

# ***Markets for Forest Ecosystem Services: Concepts and Examples***

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# Objectives:

1. Introduce key concepts and issues associated with markets for forest ecosystem services (FES)
2. Provide some examples of FES market mechanisms to illustrate these concepts and issues

# A note on the definition of Forest Ecosystem Services

“FES” can be used to refer to all of the values people derive or potentially derive from forests

However, in this presentation I’ll focus my attention on those FES that are not traditionally traded or otherwise priced through market mechanisms

# Why are markets for FES important?

Markets can facilitate:

- Efficient allocation of resources (natural, financial, and human)
- Increased investment in valued FES
- Better representation of FES in political decision-making processes

“The fact that many FES remain untraded and unpriced means that they run the risk of being both underrepresented and undersupplied”

# Central Question

If FES are so valuable, and markets so effective, why haven't markets evolved for many important FES?

# Answer 1

Many FES are public goods to varying degrees

- They are often “non-excludable,” meaning that once a good has been produced for the benefit of one person, it is impossible to stop others from benefitting
- And they are “non-rival,” meaning that as more people consume a good and enjoy its benefits, it does not reduce the amount available to others

GCC mitigation through CO<sub>2</sub> Sequestration is a perfect example of a public good



# Answer 2

FES are often poorly defined, measured or understood

- People can't see or touch many ecosystem services—you don't know exactly what you are buying or selling
- Discreet, uniform units often cannot be packaged for market trading
- Some important FES may never be valued or represented in the marketplace

Note that these issues apply in a unique fashion to each FES

# Answer 3

FES are most often supplied in bundles

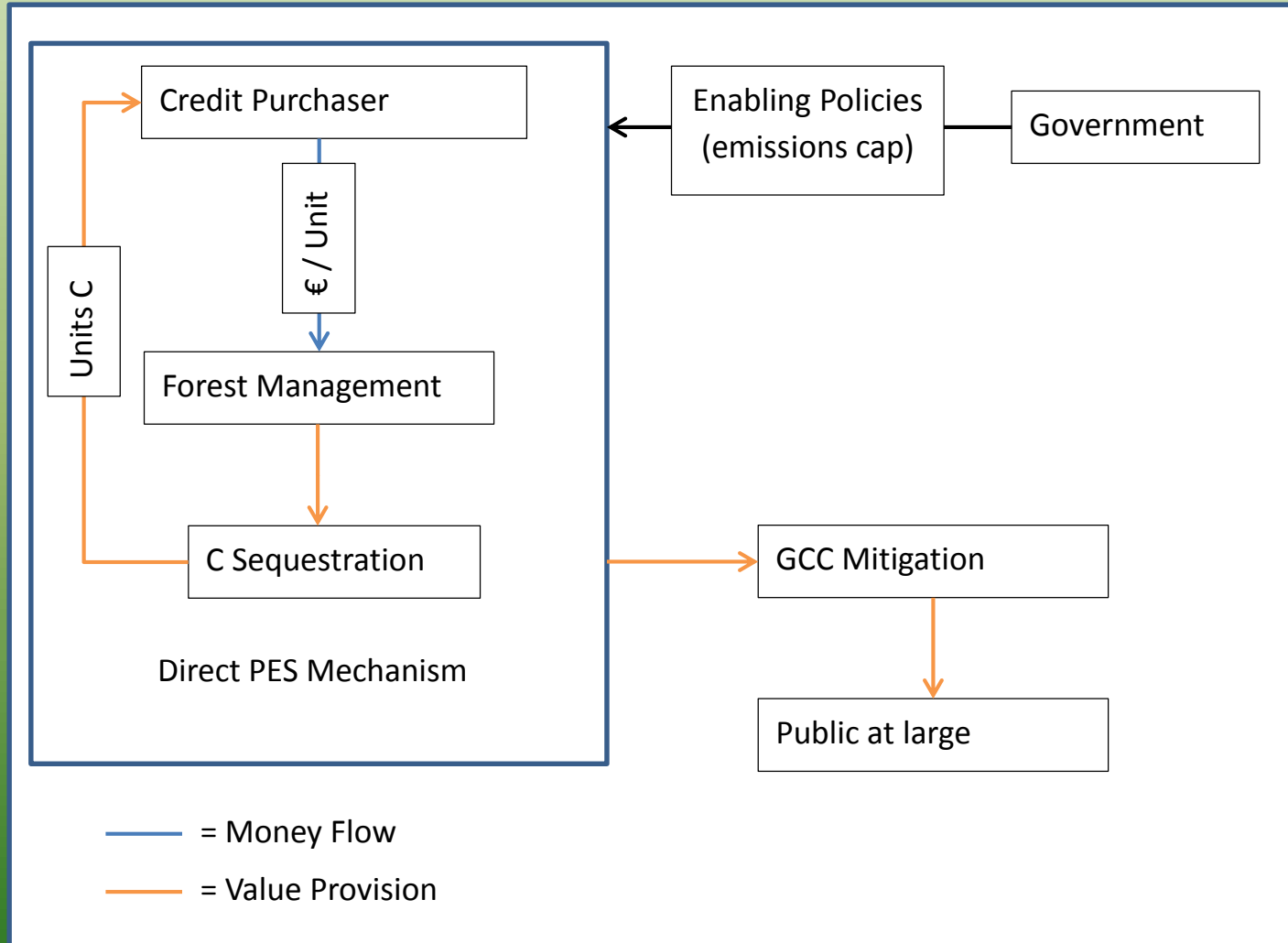
- Some FES in a given exchange may be explicitly priced but others in the same exchange may be unmeasured and un-priced
- Beneficiaries will include people who are not directly involved in the transaction
- Resulting mechanisms are complex, place-specific, and involve public-private coalitions between multiple entities



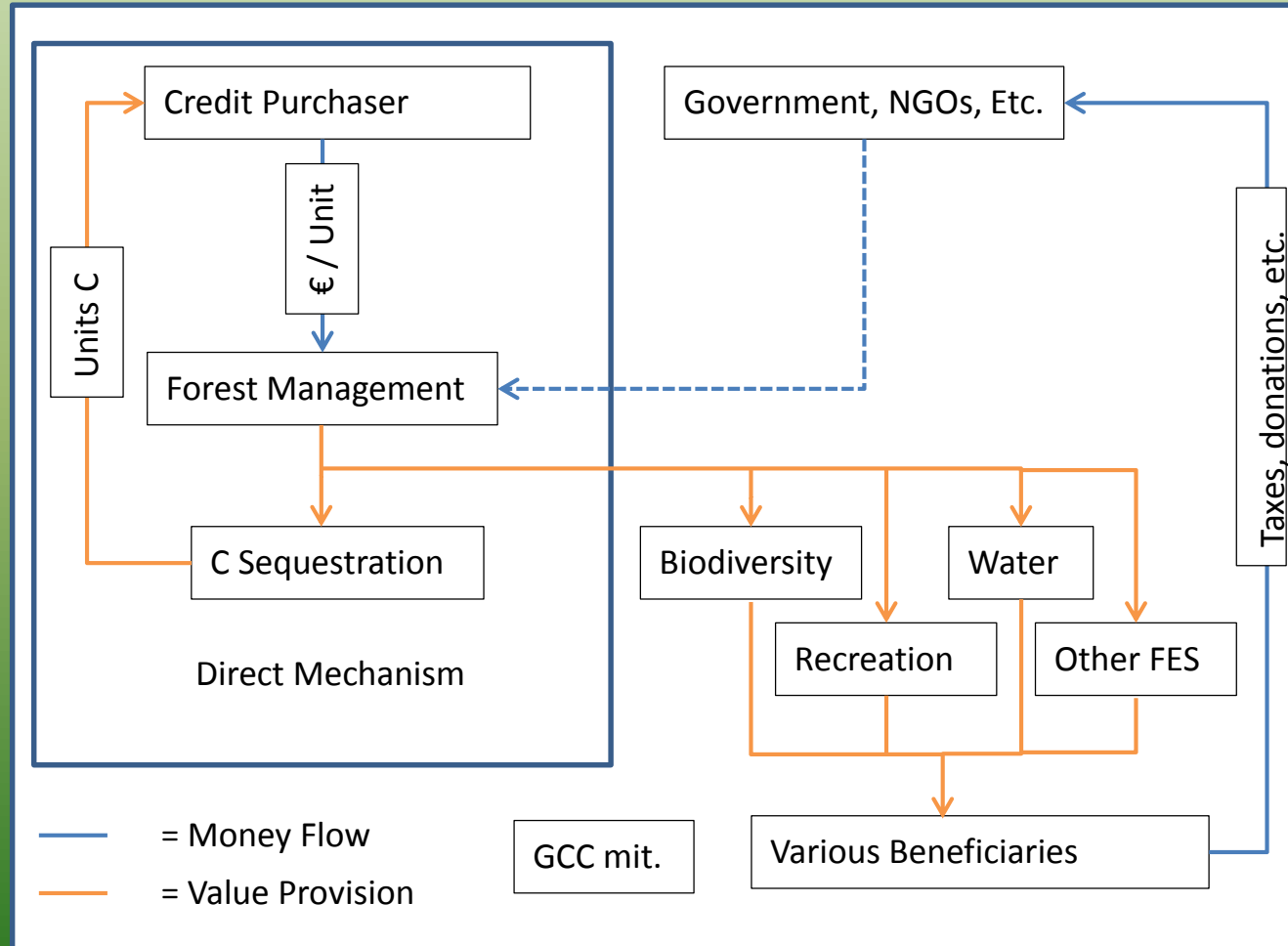
# Key Points:

- Enabling policy from government is often needed to establish markets for FES
- Information and transaction costs are often high and good science required
- Careful attention must be paid to how value is actually generated, who pays and who benefits
- Recognize that important FES will almost always not be represented directly in the transaction

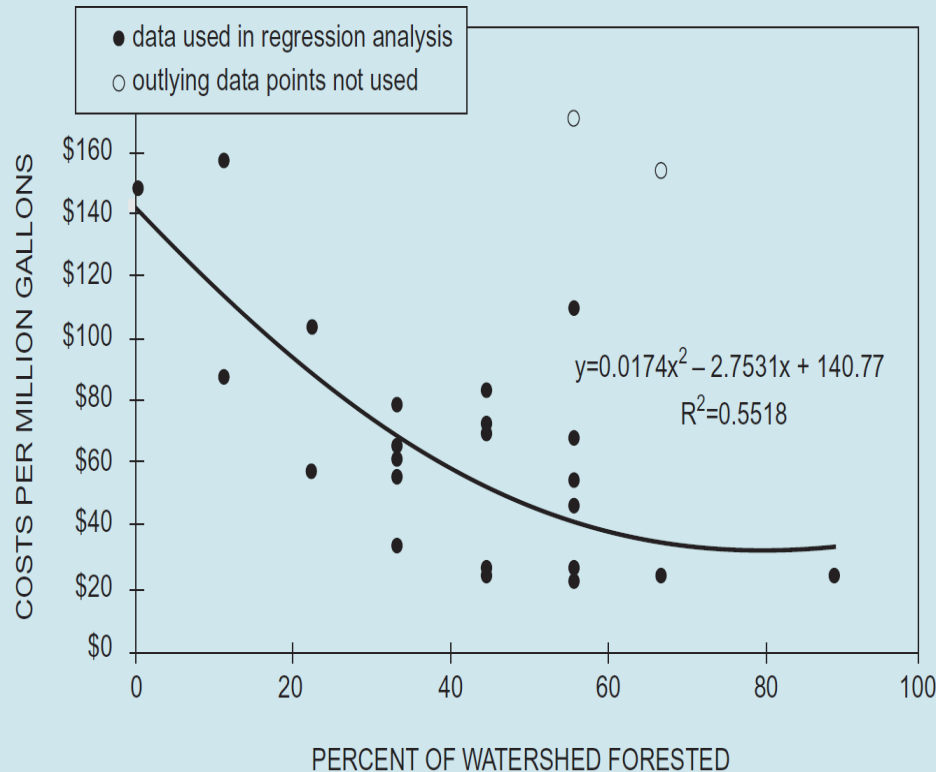
# Simple FES Market Scheme (C sequestration)



# Bundled FES Market Scheme (C sequestration)



# Specific Example: Clean water in NYC Watershed—a case of avoided cost



Estimated relationship between watershed forest cover and drinking water treatment cost (Source: Ernst 2004)

Faced with a potential cost of \$4-8 billion to construct a new water filtration plant along with an estimated \$300 million annual operating cost, NYC city instituted an upland watershed management program in lieu of these investments.

All told, the city is estimated to have spent \$1.5 billion over a ten year period and has successfully avoided the need for filtration plant.

# **Specific Example: Clean water in NYC Watershed** (continued)

Enabling Policy: Federal clean water legislation

Value generation: \$4-8 billion in avoided costs

Strategy: Landscape management

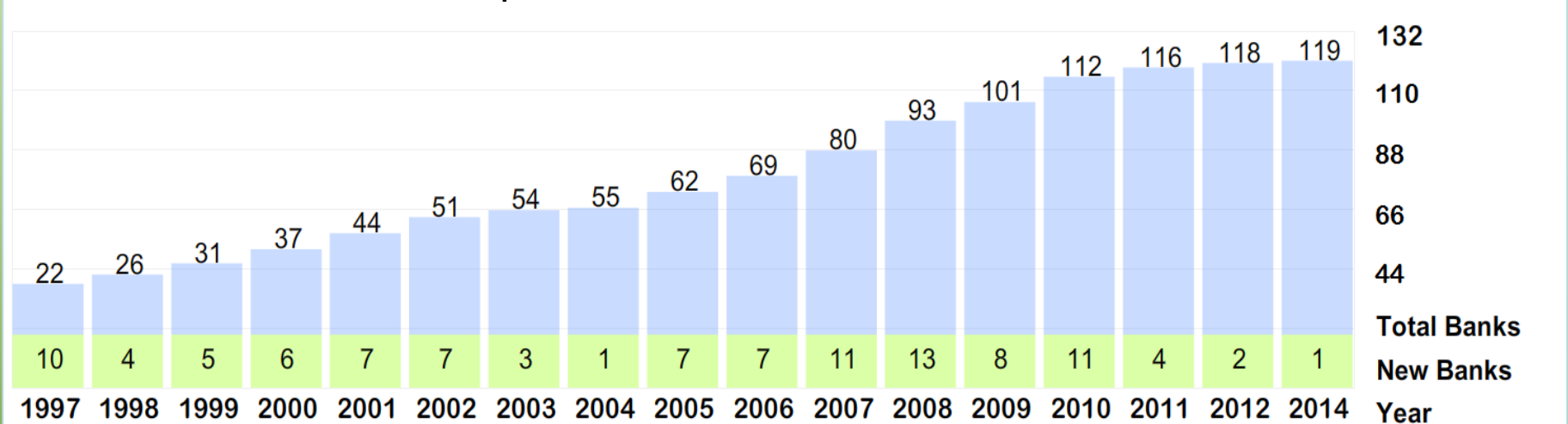
Specific FES: Clean water (subject to precise measurement)

Market mechanism: government payment (no fluid market trades)

Additional Bundled FES: various

# Specific Example: Species banking in the United States—trading acres of habitat

Rate of Establishment of Species Banks in the United States



Source: Ecosystem Marketplace Network (<http://www.ecosystemmarketplace.com>).

Faced with development restrictions arising from requirements for endangered species preservation, land owners are allowed to “bank” habitat by purchasing suitable land elsewhere subject to no net loss constraints. Habitat acres, breeding pairs, or other population measures may be the traded unit.

Conservation of organisms in question (and not just habitat) is the primary criteria.

# **Specific Example: Species banking in the United States** (continued)

Enabling Policy: Federal legislation (Endangered Species Act)

Value generation: Opportunity cost arising from development restrictions

Strategy: State and regional “banks”

Specific FES: Biodiversity conservation

Market mechanism: Land purchase/trade

Additional Bundled FES: various



# Estimated “total” revenue for ecosystem services In the United States

(million 2005\$)	2005	2008	2012
<b>Government</b>	370	369	588
<b>Non-government</b>			
<b>Wetland Mitigation Banks</b>	522	379	446
<b>Hunting</b>	420	505	789
<b>Conservation Easements</b>	189	138	199
<b>Conservation Banks</b>	24	64	52
<b>Wildlife Viewing</b>	33	43	71
<b>Carbon Offsets</b>	0.48	6.3	6.5
<b>Total Non-government</b>	1,189	1,137	1,566
<b>TOTAL PAYMENTS</b>	1,559	1,522	2,166

Montréal Process indicator  
6.1.c Revenue from forest  
based environmental  
services (Evan Mercer, US  
Forest Service).

—Government expenditures  
generally for bundled FES

—Hunting leases and fees  
single largest category

—“Revenue” not the same as  
“value” (value of FES is  
much larger)

# Conclusions:

- Markets for FES are often complex, situational, and entail high transaction and information costs
- Enabling policy is essential
- Unforeseen consequences will happen—flexible and adaptive approaches are needed
- Markets cannot be counted on to allocate all FES and the values they embody

**Thank you...**

