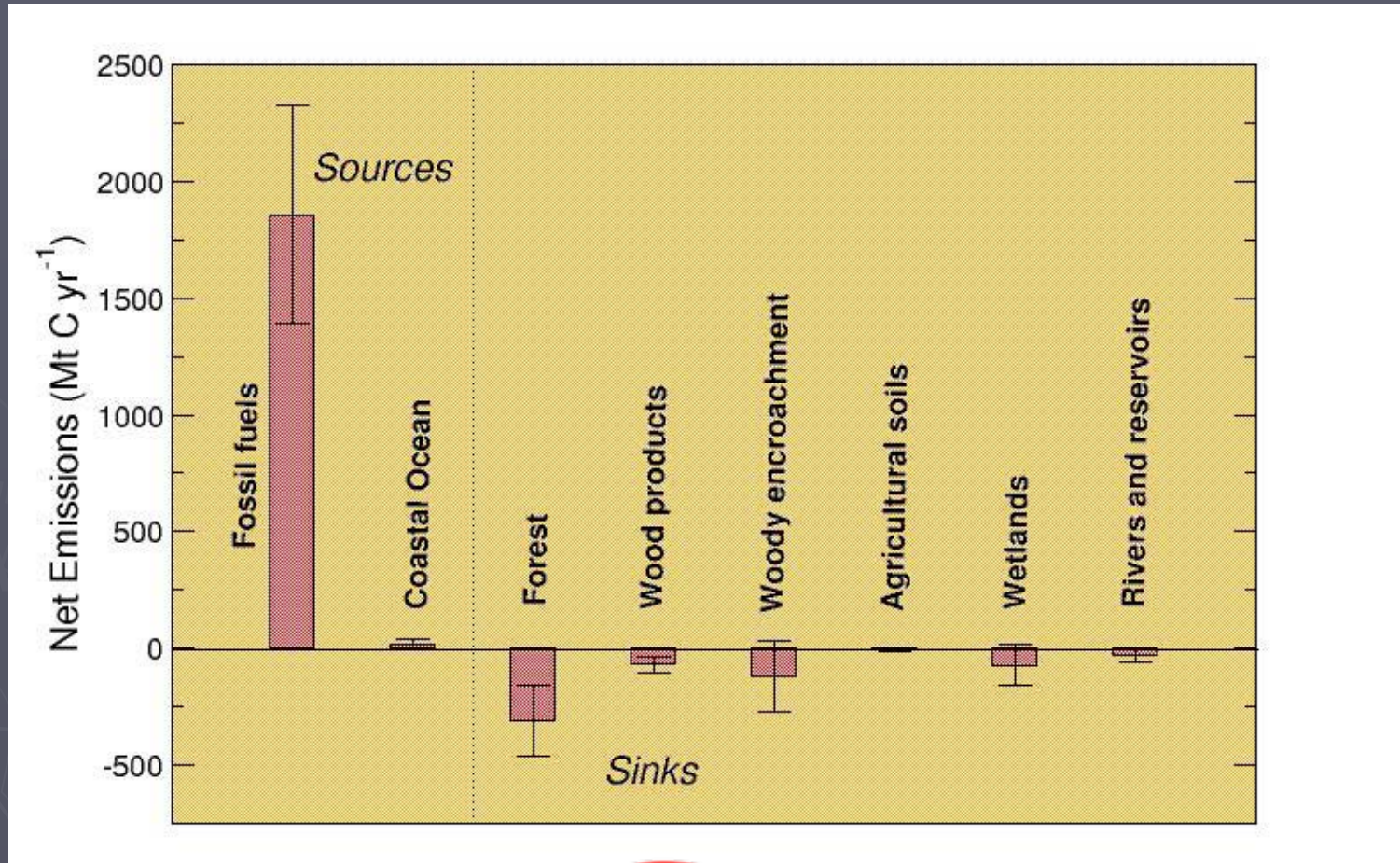
1. Total forest ecosystem carbon pools and fluxes
2. Total forest *product* carbon pools and fluxes
3. Avoided fossil fuel carbon emissions by using forest biomass for energy

Forest sector carbon pools and flows



North America is currently a net source of CO₂ with 30% of fossil fuel emissions offset by a net terrestrial sink of 520 ± 260 Mt C yr⁻¹

Slide courtesy of Tony King



Total Forest Ecosystem Biomass and Carbon Pool (Indicator 26, 2003)

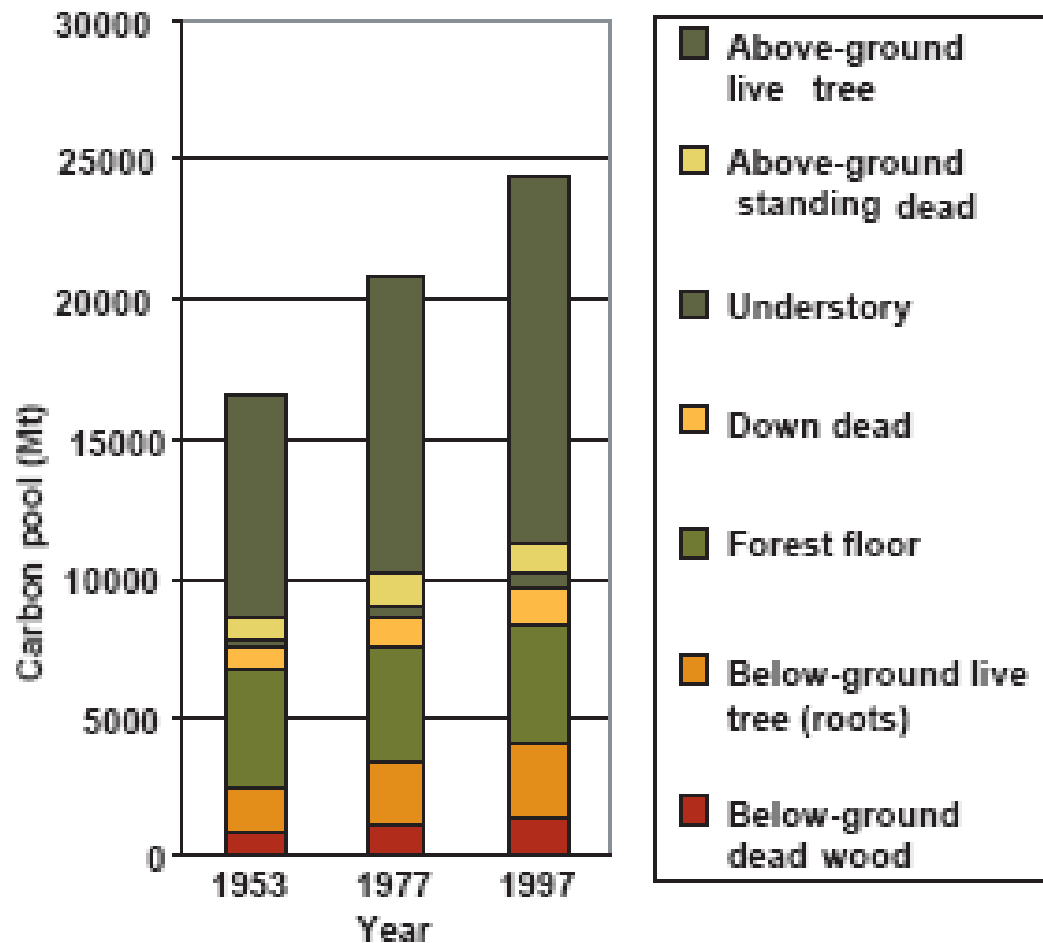


Figure 26-1. Carbon pools (Mt) of coterminous U.S. forest land.

Forest Ecosystem Net Carbon Change (Flows)

(Indicator 27, 2003)

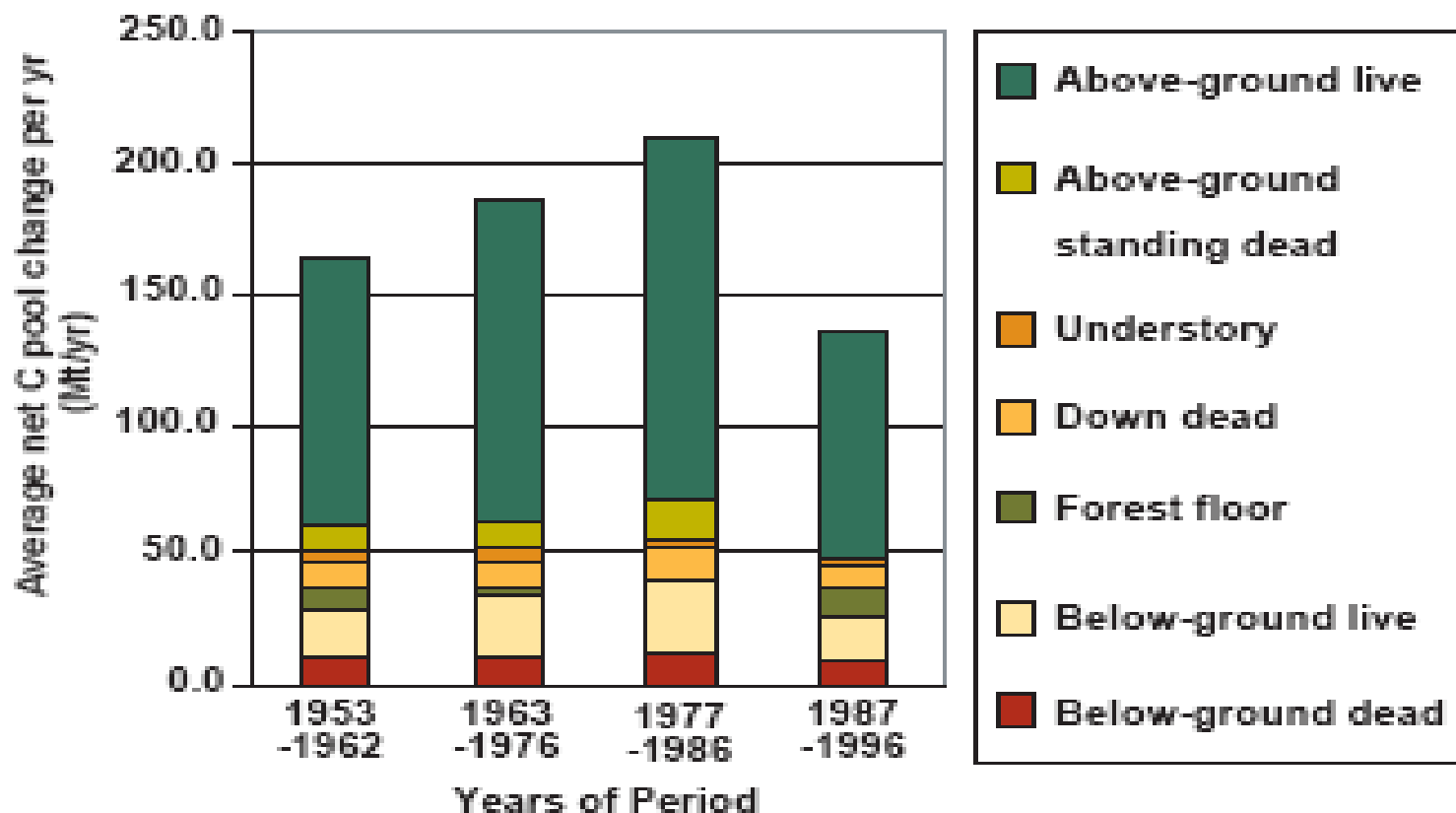


Figure 27-1. Average annual net forest carbon change (Mt/yr), 1953–1996.

Forest Products Carbon Accounts (Indicator 27, 2003)

Year	Change in products in use (1)	Change in products in dumps & landfills (2)	Total change in stock of carbon in product (3)=(1)+(2)	Emitted by burning with energy production (4)	Emitted by decay or burning without energy production (5)	Total emissions from products (6)=(4)+(5)	Total wood carbon consumed (7)=(3)+(6)
1950	13.6	6.3	19.9	37.4	25.5	62.9	82.8
1960	9.0	7.1	16.1	34.6	30.6	65.2	81.3
1970	12.4	9.2	21.6	32.8	35.9	68.7	90.3
1980	11.8	27.9	39.7	48.1	19.2	67.3	107.0
1990	26.0	33.4	59.4	74.4	11.4	85.8	145.2
2000	25.0	32.5	57.5	88.1	14.3	102.4	159.9

Table 28-1. Changes in harvested wood carbon using the carbon stock approach (Mt/yr carbon). Calculations began in 1900.

Indirect Measures

- ▶ The 2010 report will include indicators under other criteria that are important to understand the broader impacts of climate change
 - Changes in forest cover and species composition
 - Prevalence and extent of disturbances
 - Change in stream flows

Criterion 3 (2010) Maintenance of ecosystem health and vitality

Indicator	Name
15	Area and percent of forest affected by biotic processes and agents (e.g. insects, disease, invasive alien species) beyond reference conditions
16	Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

Percent of Stream Kilometers in Forested Catchments in Which Stream Flow and Timing Have Deviated Significantly from the Historic Range of Variation (Indicator 20, 2003)

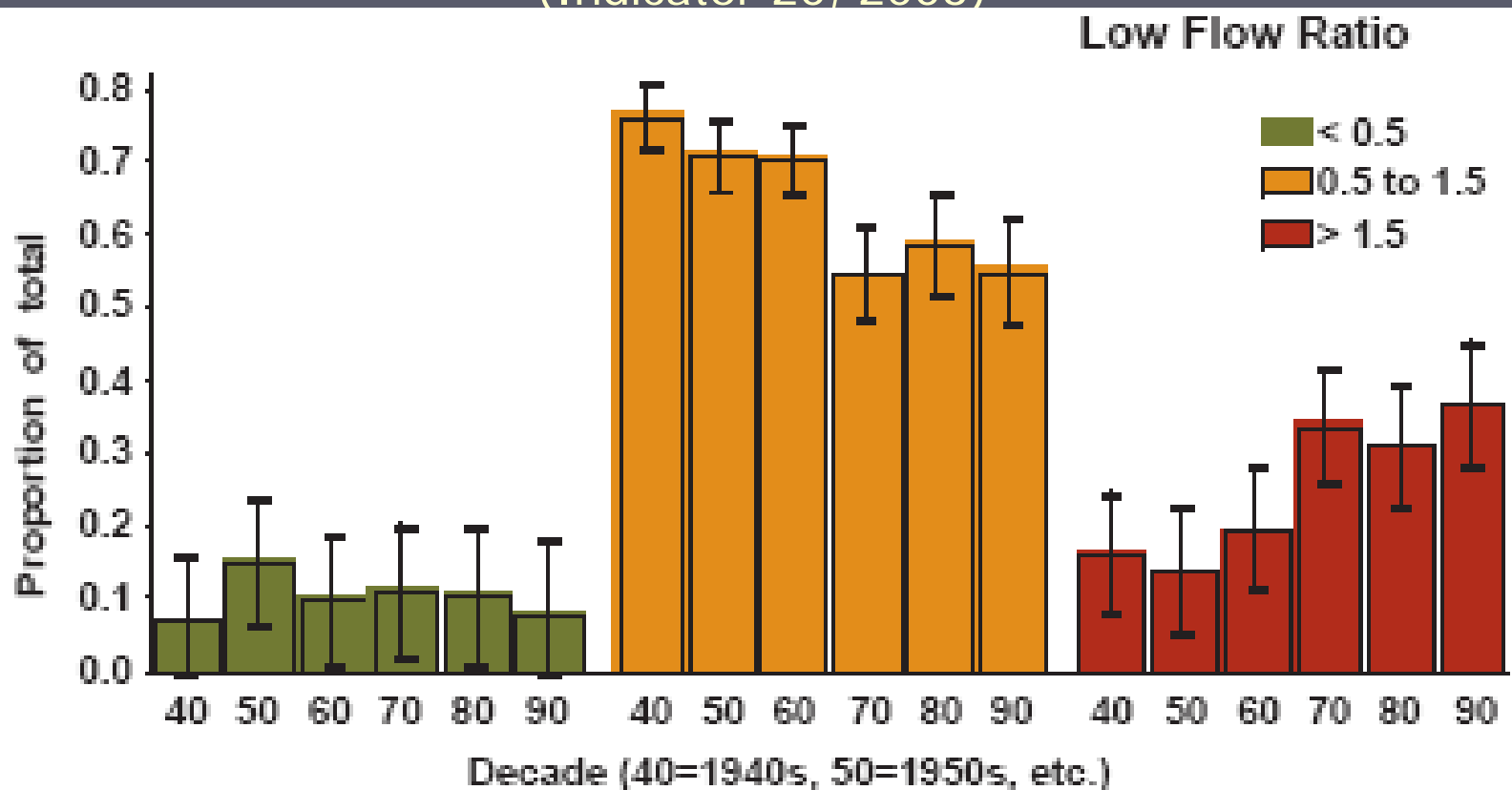


Figure 20-1. Decreased (< 0.5) and increased (>1.5) ratios of 1940–2000 data over 1870–1939 data indicates decreased and increased minimum flow rates for watersheds. Also apparent is an increase in the number of watersheds with increased minimum flows for 1970–2000.

Population Levels of Representative Species from Diverse Habitats Monitored Across Their Range (indicator 9 2003)

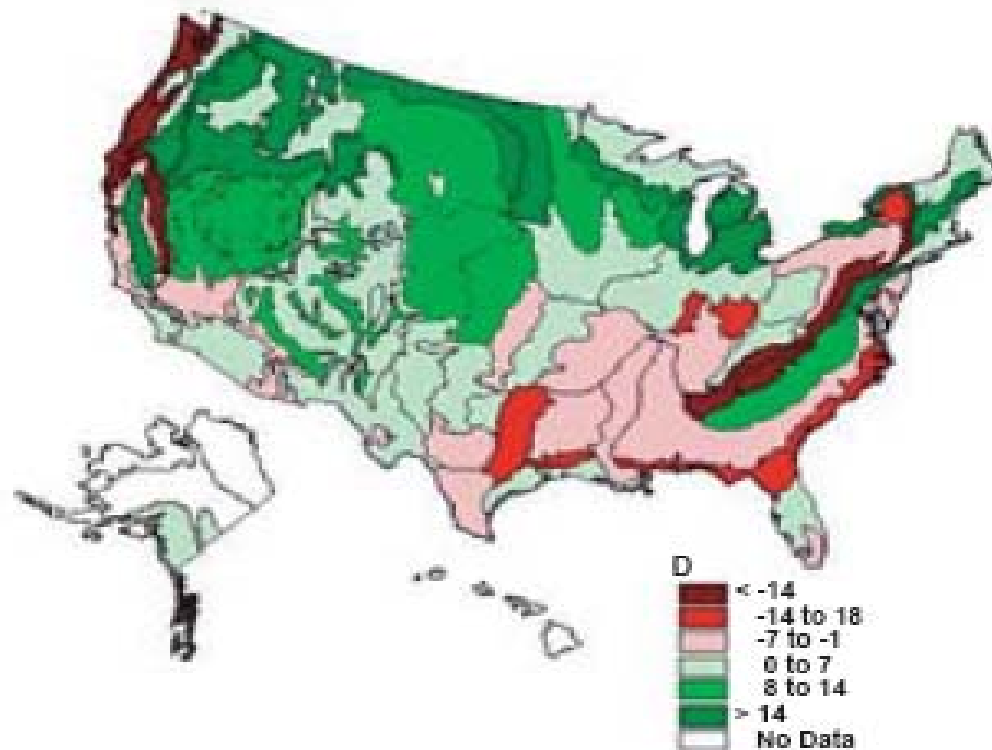


Figure 9-1. Difference (D) between the number of forest birds with significantly ($P < 0.1$) increasing and decreasing population trends, by physiographic region, between 1966 and 2000, calculated from the Breeding Bird Survey (BBS) database.

Syntheses

▶ “Partner Reports”

- E.g. “Use of MP C&I for Leading Indicators of Impact of GCC on Forests”
- Produced in association with Sustainability process via FS, Roundtable or externals
- Review process and branding needs development

▶ Uptake by others

- Short-term: citations
- Long-term: extensive quality database allows for independent and imaginative analysis

Concrete Steps

- ▶ Identify and describe the climate change connections and implications in the 2010 Sustainability Report
 - Explicit discussion of the carbon indicators
 - Syntheses that bring other indicators to the issue
- ▶ Pursue a “partner report” that explores the issue in more detail; perhaps linking to RPA Assessment
- ▶ Use C&I approach as a foundation for creating “leading indicators” of climate change impact on forests

RPA Assessment and Sustainability Report

- ▶ Together, the 2010 Sustainability Report and the 2010 RPA Assessment will provide a better basis for analyzing the impacts of climate change on forests, rangelands, water, wildlife and fish, and outdoor recreation
- ▶ Several additional steps are needed
 - Drawing connections between the past and the future
 - Improved projection models
 - Identification of leading indicators

Conclusion

- ▶ 2010 Sustainability Report and its information infrastructure is one piece of a bigger puzzle, including
 - Data
 - Analyses
 - Interpretations
- ▶ The climate change issue provides a test for the sustainability mantra

Better data → Better dialog → Better decisions