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**READINGS IN THE FIELD OF NATURAL RESOURCE
AND ENVIRONMENTAL ECONOMICS**

Alexander S.P. Pfaff and Robert N. Stavins

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Alexander S.P. Pfaff and Robert N. Stavins*

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Abstract

This is the latest version of a document periodically produced since the early 1980's. It combines an outline of the field of natural resource and environmental economics with a bibliography of 945 references. In the past, this reading list has been used in a variety of ways: as a guide to the literature for graduate students in departments of economics which do not offer a Ph.D.-level survey course of the field; and as an aid to students at the masters and undergraduate levels who wish to explore selected areas in greater depth.

* Alexander S.P. Pfaff is an Assistant Professor of Economics and International Affairs at the School of International and Public Affairs, Department of Economics, and Center for Environmental Research and Conservation, Columbia University. Robert N. Stavins is the Albert Pratt Professor of Business and Government, and Faculty Chair, Environment and Natural Resources Program, at the John F. Kennedy School of Government, Harvard University, and University Fellow at Resources for the Future.

PREFACE

This is the latest version of a document periodically produced since the early 1980's. It combines an outline of the field of natural resource and environmental economics with a bibliography of 945 references. In the past, this reading list has been used in a variety of ways: as a guide to the literature for graduate students in departments of economics which do not offer a Ph.D.-level survey course of the field; as a resource for Ph.D. students who wish to develop a directed readings course in the field; and as an aid to students at the masters and undergraduate levels who wish to explore selected areas in greater depth.

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We welcome suggestions of ways to improve this document, including additions and other changes to the outline and reading list. Please send your suggestions to Rob Stavins at the John F. Kennedy School of Government, Harvard University, 79 John F. Kennedy Street, Cambridge, Massachusetts 02138; phone 617-495-1820; fax 617-496-3783; e-mail: robert_stavins@harvard.edu.

Alex Pfaff
New York, New York

Rob Stavins
Cambridge, Massachusetts

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A. Theory of Resource Use

1. Nonrenewable Resources

a. Overview

- Krautkraemer 1998
- Hanley, Shogren, and White 1997
- Neher 1990, Ch. 4
- Hartwick 1989, Ch. 1-5
- Conrad and Clark 1987, Ch. 3, pp. 117-145
- Neary and van Wijnbergen 1986
- Johansson and Lofgren 1985, Ch. 2, 3
- Fisher 1981, Ch. 2
- Dasgupta and Heal 1979, Ch. 6-10
- Peterson and Fisher 1977
- Weinstein and Zeckhauser 1975

b. Single-Owner Private Production (or Public Management)

(1) Overview

- Dasgupta and Heal 1979, Ch. 6-8
- Stiglitz 1979
- Schulze 1974
- Solow, R.M. 1974a
- Vousden, N. 1973
- Cummings, R.G. 1969
- Herfindahl, O.C. 1967
- Gordon, R.L. 1967
- Gray, L.C. 1914

(2) The Hotelling Rule

(a) Theory

- Caputo, M.R. 1990b
- Caputo, M.R. 1990a
- Devarajan and Fisher 1981
- Levhari and Liviatan 1977
- Solow 1974a
- Hotelling 1931

(b) Effects of Uncertainty

- Harris and Vickers 1995
- Gaudet and Howitt 1989
- Brannan and Schwartz 1985
- Pindyck 1980
- Dasgupta and Heal 1979, Ch. 13-14
- Heal 1979
- Dasgupta and Heal 1974

- (3) Backstops**

 - Heal 1976
- (4) Discount Rate Effects**

 - Farzin 1984
- (5) Stochastic Time Horizons**

 - Long 1975
 - Henderson and Salant 1978
- (6) Increasing Extraction Costs**

 - Stollery 1983
 - Eswaran, Lewis, and Salant 1983
 - Hanson 1980
- (7) Risk Aversion**

 - Lewis 1977
- (8) Variable Technological Capabilities**

 - Cropper *et al.* 1978
- (9) Exploration**

 - Fulton and Just 1989
 - Swierzbinski and Mendelsohn 1989
 - Ayres 1988
 - Bohi and Toman 1984
 - Arrow and Chang 1982
 - Devarajan and Fisher 1982, pp. 327-336
 - Uhler 1979
 - Loury 1978
 - Pindyck 1978b
- (10) Multiple Deposits**

 - Ambigues *et al.* 1998
 - Kolstad 1994
 - Hartwick 1978
 - Weitzman 1976b
- (11) Multiple Uses/Users**

 - Chakravorty, Roumasset, and Tse 1997
 - Charkravoty and Krulce 1994
 - Swallow 1994
 - Kolstad 1994

(12) Recycling

- Fullerton and Wu 1998
- Weinstein and Zeckhauser 1974

(13) Durables

- Karp 1996
- Karp 1993
- Levhari and Pindyck 1981
- Malueg and Solow 1990
- Stewart 1980

(14) Multi-Sector Economy

- Gale 1967

(15) Imperfect Competition

(a) General

- Bohi and Toman 1984, Ch. 5
- Dasgupta and Heal 1979, Ch. 11
- Khalatbari 1977
- Sweeney 1977
- Heal 1976
- Hotelling 1931

(b) Monopoly

- Pindyck 1987
- Gilbert 1978
- Lewis 1976
- Stiglitz 1976
- Weinstein and Zeckhauser 1974

(c) Oligopoly

- Reinganum and Stokey 1985
- Lewis and Schmalensee 1980
- Pindyck 1978a
- Pindyck 1977
- Salant 1976

2. Renewable Resources

a. Overview

(1) The Basic Model

(a) General

- Swallow 1990
- Dasgupta 1982, Ch. 3, 5-7

- Smith 1977a
- Fisher and Peterson 1976
- Plourde 1970

(b) Basic Forests

- Clark 1990, Ch. 9.1
- Neher 1990, Ch. 2
- Swallow, Parks, and Near 1990
- Dasgupta 1982, Ch. 9
- Faustmann 1849

(c) Basic Fisheries

- Clark 1990, Ch. 1-4
- Neher 1990, Ch. 1
- Dasgupta 1982, Ch. 6-7
- Gordon 1954
- Schaefer 1954

(2) Other Theoretical Formulations

- Mitra and Wan 1986
- Mitra and Wan 1985
- Samuelson 1976
- Binkley 1987
- Chang 1984
- Hartman 1976
- Reed 1993
- Swallow and Wear 1993
- Vincent and Binkley 1993
- Newman, Gilbert, and Hyde 1985

(3) Endogenous Prices

- Clark 1990, Ch. 5
- Levhari *et al.* 1981

(4) Uncertainty

- Clark 1990, Ch. 11.2, 11.4
- Morck *et al.* 1989
- Pindyck 1984
- Lewis 1981
- Brazee and Mendelsohn 1988
- Cropper 1988
- Clarke and Reed 1989
- Haight and Holmes 1991
- Norstrom 1975
- Plantinga 1998
- Thomson 1992

b. Public Management (or Single-Owner Private Production)

- Clark 1990, Ch. 2.4-4.6
- Anderson 1986
- Kellogg 1988
- Collins and Headley 1983

(1) Stock Externalities

- Kolstad 1996a
- Berck 1981
- Falk and Mendelsohn 1993
- Newell and Pizer 1998

(2) Irreversible Investment

- Clark *et al.* 1979
- Charles 1983

(3) Limited Entry

- DuPont 1990
- Clark 1990, Ch. 8.3
- Wilen 1988

(4) Contracting

- Johnson and Libecap 1982

(5) Enforcement

- Anderson 1989
- Sutinen and Anderson 1985

(6) Taxation

- Chang 1982

(7) Information Management

- Arnason 1990

(8) Multispecies Management

- Wilson 1982

(9) Downstream Sectors

- Clark and Munro 1980

(10) User Group Conflicts

- Bishop and Samples 1980

(11) Congestion

- Brown 1974

3. External Effects

a. General

(1) Open Access

- Feeny *et al.* 1996

(2) Common Property

- Schlager *et al.* 1994
- Ostrom and Gardner 1993
- Schlager and Ostrom 1992
- Dutta and Sundaram 1993
- Seabright 1993
- Ostrom 1990

b. Nonrenewable Resources

(1) Open Access

- Brooks, Controneo, Murray, and Salant 1999
- Negri 1990
- Wiggins and Libecap 1985
- Bohi and Toman 1984, Ch. 3
- Berck and Perloff 1984
- Dasgupta 1982
- Heal 1982
- Kamien and Schwartz 1982
- Dasgupta and Heal 1979, Ch. 3
- Hardin 1968

(2) Common Property

- Karp 1992
- Ciriacy-Wantrup and Bishop 1975

(3) Information Spillovers

- Hendricks and Kovenock 1989

c. Renewable Resources

(1) Open Access

- Provencher and Burt 1994
- Clark 1990, Ch. 1, 2.1-2.3
- Neher 1990, Ch. 12
- Bjorndal and Conrad 1987
- Berck 1979b

- Dasgupta and Heal 1979, Ch. 5
- Bell 1972
- Heal 1982
- Scott 1955

(2) Common Property

- Sethi and Somanathan 1996
- Thompson and Wilson 1994
- Bardhan 1993
- Clark 1990, Ch. 5.4
- Munro 1990
- Salchenberger 1989
- Kaitala and Pohjola 1988
- Clarke and Munro 1987
- Levhari and Mirman 1980
- Sobel 1982

4. Appendix: Topics in Dynamic Optimization

a. Calculus of Variations

- Kamien and Schwartz 1991, pp. 1-120

b. Optimal Control—Maximum Principle

- Kamien and Schwartz 1991, pp. 218-221
- Clark 1990, Ch. 4, pp. 88-121
- Conrad and Clark 1987, pp. 25-31
- Dorfman 1969
- Pontryagin 1962

c. Deterministic Dynamic Programming

- Kamien and Schwartz 1991, pp. 259-263
- Stokey and Lucas 1989
- Williams 1989
- Conrad and Clark 1987, pp. 22-24
- Beckmann 1968
- Bellman and Dreyfus 1962
- Bellman 1957

d. Analytical Solutions

(1) Phase Diagrams

- Kamien and Schwartz 1991, pp. 102-111, 174-184
- Clark 1990, pp. 97-102
- Conrad and Clark 1987, pp. 158-159

(2) Computational and Numerical Techniques

- Chapman 1987

- Conrad and Clark 1987, pp. 40-56

e. Additional Topics

(1) Constraint Qualification

- Seierstad and Sydsaeter 1987, p. 83

(2) Sufficiency

- Kamien and Schwartz 1991, pp. 41-46, 133-135, 221-226
- Seierstad and Sydsaeter 1977
- Arrow and Kurz 1970
- Mangasarian 1966

(3) Free Horizon

- Kamien and Schwartz 1991, pp. 57-64
- Hotelling 1931

(4) Infinite Horizon

- Kamien and Schwartz 1991, pp. 95-96, 174-184
- Seierstad and Sydsaeter 1987, pp. 379-385
- Michel 1982

(5) Commitment and Time Consistency

- Laibson 1991
- Cohen and Michel 1988
- Kahn 1986
- Reinganum and Stokey 1985
- Bulow 1982
- Coase 1972
- Pollak 1968
- Strotz 1956

(6) Bang-Bang Control

- Kamien and Schwartz 1991, pp. 202-208

(7) Most Rapid Approach Paths

- Kamien and Schwartz 1991, pp. 209-217
- Clark *et al.* 1979
- Spence and Starrett 1975

f. Stochastic Dynamic Optimization

(1) Metric Spaces

- Malliaris and Brock 1982

- (2) **Stochastic Calculus**
 - Malliaris and Brock 1982, Ch. 2, pp. 65-140
- (3) **Blackwell's Theorem**
 - Sargent 1987, pp. 339-363
- (4) **Stochastic Dynamic Programming**
 - Kelly and Kolstad 1999
 - Clark 1990, Ch. 11, pp. 343-364
 - Bertsekas 1987
 - Conrad and Clark 1987, pp. 176-223
 - Mangel 1985
 - Cropper *et al.* 1978
 - Dasgupta and Heal 1974
- (5) **Stochastic Optimal Control**
 - Kamien and Schwartz 1991, pp. 264-271
 - Sargent 1987, pp. 29-40
 - Malliaris and Brock 1982, pp. 108-117
- (6) **Bounded and Unbounded Payoffs**
 - Bertsekas 1987

B. Numerical Measures

1. Resource Scarcity

a. Theory

- Dale 1984
- Devarajan and Fisher 1982
- Solow 1974a
- Stiglitz 1974a
- Stiglitz 1974b

b. Measuring Scarcity

- Krautkramer 1998
- Farzin 1995
- Cleveland 1993
- Farzin 1992
- Norgaard 1990
- Halvorsen and Smith 1984
- Harris and Skinner 1982
- Smith 1980
- Brown and Field 1979
- Fisher 1979
- Barnett and Morse 1963

c. Testing Hotelling

(1) Valuation Principle

- Berck and Bentley 1997
- Smith and Jin-Tan 1989
- Farrow 1985
- Miller and Upton 1985
- Slade 1982

(2) Price Paths

- Berck and Roberts 1996
- Heal and Barrow 1981
- Pindyck 1981
- Smith 1981
- Slade 1982a
- Slade 1982b
- Slade 1982c

2. Adding Up The Numbers

a. Resource Accounting

(1) National Income Accounts

- Maler 1991
- Devarajan and Weiner 1990
- Repetto 1989
- Stauffer 1985
- Weitzman and Lofgren 1997
- Weitzman 1999

(2) Growth Accounting

- Squires 1992
- Hartwick 1988
- Weitzman 1976a

(3) Valuing Resource Holdings

- McDonald 1994
- Boskin 1985

b. Applied Benefit-Cost Analysis

- Browder *et al.* 1996
- Jacoby and Laughton 1992

C. Policy

1. Overview

- Clark 1990, Ch. 8

- Neher 1990, Ch. 19
- Gamponia and Mendelsohn 1985
- Helliwell and Heaps 1985
- Dasgupta and Heal 1979, Ch. 12
- Nordhaus 1973

2. Individual Instruments

a. Property Rights

(1) Establishing Rights

- Provencher 1993
- Razzaz 1993
- Townsend 1992

(2) Unitization of Common Pools

- Libecap and Wiggins 1985
- Uhler 1979

b. Regulation

- Jones 1993
- Bjorndal 1993

c. Taxes/Subsidies

- Wolfson and Koopmans 1996
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b. Resource Security

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c. Trade

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(1) Cross-Sectional Distribution

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- Eagan 1987
- Hartwick 1977
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(2) Oil/Gasoline

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- Gulen 1996
- Gately 1995
- Shepard 1993
- Gately 1992
- Griffin 1985
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- Newbery 1981
- Loury 1980
- Hnyilicza and Pindyck 1976
- Salant 1976

(3) Natural Gas

- King and Cuc 1996
- Hendricks and Porter 1996
- Porter 1995
- Crocker 1994
- Doane and Spulber 1994
- De Vany and Walls 1993
- Hendricks *et al.* 1993
- Pierce 1992
- Kelly 1992

(4) Coal

- Boal 1995
- Friedlaender 1992
- Wolak and Kolstad 1991
- Kolstad and Wolak 1985
- Kalt 1983
- Kolstad and Wolak 1983

(5) Minerals

- Rudel and Roper 1997

(6) Electricity

- Hogan 1997
- Joskow 1997
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- Ozog and Waldman 1994
- Stoft and Gilbert 1994
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(1) Water

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- Kanazawa 1993
- Moncur and Pollock 1988
- Young and Haveman 1985
- Gisser 1983
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(2) Land/Soil

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- Pfaff 1999
- Innes 1997
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- Wu and Segerson 1995
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- Barrett 1991
- Zinkham 1991
- Stavins and Jaffe 1990
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- McConnell 1983
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(a) Genetic Diversity and Its Value

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- Barbier *et al.* 1991
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- Fisher and Krutilla 1985
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- Clark 1973

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(a) Theory

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- Vincent and Binkley 1993

(b) Empirical

- Neher 1990 13
- Bowes and Krutilla 1985
- Baldwin *et al.* 1997
- Provencher 1995
- Berck 1979a
- Johnson and Libecap 1980
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(5) Fisheries

(a) Theory

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- Deacon 1989
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II. ENVIRONMENTAL ECONOMICS

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a. Optimality Conditions

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- Just *et al.* 1982, Ch. 2
- Bergstrom and Cornes 1983
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- Weisbrod 1964
- Samuelson 1954

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- Epple and Romano 1996
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- Andreoni 1995
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- Mueller 1979, Ch. 3-4

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- Conrad and Clark 1987, Ch. 4, pp. 147-156
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- Varian 1984, Ch. 7.3
- Oates 1983
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- Dasgupta and Heal 1979, Ch. 3
- Haveman 1973
- Turvey 1963

b. Individual Instruments

- Simpson 1996
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(1) Property Rights

(a) Coase Theorem

- Shogren 1998a
- Farrell 1987
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(b) Common Property

- Gordon 1954

(c) Exchange/Enforcement

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(d) Efficiency

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(2) Quantity-Based and Markets

- Manne and Rutherford 1994
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- Krupnick *et al.* 1983
- Montgomery 1972

c. Dynamic Externalities

(1) General Theory

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- Cropper 1984
- Smith 1977a
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(2) Consumption Planning

- Forster 1973

(3) Catastrophic Effects

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(4) Effects of Government Policies

- Stavins and Jaffe 1990

d. Uncertainty

(1) General

- Metcalf and Rosenthal 1995
- Baumol and Oates 1988, Ch. 11-12
- Segerson 1988
- Nichols and Zeckhauser 1986
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- Kolstad 1987
- Mendelsohn 1986
- Roberts and Spence 1976
- Yohe 1976
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e. Private Information

- Lewis 1996
- Herriges, Govindasamy, and Shogren 1994

f. Market Structure

- Kohn 1985
- Asch and Seneca 1976

g. Nonconvexities

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- Fisher and Karp 1993
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h. Experimental Evidence

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1. Theory of the Measurement of Economic Welfare

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a. Consumers' and Producers' Surplus

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- Hausman 1981
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- Willig 1976

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- Willig 1976

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- Dasgupta 1982, Ch. 5
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c. Alternative Approaches to Aggregation and Welfare Evaluation

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- Lind 1982, Ch. 1-3, 12
- Georgescu-Roegen 1979
- Daly 1973
- Baumol 1968

(2) Distributional Weights

- Harberger 1978

(3) Opportunity Costs of Public Projects

- Bradford 1975
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(4) Inter- vs. Intra-Generational Equity

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(5) Imperfect Capital Markets

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(6) International Capital Mobility

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(7) Ethical Basis for Discount Rate

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(8) Uncertainty

- Wilson 1982
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e. Uncertainty

(1) General

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- Henry 1974

(2) Option Value

(a) General

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- Adams *et al.* 1984
- Freeman 1984c
- Smith 1983
- Bishop 1982
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- Schmalensee 1971
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(b) Transactions

- Fischhoff and Furby 1988

(c) Supply Uncertainty

- Freeman 1985b

(d) Empirical Applications

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- Fisher and Hanemann 1986
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(3) Quasi-Option Value

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(3) Private Market Choices

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(4) Individual Perceptions of Risk

(a) Decision Analysis

- Howard 1979

(b) Reference Theory

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(c) Ex Ante vs. Ex Post Values

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(d) Learning

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- Cameron 1992
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- Freeman 1993
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- Bockstael, McConnell, and Strand 1991
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- Burt and Brewer 1971

(2) Welfare Evaluation of Price Changes

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(3) Household Production Functions

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(4) Hotelling-Clawson-Knetsch Model

- Bockstael 1996
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(5) Hedonic Price Analysis

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(6) Hedonic Travel Cost Method

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(8) Private Options for Public Goods

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(9) Parallel Private Markets

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- Crocker, Shogren, and Turner 1998
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(10) Event Studies

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(11) Experimental Markets

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b. Estimating Benefits from Non-Market Data: Contingent Valuation

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- Mitchell and Caron 1989
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(2) Nonuse Value

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- Madariaga and McConnell 1987
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(3) Sources of Bias

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- Smith and Osborne 1996
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(4) Reliability

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(b) Arbitrary Values

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(c) Closed-End Surveys

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(d) Test-Retest

- Loomis 1989

(e) **Nature of the Good**

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(f) **Dichotomous Choice vs. Open-Ended**

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(5) **Discrete Choice Methods**

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c. **Combining Revealed and Stated Preference Data**

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d. **Comparison of Valuation Methods**

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(2) Valuing Environmental Holdings

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b. Applied Benefit-Cost Analysis

(1) General Theory

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(2) Regulatory Flexibility

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(3) Applications

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(b) Uncertainty

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- Weitzman 1974

(c) Underestimation of Benefits

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(d) Applied Studies

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b. Tradeable Permit Systems

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(3) Market Structure and Strategic Issues

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(2) Market Structure/Imperfection

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(3) Imperfect Information

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(4) Depletable Externalities

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d. Deposit/Refund Systems

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e. Liability

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- Zweifel and Tyran 1994
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- Cornwell and Costanza 1994
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g. Information Provision

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(1) Spatial Differentiation

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(2) Temporal Accumulation

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(1) Dynamic Efficiency/Effectiveness

(2) Discounting The Future

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(3) Technological Change

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- c. **Private Avoidance**
 - (1) **Defensive Expenditures**
 - (2) **Firm and Private Locational Decisions**
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 - (2) **Instrument Choice**
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 - (2) **Enforcement**
 - (a) **General Theory**
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(1) Effects On Distribution

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(2) Effects Of Distribution

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- Levinson 1997

c. Coordination/Treaties

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- Fullerton and Kinnaman 1996
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(1) Local Air Pollution

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- Alberini and McConnell 1995
- Zylicz 1995
- Krupnick and Walls 1992
- Hahn 1995a

(2) Transboundary Air Pollution: Acid Rain

- Maler 1989
- Cason 1993
- Burtraw 1996
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- Burtraw *et al.* 1997
- Fullerton *et al.* 1997
- Schmalensee *et al.* 1998
- Stavins 1998
- Joskow, Schmalensee, and Bailey 1998
- Ellerman and Montero 1998
- Montero 1999

(3) Global Air Pollution: Greenhouse Gases and Climate Change

- Nordhaus 1993a
- Nordhaus 1993b
- Falk and Mendelsohn 1993
- Weyant 1993
- Bohm 1993
- Nordhaus 1994
- Mendelsohn *et al.* 1994
- Kosobud 1994
- Kolstad 1996b
- Schmalensee 1997
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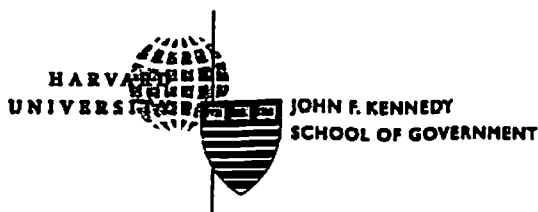
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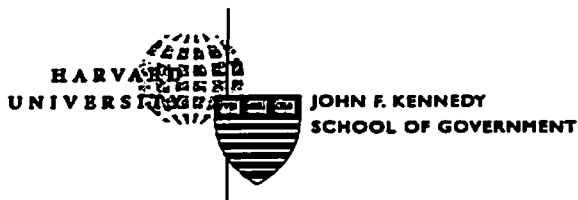
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