The Relationships among Ecosystem Services and Human Well Being

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- All aspects of human well-being are dependent upon nature and the world’s ecosystems
- Unless we account for the full value of ecosystem services, humans will continue to degrade and deplete natural systems.

Ecosystem Services Research Program (ESRP)

ESRP’s role is to provide the science to:
- Clarify this dependence,
- Describe the full range of values, and
- Quantify what we know about the limited vs. limitless nature of different services.
“...emergent understanding that a transformation to sustainability is actually not just about hard choices for “saving the planet but about ways in which human happiness can be fulfilled and progress in human affairs supported.”

The USEPA Ecosystem Services Research Program (ESRP) vision is that a comprehensive theory and practice for quantifying ecosystem services, their value and their relationship to human well-being, is consistently incorporated into environmental decision making.
We define ecosystem services as the products of ecological functions or processes that directly or indirectly contribute to human well-being, or have the potential to do so in the future.
**well-being**: a good or satisfactory condition of existence; a state characterized by health, happiness, and prosperity; *welfare-* to influence the well-being of the nation and its people
Including well-being measures in ecosystem services research

- Treating humans as part of ecosystems
- Assessing ecological-human relationships demonstrates how humans can benefit from maintaining, restoring and enhancing ecosystem services
- Taking a “What’s in it for me?” approach attempts to address a complex problem with unified support to better the chances of success

GDP only loosely reflects the nation’s state of well-being...throw in physical, mental and social health, and you get a different story. So what role does the environment play?
Linking Ecosystem Services to Human Well-Being

- What is the impact of changes in ecosystem services on human well-being and on ecosystem services, monetary and non-monetary value?

- What are the vital links between ecosystem services provisions and priority societal issues such as illness and disease, livelihood, homeland security, cultural preservation and spiritual fulfillment?
A well-being measure for the US which integrates the influence of ecosystem services on aspects of societal welfare and overall human well-being

Develop conceptual framework for linking environmental, economic and social factors to constituents of human well-being

- Ecosystem services
- Economic services
- Social services

Evaluate the qualitative values of these linkages

- Existing knowledge
- Programmatic objectives and professional opinion
- Perception

Examine and determine the qualitative and quantitative relationships between environmental services and well-being
Our goal is to develop, test, and implement an index of well-being applicable to multiple ecosystems, stressor scenarios, and geographic initiatives to help decision makers better understand the vital link between ecosystem service provision the constituents of human well-being

- Independent of Time, Place and Culture
- Unifying human and environmental domains
- Capturing the elements that matter
  - Basic human needs
  - Environment
  - Economy
  - Subjective well-being
Basic Human Needs

- **Physical and Mental Health**
  - Access to services
  - Psychological disorders, fear

- **Protection and Security**
  - Ample shelter and food
  - Clean environment
  - Governance

- **Affection and Emotion**
  - Care and Nurturing
  - Family
  - Child and Eldercare

- **Understanding**
  - Formal and Informal Education (availability and access to information)

- **Participation**
  - Volunteerism

- **Leisure Time**
  - Amount

- **Creativity**
  - Music, arts, sports
  - Childhood development

- **Identity**

- **Freedom**
  - Opportunity to meet basic needs
Environmental Needs

- Availability of Clean Air
- Availability of Clean Water
- Low Health Risks due to Toxic Contamination
- Species Diversity
- Distance from Critical Ecological Thresholds
Economic Aspects

- Cost of Education/Profit from Education
- Economic Growth and Wealth
- Sustainability
  Drawing from Index of Sustainable Economic Welfare (ISEW) and Genuine Progress Indicator (GPI)
- Non-Paid work
  - housework
  - parenting
  - volunteerism
  - elder care
Subjective Well Being

- **Access to Nature & Access to Diverse Nature**
  “We need food and housing for survival, but there are even higher types of needs—needs related to happiness. If you look at it that way, parks become as necessary to a city’s health—physical and spiritual—as the water supply.” Enrique Peñalosa, mayor of Bogotá

- **Affection/Respect toward Nature**
  Biophilia- “the connections that human beings subconsciously seek with the rest of life”

- **Spiritual and Cultural Fulfillment**
ECOSYSTEM SERVICES RESEARCH PROGRAM

Policy-Driven Factors
- Environmental Regulation
- Economic Regulation and Reform
- Social Programs

Non-policy Driven Factors
- Advocacy Groups
- NGOs/INGOs
- Not-for-profit Organizations

Political Climate

Good governance

Economic Services
- Consumption
- Production
- Employment
- Distribution
- Capital maintenance
- Capital investment
- Income
- Innovation
- Stabilization
- Finance

Social Services
- Healthcare
- Public Health
- Financial Assistance
- Family Services
- Activism
- Justice
- Labor
- Claimed Civil Liberties
- Emergency Preparedness
- Education
- Public Works
- Communication
- Community & Faith Based Initiatives

Ecosystem Services
- Water Quality Regulation
- Air Quality Regulation
- Natural Hazard Protection
- Food & Fiber
- Recreation and Aesthetics
- Atmospheric Regulation
- Soil & Sediment Quality Regulation
- Pest & Disease Regulation
- Water Quantity Regulation

Well-Being Domains
- Access to services
- Altruism
- Clean environment
- Economic growth
- Ecosystem condition
- Education
- Health
- Leisure time
- Life satisfaction/happiness
- Nutrition
- Public Infrastructure
- Safety and security
- Shelter
- Social cohesion
- Spiritual and cultural fulfillment
- Topophilia and biophilia
- Wealth

State of the Environment

State of the Economy

Social Networks

Freedom and Choice

Human Well-being

Societal Welfare

Human Well-being

Economic Well-Being

Environmental Well-Being

Societal Well-Being

Basic Human Needs

Subjective Well-being
Relative Importance of Selected Ecosystem Services to domains of Well-being

Relative Importance of the domains to the Elements of Well-Being
I feel that the goods and services provided by ecosystems significantly contribute to human well-being

I feel that losses in ecosystem services could affect my personal well-being.

10. Components of Overall Well-being
Please order the following components based on how much you feel they influence overall human well-being.
1 = most
4 = least

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Relative importance values from professional opinion and the public perception survey were used to rank ecosystem services’ contribution to overall well-being in relation to one another.
Ranks for Social Services Module

**Social Services**

- Financial Assistance
- Health Care
- Public Works
- Labor
- Community and Faith Based Initiatives
- Public Health
- Communication
- Justice
- Emergency Preparedness
- Education
- Claimed Civil Liberties
- Activism
- Family Services
In development...

Economic services
- Consumption
- Production
- Employment
- Distribution
- Capital maintenance
- Capital investment
- Income
- Innovation
- Stabilization
- Finance
Conceptual Model Linking Services to Human Well-being

Ecosystem Services
- Natural Hazards Protection
- Water Quality Regulation
- Food and Fiber
- Water Quantity Regulation
- Recreation and Aesthetics
- Air Quality Regulation
- Pest and Disease Regulation
- Atmospheric Regulation
- Soil and Sediment Regulation

Economic Services (In Development)
- Consumption
- Production
- Employment
- Distribution
- Capital maintenance
- Investment
- Income
- Innovation
- Stabilization
- Finance
- Community and Faith Based Initiatives
- Public Works
- Public Health
- Emergency Preparedness
- Activism
- Financial Assistance
- Healthcare
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- Claimed Civil Liberties
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- Justice
- Education
- Labor

Social Services
- Wealth
- Safety and Security
- Public Infrastructure
- Altruism
- Topophilia and Biophilia
- Health
- Education
- Economic Growth
- Clean Environment
- Ecosystem Condition
- Access to Services
- Shelter
- Social Cohesion
- Life Satisfaction and Happiness
- Nutrition
- Leisure Time
- Spiritual and Cultural Fulfillment

Well-being
- Basic Human Needs
- Economic Well-being
- Subjective Well-being
- Environmental Well-being

Legend
- Highest Rank
- Median Rank
- Lowest Rank

Relative Importance Value