Making the Case for Investing in Natural Infrastructure for Source Water Protection

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Analyst

March 30, 2016

EARTH ECONOMICS
What is your planet worth?

About Us

EARTH ECONOMICS

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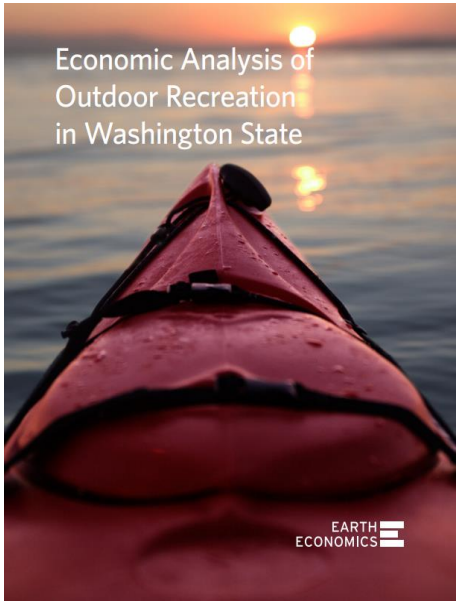


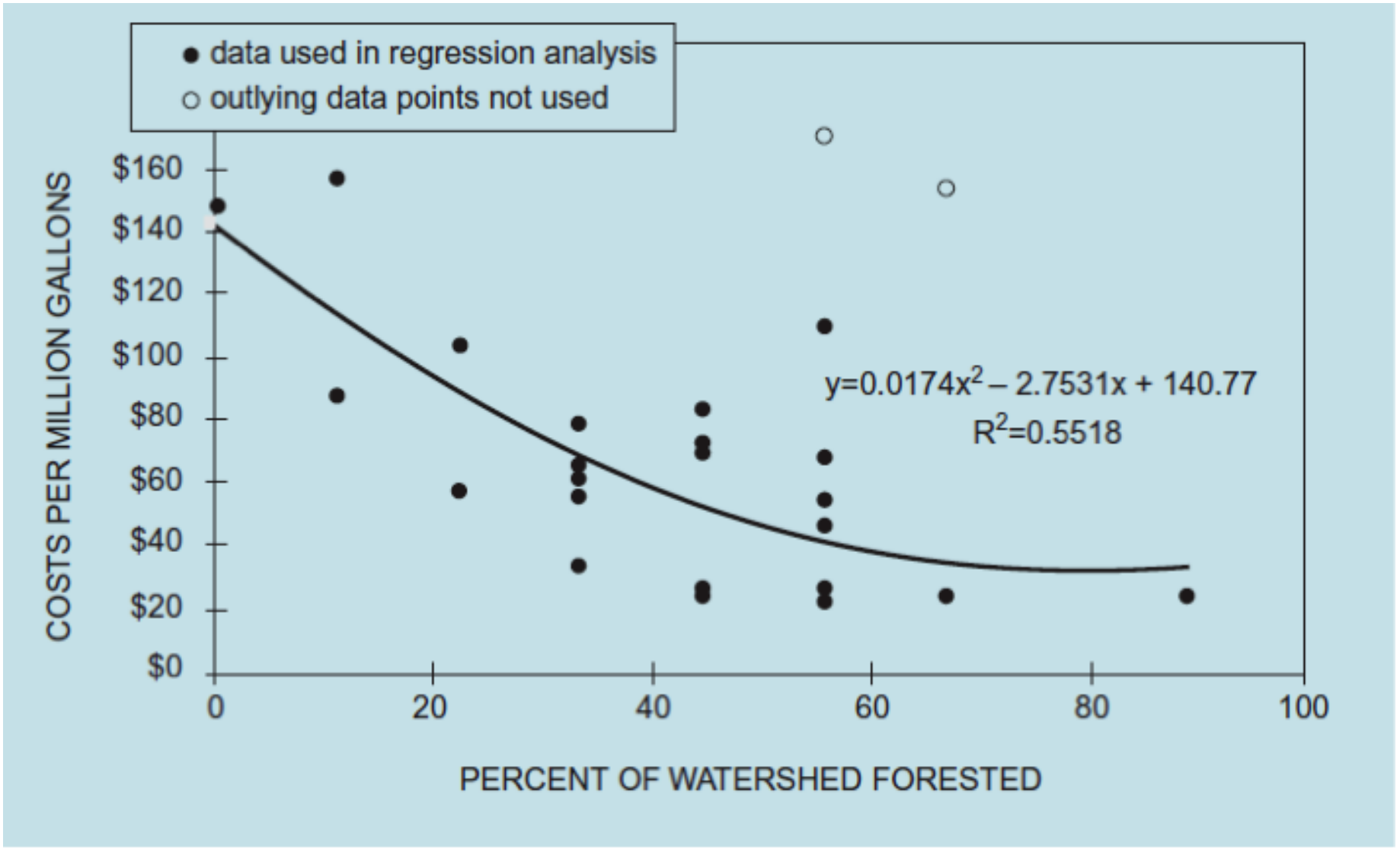

Economy
Environment


HEALTHY FORESTS – CLEAN WATER


WHY SHOULD WE CARE ABOUT WILDFIRES WAY OVER IN THE SIERRA?
WHY IS SMOKE COMING OUT OF OUR COLD WATER FAUCET?

Forest Benefits to Water Utilities

- Positive effect on raw water quality
  - Especially when compared to agriculture or urban development
- Riparian forests retain sediment, nitrate, and nitrogen


data used in regression analysis
outlying data points not used
$160
$140
$120
$100
$80
$60
$40
$20
$0
COSTS PER MILLION GALLONS
y=0.0174x2 – 2.7531x + 140.77
R2=0.5518
0
20
40
60
80
100
PERCENT OF WATERSHED FORESTED

Actions That Improve Quality

- Implementing stream/riparian protection zones
- Adjusting rotation rate and silviculture method
- Forest road construction and decomissioning
- Protection of old growth forest reserves
- Stream water quality monitoring
- Wildfire management practices

NATURAL CAPITAL – A VALUABLE ASSET

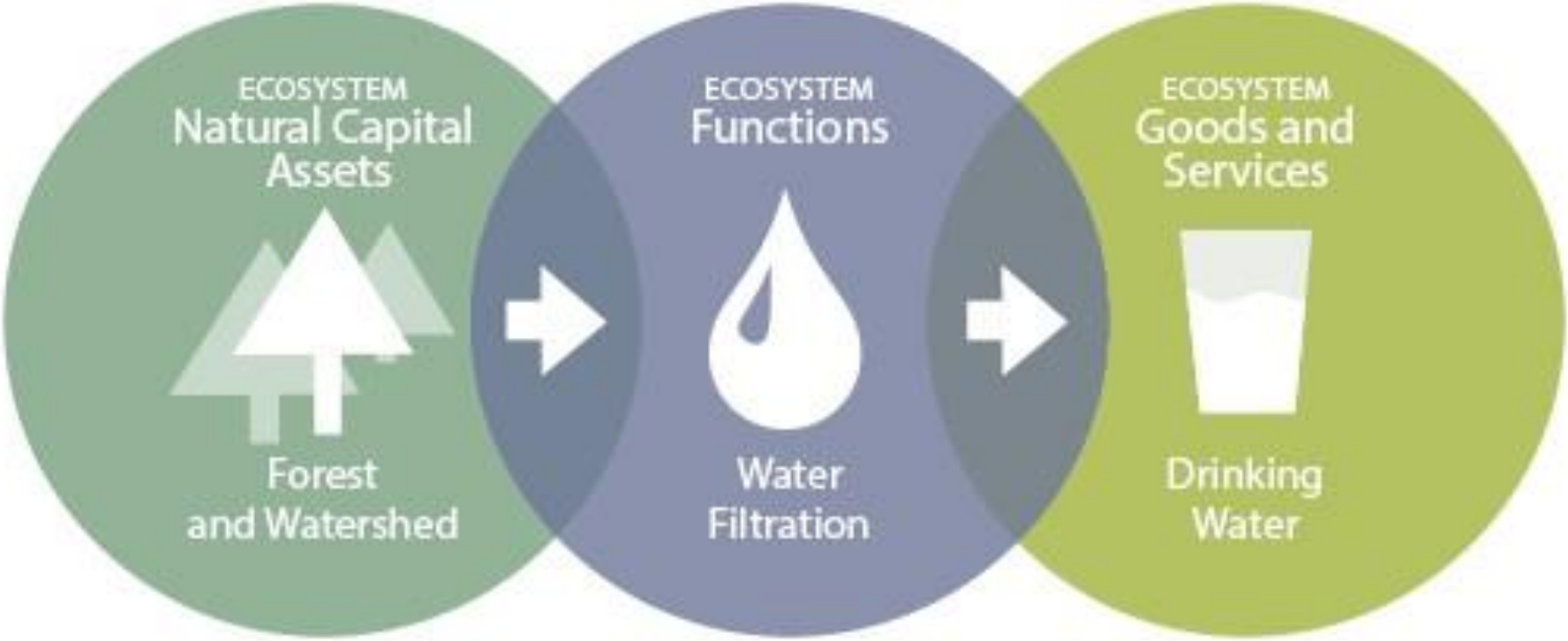
Four Types of Capital

Built Capital

Social Capital

Human Capital

Natural Capital


ECOSYSTEM
Natural Capital Assets
Forest and Watershed
ECOSYSTEM
Functions
Water Filtration
ECOSYSTEM
Goods and Services
Drinking Water

Ecosystem Services

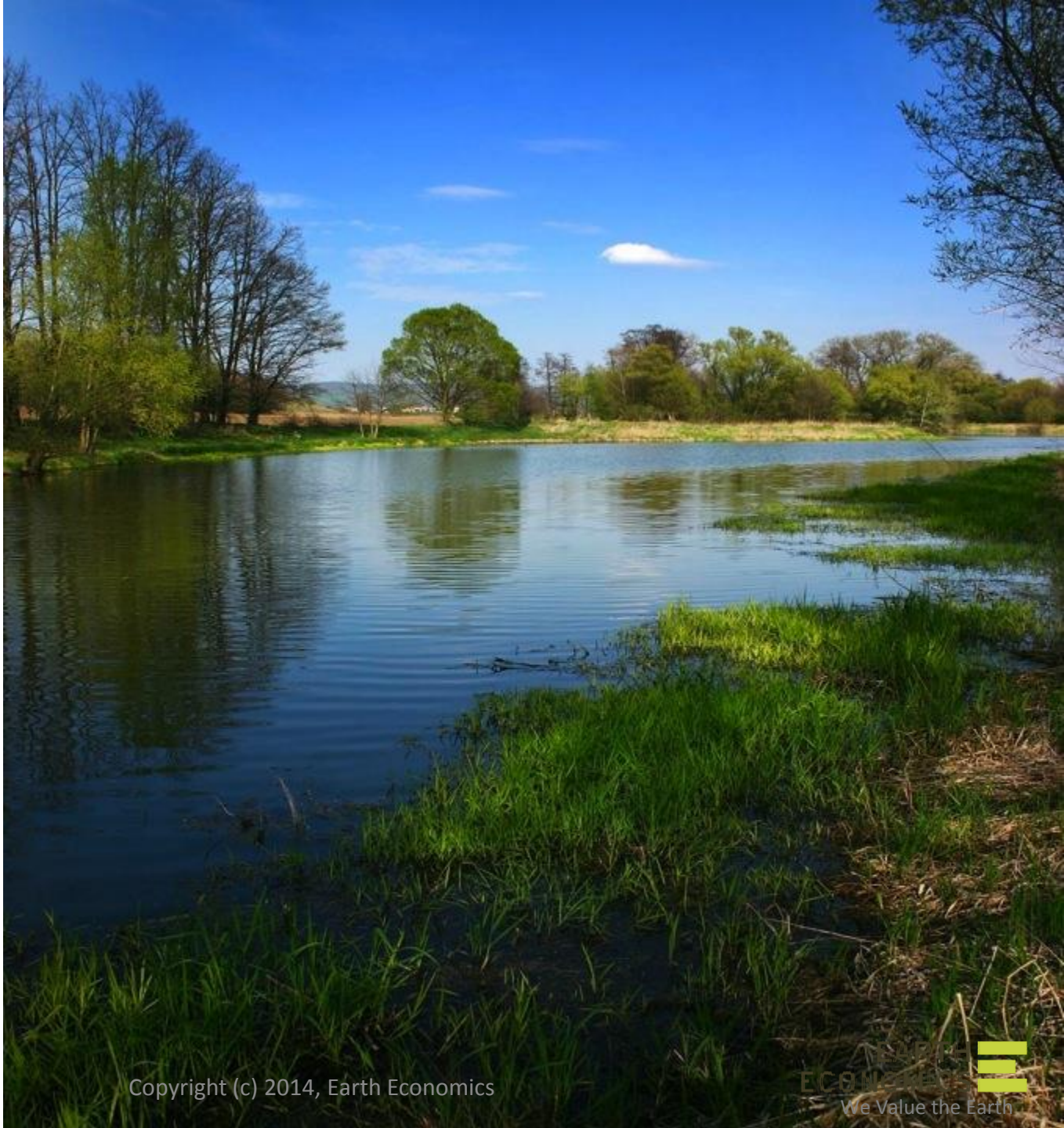
Provisioning

Regulating

Supporting

Information

Freshwater Supply



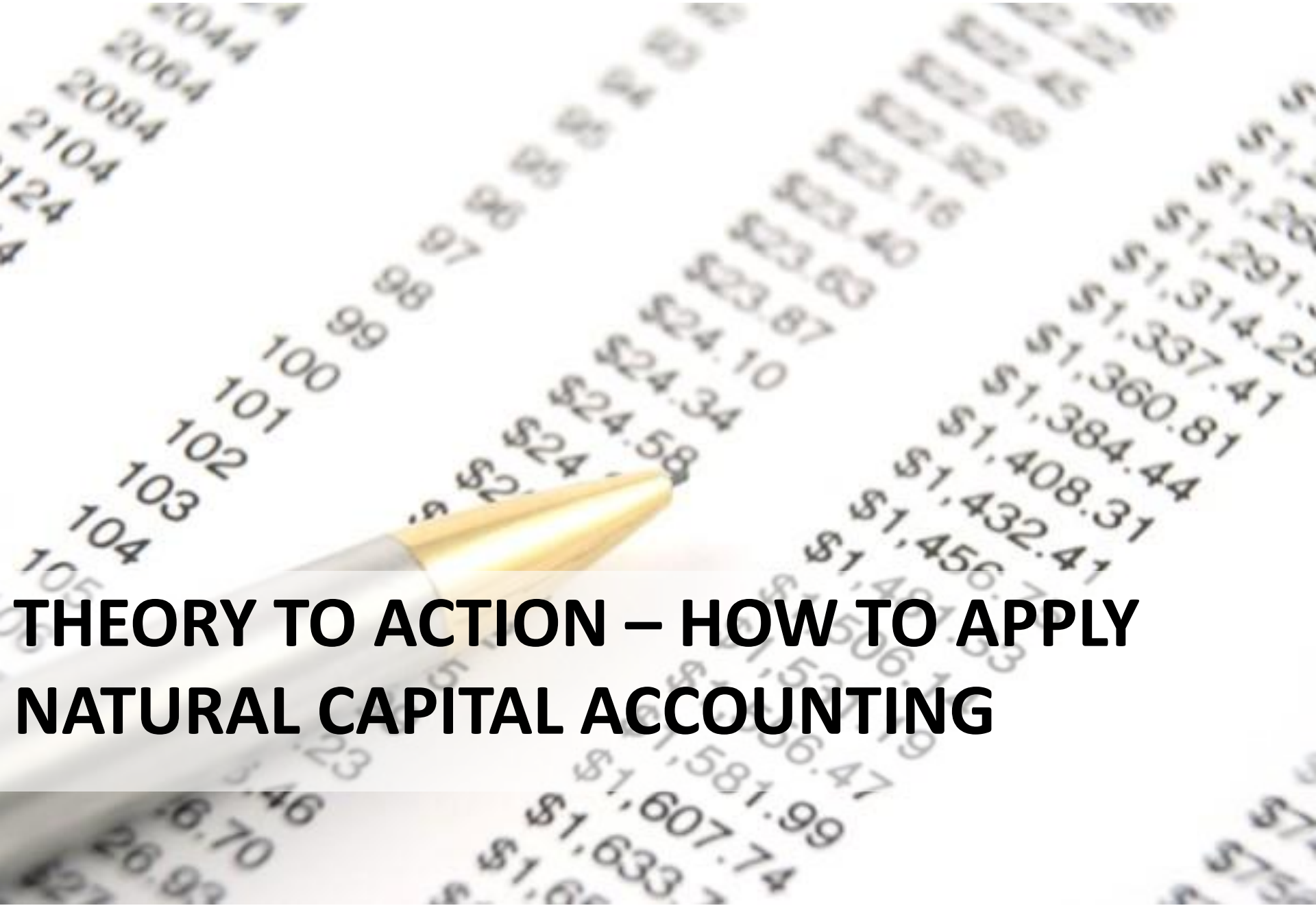
Biodiversity

EARTH ECONOMICS
We Value the Earth

Carbon Sequestration

EARTH ECONOMICS
We Value the Earth

Recreation

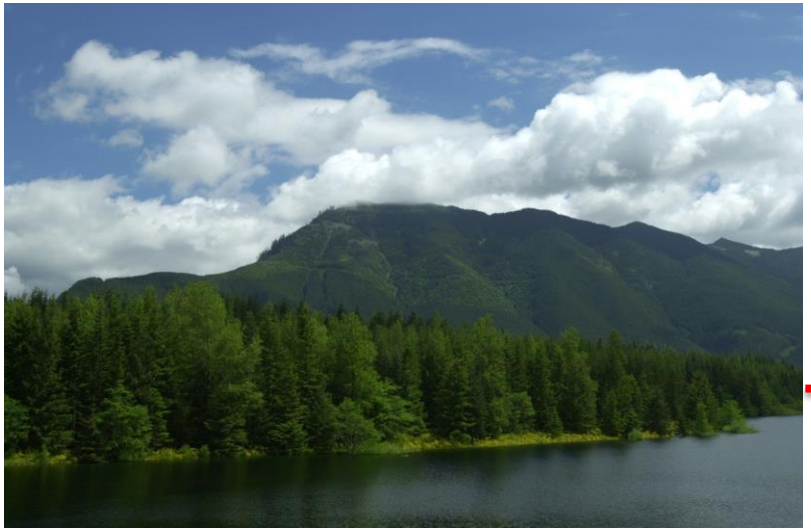


THEORY TO ACTION – HOW TO APPLY NATURAL CAPITAL ACCOUNTING

The 21st Century Natural Capital Utility Toolkit

- Accounting
- Benefit-Cost Analysis
- Bonding
- Rates Structures
- Asset Management
- Policy Maker & Public Education
- Damage Assessment
- Master Planning

Freshwater Provisioning Value: $200 million



SEATTLE PUBLIC UTILITIES - WATER FUND
(An Enterprise Fund of the City of Seattle)
BALANCE SHEETS
DECEMBER 31, 2009 AND 2008

ASSETS

	2009	2008
CURRENT ASSETS		
Cash and equity in pooled investments	$ 8,354,548	$ 7,339,673
Accounts receivable, net of allowance for doubtful accounts of $468,450 and $141,192	11,461,848	10,062,715
Unbilled revenues	9,108,669	8,936,009
Due from other City funds	1,486,725	656,123
Due from other governments	1,712,543	1,253,219
Hydrant settlement receivable	-	10,088,286
Current portion of notes and contracts receivable	21,239	22,400
Materials and supplies inventory	4,171,450	4,995,657
Prepayments and other	37,748	103,314
BPA account - cash and equity in pooled investments	510,823	275,350
Redemption account, restricted		
Cash and equity in pooled investments	-	31,795,164
Dedicated investments	-	60,274,366
Interest receivable	-	1,107,817
Total current assets	36,865,593	136,910,093
RESTRICTED ASSETS		
Bond parity account - cash and equity in pooled investments	-	68,062
Bond reserve account - cash and equity in pooled investments	9,068,015	8,989,241
Construction fund		
Cash and equity in pooled investments	15,708,119	8,483,751
Dedicated investments	-	72,292,809
Interest receivable	-	848,977
Vendor deposits - cash and equity in pooled investments	89,952	167,390
Revenue stabilization fund - cash and equity in pooled investments	13,333,321	13,136,077
BPA account - cash and equity in pooled investments	252,422	1,615,878
Total restricted assets	38,451,829	105,602,185
DEFERRED CHARGES AND OTHER		
Unamortized bond issue costs	4,490,104	5,122,923
Notes and contracts receivable	22,136	41,430
Deferred conservation costs	34,221,752	36,382,434
Other deferred charges	13,562,840	12,936,061
Total deferred charges and other	52,296,832	54,482,848
CAPITAL ASSETS, at cost		
Capital assets - excluding land	1,531,299,505	1,435,137,303
Less accumulated depreciation	(483,482,403)	(443,118,860)
Capital assets, net of accumulated depreciation	1,047,817,102	992,018,443
Construction in progress	87,082,670	105,278,733
Land and land rights	39,127,903	33,784,214
Other property	865,497	810,926
Total capital assets	1,174,893,172	1,131,892,316
TOTAL	$ 1,302,507,426	$ 1,428,887,442

See accompanying notes.

Table A2.2: Balance sheet

How would goodwill be affected by the manner in which a company addresses natural capital? Could better management increase a company's goodwill or could poor management lead to goodwill impairment?

Would new market mechanisms, such as biodiversity markets, create credits that would qualify as intangible assets?

Could trends in natural capital reduce the value in use or recoverable value of PPE, resulting in the need for impairment?

How would tighter rules on rehabilitating industrial sites affect restoration provision? Would tighter environmental regulation lead to the increasing of environmental provisions?

	2012 (£'m)	2011 (£'m)
Goodwill	20	25
Intangible assets	40	43
Property, plant and equipment	730	800
Non-current assets	**790**	**868**
Inventories	12	15
Trade and other receivables	35	45
Cash and cash equivalents	4	5
Current assets	**51**	**65**
Total assets	**841**	**933**
Borrowings	-80	-100
Trade and other payables	-23	-26
Current liabilities	**-103**	**-126**
Borrowings	-150	-170
Provisions	-350	-340
Non-current liabilities	**-500**	**-510**
Total liabilities	**-603**	**-636**
Net assets	**238**	**297**
Share capital	14	14
Share premium	139	139
Reserves	35	85
Retained earnings	50	59
Total equity	**238**	**297**

The 21st Century Natural Capital Utility Toolkit

- Accounting
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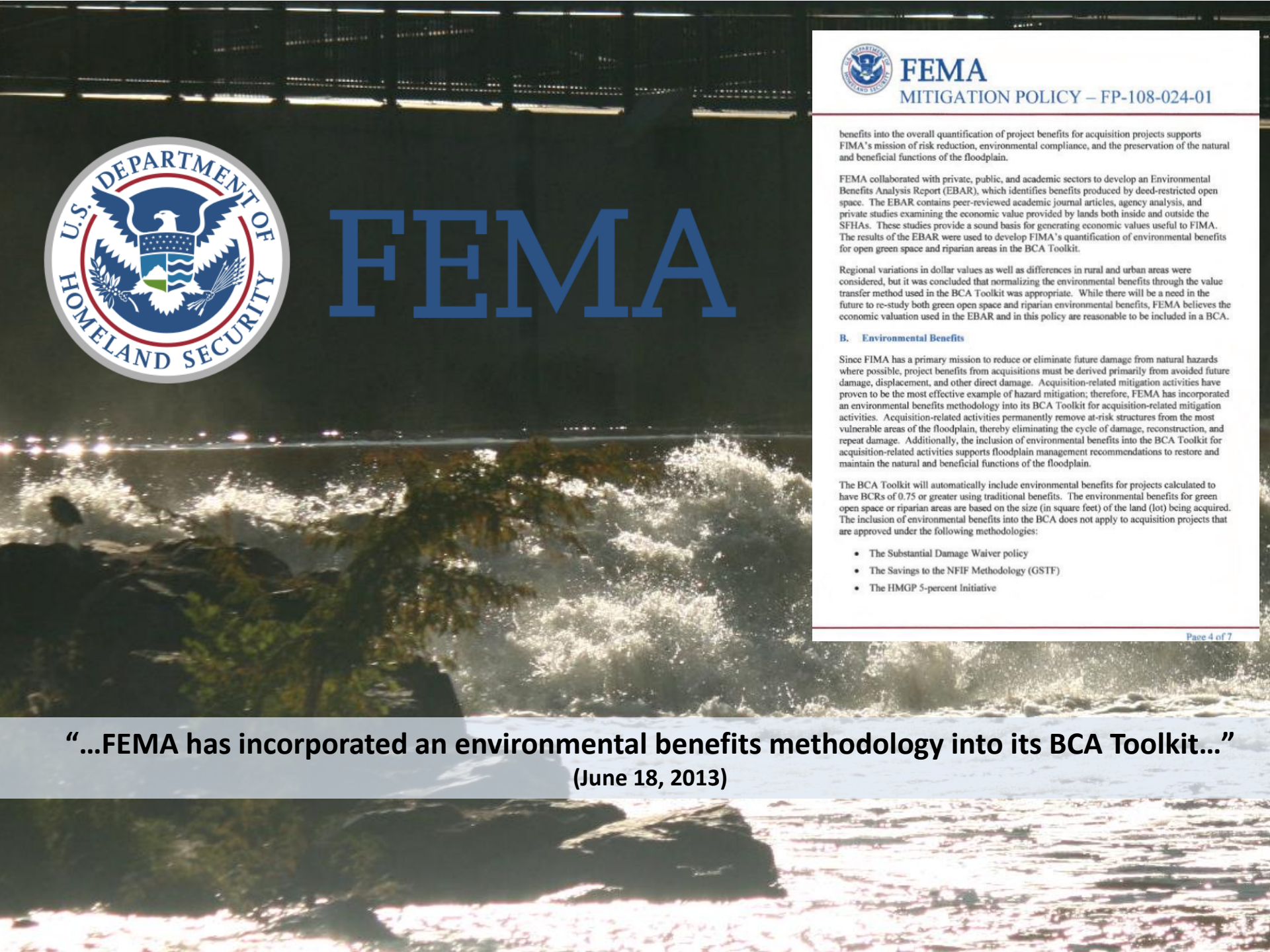
- Master Planning



FEMA
MITIGATION POLICY – FP-108-024-01

benefits into the overall quantification of project benefits for acquisition projects supports FIMA's mission of risk reduction, environmental compliance, and the preservation of the natural and beneficial functions of the floodplain.

FEMA collaborated with private, public, and academic sectors to develop an Environmental Benefits Analysis Report (EBAR), which identifies benefits produced by deed-restricted open space. The EBAR contains peer-reviewed academic journal articles, agency analysis, and private studies examining the economic value provided by lands both inside and outside the SFHAs. These studies provide a sound basis for generating economic values useful to FIMA. The results of the EBAR were used to develop FIMA's quantification of environmental benefits for open green space and riparian areas in the BCA Toolkit.

Regional variations in dollar values as well as differences in rural and urban areas were considered, but it was concluded that normalizing the environmental benefits through the value transfer method used in the BCA Toolkit was appropriate. While there will be a need in the future to re-study both green open space and riparian environmental benefits, FEMA believes the economic valuation used in the EBAR and in this policy are reasonable to be included in a BCA.

B. Environmental Benefits

Since FIMA has a primary mission to reduce or eliminate future damage from natural hazards where possible, project benefits from acquisitions must be derived primarily from avoided future damage, displacement, and other direct damage. Acquisition-related mitigation activities have proven to be the most effective example of hazard mitigation; therefore, FEMA has incorporated an environmental benefits methodology into its BCA Toolkit for acquisition-related mitigation activities. Acquisition-related activities permanently remove at-risk structures from the most vulnerable areas of the floodplain, thereby eliminating the cycle of damage, reconstruction, and repeat damage. Additionally, the inclusion of environmental benefits into the BCA Toolkit for acquisition-related activities supports floodplain management recommendations to restore and maintain the natural and beneficial functions of the floodplain.

The BCA Toolkit will automatically include environmental benefits for projects calculated to have BCRs of 0.75 or greater using traditional benefits. The environmental benefits for green open space or riparian areas are based on the size (in square feet) of the land (lot) being acquired. The inclusion of environmental benefits into the BCA does not apply to acquisition projects that are approved under the following methodologies:

- The Substantial Damage Waiver policy
- The Savings to the NFIF Methodology (GSTF)
- The HMGP 5-percent Initiative

"…FEMA has incorporated an environmental benefits methodology into its BCA Toolkit…"
(June 18, 2013)


Rim Fire, California:
$800M in damages
Our data supported California's successful appeal for federal disaster declaration


Existing Levee


Proposed Levee

The 21st Century Natural Capital Utility Toolkit

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- Damage Assessment
- Master Planning


CENTRAL ARKANSAS WATER

The 21st Century Natural Capital Utility Toolkit

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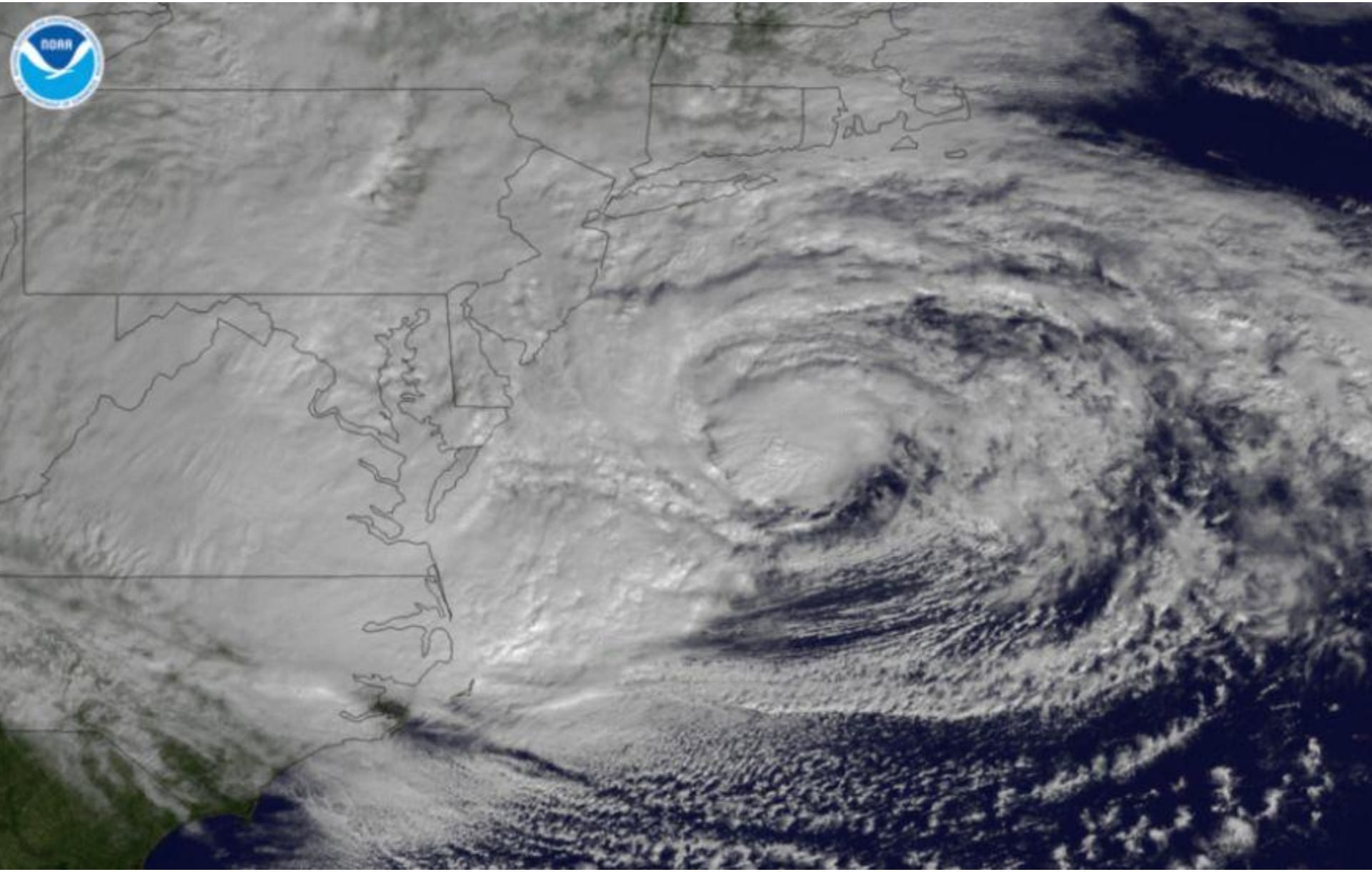
San Francisco
Water
Power
Sewer
Services of the San Francisco Public Utilities Commission
EWEB
Central Arkansas Water
Essential & Exceptional
CITY OF
FOUNDED
1775
TUCSON
Seattle
Public
Utilities

Thank You

nwahlund@eartheconomics.org

1895

Utilities could not issue municipal bonds



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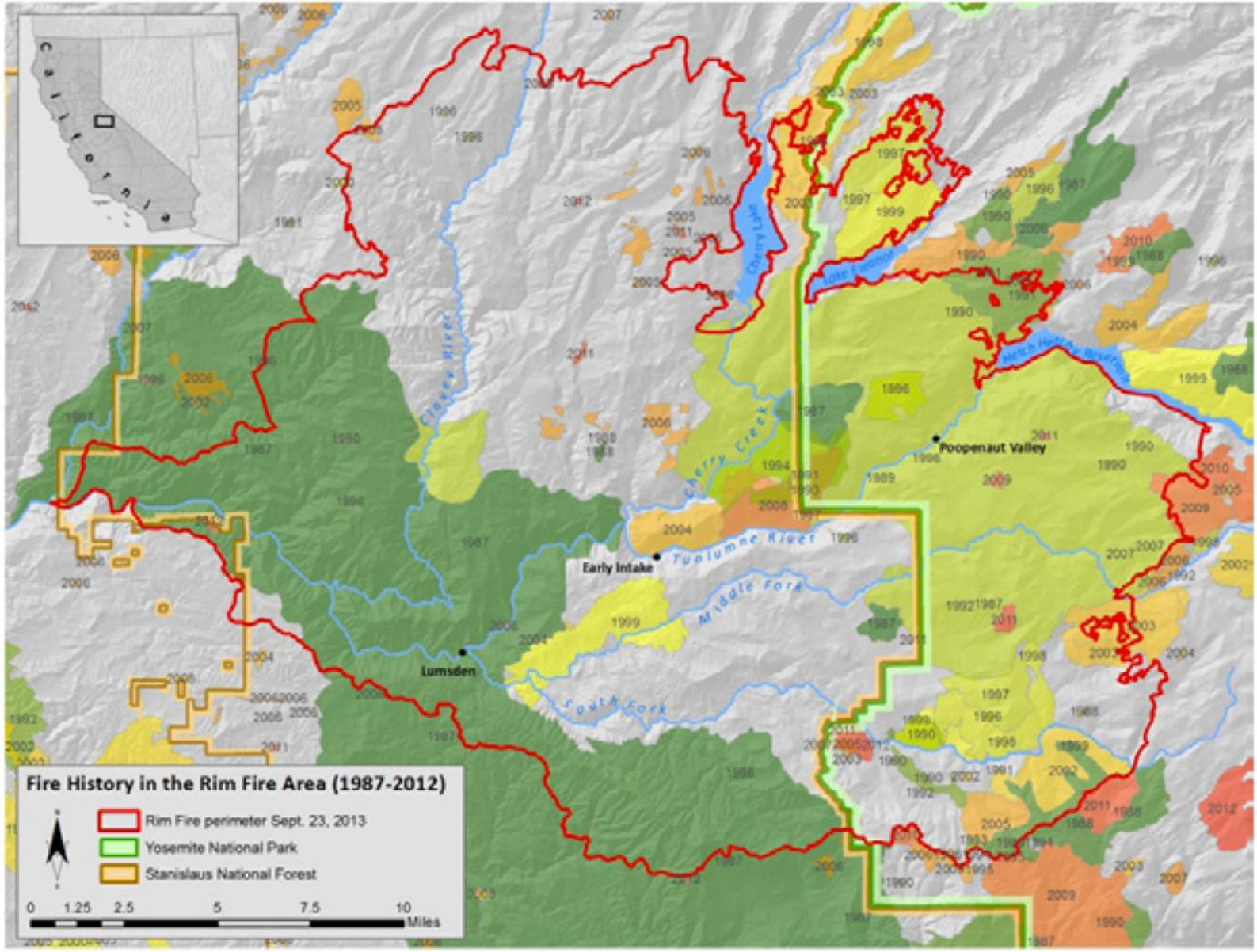
2013 Rim Fire

FIGURE 1 HISTORIC FIRES IN THE RIM FIRE REGION



Source: CAL FIRE[14]

Rim Fire Damages: Environmental Benefits

TABLE 21	TOTAL RIM FIRE FIRST-YEAR ECOSYSTEM SERVICE VALUES LOST BY LAND COVER	
Land Cover	Low	High
Grassland	$30,569,395	$69,202,212
Herbaceous Wetland	$515,158	$20,284,851
Lake	$93,926	$2,877,038
Riparian	$47,071	$325,824
River	$4,073	$907,523
Shrub	$541,959	$37,247,933
Forest Broad Leaf	$5,098,191	$284,804,356
Forest Coniferous	$63,147,300	$320,363,902
	$100,017,074	*$736,013,639*

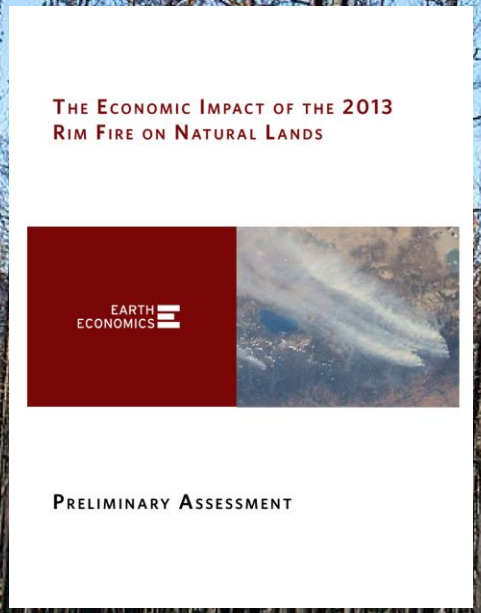
10/8/2013: Governor Brown applies for disaster declaration.

11/4/2013: FEMA denies disaster declaration request.

"…the severity and magnitude of the Rim Fire [is] not beyond State and local capabilities…"

12/2/2013: Governor Brown appeals; includes Earth Economics data.

"…the State and its communities face … **complex and multifaceted environmental damages**…"



12/13/2013: President Obama approves the appeal.

Rim Fire Damages:
Carbon Storage & Property Values

Carbon Storage Value Loss:
$102 -$797 million

Property Value Loss:
$50 -$265 million
(due to increased perception of fire risk by potential homebuyers and reduction in the amenity value of nearby forest)

EARTH ECONOMICS

U.S. Endowment for Forestry and Communities

Summary of Utility Watershed Management Programs in the U.S. *

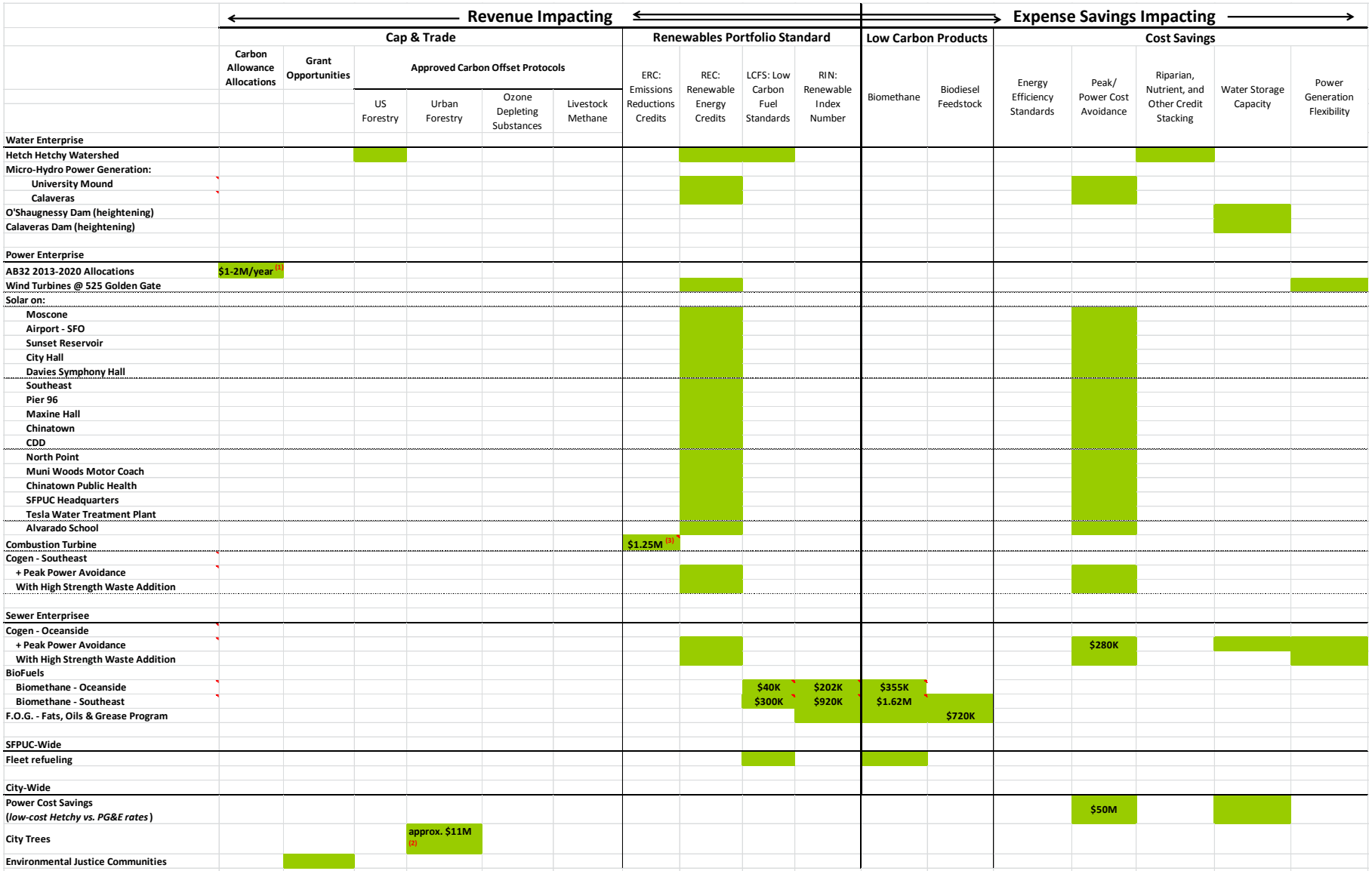
Program Name (location)	Number of Users	Fee Amount	Average Fee per Household	% of Average Bill	Rate Design	Separate Fee on Bill?	Revenue Generation	Year of Introduction	How was the Program Adopted
Aurora Water (Aurora, CO)	300,000	No fee. Included in city budget.	N/A	N/A	N/A	N	$500,000 over two years	2011	City Council
Bull Run Watershed Habitat Conservation Plan (Portland, OR)	900,000	No fee. Included in city and USFS budget.	N/A	N/A	N/A	N	$500,000 per year	2007	Congress (1996 Bull Run Management Act)
Cedar River Watershed Habitat Conservation Plan (Seattle, WA)	1,400,000	No fee. Part of utility budget.	N/A	N/A	N/A	N	> $50m over 20 years	N/A	City Council
Central Arkansas Water Watershed Management Program (Little Rock, AK)	400,000	$0.45 per month per 5/8" or 3/4" equivalent meter.	$0.45 per month	+1.1%	Fixed Fee	Y	$1m (approx) per year	2009	Utility Board of Commisioners
Common Waters Partnership (Upper Delaware Watershed)	15,000,000	Pending.	N/A	N/A	N/A	-	N/A	Pending	Common Waters Fund
Conserve to Enhance (Tuscon, AZ)	535,000	No fee. Voluntary checkbox on bill.	N/A	N/A	N/A	-	N/A	2012	Non-profit
Crooked River/ Portland Water District Payment for Ecosystem Services (Portland, ME)	200,000	No fee. Grant funded.	N/A	N/A	N/A	-	N/A	2009	Manomet Center for Conservation Sciences
Forest to Faucets (Denver, CO)	1,300,000	$0.04 per 1,000 gallons.	$0.33 per bill	+1%	Volumetric Rate	-	$3.3m per year over 5 years	2012-2013	Utility and USFS partnership
Green River Watershed Management Plan (Tacoma, WA)	300,000	No fee. Included in Tacoma Water budget.	N/A	N/A	N/A	N	N/A	2006	Utility
Lake Whatcom Watershed Land Acquisition and Preservation Program (Bellingham, WA)	88,000	$5 per month + $0.64 per CCF	N/A	N/A	Base rate + volumetric rate	Y	$25.3m since 2001	2001	City Council
McKenzie Watershed Drinking Water Source Protection Plan (Eugene, OR)	200,000	To be determined.	N/A	N/A	N/A	N	$200,000 - $250,000 per year	2013	Utility
Salt Lake City Watershed Management Plan (Salt Lake City, UT)	400,000	$1.50 per meter per month.	$1.50 per month.	+3.75%	Fixed Fee	N	$1.5m per year	1988	City Council
San Antonio Source Water Protection Program (San Antonio, TX)	1,300,000	1/8-cent sales tax over five years (2005 - 2010).	N/A	N/A	N/A	N	$45m (2005), $90m cap (2010)	2005, 2010	Voters
Upper Neuse Clean Water Initiative (Raleigh, NC)	600,000	$0.0748 per CCF.	$0.40 per month	+1%	Volumetric Rate	Y	$1.8m per year	2011	City Council
Water Source Protection Program (Santa Fe, NM)	32,000	$0.13 per 1,000 gallons per month.	$0.65 per month	+1.6%	Volumetric Rate	N	$200,000 per year	N/A	City Council
Watershed and Environmental Improvement Program (San Francisco, CA)	2,500,000	No fee. Included in San Francisco PUC budget.	N/A	N/A	N/A	N	$50m over 10 years	2005	Utility
Watershed Management (Los Angeles, CA)	666,000	Included in Los Angeles DWP budget.	N/A	N/A	N/A	N	N/A	N/A	Utility and City Council

*Please contact Rowan Schmidt (rschmidt@eartheconomics.org) or Sofi Delgado-Perusquia (sofi@usendowment.org) with any questions, comments or additions to this list.

Asset Management for Natural Infrastructure

Natural Assets			**Ecosystem Services - Operating**			**Ecosystem Services - Non-operating**	
Accounting unit	Physical stock	Units	Water infiltration (gal/yr)	Sediment removal (lbs/yr)	Nitrogen reduction (lbs/yr)	Carbon sequestration (t/yr)	Wildlife habitat (acres)
Rain garden	0.14	acres	4000	100	15	0.1	0.1
Bioswale	0.23	acres	6000	150	25	0.2	0.2
Green space	25	acres	20,000	900	100	12	20

Financial Impacts: Revenues & Expenses
Revenue Opportunities



Bond Disclosure

Ceres

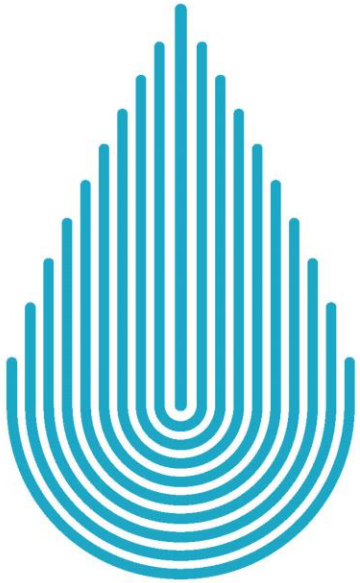
The Ripple Effect:

WATER RISK IN THE MUNICIPAL BOND MARKET

A Ceres Report
October 2010

Authored by
Sharlene Leurig, Ceres

Analysis by
WATER ASSET MANAGEMENT



A FRAMEWORK FOR ASSESSING WATER & ELECTRIC UTILITIES

Rates Structures

EARTH ECONOMICS

U.S. Endowment for Forestry and Communities

Communicating and Investing in Natural Capital using Water Rates

Water utilities depend on natural capital like watersheds, forests and river systems as a vital component of their drinking water infrastructure. As the primary source of revenue for water utilities, water rates have traditionally included a single base rate and/or user charges such as consumption charges.

To better communicate the value and magnitude of investments in their natural capital assets to ratepayers and other stakeholders, several utilities have begun to include natural capital surcharges in their rates structures. Variously called "Watershed Rates" or "Watershed Protection Fee," the following examples show that natural capital surcharges provides utilities with a useful communication and investment tool.

Central Arkansas Water, Arkansas

Name:	Watershed Protection Fee
Implemented:	2009
Amount:	$5.40 - $8.16 per ratepayer per year depending on meter type.
Communication Strategy:	Regular outreach to stakeholders from CEO and utility management.
Investment Strategy:	Acquisitions and source water protection, monitoring, management.

Central Arkansas Water (CAW), an independent utility that services Little Rock, North Little Rock and other small communities in the area, recognizes that keeping their water source protected and clean in the present will save future costs. In 2009, CAW implemented a "Watershed Protection Fee," a monthly base rate that increases with meter size. The fee is $0.45 per month for 5/8- and 3/4-inch meters, $0.68 per month for a 1-inch meter and so on. This fee funds their Watershed Management Program, which includes acquisition of land around Lake Maumelle, as well as other capital and operational costs such as environmental regulation by the county and USGS water quality monitoring. The Watershed Protection Fee, which has helped CAW to successfully meet their initial goal of acquiring 1,500 acres, will cease once the utility has raised a $3 million pool of funds, then be reintroduced once the pool reaches $2 million. CAW has received support and praise from city councils in the area and most ratepayers, although there has been some pushback from wholesale customers, who are now required to track their customers' meter sizes in order to appropriately calculate the fee. To CAW's knowledge, they are the only water utility in the region that has implemented a rates-based watershed protection fee.

Acknowledgements: Jonathan Long, P.E., Watershed Administrator, and Robert Hart, P.E., Technical Services Officer, Central Arkansas Water.

Suggested Citation: Delgado-Perusquia, Sofi; Kraft, Joanna; Schmidt, Rowan; Stangel, Peter, 2012 Communitcating And Investing Natural Capital Using Water Rates. Earth Economics, Tacoma, WA & U.S. Endowment for Forestry and Communities.

What's in it for my utility?

Finance and Asset Management

- Greater ability to use municipal bond funds for conservation investments.
- Greater ability to use capital budget for conservation investments, with more robust O&M budget.

Rate Payers

- Share investment in natural assets
- Increased awareness

Financial Report Users

- Transparency in asset and liability reporting
- Better-informed policy decisions