

Ecosystem Services Workshop

October 2-5, 2006

Workshop Objectives

1. Review ecosystem services concept history and background
2. Identify rangeland- specific ecosystem services
3. Prioritize rangeland ecosystem services based on criteria to be discussed
4. Evaluate SRR conceptual model representation of rangeland ecosystem service relationship, and see SRR indicator capture of ecosystem services
5. discuss potential incentive programs for rangeland ecosystem services

October 3, 2006

- 1) Introductions
- 2) Review of agenda
- 3) Brief of SRR (refer to handouts)
 - a) started 2001
 - b) funding from NRCS, CSU, ARS, USFS, ...
 - c) 64 indicators in 2003
 - d) 2005 progress report with core indicators
 - e) 2004? conceptual model
 - f) currently in 3rd phase
- 4) **Laura Meyerson- Ecosystem Services Background (PowerPoint)**
 - i) Historic People
 - (1) Plato
 - (2) George Perkins Marsh - *Man and Nature*
 - (3) Fairfield Osborn—*Our Plundered Planet*
 - (4) Aldo Leopold—*Sand County Almanac*
 - (5) Paul Sears- *The Process of Environmental Change by Man*
 - (6) Paul and Anne Ehrlich- *Ecosystem in Jeopardy*
 - (7) Gretchen Daily
 - ii) Ecosystem services are the benefits that people receive from well functioning ecosystems. These services can include, but are not limited to, pest control, fisheries, soil retention...
 - iii) Terminology evolution- How the verbalization change over time.
 - (1) public services of a global ecosystem
 - (2) Nature services
 - (3) ecosystem services
 - iv) *The value of the worlds ecosystem services and natural capital-* Robert Costanza
 - (1) 17 services equaling \$33 trillion
 - v) Millennium Ecosystem Assessment (MEA)- The meeting was to provide information to decision makers and public about the current state of systems.
 - (1) There was a breakdown of the serviced into 4 categories: (*definitions as used by the Ecosystem Services Workshop and obtained through the 103 Delphi.*)
 - (a) Provisioning- Services are the consumptive and non-consumptive products obtained form rangeland ecosystems.
 - (b) Regulating- Services where benefits are obtained form the natural regulatory processes of rangeland ecosystem.
 - (c) Cultural- Services that area direct and indirect non-material benefits obtained from rangeland ecosystems.
 - (d) Supporting (the base to all others)- Services are the services necessary for the continued delivery of all other rangeland ecosystem services.
 - (2) Major findings of MEA:
 - (a) Humans have altered ecosystems most within the last 50 years than any other time.

- (b) Ecosystem changes have resulted in great benefits to humans (food production, hydropower, paper pulp, ...) and these gains have been achieved at a cost that is not sustainable.
- (3) Ecosystem services concept- It is a concept created to convey information to different groups.
 - (a) What ecosystem services provide...
 - (i) the services we depend on, but do not pay for
 - (ii) an anthropocentric concept
 - (iii) direct or indirect services
 - (iv) They can be inside or outside of existing markets.
 - (b) Example: Kristina Stinson- She showed how the introduction of an introduced species diminished an ecosystem service using garlic mustard (introduced species), micorrhizae, and sugar maple, white ash and red maple. The decrease of wood production was the direct effect to the ecosystem service.
 - (c) How are we doing quantifying ecosystem services on a national scale?
 1. Services are often local or regional, not really national.
 2. Aggregation of services occurs across multiple scales.
 3. Services are not always well connected cross country (different connections and analysis).
 4. Examples of large scales:
 - a. non-national: Forest watersheds can set boundaries to measure water productivity, habitat, carbon storage, water filtration...
 - b. national: Net primary production (Steve Running in Meyerson et al. 2005) and carbon storage can be looked at on a national scale.
 - c. Unknown scales:
 - i. Pollination and pollinator are a huge value, but what scale is most appropriate to look at them?
 - ii. The Heinz Center, since 2002, has been looking at recreation, food, fiber, wood. But indicator development is needed. How do you measure such things?
 - (d) How to value services (different techniques):
 - (i) Monetizing services- placing a dollar value on the services.
 1. Valuing services in other ways that cannot be easily be monetized or quantified. These are methods by which public policy and private landowners can take each of these into account.
 2. The EPA measured the social benefits of ecosystem services (scarcity, population dependant on it).
 - (e) Why are these important?
 - (i) To report quantities of services at the national level.
 - (ii) To understanding trends to manage sustainability.
 - (iii) The payoff to responsibly manage resources
 - (iv) But one must remember the need to be scalable and spatially explicit.

5) Fee Busby- History of Range Management for Goods and Services (see PowerPoint)

- a) There are five periods in history:
 - i) Period of exploration
 - (1) Native Americans – land and life synonymous (science, water, fuel...)
 - (2) early Spanish, English and French (adventure, deterioration of land, government promoted)
 - ii) Period of land acquisition and disposal
 - (1) Main mind set of settlers was manifest destiny, the want for land freedom. Movement of Native Americans to reservations, created space for settling, and optimistic development.
 - (2) Early settlers needed forage, cultivation, religious freedom, freedom and opportunity, irrigation, silver and gold, employment, wealth and thus were no longer out for adventure—it was work and a lifestyle.
 - (3) Late settlers were homesteaders and large ranches. The public domain was unclaimed land used for grazing and timber harvest and mineral extraction. There were needs for water for cities and

businesses. Railroads and transportation systems began, which increased the demand for fuel in huge amounts.

iii) Period of public land reservation and protection

(1) People began to think for scenic beauty and recreation.

(a) The movie, *The Long, Long Trailer* (staring Lucy and Desi), in 1954, inspired people to hit the road and head to natural areas. There was a want to visit places that are outside the city that people need to go and see. It drove people to get outdoors.

(2) Government had been telling people to go west.

(3) By 1848, all land acquisition done.

(4) There began to be a need to protect water quality (not necessarily for timber production), to create wildlife refuges, and begin land management.

(5) Pinchot's "greatest good, greatest number, for longest time" became a driving force.

(6) There was need to meet war effort through formation of military bases (attain land), engery (oil and gas), training...

(7) The Dust Bowl was a huge factor in this period. It was due to past land uses, drought, and economic drivers (WWI there was a need for grain. WWII there was not as much need for grain, but the economic crash made it so producers continued to produce more and more for the benefit of marginal profits—which were tiny.).

(a) At this time there were no programs to act as a safety net for farmers, which caused the drastic overproduction and degradation of the land.

(b) There began to be land conservation for clean air as a direct result of the dustbowl. SCS/NRCS was created. All unclaimed land was bought and under put under government management.

(c) People began to think of carbon sequestration, genetic banking (keeping/replanting natives) and heritage preservation.

(8) There was a drive for moral restoration and the study of mostly undisturbed ecosystems.

iv) Period for recovery from WWII

(1) High agricultural exports because we had huge capacity to grow things. We tried the Food for Peace program, trying to "buy" friendships.

(2) There were huge increases in suburban development, transportation development (mainly highway development), and cutting timber for houses.

v) How will the land meet today's objectives

(1) Legislation

(a) Multiple Use and Sustainable Yield

(b) wilderness act

(c) NEPA

(d) Wild and Free-Roaming Horses and Burros Act

(e) ESA

(f) Clean water act

(g) Food Security Act (It is an environmentalist bill and not an agricultural bill.)

(i) CRP and other conservation incentives created.

(ii) Sod busters were ceased through government subsidies.

(iii) The government began to enforce conservation compliance.

(iv) The over production like after WWII, began during the Cold war, but there were government programs to help farmers—thus less of a problem.

(h) Farm Bill- Environmental Quality Incentive Program

(i) Congress passed a bunch of laws that the actual users and mangers of the land may not have wanted, but they still care and want to restore degraded land and acknowledge the planning needed.

(2) Today, managers are busy with creating land use planning handbooks, attending meetings, creating scoping documents, planning, going to court for appeals, worrying about T&E species...

6) Questions for Fee and Laura

a) Where does planning fit into the programs that we have to accommodate them?

- i) Large crop subsidies could be decreased by minimizing the land in crop production through renting the land from farmers for conservation thus reducing production. Hence farmers get more money for doing less.
- b) With programs, have we learned anything from the past?
 - i) Programs that are a one size fits all are problems...
 - ii) Congresses gains support by distributing money and thus it continues (Montana congressmen want subsidies because their constituents want them.)
 - iii) When writing bills to meet one area's need (inner mountain west) other areas will call out that there is unfair treatment.

7) Agency and NGO perspectives (numerous people):

a) Rob Doudrick, USFS:

- i) There is a clear struggle between market values and other values.
- ii) Who is going to pay for conservation/ preservation/ ecosystem services? There is never enough federal money to do it all.
- iii) Information to remember...
 - (1) There will be an administration Farm Bill for 2007.
 - (2) Eventually, there will be a commodities market.
 - (3) greenbiz.com (An internet resource to find out what market penetration means and what needs to be done to get involved.)
- iv) Important questions that need to be asked:
 - (1) How are you going to make it relevant to those that will be funding SRR or working for SRR?
 - (2) Society's values are different, how do we sort them?
 - (3) Are markets appropriate? (It's a huge enterprise to convince people that this is important.)
- v) Solutions for the future:
 - (1) We know what needs to be in the farm bill (alleviate risk and foster demand), but the problem is the politics behind it—it comes to fairness.
 - (2) Get to who cares. There needs to a clear picture of how you are going to make it relevant, how you are going to deal with it, who's going to pay farmers for changing behaviors, and who's interested.
 - (3) Identify how you reconcile differences between buyers and sellers.

b) Kit Muller, BLM:

- i) There is no agency perspective on issues of ecosystem services.
- ii) Looking into the past, there was a 1982 instructional memo circulated regarding how to estimate market values. How did this memo and the handbook reflect on ecosystem services in the past compared to today's efforts?
 - (1) In the memo, the focus was on one service (recreation or flood control) and not a sweet of services, like we are focusing on today.
 - (2) The focus in the past was on a single project (cost benefit for a single project)and there was no tracking over time.
 - (3) The spatial focus was very local-- very individual and not scaleable.
- iii) The main point though, is that decision making is still in 1982. The framework for talking about these services is not here. We need to develop these things, but the BLM will have a hard time applying management decisions because their decision making is still back in 1982.
- iv) Agency Structure information:
 - (1) There are three levels, all based around local concerns and needs, and different across different uses (mining, grazing, ...)
 - (a) assessments
 - (b) planning permits
 - (c) projects
 - (2) So, any changes will have to be incorporated across these three different levels (processes, programs and scales).

c) John Tanaka, SRM:

- i) 1948 Articles of Incorporation include:

- (1) public appreciation of rangelands
- (2) to better manage for services needed
- ii) Policy position statement created in the 1960s/1970s are the core values to the society. They include:
 - (1) The definition of rangelands
 - (2) To goal to provide optimal sustained yield of products and services, which include (but are not limited to):
 - (a) livestock grazing
 - (b) water management
 - (c) aesthetics
 - (d) recreation
 - (3) Basis on ecological principles and not on economical or sociological principles.
- d) Cliff Duke, ESA:
 - i) The main goal of the association is to promote the development of ecological science and to use ecological science in decision making.
 - ii) Why to get excited about ecosystem services?
 - (1) Analytically. The science begins to shape questions and concepts in research.
 - (2) Communication. The ability to get better science into the way we manage lands. Science gives us another way to talk about issues.
 - (3) Collaboration. It gives us the ability to address issues and bring people together because we need help from others.
 - iii) What do we (as an association) do?
 - (1) We help to develop tools.
 - (2) We provide vehicles to get word out (fact sheets, information, communications, websites).
- e) Sarah Lynch, WWF:
 - i) WWF is a science based organization to preserve wildlands.
 - ii) It is a place based (19 places) organization which allows them to focus on certain areas where there is greater ecological integrity and drivers that crosscut across all systems (ag, transports, infrastructure...).
 - iii) WWF has a big focus in ecosystem services (an exciting concept).
 - iv) Current Projects:
 - (1) Natural Capital Project: An attempt to develop the framework to look at ecosystem services (CA, Africa and Yangsee river basin), develop tools, work across disciplines (economics, social sciences) and apply these tools to future use.
 - (2) Florida Ranchlands is a collaboration amongst different people with different tools. (*More information in tomorrows session.*)
 - v) In Sarah's opinion:
 - (1) We need to create a mission of where we need to get. In other words, what makes range sustainable?
 - (2) We need to think of indicators for multiple uses of the land.
 - (3) We need to begin planning who is going to pay.
 - (4) Is there a way to stack the services (multiple services, with multiple benefits with one price tag).
 - (5) What are going to be the metrics (documenting and measuring)?
- f) Ryan Yates, NACD:
 - i) NACD recognizes that grazing is an essential tool.
 - ii) In order to get ranchers interested in conservation, they must have an economically viable operation to begin with. We need to get ranchers involved, otherwise there will be land fragmentation and loss of ecosystem services.
 - iii) The development of an environmental market place would be beneficial.
 - iv) How do you plan for quality conservation, especially on a policy level?
 - v) There will be a ecosystem services part to the 2007 Farm Bill, and it will be interesting to see how we will be able to use it.
 - vi) ***WE NEED TO MAKE A DISTINCTION BETWEEN THE QUANTIFICATION OF CONSERVAITON AND THE VALUE OF CONSERVATION.*** (Robin O'Mally)

g) Aggie Helle, American Sheep Industry:

- i) There is a great value to biological control methods (for example, prescribed livestock grazing).
 - (1) Both scientific studies and onsite visits show improvements with biological controls.
 - (2) Questions to be answered:
 - (a) How do we quantify services like that from habitat restoration?
 - (b) How do we keep this economically viable to the producers? Without economic viability, conservation/ restoration projects will not be able to happen.
 - (3) There is a handbook, and there are workshops which are created/ held to help agencies and producers.
 - (4) Is there the ability of “green labeling” or “forest certifying”? (Green labeling is the idea of increasing prices because of the beneficial land management techniques used. Forest certifying treatments will allow the treatments to be used on USFS land.) Currently there have been talks, but nothing more.

h) Rooter Brite, GLCI:

- i) In the 1985 Farm Bill, the grazing agencies advisors were removed minimizing help available to ranchers. They need to be brought back to range; the funds need to be brought back.
- ii) This group tries to get people together to work together (multidiscipline, multilevel) thus quit pitting one side against the other.
- iii) Congress is only doing what we are forcing them to do. We need to do more and be able to show why.
- iv) We need to keep in mind that producers need to make some money to maintain interest in ownership, conservation and diversity.
- v) There is a very strong compatibility between SRR and GLCI.
- vi) There is a strong need to maintain technical and scientific credibility.

i) Leonard Jolley, NRCS:

- i) There is a new chief in the office and we'll have to see what's coming down the pipe.
- ii) SWAPA (soil water air plants animals) keeps managers planning for incentives, all the uses, and services. There are...
 - (1) 72 criteria to plan with
 - (2) 140 conservation practices available
 - (3) How do we add further complexities to this system?
- iii) Who do we look for as employees? We need to work with the universities to train people that we need in the ways that we need them.

j) Heather Johnson, USFWS:

- i) How are we meeting the needs for ecosystem services and maintaining our agencies responsibilities?
 - (1) Example:
 - (a) Partners for Fish and Wildlife
 - (i) We offer financial and technical assistance.
 - (ii) We have volunteers.
 - (iii) The main goal is habitat restoration.
 - (iv) Priorities:
 - 1. to restore habitat
 - 2. to keep common species common
 - 3. to use landscape level conservation
 - (v) Field staff have authority to make the management and monetary decisions.
 - (vi) Clearly identify the biological needs, identify landowners needs, and discuss options are all done with the landowners (start to finish).
 - (vii) Landowners and managers write a short agreement (3-5 pages).
 - (2) USFWS provides support for farm bill conservation program application on multiple scales.
 - (3) An intact landscapes equals healthy wild populations which equates to viable agriculture, and thus sustainable rural communities.

8) **Bob Breckinridge and John Tanaka- Conceptual Model of SRR** (PowerPoint)

- a) What is a model?

- i) To best describe a model, the slinky experiment example can be used. The slinky equates to the ecological system, and each loop is an ecosystem service. A slinky can only be stretched so far and even then there are still changes and difficulties when released.
- ii) A person's health is also an example if indicators used in modeling. Take blood chemistry, as an example. It can indicate human health by linking all parts and pieces together with general measures.
- iii) Models are the blue prints for the way we want to think about and consider ecosystems systems.
- b) Important questions to identify with the model:
 - i) sustainability
 - ii) processes
 - iii) indicators
 - iv) indicator usefulness over time
- c) The framework of this model was created from integrated teams of SRR participants.
 - i) The number one rule was to keep it simple.
 - ii) There was a need for indicators to address critical questions that were posed.
- d) The conceptual model, itself:
 - i) is not a predictive or mathematical model;
 - ii) is the blue print that you can build and communicate around
 - iii) is a framework for:
 - (1) evaluating
 - (2) explaining indicator meanings and integration
 - (3) the setup of states, processes and indicators
 - (4) the natural environment as a social and economic system
 - (5) knowing where we were, where we are now, and looking at how we moved through time and got from point A to B
- 9) **Model Question Session/ Group Discussion/ Further Steps to take:**
 - i) *THE MODEL TEAM SHOULD WORK THROUGH THE MODEL WITH RESOTRATION AS A CONCEPT BEFORE THE SCOTSDALE MEETING. LOOK AT NON-EXTRACTIVE USES TO SEE IF THERE NEEDS TO BE ADDTIONS OR MODIFICATIONS.*
 - ii) *CAN WE WORK THE MODEL INTO A BUSINESS LEVEL OR A MODEL FOR BUSINESS? (IT NEEDS TO CONVERT TO DIFFERENT MARKETS—CONSUMER AND PRODUCER MARKETS.)*
 - iii) There is a complexity that makes it hard to understand.
 - iv) *WE NEED TO FORM INDICATORS FOR SERVICES AND INDICATORS FOR SYSTEMS AND KEEP THEM IN MIND.*
 - v) *THERE IS NO CONNECTION BETWEEN DEMAND AND CONSUMPTION—THERE MAY BE STEPS, BUT IT NEEDS TO SHOW PEOPLE THAT THERE IS A CLEAR LINK. THAT WAY THEY WILL KNOW IN BLACK AND WHITE HOW THEIR CONSUMPTION AFFECTS THE SYSTEM.*
 - vi) *CAN YOU MAINTAIN RESORATION WITHOUT CONSUMPTION?*
 - vii) Why are you doing restoration?
 - (1) because there is value that needs to be restored (social, economic, cultural). but it need to be explicitly stated the linkage with the model
 - (2) to put waste product back into the system to creating new products (see model)
 - viii) *THERE IS A NEED TO BREAK UP ECOSYSTEM SERVICES TO MORE LEVELS, POSSIBLY TANGIBLE AND INTANGIBLE. Reply: these levels are not shown, but they are created and they exist.*
 - ix) *LOOK AT TRADE AND HOW IT AFFECTS THE SYSTEMS. LOOK AT THE CONSEQUECES AND THE INTERACTION THAT TRADE CAN HAVE ON CHOCIES.*
 - x) *DON'T PUT 'THE' INFORNT OF MODEL. THERE ARE A COLLECTION OF MODELS THIS GROUP USES. IT IS A MODEL OF THE DAY FOR DIFFERENT PEOPLE WITH DIFFERENT PURPOSES. THE PROCESS OF RECREATING IT OVER AND OVER IS THE TRUE BENNEFIT.*

xi) WE CAN'T CONFUSE ACTUAL SERVICES AND THE VALUE THAT WE PLACE ON THESE SERVICES.

xii) Conclusions:

- (1) The model was made to think about the connections and their interactions.
- (2) Indicators need to be able to evaluate the monitoring questions, and trends.
- (3) There were a lot of people with a lot of different backgrounds who have worked together to put this model together.
- (4) This model should give us a road map to be able to explain things to everyone—that's the only way it will be useful to use.

questioned Themes: (ignored)
what are the services and what do we do?
do we need to put a monetary value on services?
how do we get people to invest?

10) Tom Bartlett- Delphi Results (*see handouts*)

- a) The Modified Delphi results:
 - i) Addressed issues and definitions.
 - ii) It was iterative.
 - iii) The goal was to come to a consensus on issues.
 - iv) All can participate via internet at any phase of the 3 phase process.
 - v) There's anonymity, which means we get more opinions that might not be mentioned in a large group settings.
- b) The purpose:
 - i) to define "rangeland ecosystem services"
 - ii) to have participants identify rangeland ecosystem services
- c) The process is three steps:
 - i) 101- initial definition
 - ii) 102- revised definition, services and concerns
 - iii) 103- revised definition and identification of the services

11) **Dennis Child: The Assignment.** The Delphi has been processed and now the groups need to go through to select services that need to be discussed and focused on. Also, think about the structure and the categories. (Groups can determine their own scale. These will be used to meet our meeting goals. We will cover all four groups—a parallel exercise for each of the groups.)

- a) Rules to Listen to Learn (by Lou):
 - i) listen for essence, reasoning and assumptions
 - ii) probe different points of view to truly understand
 - iii) summarize what I learn from others
 - iv) test my interpretations of others ideas
 - v) reveal my thinking, reasoning and assumptions
 - vi) invite questions and refinement of my ideas
 - vii) offer suggestions to enhance others
 - viii) build on ideas to advance the team.

12) Group conversation:

- a) Group 1:
 - i) We did not use the Millennium Assessment category scheme
 - ii) Services were divided into services/endpoints and processes and then were put in to criteria groupings.
 - iii) There was a need to pay attention to the processes as well as the actual endpoints.
 - iv) Services/ products were then divided again into realized markets, developable markets, and no market items.
 - v) Sustainability indicators are a mix of services and processes.
 - vi) We must link wants and needs of people, to the services we acquire from the systems.
 - vii) similarities with group 2:
 - (1) there was a clear want to established linkages

- (2) tried to remove double counting
- b) Group 2:
 - i) A further step that would need to taken would be to compare the list of services with the indicators.
 - ii) We compared services in two categories: market based or non-market based.
 - iii) There was a lot of lumping services into larger categories.
 - iv) There wasn't a huge acceptance of cultural services.
 - v) Questions:
 - (1) where is the line between values--added or not?
 - (2) how do you find a basis to provide long-term support for non-market based ecosystem services?
 - vi) issues looked into
 - (1) double counting
 - (2) the service "viewshed," placement
- c) Group 3:
 - i) Decided that they needed to start with building blocks (soil, water, air, plant/animals) to figure out where we were going.
 - ii) They looked at the things that they can control, as opposed to the market availability of the service.
 - iii) There was a lot of lumping services into bigger categories.
 - iv) This group is similar to group 2, with regard to the looking into things that can be controlled and measured and not market availability.
 - v) There was no discussion about changing the four categories setup by the Millennium Assessment.
 - vi) Differences/ Similarities with the other groups:
 - (1) The supporting services are more like processes.
 - (2) All four categories were used, but mostly reclassified.
 - (3) There was no conversation about market availability for the services.
 - (4) There wasn't a great deal conversation about double counting—it was to be calculated at a later time.
- d) Group 4:
 - i) There was talk about regulatory and supporting services, which seemed to be only separated by time, so the four categories(Millennium Assessment) were thrown out.
 - ii) All categories are anthropocentric.
 - iii) Issues of "additive values"—double counting—were discussed.
 - iv) What are core characteristics of sustainable rangelands?
 - v) What needs to be done to maintain them?
 - vi) What are the key indicators?
 - vii) There are underlying supporting geological processes that ensure the provision for others.
 - viii) Characteristics of ecosystem services:
 - (1) tangible/ extractable/ provisional
 - (2) non-tangible/ cultural
 - (3) core characteristics and processes
 - ix) Core processes:
 - (1) photosynthesis
 - (2) soil formations and retention
 - (3) nutrient cycling
 - (4) water cycling
 - (5) extinction and speciation
 - (6) disturbance process
 - (7) waste absorption
 - (8) atmosphere cycling
 - (9) pollination
 - (10) immigration and emigration
 - (11) interactions among organisms
 - (12) biological diversification
 - x) Tangible goods

- (1) food
- (2) fiber
- (3) hunt / watch able wildlife
- (4) biofuel
- (5) energy
- (6) germ plasm
- (7) biochem
- (8) ornamental
- (9) ceremonial
- (10) water
- (11) mineral resources
- (12) pests and disease

xi) Intangible services:

- (1) viewshed
- (2) habitat
- (3) openspace
- (4) recreation
- (5) aesthetic
- (6) existence
- (7) wilderness
- (8) culture, history, archeology

xii) Differences and similarities:

- (1) Group 4 was similar to group 2, but there was a division between tangible and non-tangible, but they were also closely tied to market availability, too.
- (2) There were double counting concerns.
- (3) Group 4 was most similar to group 1, but there are some incongruence.
- (4) They didn't keep the didn't keep the four categories from the Millennium Assessment, either.
- (5) Group 1 and 2 both used market and non-market classification.
- (6) The output needs to be for research or policies. What we say is not for disposition—framework for policies.
- (7) Markets versus incentives is the key point and markets are a limited view of the toolset.

e) Extra notes:

- i) There wasn't much conflict between the groups, two colored inside the lines and two colored outside.

** need to make sure services correspond with indicators

October 4, 2006

1) Lou - Overview of the SRR

- a) The roundtable journey
 - i) The groups began with the Santiago declaration and then the meeting in Montreal.
 - ii) The Roundtables:
 - (1) Forest (1994-1998)
 - (2) Mineral and Energy (98) still going or stopped?
 - (3) Rangeland (2001)
 - (4) Water (2003)
 - iii) There are participants that are active in multiple roundtables (roundtable network).
- b) SRR Vision- The participants in SRR envision a future in which rangelands in the US provide a desired mix of economic, ecological and social benefits to current and future generations, and criteria and indicators for monitoring and assessing the sustainability of rangelands are widely accepted and used.
 - i) advocacy and promotion
 - ii) integrated rangeland assessment
 - iii) integrated rangeland research
 - iv) communication and coordination
- c) Yesterday's accomplishments (October 3, 2005) were to gain same definitions (of some terms) and an understanding amongst participants.
- d) Where are we going?
 - i) We need to make sure that the indicators we are planning to use will accurately describe the services we want to consider.
 - ii) We need to try to look into policy. What should we do to help preserve/protect/ maintain rangelands through policy (incentives)?
 - (1) Dennis Child- focus on i.) to develop the big picture both for yesterday, today and in the near future ii.) (tomorrow and future).
 - iii) We need to create something that is short and filled with important information for an executive summary of the findings of this meeting about ecosystem services (an end product we should could share).

2) John Tanaka- Types of Values: (*see PowerPoint*)

- a) Types of values
 - i) social
 - ii) economic
 - (1) Does price equal value?
 - (2) Perfectly competitive market characteristics:
 - (a) have many buyers and sellers
 - (b) have the perfect knowledge
 - (c) all the resources are mobile
 - iii) How well does market price reflect market value?
 - iv) Does social value equal economic value?
 - v) How do we reconcile the two?
- b) Different types of values:
 - i) use vs. nonuse
 - ii) option, bequest, existence
 - iii) economic vs. social
 - (1) is economic value subset of social value?
 - iv) market vs. non-market
- c) Why are values important?
 - i) Allocation of scarce resources
 - (1) How do we weight different uses and which are the most important?
 - (a) market- prices, which can give weights and can change over time
 - (b) non-market goods

- d) Example of John's home area and the question 'how much wilderness is enough?'
 - i) Society values the wilderness.
 - ii) The first Wilderness Area designed most valuable and people lobbied for what they held precious. The question is, what characteristics did they use?
 - iii) Would the next areas be as valuable to society? And how about the next one? We must look at the marginal valuation.
 - iv) How should we define potential wilderness areas?
 - (1) For there alternative uses (wilderness, backcountry recreation, development)?
 - (2) Which values are most important?
 - (3) Marginal valuation needs to play a role in decision making
- e) Example two, to Subdivide or Not?
 - i) We know the market value for small acreages and we know the desire not to have land segmented, but what is the market value for intact land?
 - (1) What is the social value?
 - (2) What are the values from ecological characteristics?
 - ii) Which set of values dominate decision making?
 - iii) Why would the landowner want to enter into a conservation easement?
 - iv) Is money the only important thing in easements or are there social values held by landowners?
 - v) Is location and timing important of conservation/ preservation/ easement?
- f) More questions to ponder:
 - (1) Can you add market and non-market values? Non-market values tend to be very large.
 - (2) How much xxxxxxx (biodiversity, water quality) is enough?
 - (3) Can you take an individual's value and extrapolate it to the rest of the world?
 - (4) Can, or should, you really put everything in money terms?
 - (5) What is tradeoff between market and non-market goods? Are they competitive so that there is an optimum for both or antagonistic, where we can't have both?
 - (6) Can we compare economic and social values?
 - (7) Which values effect ecological processes more?
- g) Information regarding indicators and values from SRR that are linked to market and non-market based processes:
 - i) #27- value of forage harvested from rangeland by livestock- market based
 - ii) #28- value of products of non-livestock products produced from rangelands
 - iii) #54- public belief, attitudes, and behavioral intention toward natural resources
- h) Summary:
 - i) How do we avoid double counts? Is double counting important for indicator work?
 - ii) Do we need a common metric for the roundtable?
 - iii) What do private and public managers respond to? what values?
 - iv) The conceptual model will help us link ...
 - (1) social combinations with services
 - (2) \$ with social values
 - v) Market imperfections affect the way we value things. (In other words, improper valuation is due to market imperfections.)
 - vi) Indicators are meant to be "valueless." They are just suppose to be the things we monitor. Indicators are not going to spit out an answer to our questions; people will have to interpret the data with their own values. Questions could include, do I think that rangelands are sustainable? From there, we need to share our findings and act upon the data. The model is a way to start and base communications among all people, with all their different values.

3) John Loomis- Overview of Valuation of Ecosystem Services

- a) There has been a lot of public interest in attempting to value these service (books and publications).
- b) Things need to be broken down into goods and services.
 - i) A good flows from an ecosystem that is of value to humans and occurs naturally. There are stocks that go through processes and flows to create a good.

- ii) Natural capital produced a natural flow, which goes to the human system where values are derived. Some values are economic and others are social. Ecosystem services are what we are trying to capture when the flows are used by humans.
- iii) How do we value things?
 - (1) Valuation is anthropocentric.
 - (a) Goods/ services must be scarce and provide utility.
 - (b) Valuation started with utility.
 - (c) Not all people value the same. Values are not all equal and not assigned by majority. There can be negative and positive values between people.
 - (d) There can be profitable things- that we shouldn't do (selling heroine), and unprofitable things that we should do (T &E habitat protection).
 - (e) We should not use the idea, "if it pays it stays."
 - (2) How direct is the link to the good provided to the people?
 - (3) Methods:
 - (a) Markets: prices that can change
 - (b) Production Function Approaches: We know the good is un-priced or under priced, so we need to find the true value to the "shadow price" that incorporates the full value.
 - (c) Replacement Costs/ Cost Saving: We can look at substitutions or similar products. If nature can do it cheaper (exp. filter water), we should have nature do it.
 - (d) Non-Market
 - (4) Measurement:
 - (a) Recreational Use
 - (i) Revealed preference can use the *Travel Cost Method* of trying to get at net willingness to pay by using actual behavior.
 - (ii) Stated preferences can be used for *Contingent Valuation* but this is based off intended behavior. We survey the general public regarding whether they would vote to pay higher taxes or fees for the services provided.
 - 1. How much would people be willing to pay? This question will force people to measure the benefits against the costs.
 - 2. On a survey...
 - a. we try to show a with or without a scenario.
 - b. we ask a closed *willingness to pay* question, thus getting a general idea about the public's willingness to pay.
 - 3. One can check for validity of people's quoted willingness to pay through the negative sloping demand curve. If it isn't negative sloping, it's not correct.
 - 4. This method can be comparable to the *travel method*.
 - (iii) Using both of these (contingent valuation and travel cost method), we can increase the standards for ecosystem services (higher quality resources) to increase visitation and use, thus more benefits.
 - (b) *Residential Amenity Values* are the housing prices due to views, scenic vistas, streams, and openspace that people reveal their preferences for when buying a home.
 - (c) Other Ecosystem Services we can't create a market for, but we can imagine what would happen if there was one.
 - (i) *Choice Experiment/ Conjoint Analysis*:
 - 1. Survey using bundles of things (like different restoration treatments), have a cost attached to each bundle, and ask which treatment the public would be willing to pay for.
 - 2. We can get a relative importance or relative weights of treatments both in monetary and non-monetary terms.
 - (ii) *Financial Provisioning*:
 - 1. Goods and services might provide a small benefit for a single person, but aggregated they are much bigger.
 - 2. Services that were previously free, are no longer. Through...

- a. conservation easements.
- b. to need maintain services which were previously free.
3. Markets are just one way to get people to pay.
4. Conditions require...
 - a. scarcity.
 - b. clear property rights.
5. Is consumption exclusive (pure private goods—use markets) or nonexclusive (pure public goods and nonexclusive) and rival and non-rival. Public goods need other markets because it is nonexclusive and non-rival. {See Dr. Loomis's charts for further information.}
6. Is beyond markets because individuals and government are buyers and sellers.
7. Payment options include...
 - a. government charges that ought to reflect fair market values.
 - b. a higher potential in enhancements to the resources (exp. fuel reduction). You won't get very far to increase prices for things people already get, but if you do an enhancement, people might be willing to pay.

(d) Questions:

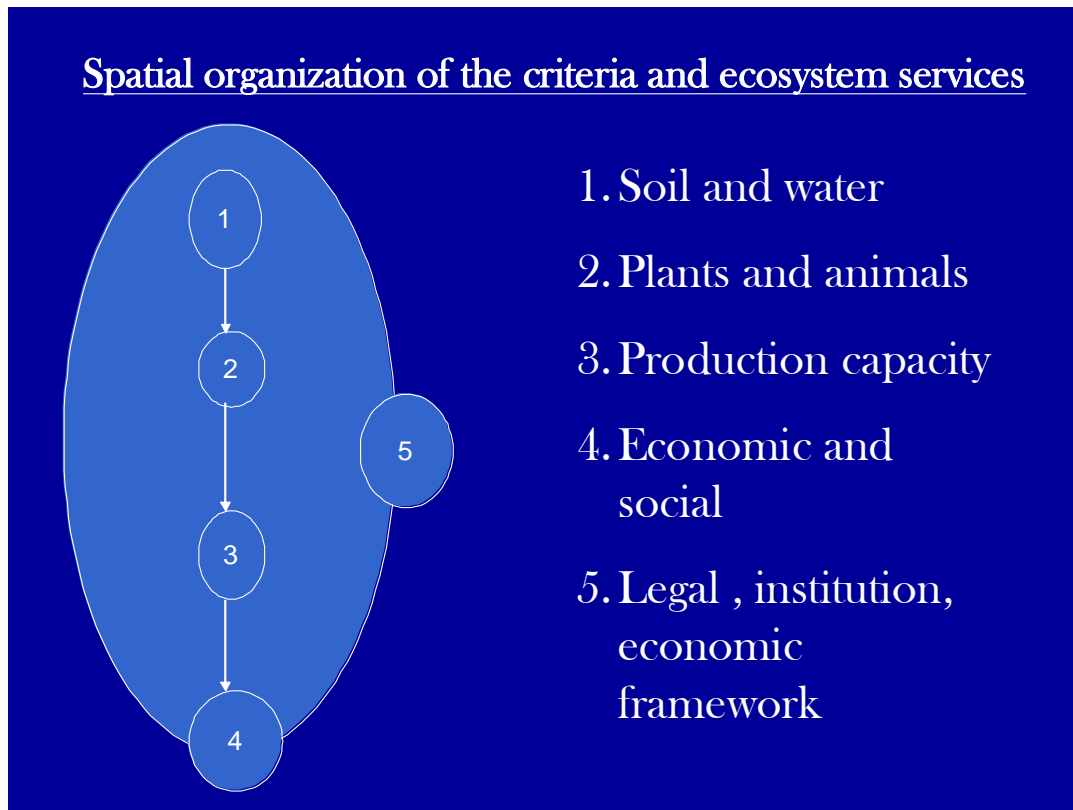
- (i) What happens when technology increases human capacity to perform an ecosystem service making it cheaper for humans to do than it costs from nature?
 1. Hopefully, other services will kick in and still add more value for different services, thus still keeping the natural services of more value than human provided services.
 2. These decisions are all based off of biological, economic and political decisions.
- (ii) There was an increased need shown for ecosystem services—on public and private lands.
- (iii) Loomis's paper available on www.fs.fed.us/rm/value/does/ecosystem_goods_services.pdf with more detail on: "*Valuing and Provisioning of Ecosystem Services.*"
- (iv) What are the other payment mechanisms?
 1. easements
 2. incentives
 3. exchanges
 4. voting and advocacy
 5. As things get scarce, we will be creative and come up with new mechanisms.
 6. The dollar is the common metric and although it doesn't have to be used, it may be easier and better to use but it is not mandatory.
- (v) What is connection between policy, core ecosystem services and valuation?
 1. There is very little connection between the policy and the ecological processes. Instead policies were driven by the public observances (exp. health problems).

4) Dennis Child: Assembling the ideas from the group work yesterday. (*paper and electronic copies*)

a) General observations:

- i) Most of the groups divided goods into non-market vs. market categories.
- ii) There was a need for separation of the process from the services.

- iii) The Millennium Assessment terms are not appropriate for our use.
- iv) Lumping of services and goods was needed.



b) Chart 1 by Dennis (insert chart)

i) How is the structure?

- (1) “Developing market” is bad term because a developing market just needs time.
- (2) Attaching the criteria to the market availability might make it hard to merge, but it is appropriate.
- (3) Can we use the market availability to divide categories?
 - (a) Should we switch to ‘tangible’ verses the ‘non-tangible’?
 - (b) Or should we use ‘in situ’ and ‘extractable.’
 - (c) Are we going to conclude that ‘goods’ are synonyms with ‘tangible’?
- (4) Can we use SRR criteria at top of the chart?
 - (a) No. We can’t use the criteria, but we can use the general grouping for now.
- (5) Are the criteria we’ve listed, capturing ecological services?
- (6) What is the use of this information? We need to focus on the indicators, their extrapolation, and the goals for the final output.
- (7) Using indicators gives us a link to the past.
- (8) We need to make sure that there is a clear link between core processes and the indicators that we have chosen (matching needs to be done). They need to be matched with the model, as well.
- (9) Maintaining core process will result in sustainable rangelands.

c) Chart 2 (insert chart)

i) Comments: Let’s not use this.

5) **Small Group Assignment-**

a) assignment:

- i) We should use ‘goods’ vs. ‘service’/ ‘tangible’ vs. ‘intangible’
- ii) Rate the public stakeholders and private landowners value of importance (high medium low) for each service/ process.
- iii) Define the relationship to markets/ incentives using...
 - (1) the characteristics of service.
 - (2) the existing markets or incentives.
 - (3) new ones? if so how?

(4) a conceptual model check.

b) Overall Approach

- (1) core process result in sustainable rangelands
- (2) ecosystem services are something sustainable rangelands produce
- (3) how do we measure them? indicators.
- (4) how do we value them? *what this assignment is about*

	Soil, Water Product. Capacity	Plant and Animal	Socio-economic Legal
Goods Give List			
Services Give List			
Processes			

6) **Small Group Findings:**

a) Group 1 Summary- Soil, Water and Productive Capacity

- i) Their main concept focused on addressing threats to the ecosystem. After addressing the treats, you could trace them back to the processes that would be affected. Then you can look at policies/ incentives/ regulations that could promote the desired effects and minimize threats.
- ii) You can find commonalities between threats and processes that are affected, thus know the most common and major threat/ processes to deal with.

b) Group 2 Summary- Plant and Animal:

- i) They based their main setup with the of rival/ non-rival vs. excludable/ non-excludable chart presented by John Loomis.
- ii) The main point was to categorize for right now, not adding. Thus as of right now, there was no concern for double counting.

iii) Feedback:

- (1) Participants really liked the idea of rival/non-rival vs. excludable/ non-excludable from Loomis's lecture.
- (2) Really need to make sure that: "something is only a good if there is a market for it" is **WRONG**.

c) Group 3 Summary- Socio-economic and Legal:

- i) There main organizational split was between 'goods' (soil, water, productive capacity) versus 'services.' This group then only dealt with services, because the goods should be handled by other groups.
- ii) They then looked at the characteristics that would make each service available to being marketed.
- iii) There is a strong need to make sure these flow through the conceptual model.

d) General Summary of the Assignment:

- i) Clarity needs to be enhanced. We need to define separate processes and define services. We need to establish common terms . There has been the suggestion that everything needs valuation, which is wrong—we are just trying to look for opportunities.
- ii) Does extraction of goods equate to the destruction of good and services.

- iii) Need to repeat the exercise where we look at ramifications, market availability, and incentives.
- iv) It needs to be made clear, this meet is just the foundation.
- v) Things that need to be done by the end of the meeting:
 - (1) terms (make sure that everyone is on the same page)
 - (2) how to talk about services (how to communicate)
 - (3) how to bring back to the model
- vi) There has been a lot of learning here.
- vii) There is need to possibly do another Delphi.

October 5, 2006

Altered Agenda:

8:15 Carl NRCS
Sara WWF
James SBLT
William TNC

10:00 Discussion – Tactical Next Steps

- Long term ecosystem services products?
 - o What should we do, and for who? (Categories, what are they?)
- The workshop accomplishments?
 - o Packaging; distribution?
- Left to do from this workshop?
- Using results from this workshop for long-term eco-system products
 - o How (future work-do we need another workshop like this)?
 - o Who (should it be a smaller group)?
 - o When (time frame)?
- Re-integrating the “long term product” with roundtable players and strategic plan
 - o When will the key roundtable players work on these workshop results?

Presentations

Carl Lucero (NRCS) “Market based Approaches”

- He is the national NRCS lead on this approach, worked over time as an engineer in many roles and is the DC lead of these approaches

I. Background on market based approaches

1. Market-based approaches
 - a) New terminology and definition and NRCS approaches
2. Definitions
 - a) Goods – number of sellers and buyers in different markets like grocery stores, car dealerships, Ebay, housing markets with differences
 - b) Markets need a middle man (a broker)
 - c) All approaches have expectations: Quality and Production, ingredients in label are on the product, Performance, and all these reflect in price
3. Essentials
 - Supply and Demand; Value of product; be able to Measure it; there needs to be rules of governance
 - All these rules are transparent
4. Market Drivers
 - a) Regulations (e.g. Clean Air, Clean Water legislation)
 - b) Threat of impending regulations like CO2 Cap, and its expected in a few years
 - c) Moral and ethical responsibility – trees in soccer cup and Super Bowl
 - d) Tax incentives- money drives it
5. Challenges
 - a) Change the way society views our natural resources like bottle water, or oxygen in a can
 - b) Turn our natural resources into a commodity and be able to buy credits
 - c) Bottom line is Net benefit for the environment

II. NRCS Strategy for Market-based Approaches

1. Green payments (public funds)
 - Incentives (CSP), Cost share (EQIP, WHIP), easements (WRP, FRPP)
2. Environmental Credit Trading
3. Water Quality, Air Quality, Mitigation banking (wetland banking), Wetland banking

Examples of these approaches

- a) Tualitan – clean water services to pay landowners to plant trees near stream for chilling process
- b) Vander Haak Dairy – sold methane at the Chicago fuels market, a voluntary market

- c) Hickory Pass Ranch, TX - endangered species of golden checked warbler and use a resource for species and sold 400 credits sold at \$5000 each and basically an easement

Green Labeling (Organic, dolphin free tuna, shade grown coffee)

A minimum threshold of conservation will then be labeled

Create a water conservation program label

III. Opportunities

- a) Look at all existing programs and trying to incorporate these issues
- b) Expand Partnerships with new partners like bankers and use NRCS staff as broker or aggregator
- c) Link the Buyer and seller
- d) Outreach and education - the handout (Market based conservation), workshops with the EPA

Market based projects: WWF example in Florida: PA reverse auction for farmers into Chesapeake Bay; RI used a grant to charging fee for bird watching and allow folks to continue farmers;

Sara Lynch (WWF)

She noted a natural capital project that complements this work (work with TNC and Stanford) which is trying to map and quantify with ecosystem services from wild lands and more information on the WWF website "Florida Ranchlands Environmental Services Project (FRESP)"

FRESP

1. Decline of Everglades ecosystem
2. Conservation act in 2003 focused on restoration
3. North of lake
 - a) altered hydrologic regime, excess phosphorus brought into Lake O, and pulses come from the lake
 - b) extensive areas of ag uses
 - c) The source is the phosphorus in the lake (Ranching largest due to size, but other uses are worse do the graph of p)
 - d) Need to keep them going, but change their behavior
4. Funding 2001 partnerships allowed work on NRCS innovation grant in 2005
5. Partners: include a private conservation group and 4 ranches; \$4 million dollars to work into the market, but first think like a rancher than like a market
6. Ranch Revenue: Traditional products and private markets
7. Think like a Rancher
 - a) Profit; integrate management, time, and cost
 - b) minimize surprises in regulation; stewardship
 - c) cultural heritage in Florida
8. Responsible Governing (Buyers are the government)
9. Organization of FRESP
 - a) Board of Directors with Ranchers, WWF, Agencies with consultants assistance
 - b) Environmental services cost center developed by economist for each rancher
 - c) Documentation Team: Water storage, phosphorus, and wetland habitat enhancement because that is what ranchers want and without a hurricane, we can move away from water storage
10. Multi services approach in measuring these three items
 - a) Used an existing credit system to measure the difference within a graphic system
 - b) Example, William Cattle Company rehydrated wetland: Install culverts for storage, and p(phosphorus) retention
 - c) Example, Lykes Bros 2500 acre STA - by paying them to pump water through incentives
11. Subsidy Approach: Environmental protection is a regulatory burden to be lessened with cost share to store back to start point
12. Market Approach: Reward environmental protection
13. Road Ahead: 3 projects with new projects
 - a) 2005-2008 We add new projects to increase N in pilot and invest with FL legislative assistance
 - b) 2008 -2010 Develop a pay for services approach
14. Challenges

- a) Quantify services
- b) Dedicated funding
- c) Eligibility criteria (who can participate?)
- d) High transaction costs with need to build innovation into program
- e) Integrate into existing regulations and federal programs with NRCS

James Bernard Conserving Land: Benefits, Techniques, and Examples

1. Economic benefits in conservation (conserved land):
 - a) Listed: Increased property values; recreation includes local business for suppliers of tourist items; economic activity – high end tourism and provide high skill jobs; enhance quality of life; reduce public spending without development; hazard mitigation – avoid public costs of damages; reduce public health costs
2. Menu of techniques
 - a) Full market value purchases – easiest approach; Example: 65,000 acres conserved in his work with partners with most from this approach
 - b) Donations or bargain sales – most easements are donated bargain sales for tax purchases or promote large organisms
 - c) Easements – highly used option
 - d) Leases or options
 - e) Remainder interest
 - f) Undivided interests
 - g) Dedication and pre-acquisitions (not used at this time)
 - h) Conservation investors or buyers – especially in Jackson Hole area, but do not want to facilitate development of conservation areas
 - i) Limited or joint venture development; installment sales; lease with option to buy
 - j) Purchase (leaseback) – used for supporting new ranchers\
 - k) Donation will – he is working on several of these right now
3. Conservation Easements
 - a) Family decision and sell the development right to a “trusted” conservation land trust organization
 - b) Act on behalf of future generations and are the rights for forever (in perpetuity)
 - c) Land trust movement is still around 50 years out
 - d) The donation can be land
 - e) Formal declaration of long-term stewardship
 - f) 11 Step Processes for Easement (briefly summarized):
 - Meet with landowners, allow owners to meet with folks, documentation of stop time with conservation, and other steps that include title, appraisal, and then stewardship endowment with monitoring system
4. New Tax Incentive for Conservation Easement
 - a) Aug 06 – from 30% to 50% of gross income of one year
 - b) Carry-forward allows players to spread the tax incentives over 15 years - used to only allow high-income folks, but it can now reach new players with the benefits over 15
 - c) Provision that limits it for two years and Senator Grassley does not like it
 - d) Problem of rushing conservation easements, but allows a time crunch
5. Examples of Conservation Easements
 - a) Navarro Point: Conserved several factors including viewshed and genetic material
 - b) Ridgewood Ranch: conservation values list and the federal funds has decreased due to activity in Iraq, cannot charge for weddings on site
 - c) Big River, Maine – all this comes together in partnership 20 conservation, 17 private, 70 local businesses and civic groups, and over 1,400 individual donors from 25 states with Stewardship (recreation and restore water areas)
6. Land conservation is economic development for future generations

He provided a summary of comments related to the previous presentations and briefly mentioned some items on his presentation.

1. Conservation easements are a way for the public to pay private landowners for what the development values as a proxy for ecosystem services
2. Land conservation plans are land aggregators or brokers for conservation deals
3. Works through the Colorado state in land projects and the TNC's initiatives and campaigns work as ecosystem services
 - a) Water and healthy forest and easements provide services
 - b) Policy, marketing and outreach help us sustain the work
4. Carl and Sara is working on cattle in Florida, and maintain cattle in Colorado provides for biodiversity values and provide food as a value
5. Development value versus ecosystem services and are they cheaper or more expensive values? What will be higher values?
6. Measures of success are part of a 5 step management adaptive management process
 - a) Systems and species- what ecosystem systems and species with fundamental value of biodiversity (1 and 2)
 - b) Stress - We looked the most serious types of destruction or degradation (3)
 - c) Sources of successes - causes of stress, but usually never get to population growth as the culprit and stop somewhere in the middle (4)
 - d) Measures of success - what are the threats with USFS and feed back into the process, the measures are variable - acres lost, acres gained, and look at ecological grasslands to create conditions and nesting vitality
 - e) Example: Water flows and forest issues from different factors and sediment. Can we take actions to increase flows in complex wells and surface issues? We are working with CREP to provide new incentives
7. Partnerships are fundamental precondition for these approaches. Implementing with partners is a key ingredient due to money values and to be able to talk about these issues from a dollar sign perspective.

Comments on Presentations

Partnerships - WWF- went on to any willing ranchers, but expand to new ranchers and other land holders; NRCS - have traditional partners, but we are no exclusive and expand to non-traditional partners (investment firms, bankers, insurance companies, etc.), TNC - going with partners for different projects and large issues;

Ongoing Theme - need a system for benefits and costs be bought and sold, and mindset could be a wrong road for SSR due to effects on poor (winners and losers) and inability in capturing intangibles and processes
NRCS perspective: market approaches are ways for revenue streams besides federal funds

Lessons from this work - partnerships that involved target audience and working through what incentives; connection to the problem and the logic chain for understanding, and tools to work on these issues.

We need to be creative with market-based approaches and to look at tools include markets with the ability to shift into an alternative tool. We need to be caution and to not make mistakes.

Disaster and a willingness to build trust over 5 years in WWF project. Important tools and we do need metrics that come out of specific project. We have to figure out a way to stack and map the different ecosystem services

You need to look at watershed approach and the suit of issues from a systems approach. The ranch needs to looked at from the context of larger context

This effort is from regional and national perspective, and with strategic projects, this is important to what information affects this decision-making.

TNC looking at saving 10% of all ecosystems and problems with grasslands; it is starting broadly and working down to allow it to work down

Importance of using market based approaches and with the landowners, the issue of bringing the issue of fragmentation and affect their decision-making

We need to develop a tactic of marketing, but who are our target market for different ecosystem service.

Grass feed beef example: develop linkage or bridge to efforts like developing grass fed beef indicator linkage that is quantified.

- a) Grass feed is bundled with other issues like regional, local, and other issues
- b) Food alliance website is an example of a standard for a green labeling

The driver is important. Ex: Certified sustainable forests is a good idea, but does not create a premium for this effort

- a) Sustainable practice does not necessary cost more and there is a range of practices

Being mindful to market and engage directly to landowners

What determines the target priorities based on conservation tools?

TNC is many ways opportunistic with partners

Economic Premise - Stop environmental degradation at least costly solution

Problems to go down road of paying for it

The road may be one of enhancement from status quo

Conservation is sometimes paid for avoiding cost

The issue is environmental degradation versus avoiding costs

Conversation needs to move from winners/losers and winners of the watershed

Strategic decisions toward stakeholder group for what value or products we will add

Thinking through the idea of a brochure

We need action in a business case for using these tools. The values are threatened, but what are tools to make the case. Why these are the tools are the right ones?