Ecosystem Services: Yet another buzzword?

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I've "Seen it All"

- Degrees in biology/ecology
- Degrees in resource economics
- 20 years government experience
- 13 years at University of Alberta
- Can you imagine how many policy initiatives, strategic planning approaches, "new" ways of thinking etc. I have been through?

I've "Seen it All"

- One constant - Considerations of environmental issues seems to always be associated with some vague new term
- Example - Management of forests and public lands has gone through a number of gyrations
  - Multiple use management; ecosystem based management; integrated resource management etc.

Agriculture is not different

- Multifunctional agriculture; sustainable agriculture
- Are the terms “ecosystem services” or “environmental services” or “ecological goods and services” any different?
- What do they mean? How could they be useful? Are they simply another “buzzword”
  - a word or phrase used to impress, or an expression which is fashionable – they often originate in jargon

BUZZWORD BINGO

A bingo-style game where participants prepare bingo cards with buzzwords and tick them off when they are uttered during an event, such as a meeting.

The goal of the game is to tick off a predetermined number of words in a row and then yell "Bingo!" (or "Bullshit!").

Bullshit Bingo

you keep falling asleep in meetings and seminars? What about those long and boring conference calls? Here is a way to change all of that!

to play: Check off each block when you hear these words during a meeting, seminar, or phone call. you get five blocks horizontally, vertically, or diagonally, stand up and shout **BULLSHIT**!!

eadership	Strategic Fit	Core Competencies	Best Practice	Bottom Line
Revisit	Take That Offline	24/7	Out of the Loop	Benchmark
ue-Added	Proactive	Win-Win	Think Outside the Box	Fast Track
sult-Driven	Empower [or] Empowerment	Knowledge Base	At the End of the Day	Touch Base
Mindset	Problem Solving	Ball Park	Game Plan	Leverage

monials from satisfied players:

Ecosystem Services (ES) & Ecological Goods and Services (EGS): What are they?

- Related to economics:
  - Human needs and wants are satisfied by buying goods and services. Goods are items you can see and touch, such as a book, gasoline, etc. Services are provided for you by other people, such as; a doctor, a lawn mower worker, a dentist, haircut and eating in restaurants
  - E.g. restaurants provide physical goods (prepared food), but also provide services such as ambiance, the setting and table service etc.
  - Ecosystem goods and services are the same sorts of things, but are provided to us by ecosystems.

ES &EGS: What are they? What are they not?

- They are NOT ecosystem processes
  - Nutrient cycles, photosynthesis, ground water recharge, soil formation etc.
- BUT when one links human well being to an ecosystem process the result is an ecosystem good or service
  - Many ecosystem processes provide crops and grazing which is used by humans for food
  - Wetlands can filter runoff and recharge groundwater which provides people with clean drinking water.
- They may not have linkages to "*biotic integrity*"

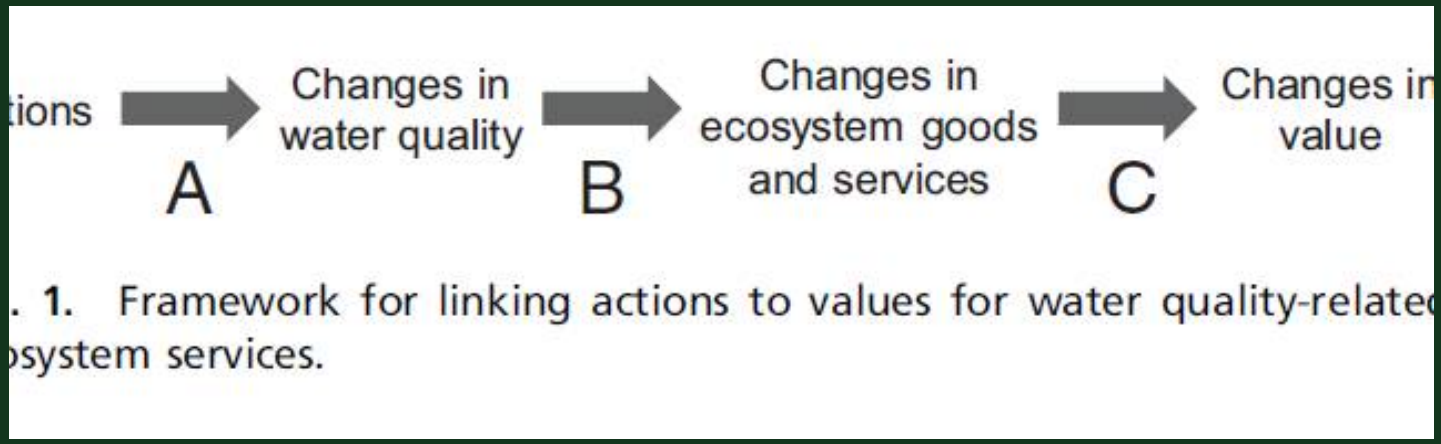
ES &EGS: What are they? What are they not?

- "We advance the following definition of a final ecosystem service: Final ecosystem services are components of nature, directly enjoyed, consumed, or used to yield human well-being." Boyd and Banzhaf , *Ecological Economics (2007)*

- "Until there is some person somewhere who is benefitting from a given [ecological] process it is only a process and not a service." Tallis and Polasky, *Annals of the N.Y. Academy of Science. (2009)*

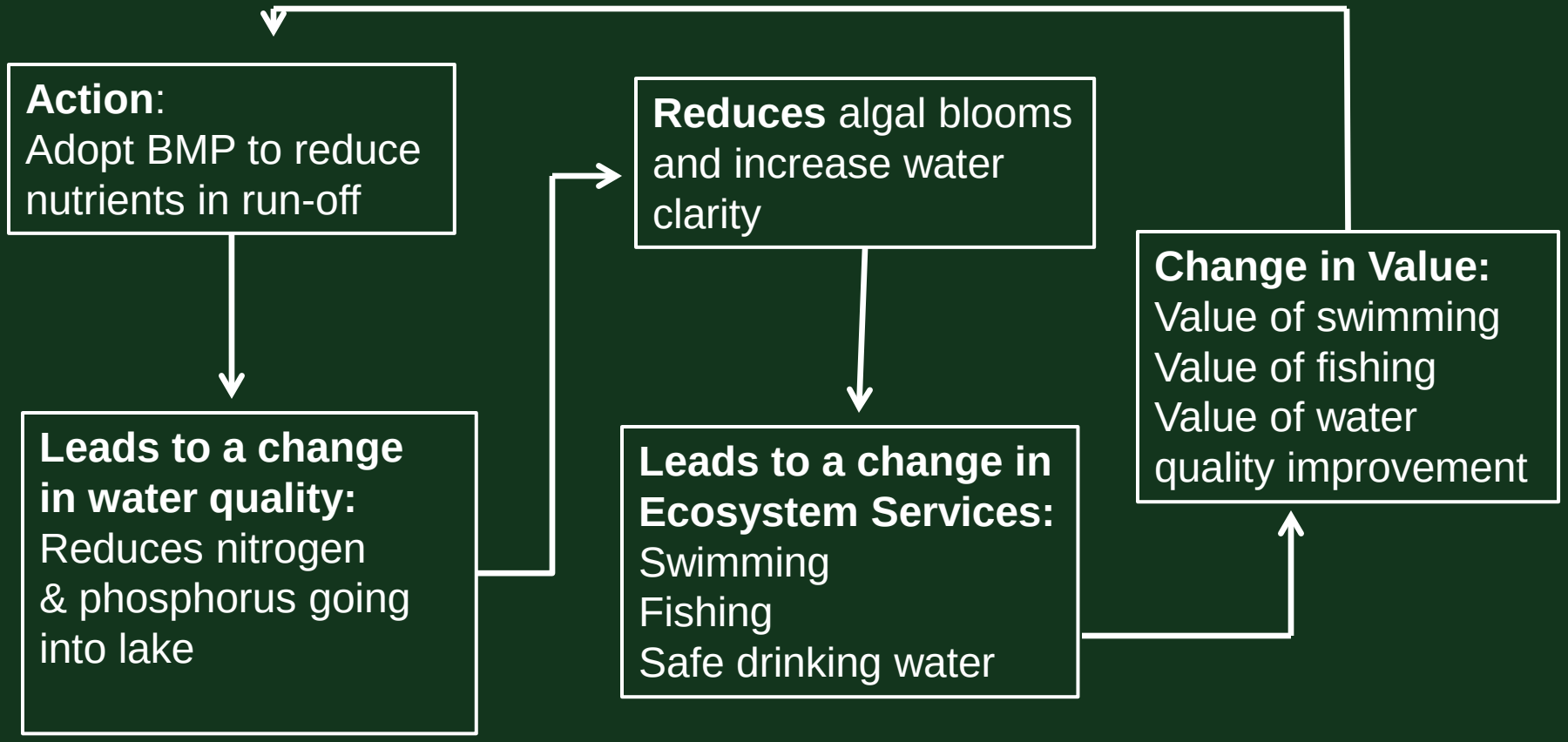
ES &EGS: Are these New Terms Useful?

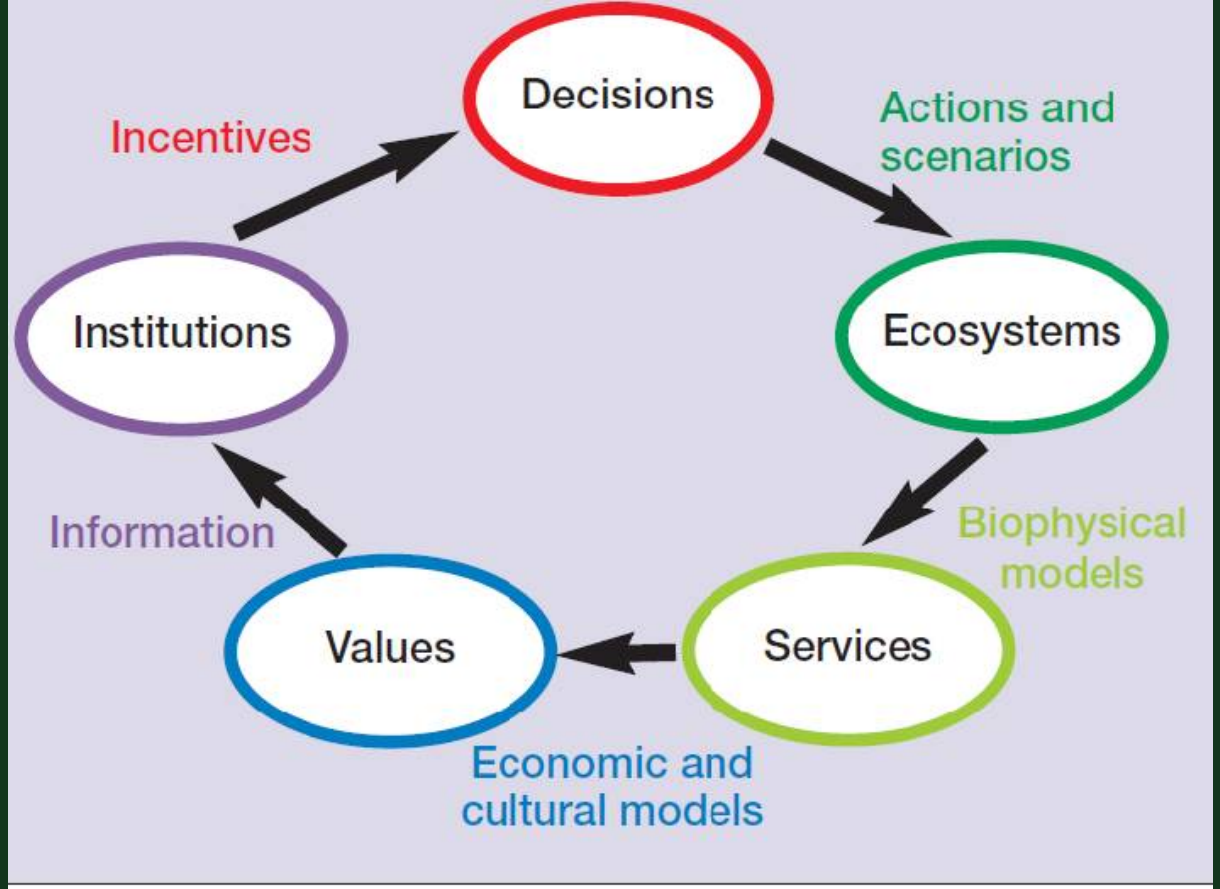
- From an economist's perspective ES and EGS are very useful and important
  - Force us to think of "endpoints" for which we can try and determine economic values for trade-offs
  - Endpoints are the *specific* things humans want like income from crop production or days of recreation



. 1. Framework for linking actions to values for water quality-relate
osystem services.

Example – Farming near Lake Winnipeg





gure 2. *A framework showing how ecosystem services can be integrated in cision making. One could link any two ovals, in any direction; we present t*

cosystem services in decision making: me to deliver

tchen C Daily[1*], Stephen Polasky[2], Joshua Goldstein[1], Peter M Kareiva[3], Harold A Mooney[1], Liba Pejchar
or H Ricketts[4], James Salzman[5], and Robert Shallenberger[6]

ront Ecol Environ 2009; 7(1): 21–28, doi:10.1890/08002

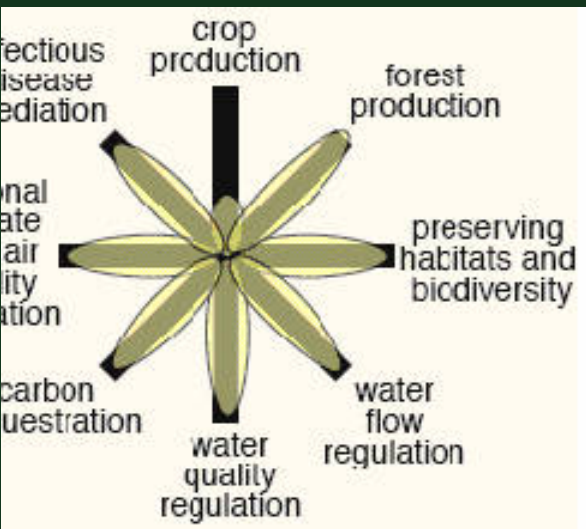
Wetlands on agricultural landscapes

What ecosystem goods and services are provided by these?

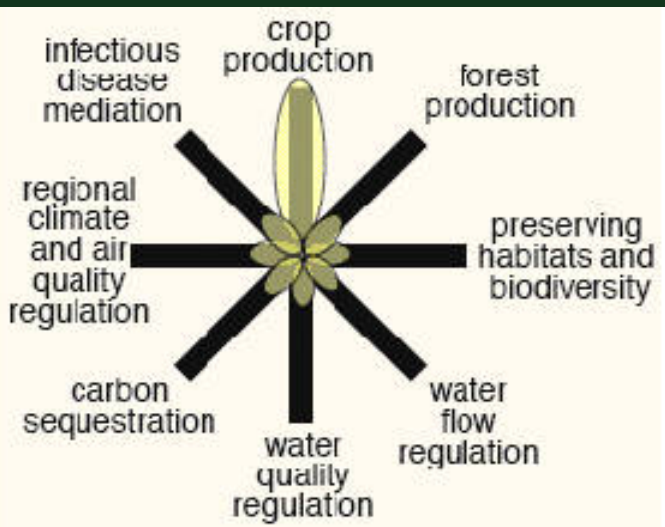
Storm water
Retention Ponds

What ecosystem goods and services are provided by these?

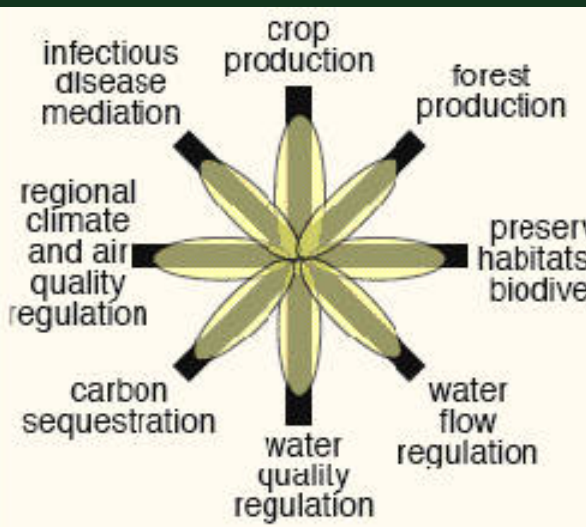

Drained Wetlands on agricultural landscapes
What ecosystem goods and services are provided by these?



natural ecosystem



intensive cropland



cropland with restored ecosystem services

US Dept of Agriculture

How do we value ES & EGS ?

- Some EGS are associated with markets:
  - Agricultural products - there are people willing to pay for them since they want food - hence markets exist
  - Carbon – until recently no markets existed, but now society is willing to pay for sequestration services
  - Improvements in drinking water quality, a municipal treatment utility may be willing to pay farmers to adopt certain BMPs if it lowers treatment costs
    - a private entity contracts with farmers

Example: *The Catskill Watershed in New York State*

- New water filtration plant for NYC to cost $6-8 billion

- "Repairing" the watershed cost less than $2 billion to achieve same water quality as the plant would generate
- In addition, the upstate economy was boosted by $100 million per year because of

  - Increased employment
  - Increased subsidies
  - Increased ecotourism

Source: *Kenny 2006*

Source (picture) The Catskill Post

ES & EGS: how do we value these?

- Other EGS values may not be associated with markets or there may not be sufficient demand to generate changes from current practices – Unless.....
  - Government programs generate demand / value if the government thinks it's valuable (e.g. US Conservation Reserve Program, Alberta Emissions Offset Registry etc.)

Example: Carbon Offsets in Alberta

- Alberta requires annual reductions of CO_2e for large emitters of 12% from baseline for established facilities and a 2% – 10% reduction from baseline for newer facilities after 3 years of operation
- Emitters can invest in facility upgrades and technology to reduce emissions
- One option – emitters purchase "Emission Offsets"
  - Resulted in an offset market and public registry that lists eligible projects available for credits
  - Many of these projects involve agricultural operations

ES & EGS: how do we value these?

- ENGOs generate demand / values if ENGO members think its valuable (e.g. Ducks Unlimited Canada etc.)

Example: Reverse auctions to restore wetlands

- Ducks Unlimited Canada and Saskatchewan Watershed Authority invited landowners to submit bids to be paid to restore wetlands on their properties
- Bids ranked according to cost per environmental output and winners selected up until the restoration budget was exhausted
- Successful bidders were paid between $21 - $391 per wetland acre
  - 211 wetlands totalling 211 acres were restored at a cost of $182,000

ES & EGS: how do we value these?

- Many of these interventions result in the creation of economic markets where no market existed before.
  - Market-based instruments
- Alternative interventions involve the imposition of regulations or command and control
- Another is "*stewardship*" typically supported through extension and education efforts

ES &EGS: how do we value these?

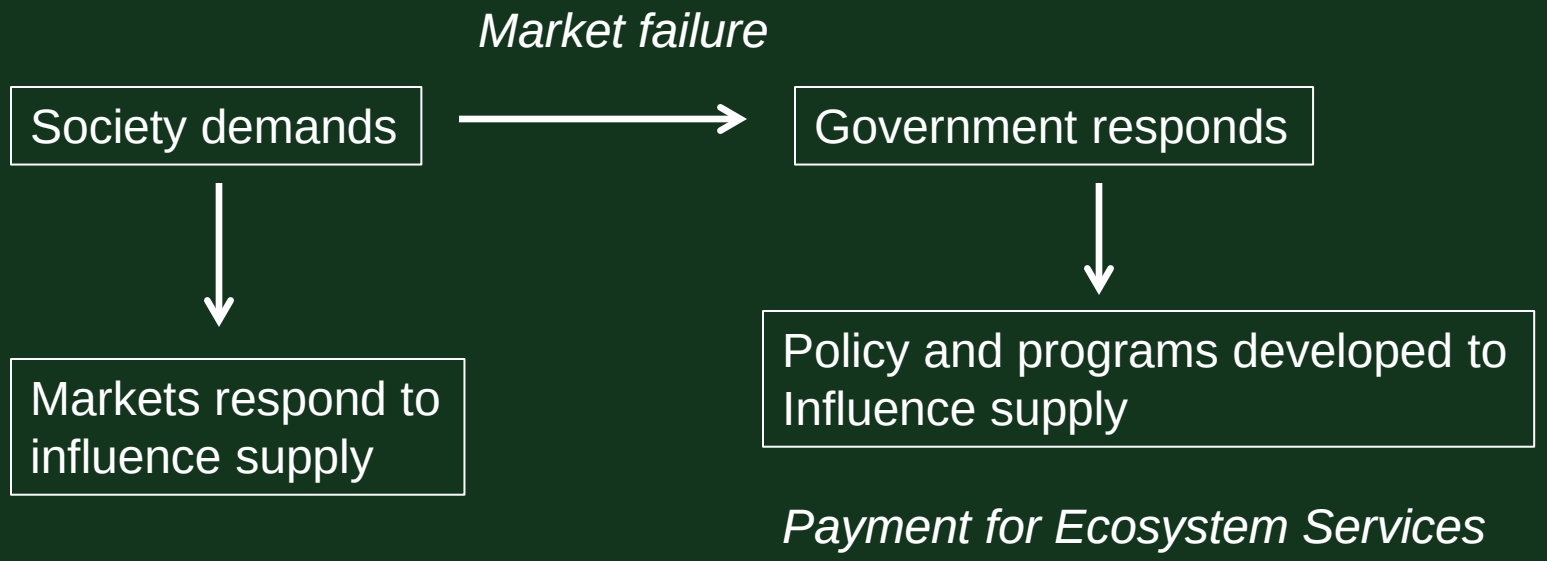
- The “Big” problem is those EGSs that may not have sufficient demand to generate significant values from changes in current practices.
  - Biodiversity (is it an ecosystem process or an ecosystem service?)
  - Habitats
  - Recreation
  - Abatement of nutrients in run-off
- Role for Government or ENGO?
  - Need for institutions to capture the values and purchase these EGSs that are socially beneficial.

Market Based Instruments (MBIs)

- Using the market to provide incentives to individuals and organizations to provide EGSs while protecting or considering their bottom line
- A myriad of types of MBIs
  - Auctions, offsets, tradable permits or development rights, mitigation banks
- Typically done by generating an economic value for producing the EGS
  - Value is captured by the producer/supplier

How do values arise?

- Economic value arises from demand
  - Scarcity of something makes it valuable if its wanted
  - Presence of many substitutes makes it less scarce hence reduces demand

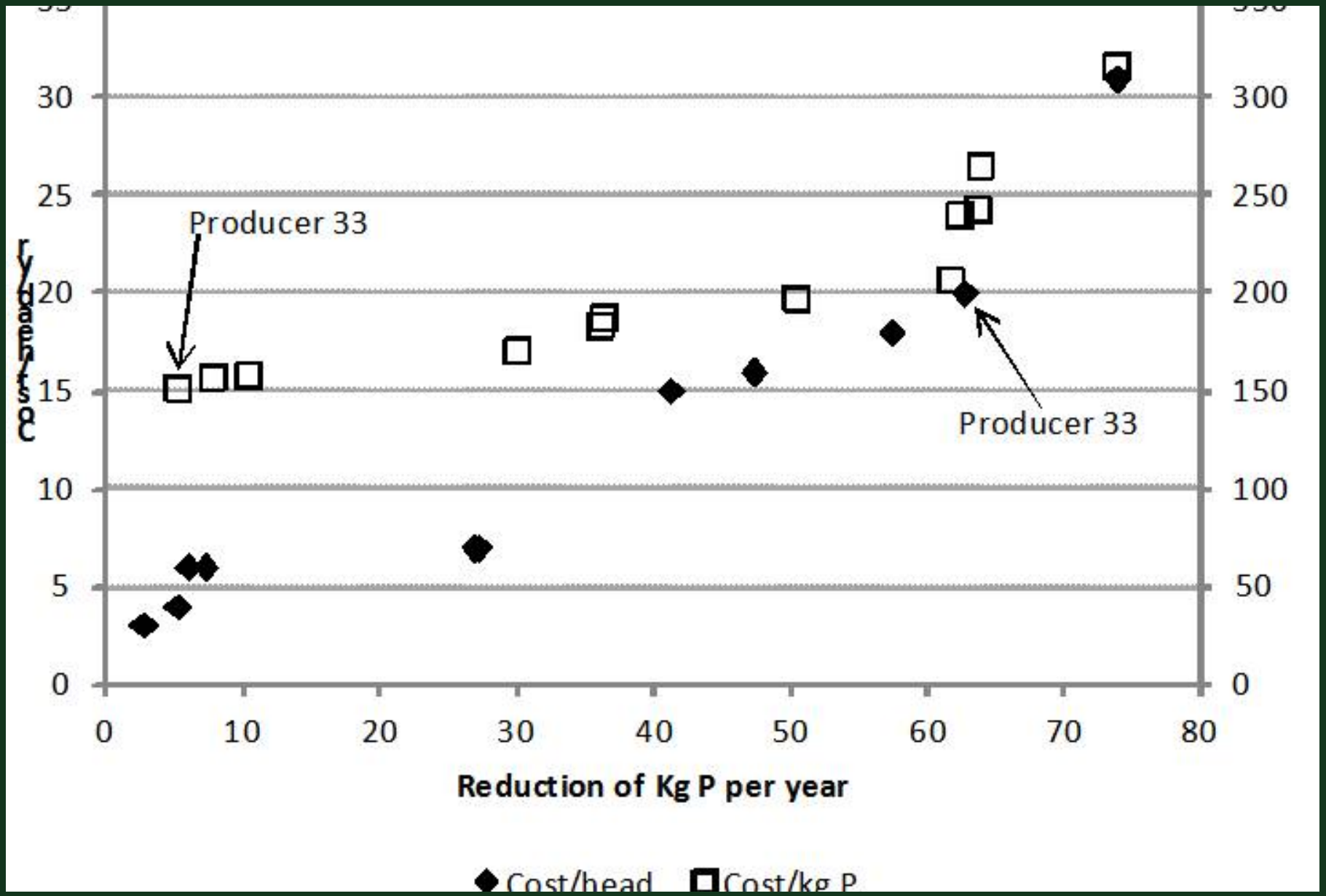


But there are costs of supplying EGS

- Payments to producers of EGS require knowledge of those costs – especially if its "public" money
  - Why? Tailor payments to costs of providing them
- But each farm will have different costs
  - Why?
  - Farms are different – soil types, slope etc.
  - Producers' management practices are different.
- ** Each farm will be able to supply different levels of a particular EGS
- ** Should each landowner be treated the same in a program?


The Holding Pond BMP

Holding Pond BMP costs and Phosphorus abatement



What does this large variation in costs mean?

- Targeting financial resources to maximize EGS provision
  - Especially with public funds
- Raises questions about fixed payment incentive schemes where providers all get paid the same for a particular action
- Raises questions about cost share payment incentive schemes
  - Shares may be substantially lower than costs of provision
  - Could partially explain low update of BMP programs

The Costs of Changing Behaviour – An Example from South Tobacco Creek (STC) Manitoba

BMP	Number of affected producers in STC	Our estimate of what it would cost producers over 12 yrs	Budget (National Farm Stewardship Payments & Env Farm Plan)
Riparian management	6	$294,884	$100,434
Runoff holding pond	12	$112,462	$56,231 (~$57/head)
Zero-tillage	36	$1,444,175	$433,253 (~$94/acre)
Forage conversion	36	$2,860,727	$858,218 (~$62/acre)

How do values arise?

- Economic value arises from demand
  - Can we change existing markets or create new ones for differentiated products?
  - We do this by providing more information about the product
  - Reduction of market friction

Issues

- Need for standardized information and effective evaluation
  - To avoid the problem of “greenwashing”
  - Verification of changes in EGS provision – who is going to do this?
- Is there a green premium for differentiated products through EGS provision?
  - Will production changes and label actually provide a market advantage?
  - How many differentiated products will consumers respond to?
- This approach will require significant investments in monitoring and verification

Conclusions

- Yes EGS is a buzzword – but I think its more useful than others I have been exposed to
- Do not forget the explicit linkage with human well being
  - *Biotic integrity* might have little to do with ecosystem goods and services
- This then relates directly to values – especially economic values
  - If it helps recall the difference between a remote wetland and a storm water structure
- The linkage of EGSs with economic values provides the MBI potential for their supply

BMPs Adopted

MOST POPULAR BMPs BY EXPENDITURE, PRAIRIES & YUKON National Farm Stewardship Program	
Improved Cropping Systems	~$47 million
Product & Waste Management	~$22 million
Wintering Site Management	~$12 million
LEAST POPULAR BMPs BY EXPENDITURE, PRAIRIES & YUKON National Farm Stewardship Program	
Grazing Management Planning	~$9,000
Riparian Health Assessment	$0
Biodiversity Enhancement Planning	$0