

Ecosystem Services and Planning

Managing Risk and
Creating Resilience

Introduction

Externalizing costs creates risk...

- Tucson, AZ and water quality & scarcity
- Puget Sound, WA and ESA listed salmon
- Rapid City, SD and flood impacts

...ecosystem services valuations need to be part of our decision-making schema.

Ecological Economics 101

- Five kinds of capital: natural, human, social, financial, built
- Natural capital is foundational
- Scarcity of natural capital
- EGS Valuation

Thriving economies by most measures...

- Tucson AZ: aircraft refitting operations and large air force base as major part of the local economy and regional growth
- Rapid City and floodplain practices
- Puget Sound and culture of fish tossing

Costs and Trade-offs

- Economies externalized cost of using natural capital
- Financial and built capital were inflated
- Result: burden to each type of capital to restore or remediate (natural capital)

Implications for planning

Plan for watershed function (aka services)

- Adapt to the site and landscape attributes (e.g., Ian McHarg: Design with Nature; floodplain undevelopment)
- Evaluate and build projects; build 5 kinds of capital (communities and infrastructure)
- Cross jurisdictional coordination of policy and planning approaches

Risks and measures

- Improved assessment of risk
- >TBL with lifecycle costs and benefits
- Better measures to gauge ecosystem health and appropriate response

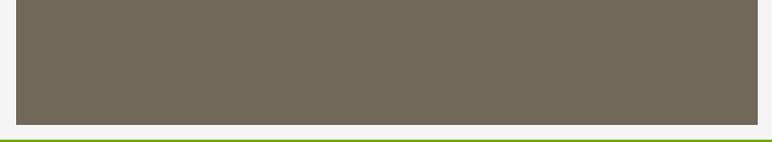
Toward resilience

- More cost effective to protect than restore
- Redundancies in system is key
- Built capital in context of ecosystem dynamics
- Uncertainties and climate change adaptation
- \uparrow Capital = \uparrow Resilience



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Reference slides...



Risk and Resilience

Social and natural capital

Return on Investment

Multiple scales

Multiple win solutions

Risk, Mitigation and Creating Resilience

- Costs of flood, polluted water supply
- Developing measures
- Evaluating risk
- Proactively allocate resources to mitigate risk

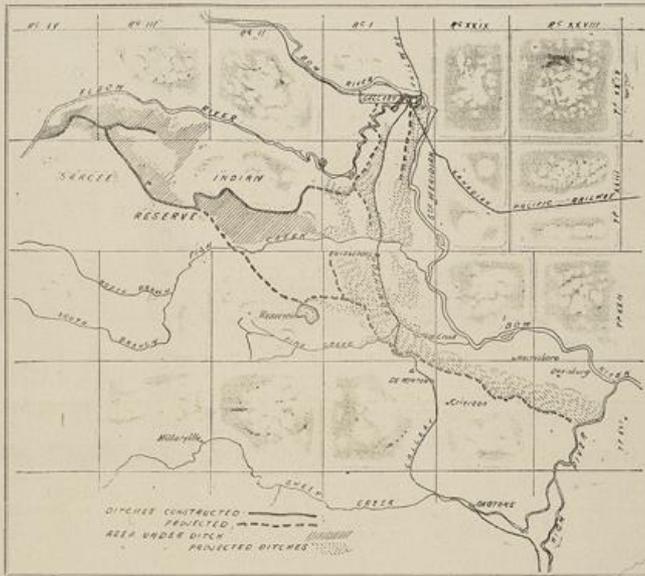
Wetlands and Municipal Services

- Ecosystem Goods and Services
- Natural capital, built capital
- Water resources (hydrology) protection
- Flood, water scarcity and drought
- Balancing the cost and level of service
- System (natural - community) resilience

CALGARY IRRIGATION COMPANY

Map Showing Route of Ditch and Irrigable Lands Tributary to it

SCALE 1 INCH = 1 MILE.



Why settle on lands depending on rainfall to produce a crop when you can on easy terms purchase from the

Calgary Irrigation Company

land which is of the most excellent quality and is already under ditch. The irrigator is independent of rain and has no crop failures under a proper system of irrigation. Soil, water and sunshine combined

will give

the desired results. Consider the matter well and don't make the mistake of settling where these cannot be had. Success awaits the industrious man who has

an irrigated farm

The Company's lands are of a quality that cannot be surpassed, and are offered

for

sale at lower prices than irrigated lands can be purchased for in any other district. The prices are

\$4 to \$7 per acre

Ten annual payments allowed, with interest at 6 per cent. Apply to

P TURNER BONE, Secretary

develop in two different stages, the one the raising of pigs ready for fattening, the other the fattening of sows, a subdivision which would be so divided as



The Stuart Steel Improved Land Grader

Undervalued landscape assets

- Historical precedent for externalizing costs
- Valued for limited purpose
- Ecosystem function reduced
- Cumulative actions = Resilience opportunity lost

Ecosystem Goods and Services

- More cost effective to protect than to restore or replace (TIAA, Smith Island)
- Other examples flooding landscapes...Katrina Rapid City
- Drought? Wetlands function

Wetlands (NC) Valuation

- Natural capital declines
- Retain value
- Self-sustaining
- Asset function retained
- Benefits retained over time
- Built capital increases
- Decrease in value
- Require O&M
- Become liabilities as function lost
- Decommissioning costs

Scales of Management

- WA State GMA
- Watershed Scale and nested solutions
- Planning for resource protection (KC GWMA, SC&KC&Tribes SBPP)
- Proactive not reactive (headwaters investment and supply)