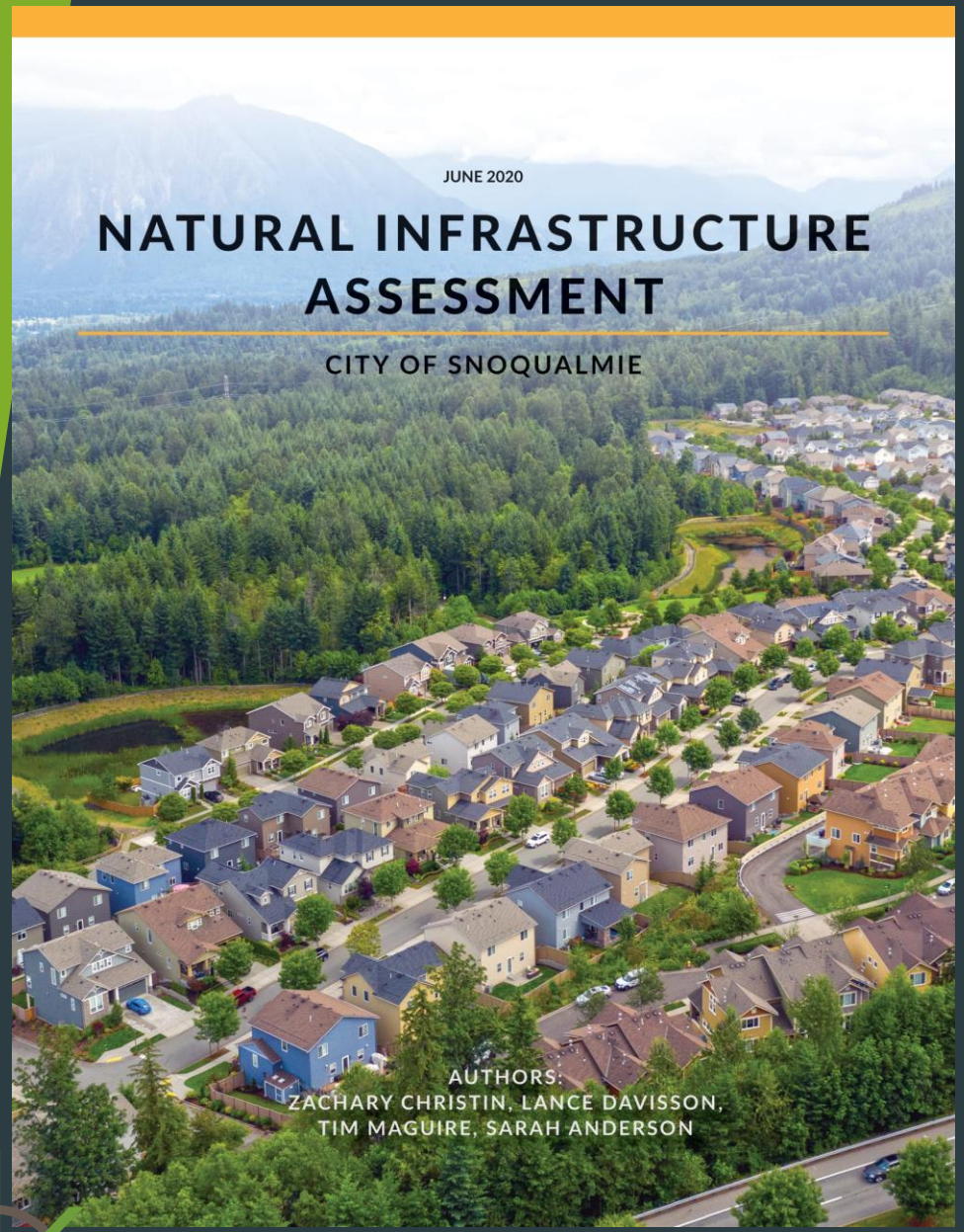

The Value of Snoqualmie's Urban Forest

July 2020

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CITY OF SNOQUALMIE

+70%

OF CITY OWNED LANDS ARE FOREST

$5.8M TO $7.3M

ANNUAL DOLLAR VALUE (IN MILLIONS) OF EVALUATED GOODS AND SERVICES GENERATED BY PUBLIC FORESTS

Snoqualmie's Natural Infrastructure

Proven return on investment (ROI) at a critical time

- Your investment today returns over $150 million over the next 50 years – clean air, clean water, carbon stability, healthy & active citizens

- Snoqualmie's Urban Forestry Program
  - Leveraged funding & technical assistance – King Conservation District (KCD), Green Snoqualmie Partnership
  - Thorough data & scientific analysis to support program goals: stormwater, citizen engagement, restoration

- 2020 Natural Infrastructure Assessment
  - Final foundational piece to communicate ROI to leadership, staff & the public
  - Opportunity to solidify policy & funding decisions

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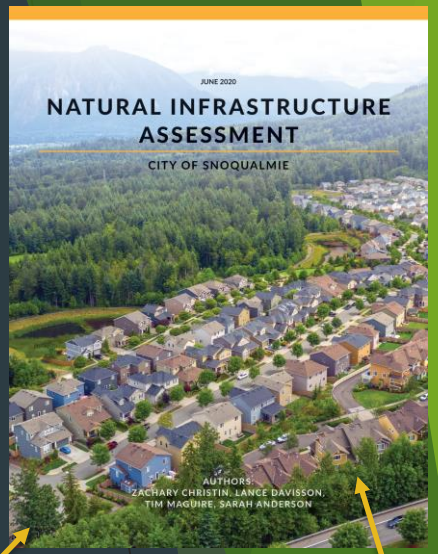
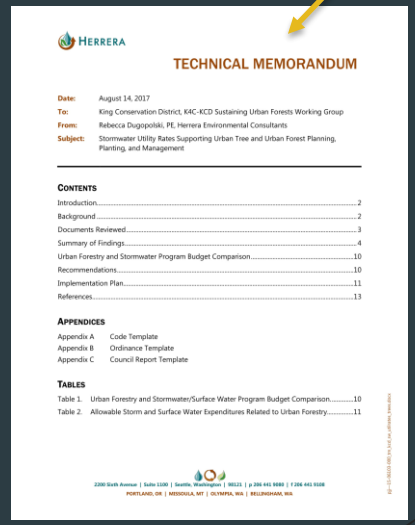
Natural Infrastructure Assessment
Solidifies policy & funding decisions

1. **Herrera Stormwater Utility Rate 2017 Technical Report**
   - Redmond, Vancouver, Kirkland, Tacoma use stormwater funding to support urban forestry

2. **2017 Snoqualmie stormwater ordinance update**
   - *'The city's combined water, sewer and stormwater … utilities purpose is … to support city stormwater management activities. Such activities include …. urban forest management.' (Ord. 1198, Chapter 15 (Exh. A), 2017)*

3. **Snoqualmie Natural Infrastructure Assessment - June 2020**




HERRERA

TECHNICAL MEMORANDUM

Date: August 14, 2017
To: King Conservation District, K4C-KCD Sustaining Urban Forests Working Group
From: Rebecca Dugopolski, PE, Herrera Environmental Consultants
Subject: Stormwater Utility Rates Supporting Urban Tree and Urban Forest Planning, Planting, and Management

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Appendix C Council Report Template

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2200 Sixth Avenue | Suite 1100 | Seattle, Washington | 98121 | p 206 441 9080 | f 206 441 9108
PORTLAND, OR | MISSOULA, MT | OLYMPIA, WA | BELLINGHAM, WA

Snoqualmie Municipal Code


Title 1 GENERAL PROVISIONS
Title 2 ADMINISTRATION AND PERSONNEL
Title 3 REVENUE AND FINANCE
Title 4 (Reserved)
Title 5 BUSINESS LICENSES AND REGULATIONS
Title 6 ANIMALS
Title 7 (Reserved)
Title 8 HEALTH AND SAFETY
Title 9 PUBLIC PEACE, MORALS AND WELFARE
Title 10 VEHICLES AND TRAFFIC
Title 11 (Reserved)
Title 12 STREETS, SIDEWALKS AND PUBLIC PLACES
Title 13 WATER, SEWERS AND PUBLIC SERVICES
Title 14 DEVELOPMENT REVIEW
Title 15 BUILDINGS AND CONSTRUCTION
Title 16 SUBDIVISIONS, SHORT SUBDIVISIONS AND BINDING SITE IMPROVEMENT PLANS
Title 17 ZONING
Title 18 MOBILE HOMES
Title 19 ENVIRONMENT
Title 20 IMPACT FEES
Title 21 AMENDMENTS TO COMPREHENSIVE PLAN AND DEVELOPMENT REGULATIONS

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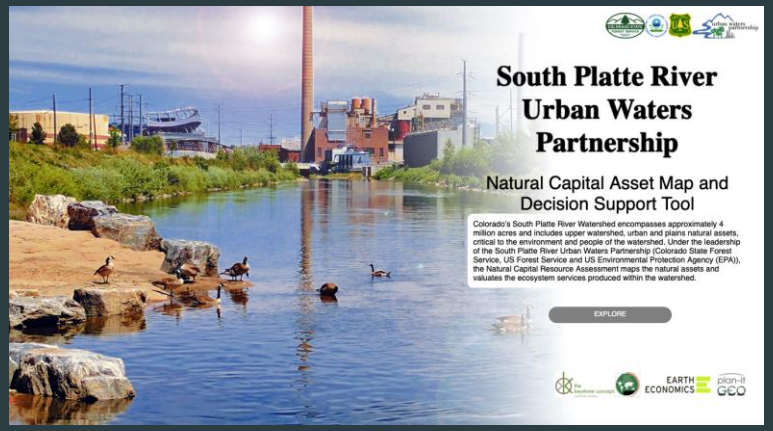
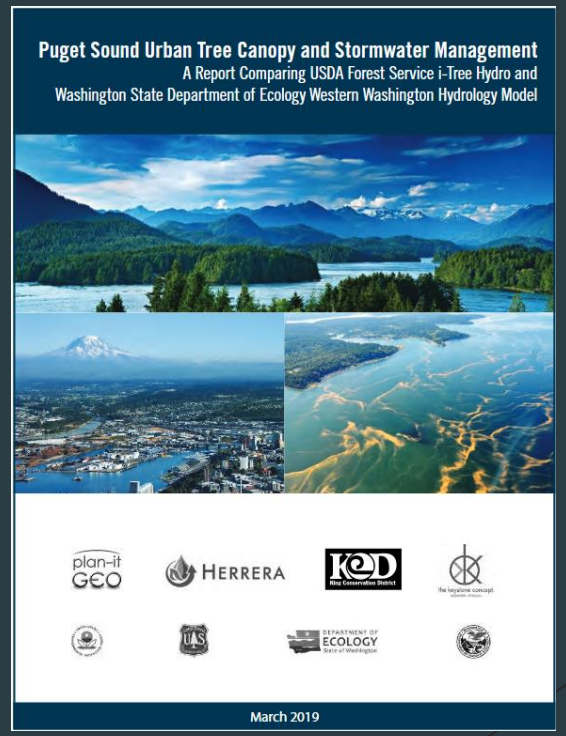
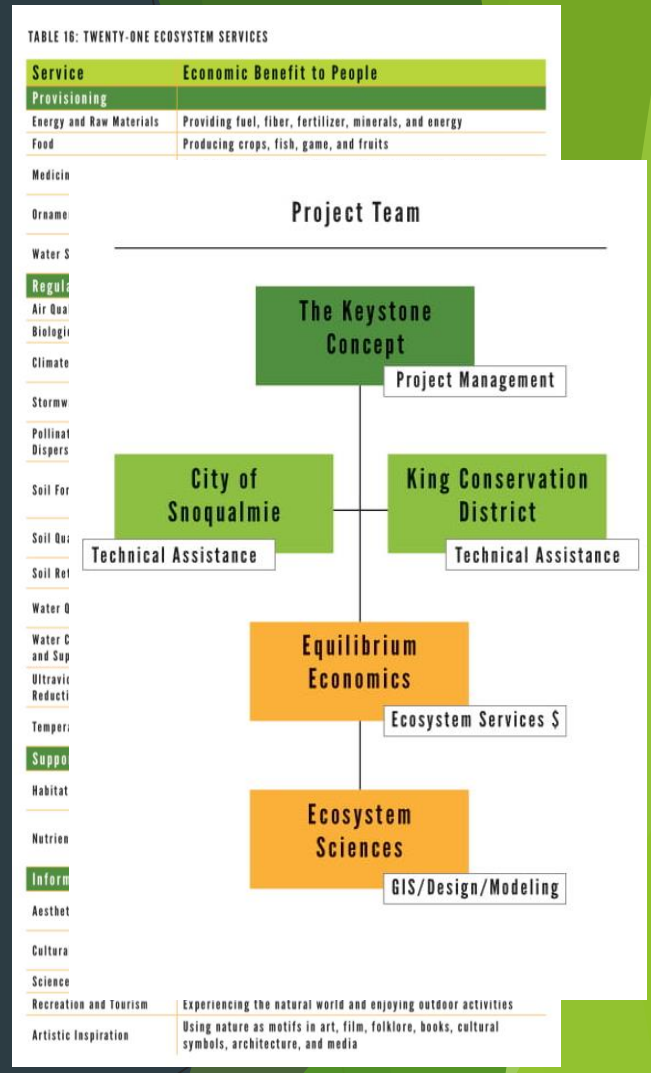
The Keystone Concept Team

- Sound science & policy experience across the Pacific Northwest and USA
  - GIS & vegetation mapping
  - Stormwater modeling & analysis
  - Ecosystem Service Valuation
- Collaborative & sustainable solutions
- Impact & return on investment







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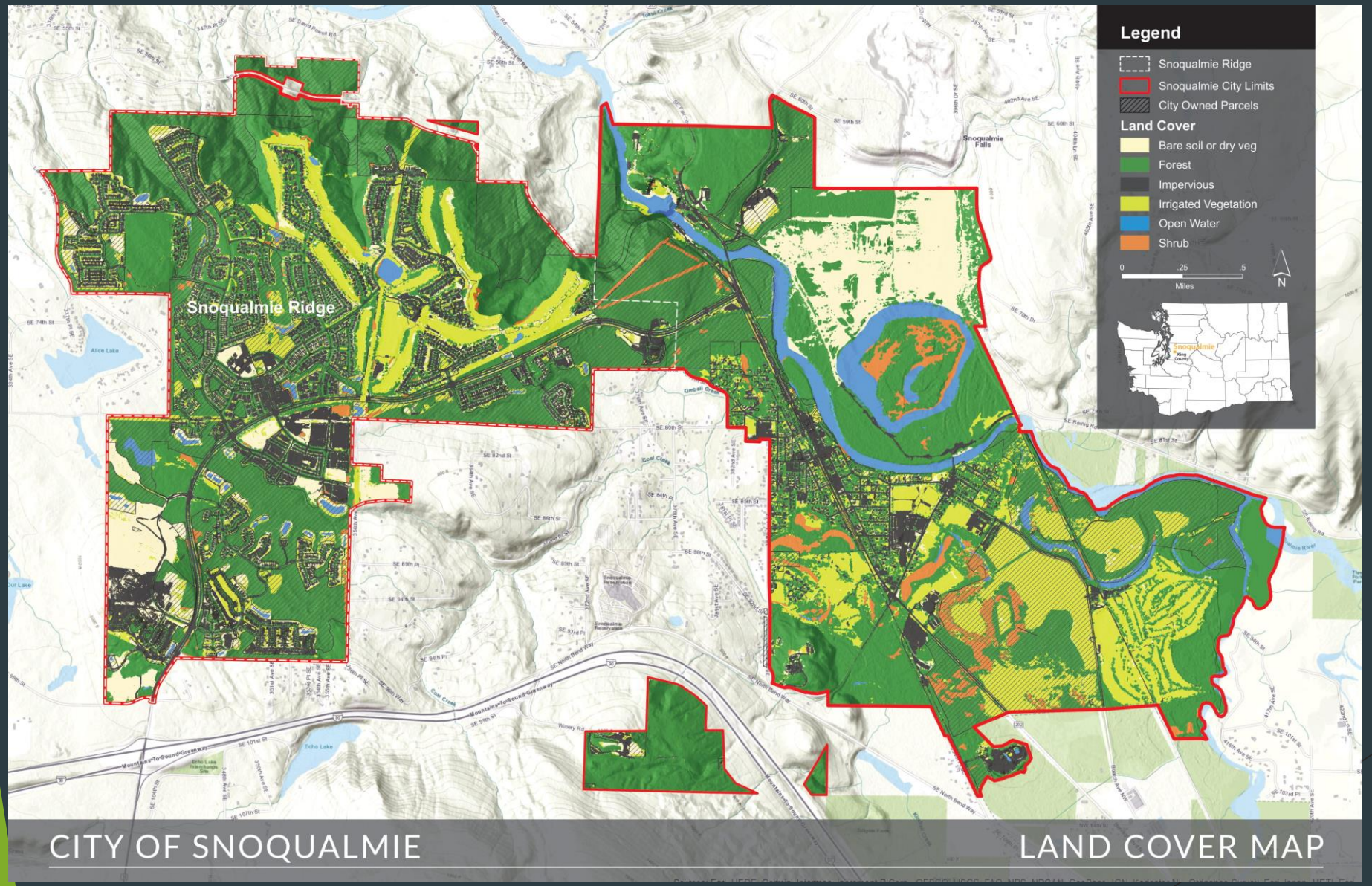
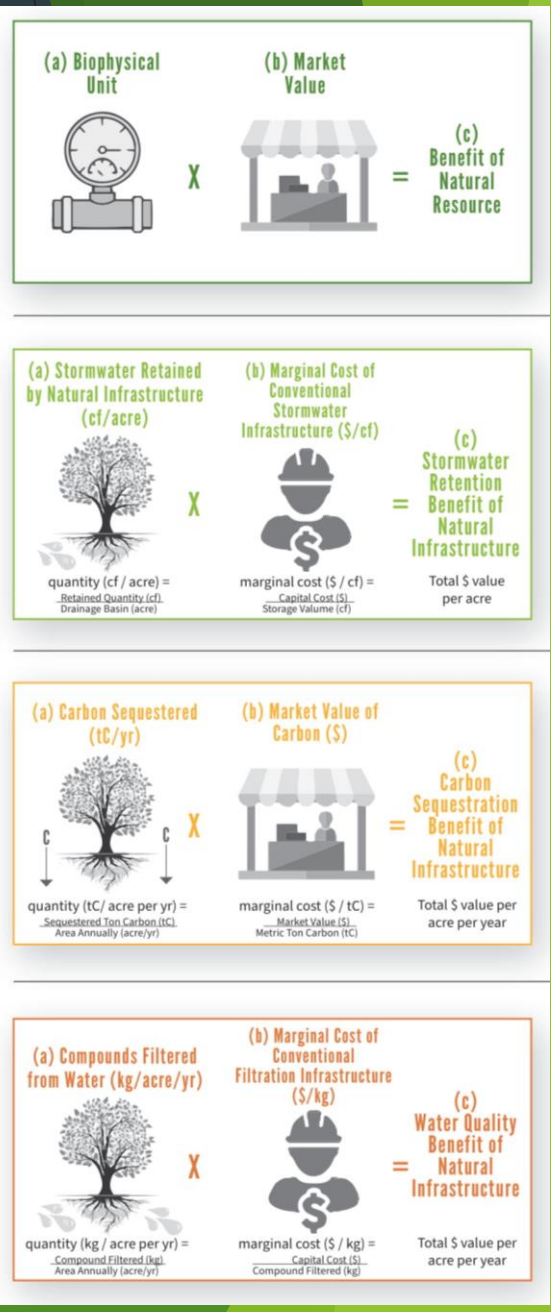
A Scientific & Data Driven Approach





What are Ecosystem Services?

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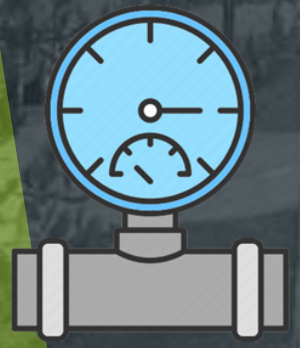
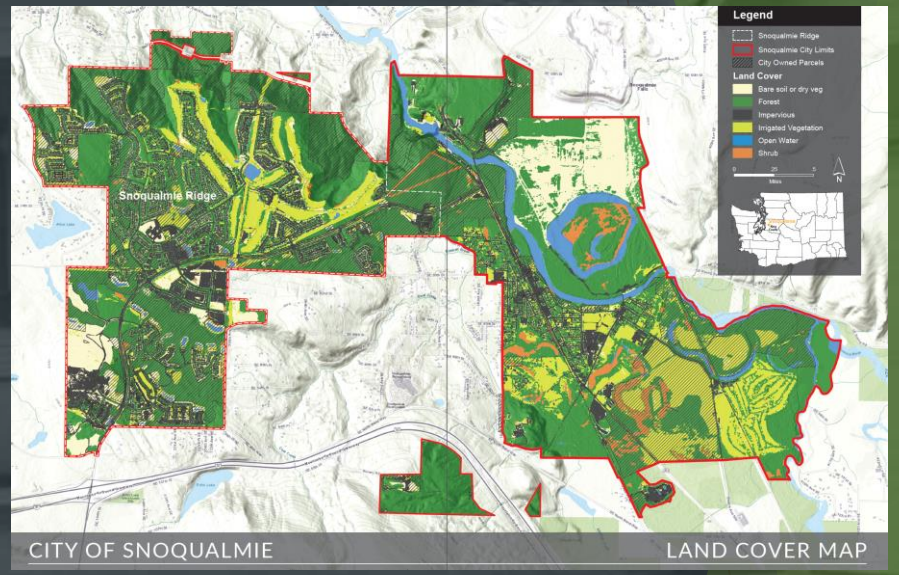
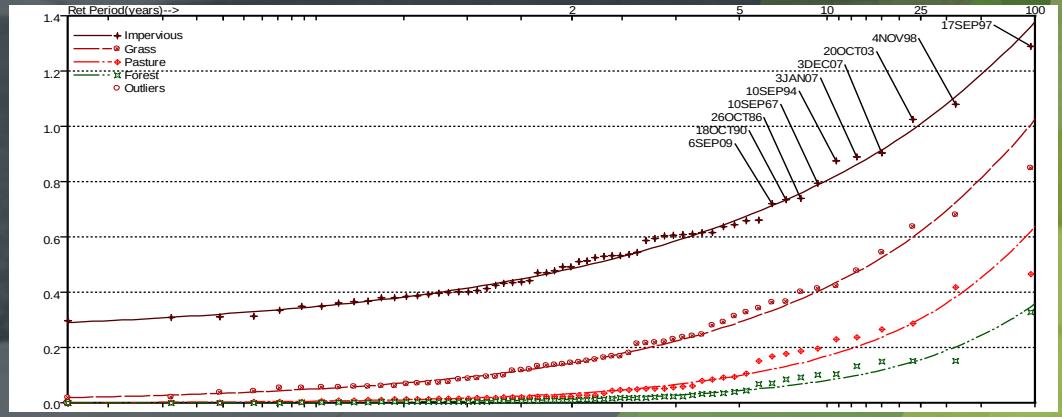
How are Ecosystem Services Valued & Why do this?

Function Transfer

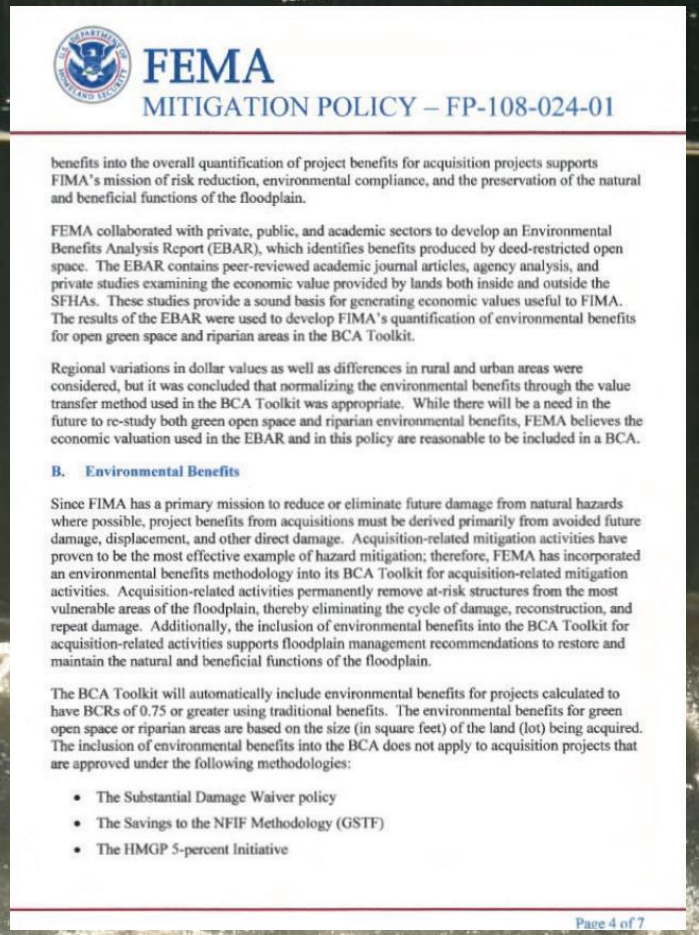
Field Data X **Market Value**







FEMA



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

Page 4 of 7

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

Stormwater Runoff

- The stormwater retention value of Snoqualmie's publicly owned forest resource is between $5.7 to $7.1 million annuallly

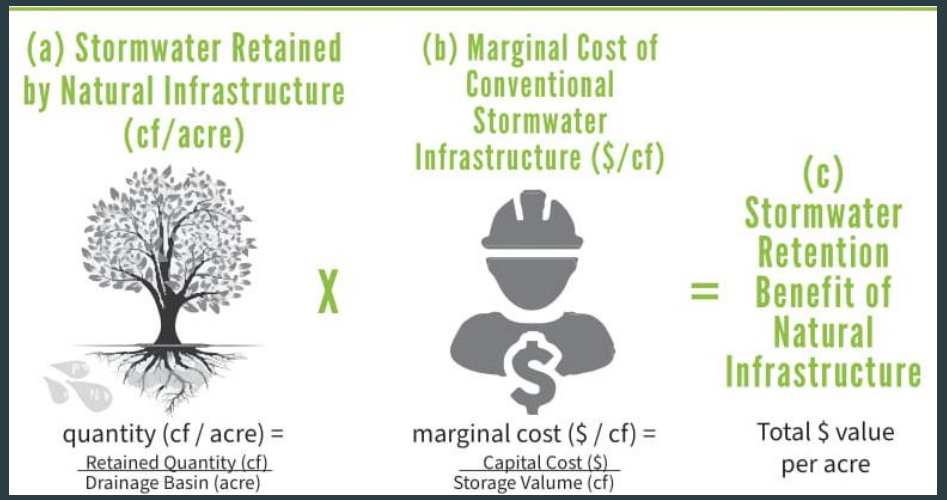


TABLE 3. TOTAL VALUE OF STORMWATER RETAINED BY SNOQUALMIE FORESTS ($/2-YEAR STORM)

Ownership Type	Total Acres of Forest (acre)	Unit Water Volume Retained (cf/acre)	Total Water Volume Retained (cf)	Marginal Water Storage Market Value ($/cf)	Total Value of Water Storage by Forests ($)
Private	1,365	5,339	7,287,360	$0.83 - $1.02	$6,048,508 - $7,433,107
Public	1,150		6,139,534		$5,095,813 - $6,262,324
ROW	150		800,809		$664,671 - $816,825
Total	**2,665**		**14,227,702**		**$11,808,993 - $14,512,256**

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Water Quality

- The water quality benefit value of Snoqualmie's publicly owned forest resource is between $57,000 to $147,000 annually

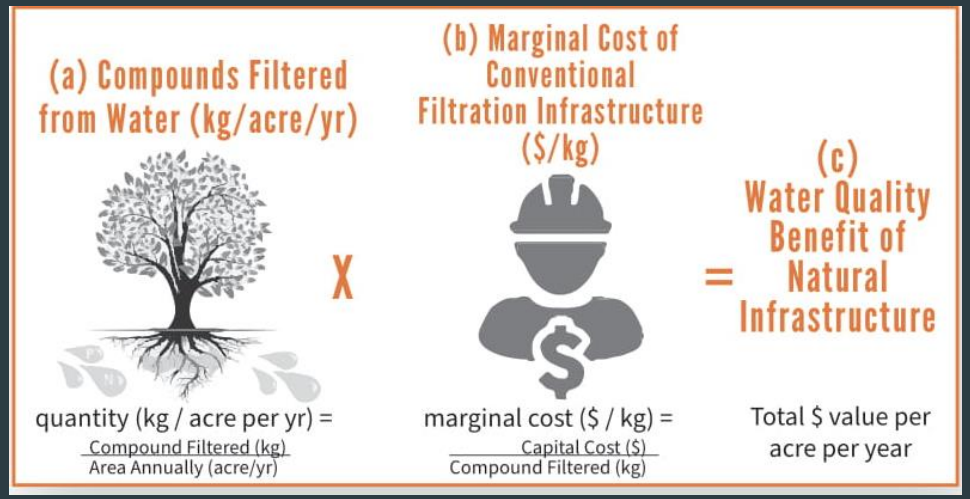

TABLE 5: TOTAL VALUE OF WATER QUALITY BENEFITS OF SNOQUALMIE FOREST

Forest Ownership Type	Acres	Value of Nutrient/Compound Reduction ($/Acre/Year)		Value of Nutrient/Compound Reduction ($/Acre/Year)	
		Low	High	Low	High
Public	1,300	$44.18	$113.24	$57,471.98	$147,304.85
Private	1,365			$60,308.47	$154,574.97
Total	2,665			$117,780.45	$301,879.83

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Carbon Sequestration

- The carbon sequestration value of Snoqualmie's publicly owned forest resource is between $45,000 to $81,000 annually

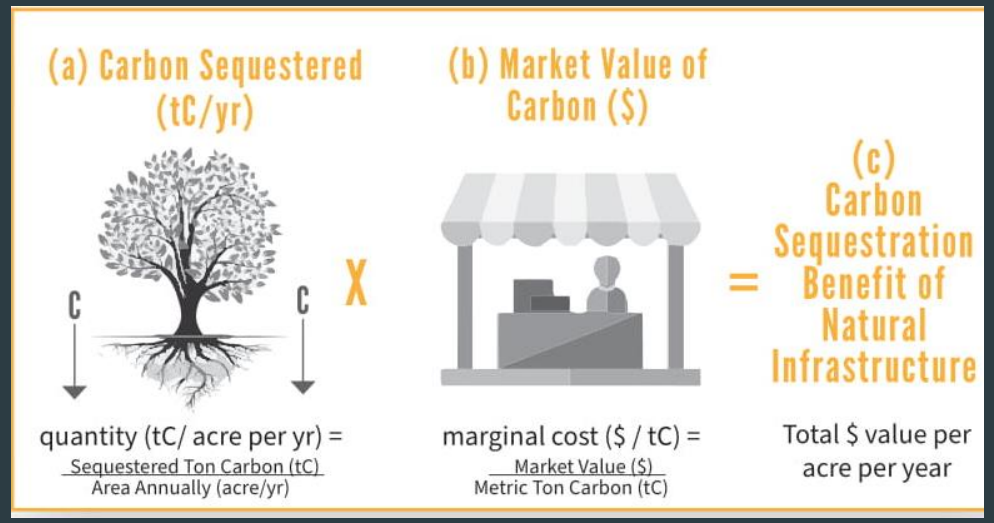

TABLE 4: TOTAL ANNUAL VALUE OF CARBON SEQUESTRATION BENEFITS OF SNOQUALMIE FORESTS

Ownership Type	Acres by Ownership	Total Carbon Sequestration Value Low($/yr)	Total Carbon Sequestration Value High ($/yr)
Public w/ ROW	1,300	$45,819.72	$81,213.42
Private	1,365	$45,380.75	$57,456.80
Total	2,665	$91,200	$138,670

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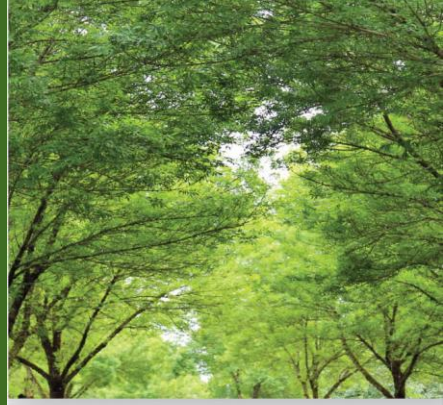
CITY OF SNOQUALMIE

Future Stewardship & Opportunities

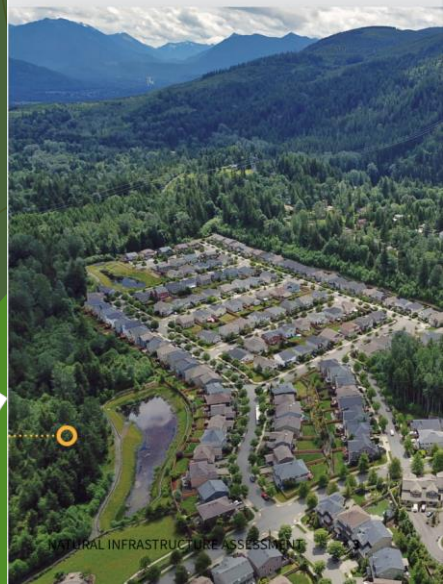
- Recognize the value of your natural infrastructure & capture that value
  - Implement policy
  - Develop funding mechanisms

- Future Stewardship & Opportunities for the City
  - ***TOP PRIORITY*** *- Apply future stormwater fee funding to the City Urban Forestry Program*
  - **Investigate & Develop opportunities for**
    - **City Forest Credits**
    - **Valuing additional ecosystem services - recreation & tourism**



WHEN ACCOUNTING FOR ECOSYSTEM SERVICES VALUE RESULTS SHOW THAT PUBLIC FORESTS IN THE CITY OF SNOQUALMIE GENERATE

$158M TO $195M OVER 50 YEARS



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CITY OF SNOQUALMIE

Thank You!

- City of Snoqualmie staff & leadership
  - Phil Bennett, Nicole Sanders, Jeff Hamlin, Brendon Ecker
- King Conservation District
  - Mike Lasecki
- Equilibrium Economics & Ecosystem Sciences
- Additional contributors
  - King County
  - City Forest Credits
  - Northwest Hydraulic Consultants

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KCD King Conservation District

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