Designing and Implementing PES

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Translocation

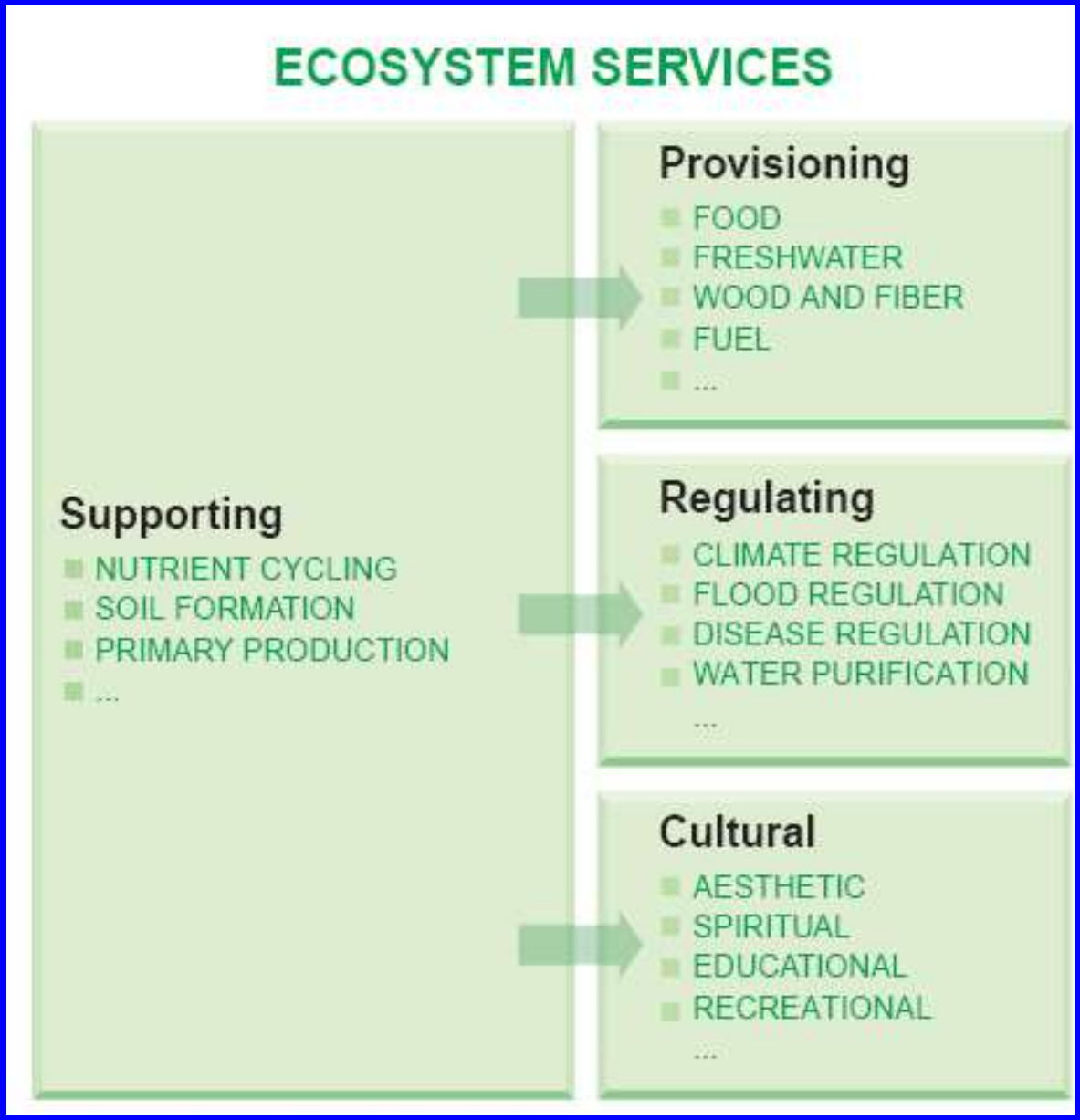
Pollination
Seed dispersal

Stabilizing

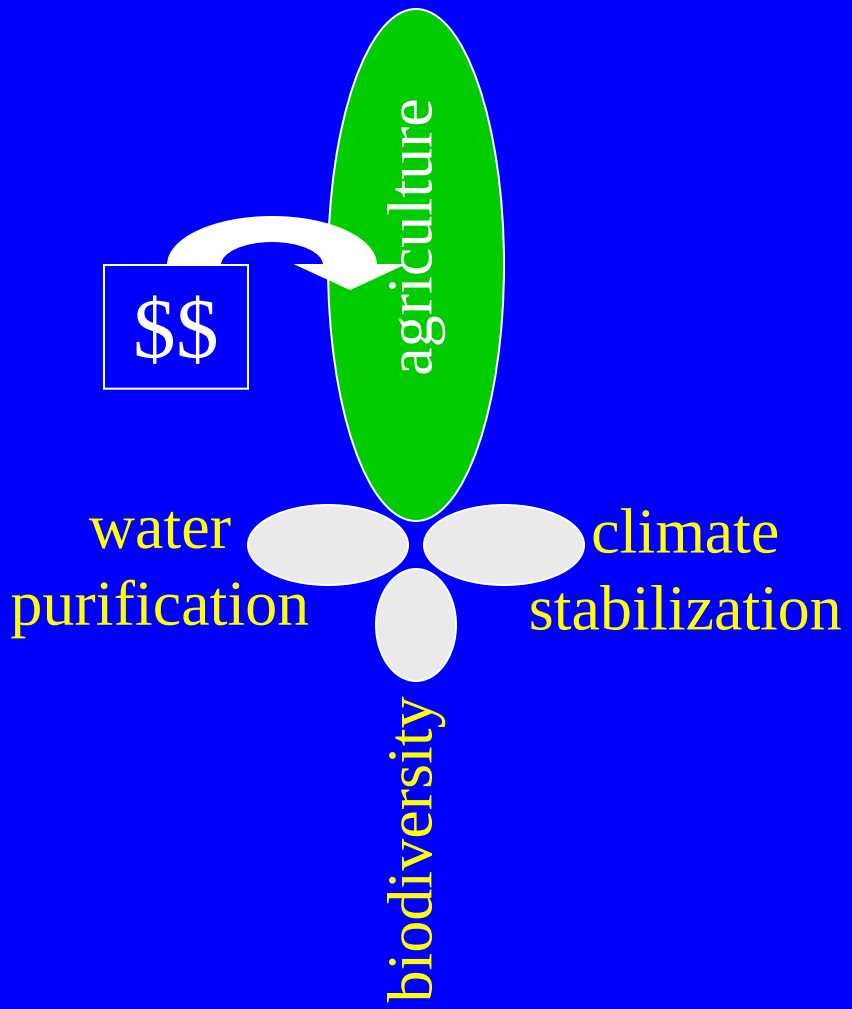
Pest control
Climate regulation
Mitigating droughts
Flood control

Cycling and Filtration

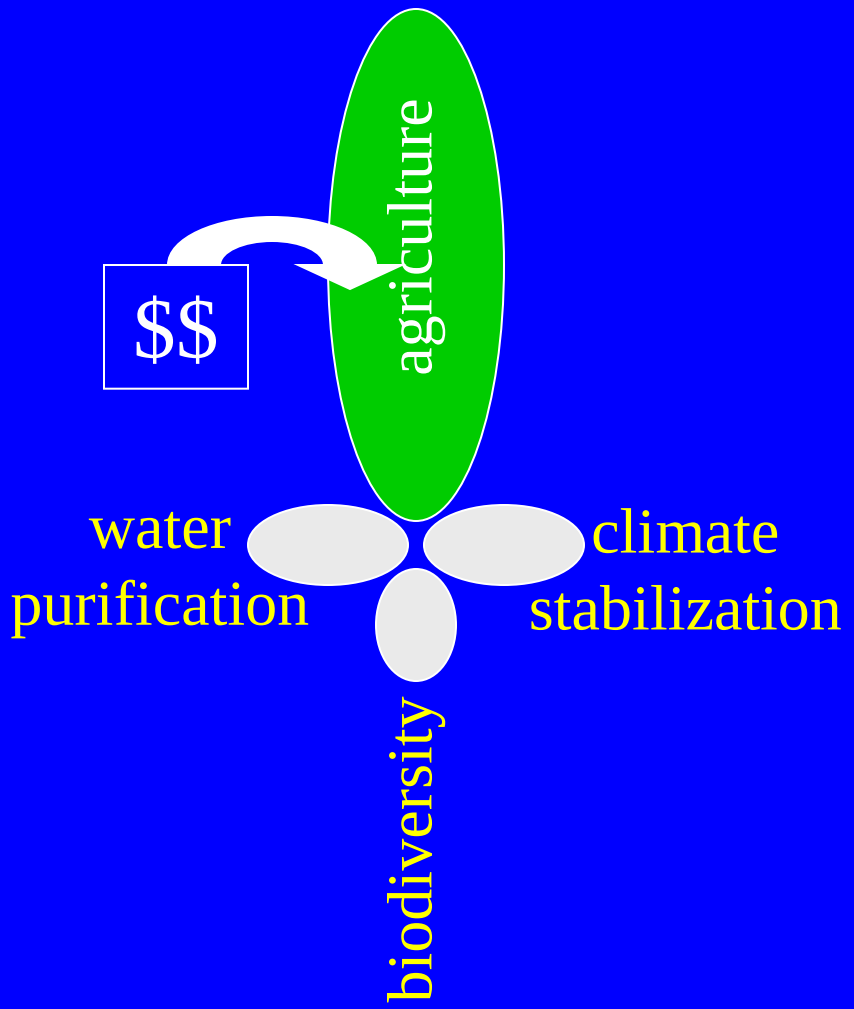
Water purification
Waste degradation
Soil fertility

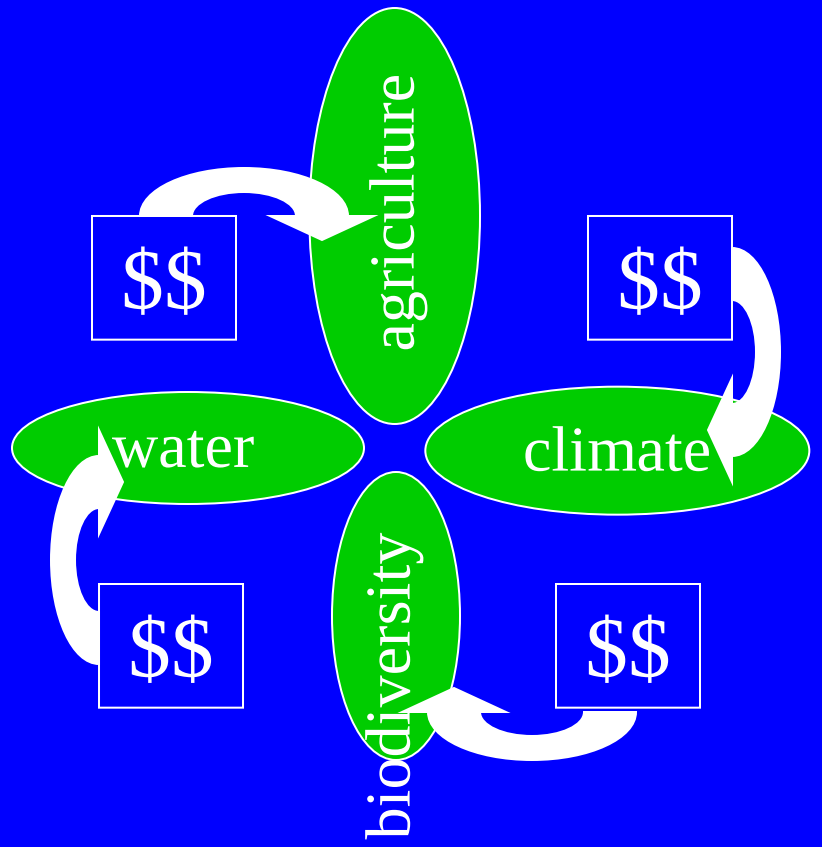

ECOSYSTEM SERVICES
Supporting
NUTRIENT CYCLING
SOIL FORMATION
PRIMARY PRODUCTION
...
Provisioning
FOOD
FRESHWATER
WOOD AND FIBER
FUEL
...
Regulating
CLIMATE REGULATION
FLOOD REGULATION
DISEASE REGULATION
WATER PURIFICATION
...
Cultural
AESTHETIC
SPIRITUAL
EDUCATIONAL
RECREATIONAL
...

Joint Products of Ecosystems



Joint Products of Ecosystems





Why Such Poor Protection of Services?

- **Ignorance**
  - Services taken for granted
  - Biophysical provision poorly understood

Production of Goods

- Food
- Pharmaceuticals
- Energy
  - e.g., biomass
- Industrial products
  - waxes, oils, fragrances, dyes, latex, rubber, etc.
- Durable materials
  - precursors to many synthetic products
- Genetic resources

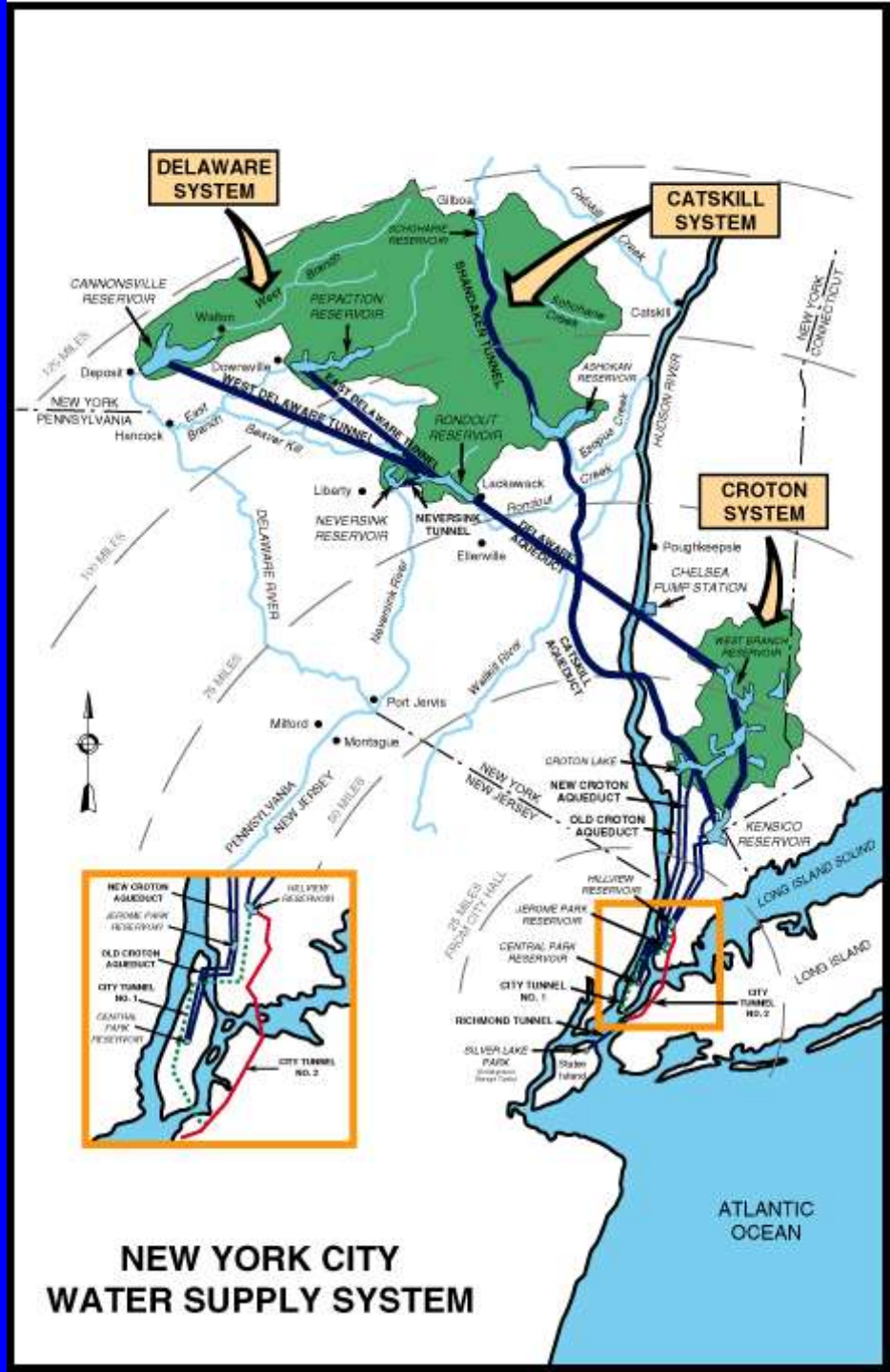
Why Such Poor Protection of Services?

- **Market Failure**
  - Few markets for public goods and services
  - Current price signals don't indicate sufficient value to encourage protection and provision of services
  - Value is landscape-specific
  - Scarcity triggers action too late

Why Such Poor Protection of Services?

- **Institutional Failure**
  - Policies and institutions do not encourage or value management of ecosystems for service provision
  - Ecological and political boundaries rarely overlap
  - Challenge of extending authority beyond traditional institutional boundaries

The Catskills Watershed Case Study



The Filtration Option

- NYC Estimates
  - $6 billion capital costs
  - $300 million operating costs
- EPA Expert Panel
  - $3 billion
- Expensive

SDWA Waiver

1997 Memorandum of Agreement

- Strengthened Watershed Rules & Regulations
- Watershed Protection & Partnership Program
  - $400 million
  - Catskill Watershed Corporation
- Land Acquisition Program
  - $250 million for Catskill/Delaware
    - Must solicit participation of 350,000 owners
  - $17.5 million for Croton
    - $10 million NYC, $7.5 NY State
- EPA waives filtration requirement until 2002

Perrier Vittel

- **Payments to local land owners to keep springs unpolluted**
  - Land purchase and rental back to former owners
  - Long term management contracts

Costa Rica

- **Payments to landowners for services (PSA)**
  - Government acts as broker
  - Most contracts for biodiversity (thanks to GEF)
  - Water quality contracts only with hydropower

Brazil

- Extrema, in Minas Gerais, paying R$148/hectare to farmers for soil conservation, 20% intact forest cover

- Joinville, in Santa Catarina, payments of R$175-$550 to farmers for riparian vegetation

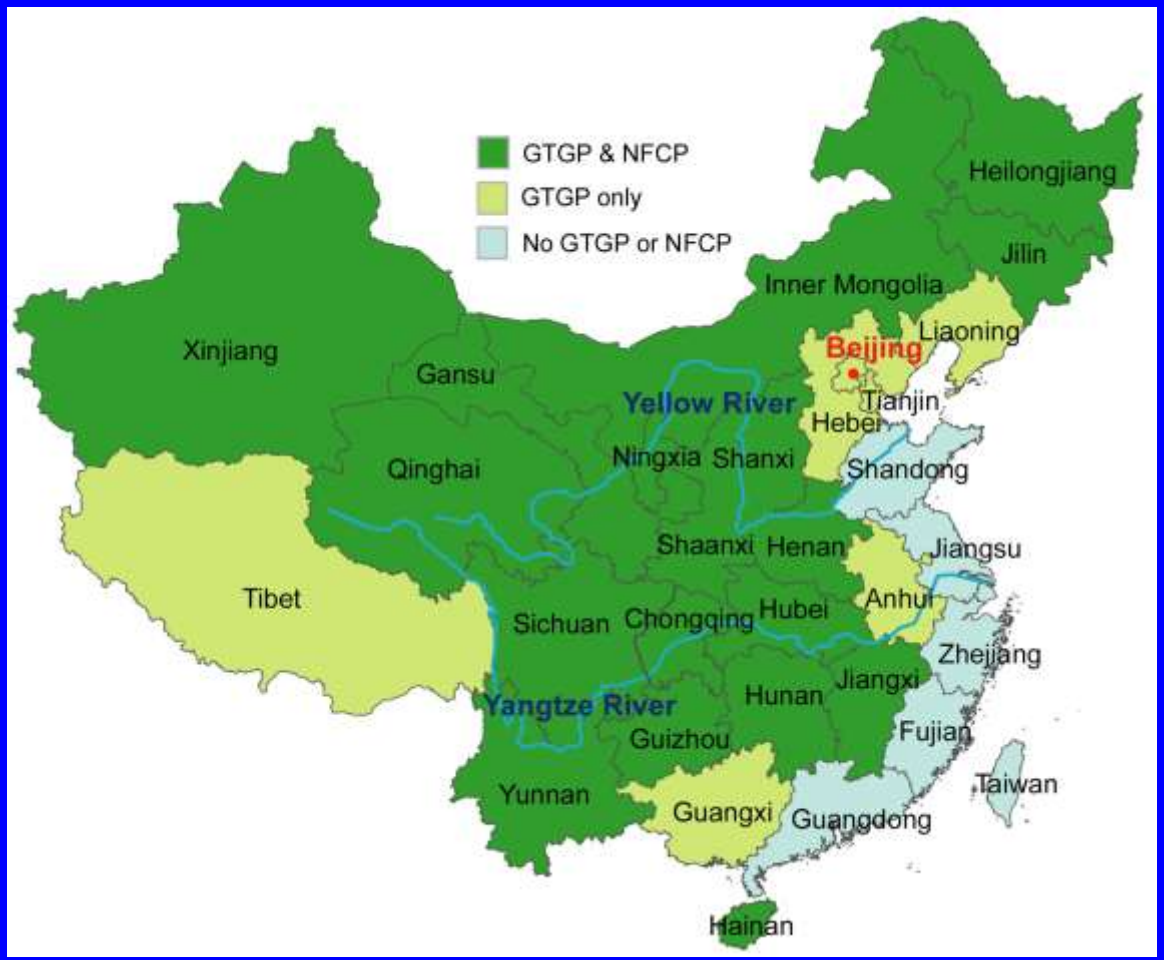
China: Grain To Green Program

- **Payments to farmers for planting trees on erosion-prone slopes**
  - Nationwide cropland set-aside program
  - Payment in cash and grain subsidies
  - Largest PES program in developing world ($43 billion for 2000-2010)

China: Natural Forest Conservation Program

- **Reduce timber harvesting from natural forests**
  - Restore natural forests
  - Meet domestic timber supply with plantations
    - Reduce loss of soil, improve water retention, reduce desertification, flood control, etc.

Largest PES programs in developing world
~$100 billion for 2000-2010

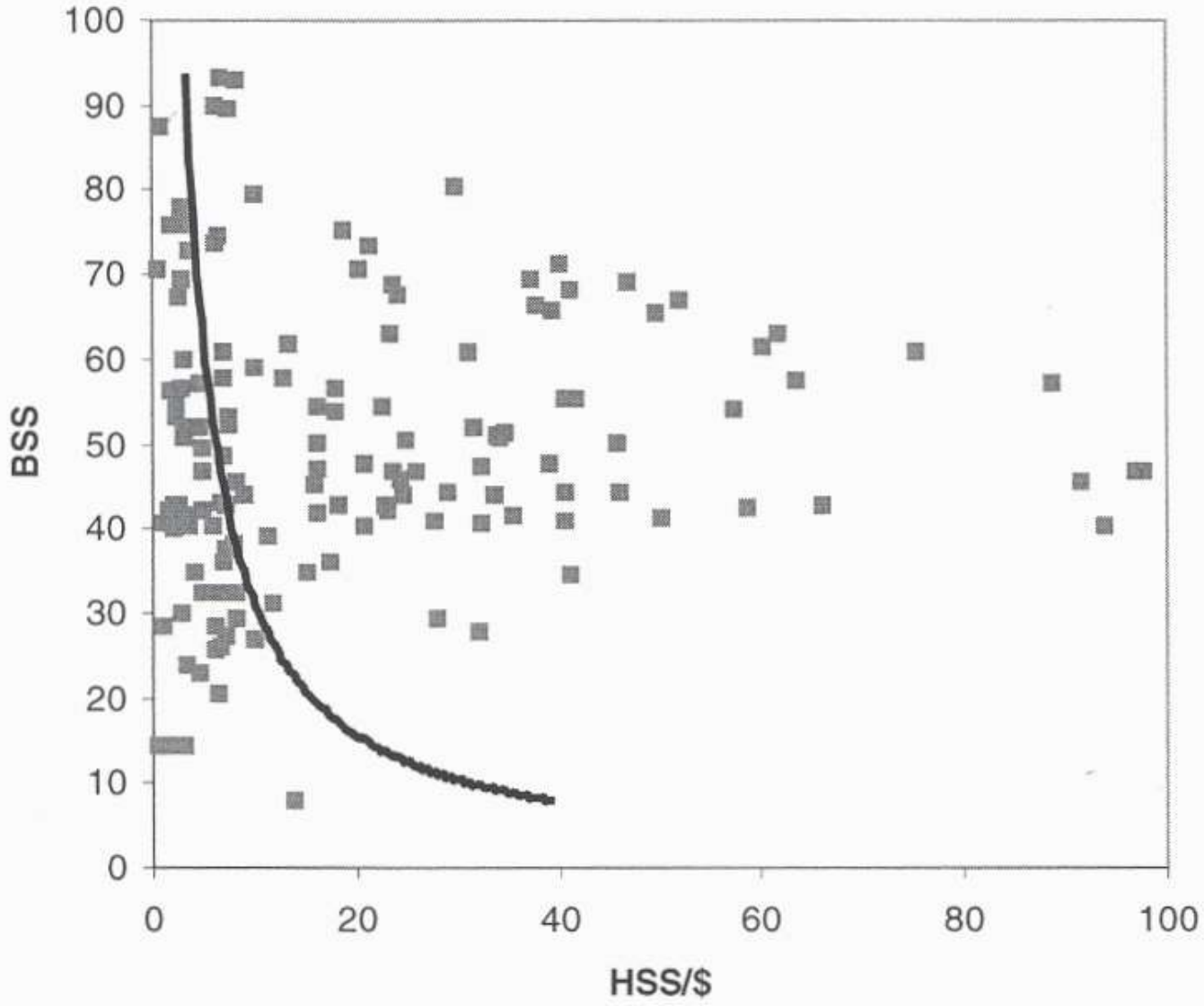


BushTender

- **Reverse auctions for biodiversity conservation**
  - Calculation of Biodiversity and Habitat Significance Scores
  - Combined with bid price and graphed

Figure 3

Threshold-BBI and Bid Data



Ecosystem Service Payments

- **B2B**
  - **Perrier Vittel, MRFF**
- **Mitigation Markets**
  - **Wetlands Mitigation Banking**
- **Subsidy (government or NGO)**
- **Government Competitive Payments**
  - **CRP, Bushtender**
- **Hybrids**
  - **Catskills, PSA**

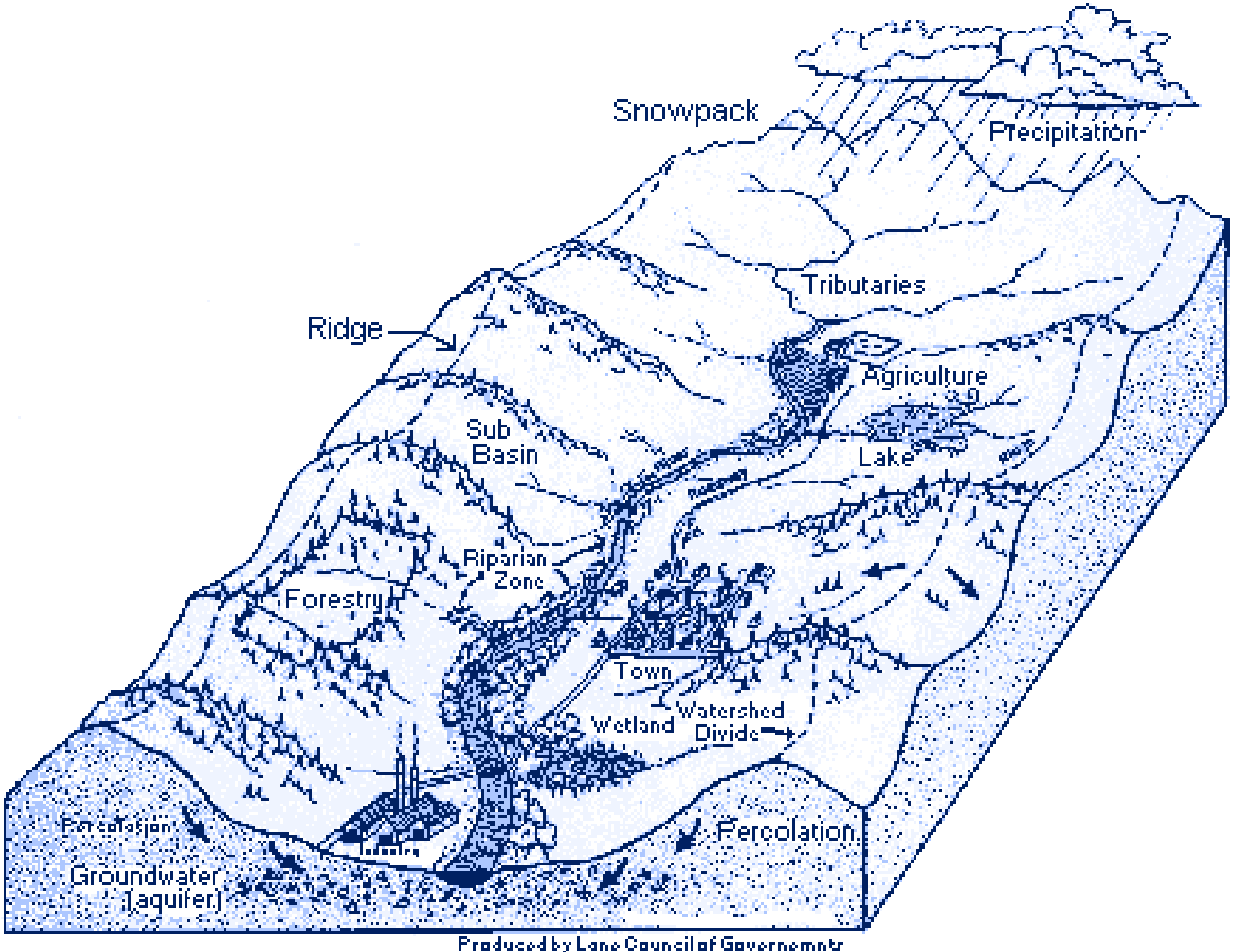
Why the Growing Interest?

- Placing land management in new terms, but familiar terms
  - Financial capital → Natural capital
  - Managing for multiple services
- Public appreciation of services' value
- New sources of revenue
- Market mechanisms in working landscapes

Designing PES

How do we make forests worth more standing than cut down?

Michael Jenkins


Snowpack
Precipitation
Tributaries
Ridge
Agriculture
Sub
Basin
Lake
Riparian
Zone
Forestry
Town
Watershed
Divide
Wetland
Percolation
Groundwater
(aquifer)
Produced by Lane Council of Governments

The Policy Toolkit – The 5 P's
Water Quality from Farm

- **Prescription**
  - regulations requiring riparian fencing
- **Penalties**
  - fines per metre of unfenced streambank
- **Property**
  - tradable right to have % unfenced streambank
- **Persuasion**
- pilot projects with fenced streambanks

The Policy Toolkit – The 5 P's
Water Quality from Farm

- **Payment for services rendered**
  - treat farmers' provision of ecosystem services as no different than their provision of other marketable goods

Farmer A

Farmer B

Should we regulate or pay Farmer B?

When should we choose payment?

- De jure/De facto
- Discrete providers
- Discrete beneficiaries
- Perceived scarcity and value of the service
- Mechanism for providers and sellers to agree on price
- Procedures for monitoring and dispute resolution

Violation of the Polluter Pays Principle?

- **Are farmers polluters or valuable providers of services?**
- **Should we be paying or regulating them?**
  - Should I be paid to stop mugging people?
  - De Jure/De Facto property rights
    - Loud music at night

Discrete Providers

- Private land owners
- Communal land owners or communities
- Public land owners
  - Should they be paid by beneficiaries

Can't pay everyone!

Discrete Beneficiaries

- individuals
- communities
- government representation of these interests *if diffuse*
  - purchase of a public good on behalf of citizens

Can't charge everyone!

Perceived Scarcity and Value of the Service

- Communication/Education
  - Ecosystemmarketplace.com
  - Katoomba Group, Forest Trends
- EPA's Science Advisory Board Committee
  - Valuing the Protection of ES
- US Forest Service Initiative
  - Accounting for Ecosystem Services

Why pay for what has always been free?

Should we pay more to Farmer A?

or to Farmer B?

Creation of a Moral Hazard?

- **Even if we pay for marginal improvements in service provision, what message does it send?**
  - Likelihood of detrimental land use change
  - Likelihood of delay in improving land use

Mechanism for providers and sellers to agree on price

- B2B
  - MRFF, PSA
- Mitigation Markets/Offsets
  - CDM, Wetlands Mitigation Banking
- Subsidy (government or NGO)
  - Riparian Buffers
- Government Competitive Payments
  - CRP, Bushtender
- Hybrids
  - Catskills

Mechanism for providers and sellers to agree on price

- Institutional actors to overcome collective action
  - Monopsony

Procedures for implementation, oversight and dispute resolution

- What are we paying for?
- How do you know you're getting value for money?
  - Macquarie River Fruit and Fibre
  - Payment for inputs or outputs?

Future's so bright
I gotta wear shades!

Where are the markets?

PAYMENTS FOR ECOSYSTEM SERVICES (PES) MARKETS

CLASSIFICATION			MARKET SIZE			
PES MARKET	SUB-MARKETS	MARKET DRIVER	CURRENT SIZE OF MARKET 2006	CURRENT SIZE OF MARKET 2012	PROJECTED SIZE BY 2006 for 2020	PROJECTED SIZE BY 2012 for 2020
Compliant Carbon Forestry	Kyoto: CDM, JI, NSW, RGGI, CCAR (coming soon at regulatory level)	Cap and Trade/Compliance -Driven Markets	New South Wales GHG Abatement Scheme: $558,558; CDM & JI (2006): $0; CCX ~ 359,000	$26 million	$5 million - $5 billion	$470 million
Voluntary Carbon Forestry	Chicago Climate Exchange; Retailers; NGO Initiatives (ex. TNC in Bolivia; Carbon Pool, CI, etc.); VERs from pre- CDM projects	Voluntary; Public relations; Preparing for regulation; Corporate responsibility; individuals taking responsibility	At least $21 Million in 2006 (LULUCF/ REDD Market)	$156 million	$10 million - $5 billion	$10 million - $5 billion
Compliant Water Quality Trading	Nutrient/Salinity/Temperatur e trading: Canada, Colorado, Connecticut, Pennsylvania, Minnesota , Ohio, Oregon, Virginia, Australia has numerous programs in development.	Cap and Trade/ Compliance-Driven	$15 million	$20 million	$1,000 million	$43 million
Voluntary Watershed Management Payments	Beverage Companies (Vittel, Coca-Cola, Beer companies), Public or Semi-Public Utilities in Costa Rica and Ecuador	Voluntary Private PES	$5 million (many public PES are partially private - like Costa Rica ~30% private funds by electric, also Ecuador, public utility revenues)	$5 million	$2,000 million	$50 million

Small Beer

- There aren't really all that many examples of PES outside of government pilots
- If such a great idea, why is PES not more dominant in the market?

Inadequate Demand

- Ignorance
- Public goods
  - Why pay for what you always got for free?
- Collective action
  - Importance of institutional actors
    - Watershed PES versus biodiversity

Inadequate Supply

- Who owns positive externalities?
- Are the property rights secure enough to create payment obligations?
- To what extent can/should government commodify services?
  - Create rights (carbon credits)Who owns positive externalities
- Secure land title?
  - *De facto* vs. *de jure* tenure

Transaction costs

- Contracting fees
  - Higher transaction costs → fewer transactions

Design Flaws

- CDM
  - Global Warming Potential
    - CO_2 = 1; CH_4 = 72, HFC-23 = 11,700
  - China ramps up HCFC-22 production
    - Billions of CERs sold
  - PES for carbon sequestration can't compete

Design Flaws

- Additionality
  - Are payments changing behavior?
- Pagos por Servicios Ambientales
  - Over 700,000 ha, $150 million
    - Pfaff et al.
      - Deforestation prevented on 0.25% of lands
    - Sanchez Azofeifa et al.
      - 7.7% of payments to areas threatened by deforestation

Design Flaws

- What are public funds paying for?
  - Service provision *and* local development *and* poverty alleviation

Social Justice

- When property rights create fences
- Concern for native and indigenous groups
- Debates over REDD
  - What happens to local communities when national commitment to reverse deforestation conflicts with local use rights?

How big can PES grow?

How Does Wall Street Make Money?

	Low Transaction Costs	High Transaction Costs
Low Volume		
High Volume		

	Low Transaction Costs	High Transaction Costs
Low Volume		
High Volume	X	

Stock Market

Low transaction costs
High Volume
Low Margins

	Low Transaction Costs	High Transaction Costs
Low Volume		X
High Volume		

Investment Banking

High transaction costs
Low Volume
Low Margins

Where does PES fit?

	Low Transaction Costs	High Transaction Costs
Low Volume		Watershed payments
High Volume	carbon credits	Wetlands mitigation banking

(1) High Volume / Low Margins
carbon credits

(2) Low Volume / High Margins
Wetlands mitigation banking

Operating on the margins –
Works best where land values are low so that margin is relatively significant.

A Typical Farm in 20 Years?

Commodity	Share of farm business	Client
Cereals	40%	World Market
Wool	15%	World Market
Timber	10%	Pulp Wood Specialty Timber
Carbon Credits	7.5%	Steel Company
Salinity Credit	7.5%	Catchment Authority
Water Filtration Credit	15%	Water Board
Biodiversity Credit	5%	Philanthropic Trust

Bush Administration Policy

Today, I am announcing that USDA will seek to broaden the use of markets for ecosystem services through voluntary market mechanisms. I see a future where credits for clean water, greenhouse gases, or wetlands can be traded as easily as corn or soybeans.

Mike Johanns
U.S. Secretary of Agriculture
8/30/05