An aerial photograph of a large, deep blue lake with several forested islands. The surrounding land is covered in dense forest with some autumn-colored trees. In the far distance, a range of mountains is visible under a clear blue sky.

# The Sebago Watershed: Alternative Conservation Pathways

Spencer Meyer  
Malia Carpio  
Paul Hunt  
Marcy Lyman

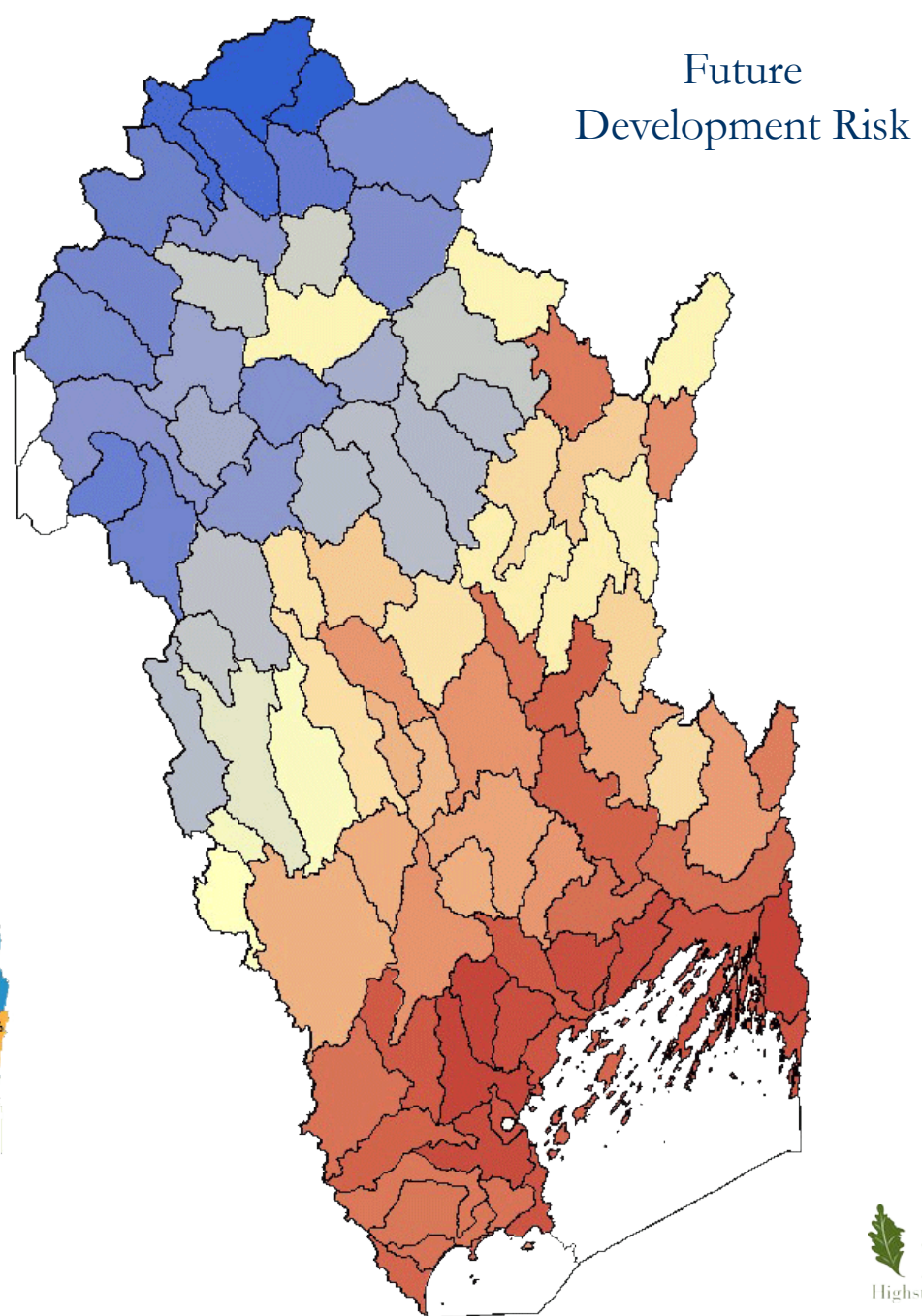
ACES Conservation Finance Track  
December 6, 2016  
Jacksonville, FL



# Portland Water District



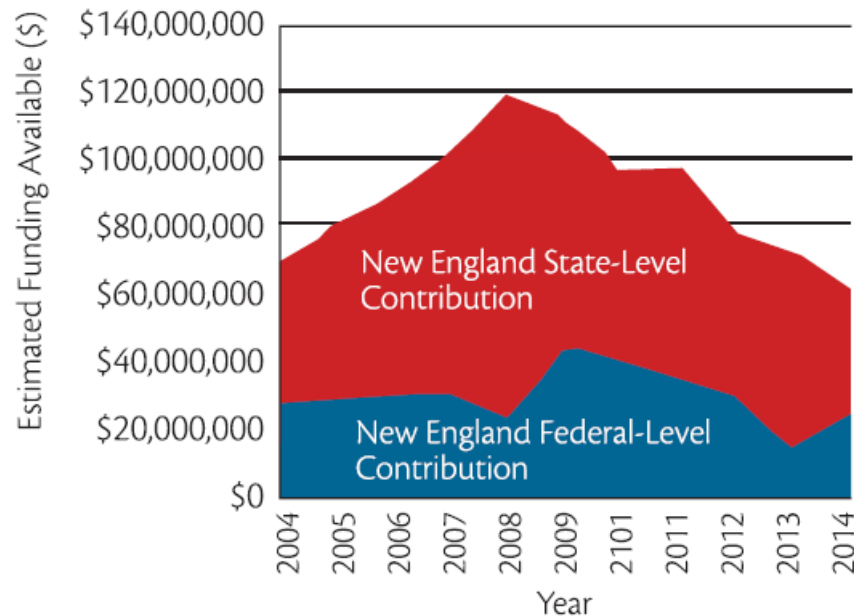
- Drinking water since 1908
- 22 Million gal/day
- 200,000 consumers in 11 communities
- Sebago Lake is source
- ~280,000 ac watershed
- One of ~50 unfiltered water systems in U.S.



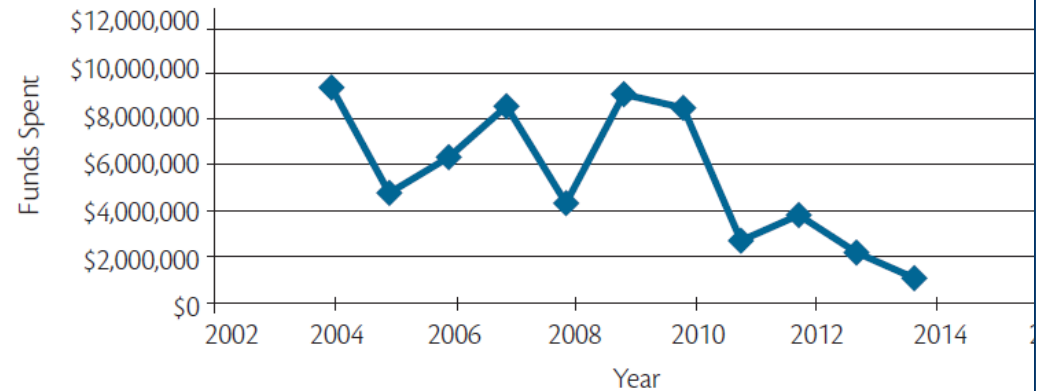


# Recent Public Funding Trends

**Estimated Combined Federal and State Conservation Funding in New England, 2004-2014**



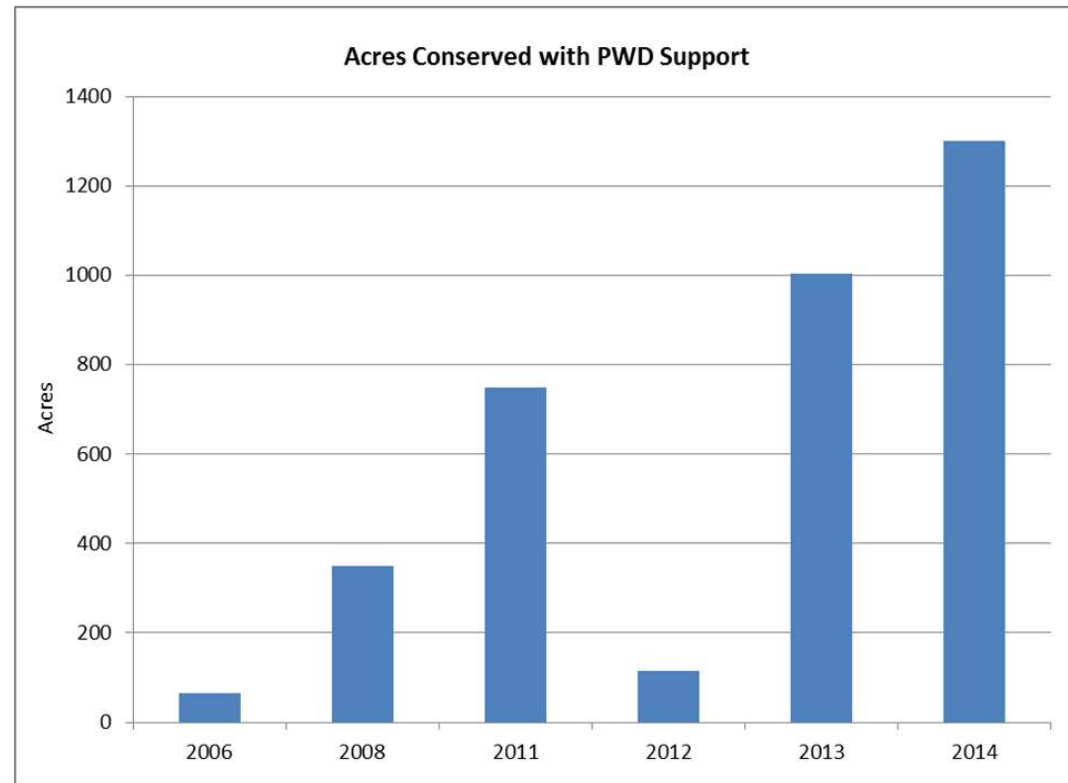
**Land for Maine's Future Conservation Spending, 2004-2014**



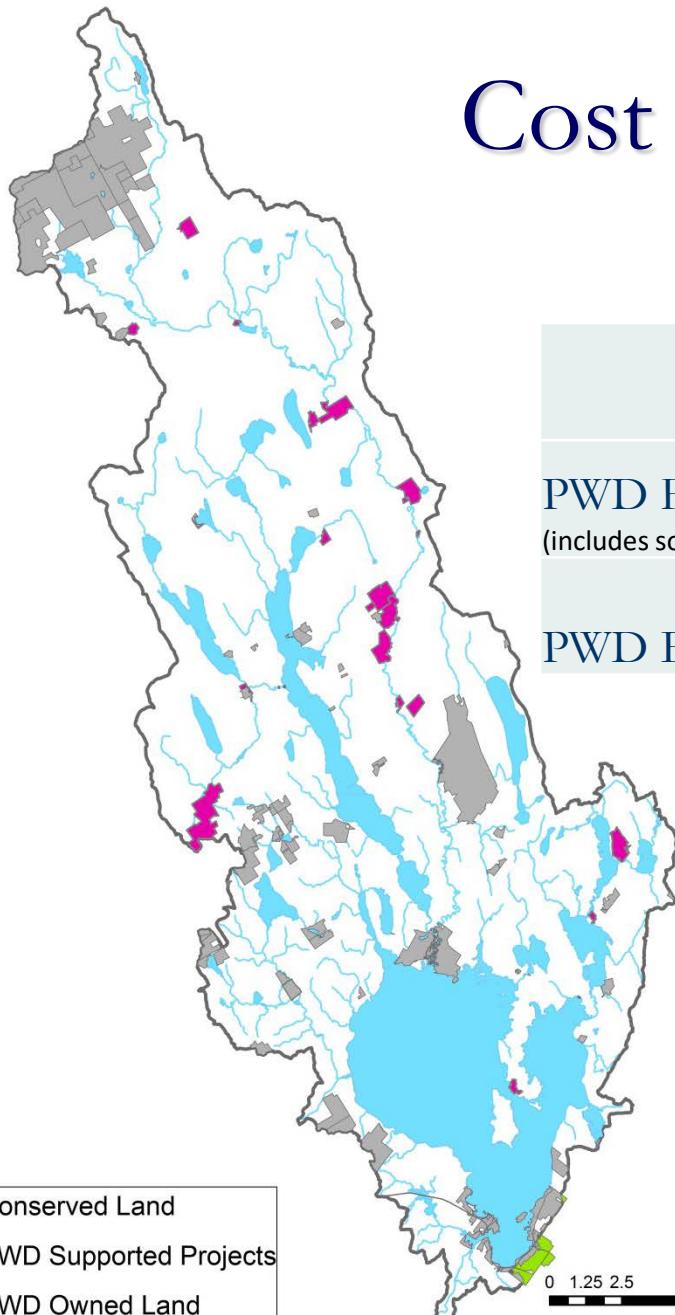
# Portland Water District Watershed Land Conservation Initiative



- Began in 2007, informally
- Created formal program in 2013
- PWD will fund up to 25% of conservation transactions
- Projected ~ \$6M over next 25 years
- Works primarily with two local land trusts
- 18 total projects, ~4,000 ac



# Cost of Protection



	Acres	Appraised value/ac	PWD cost/ac	Leverage
PWD Fee-owned Lands (includes some donations and swaps)	52	\$ 607,363	\$ 57,440	10.6 x
PWD Easement Grants	4,056	\$ 1,660	\$ 126	13.2 x

# New Capital Needed to Match PWD's 25%

- Total cost of easements to reach 15% protected:
  - \$7.9 million
- Total cost of easements to reach 25% protected:
  - \$23.6 million

## More Focused Capital Needed

- 10% of transactions previously identified as PWD water priorities
- Average Conservation Priority Index score: 4.7/10
- PWD match is ~10% on average



# Use Ecosystem Services Models to Identify Conservation Value Propositions

- InVEST Models
  - Carbon storage
  - Water yield
  - Nutrient Retention
  - Sediment Retention
  - Managed Timber
- Locally Derived
  - Conservation Priorities
  - Development risk
- State wildlife action plan



## Four Scenarios

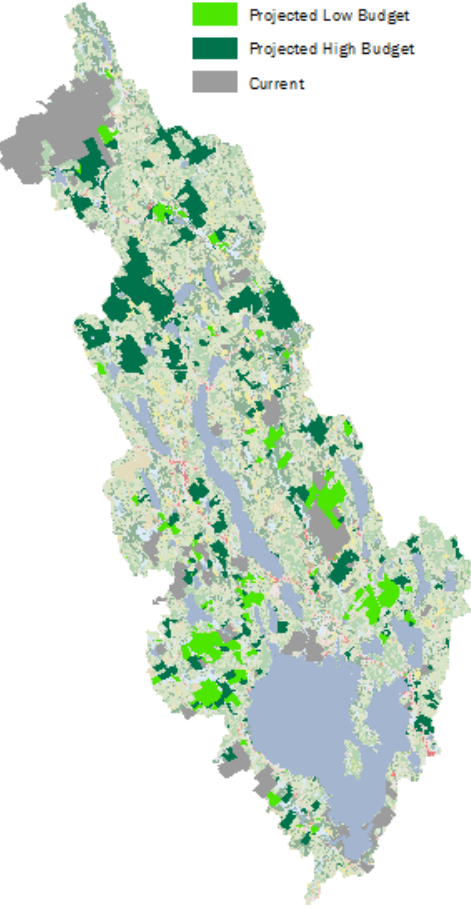
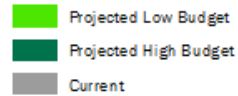
1. Baseline
  - Recent trends with broad conservation objectives
2. Water Quality Focus
  - Nitrogen/Phosphorus retention
  - Sediment retention
  - Water yield
3. Biodiversity Focus
  - State wildlife habitat focus areas
  - TNC Climate Resilience
4. Large Landscape Focus
  - Timber parcels > 500 acres with better than avg. NPV; AND
  - Water quality, habitat, TNC Climate Resilience (at least 1)





# Alternative Conservation Strategies

## Trend



## Low Budget:

50% increase for 12,000 new ac  
Yields 14% protected after 30 years

## High Budget:

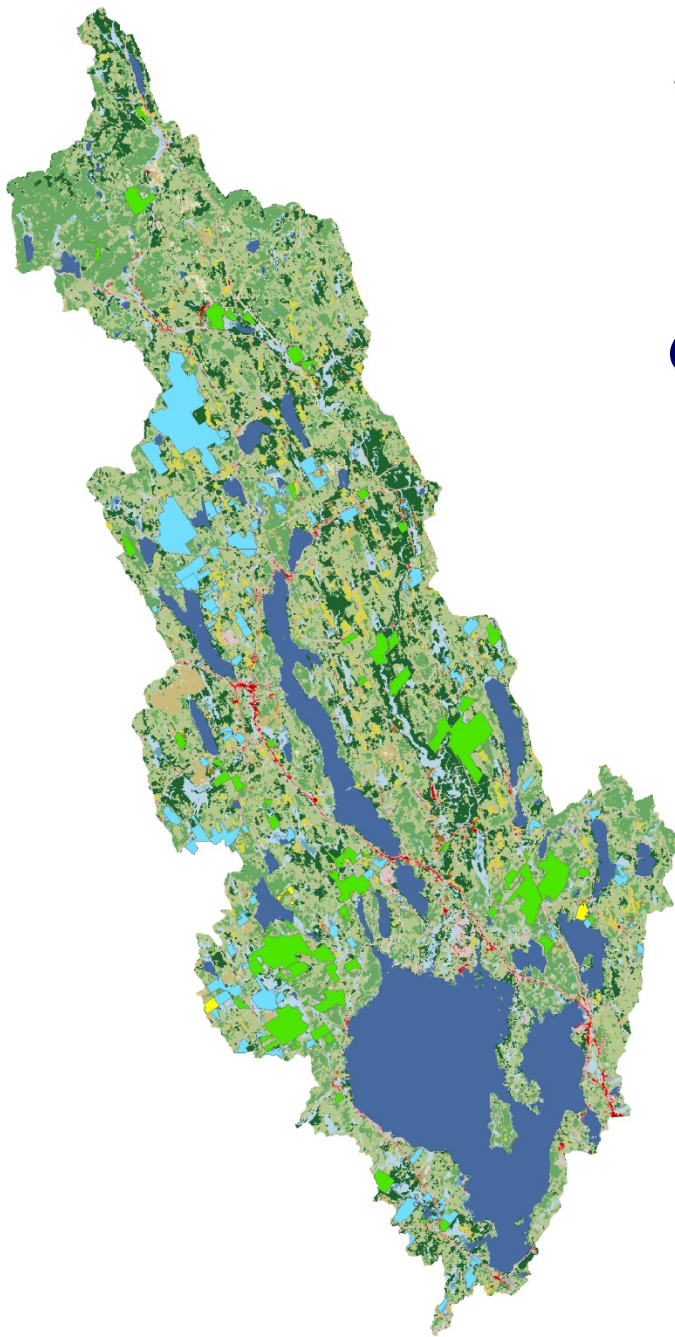
150% increase for 36,000 new ac  
Yields ~25% protected after 30 years



# Not all protection scenarios capture highest value water ecosystem services very well under limited budget.

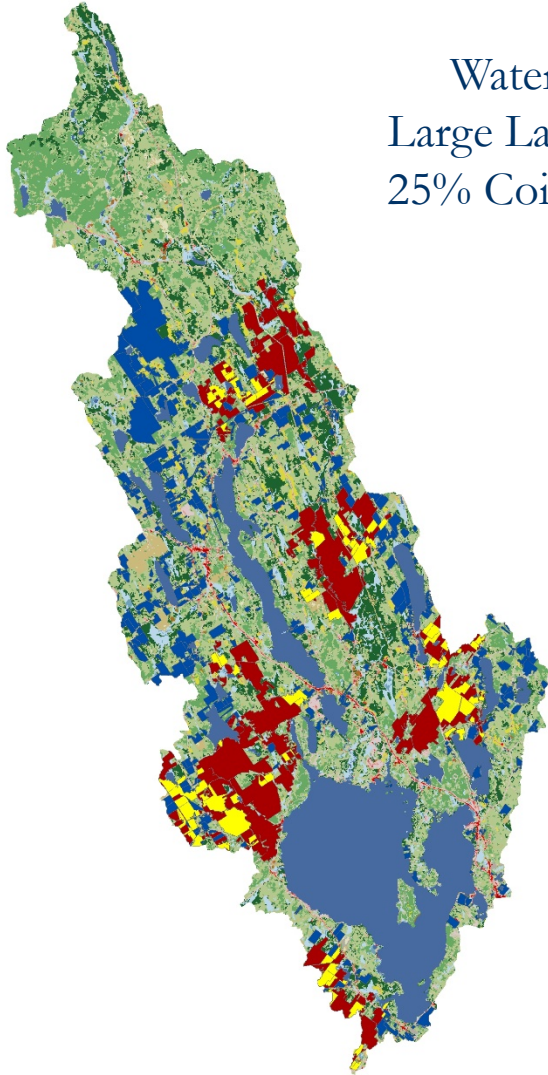
- Only 3% overlap (yellow to left) between current trends and water-focused scenarios
- Biodiversity-focused scenario protected lands with 8-16% less nitrogen and 15-27% less phosphorous retention than other scenarios
- Water yield, carbon storage, and timber production results were similar

(Caveat: unprotected lands don't necessarily get developed)

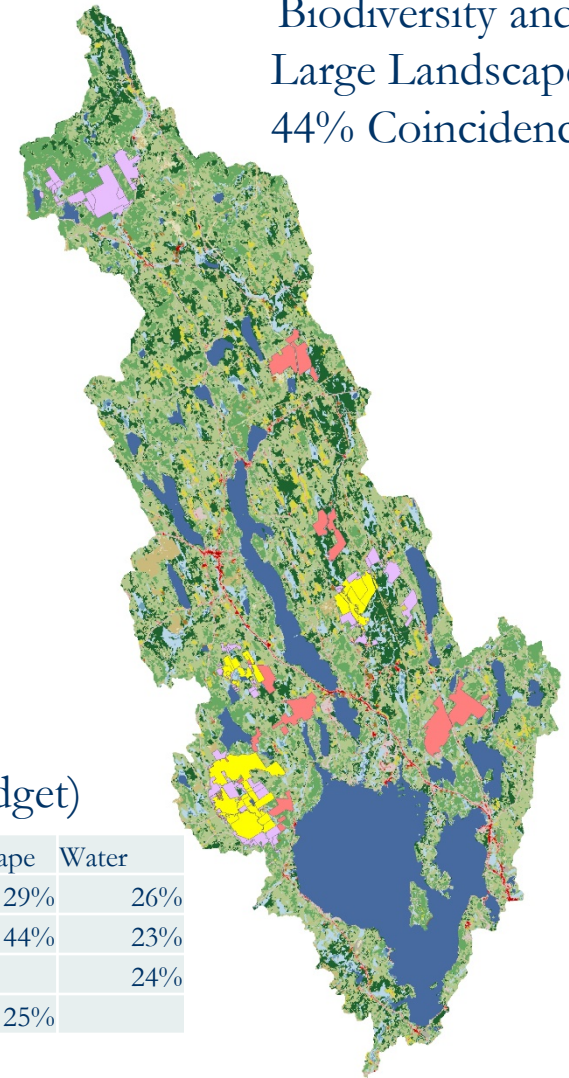


# Comparing Alternatives With High Budget

Water and  
Large Landscape:  
25% Coincidence



Biodiversity and  
Large Landscape:  
44% Coincidence

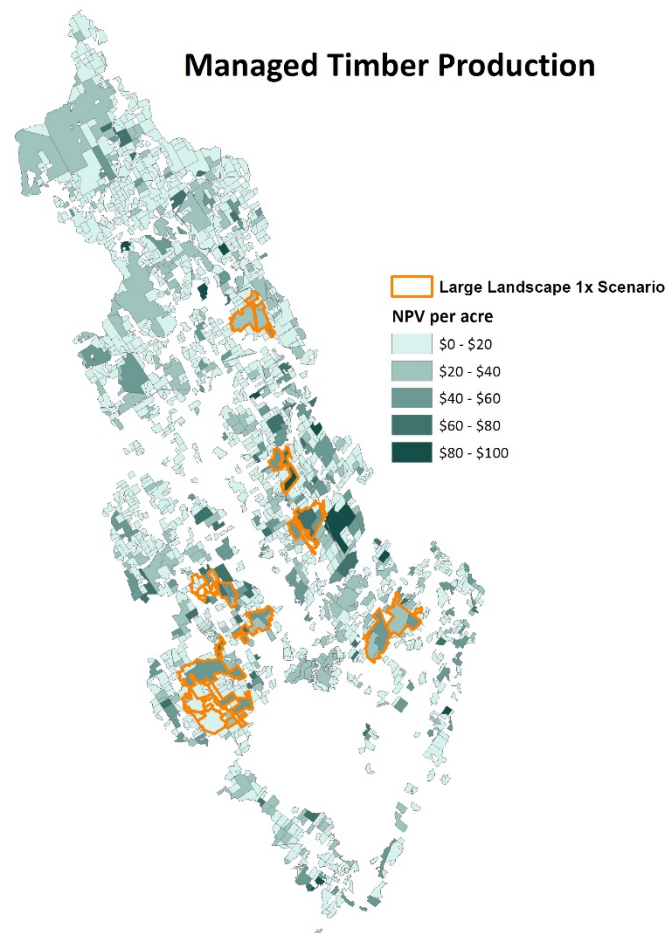
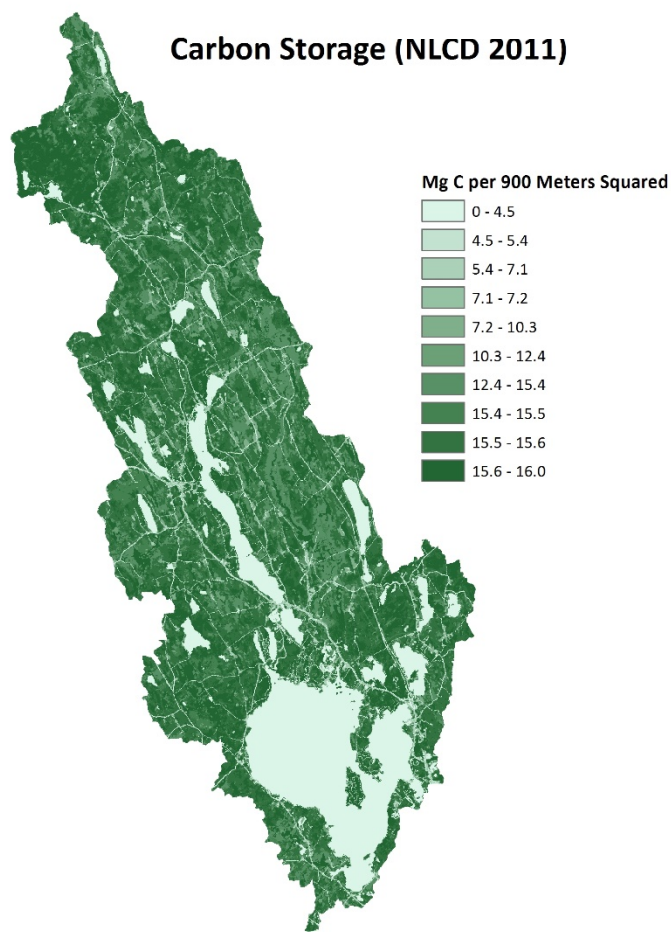


Coincidence Matrix (High Budget)

	Trend	Biodiversity	Large Landscape	Water
Trend		47%	29%	26%
Biodiversity	47%		44%	23%
Large Landscape	30%	44%		24%
Water	27%	24%	25%	



# Identify Revenue Potential with Conservation Co-Benefits



# Closing Thoughts

- Traditional sources of funding declining, so new sources of watershed investment needed.
- Land trusts seek more capacity to link willing landowners with fundable conservation projects that can attract more financing.
- Utility seeks accelerated protection, with others sharing the cost.
- With lower investment, targeted water protection more important
- Investable opportunities for right stack of philanthropic and investment capital.
- Partnership emerging to:
  - 1. Develop business case for watershed investments
  - 2. Create water fund based on water quality protection and co-benefits

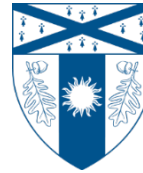


Highstead

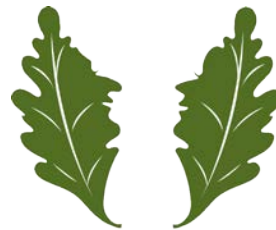
# Thanks to Many Collaborators



Portland  
Water  
District



Yale SCHOOL OF FORESTRY &  
ENVIRONMENTAL STUDIES



Highstead



The Nature  
Conservancy   
Protecting nature. Preserving life.\*



OPEN SPACE  
INSTITUTE



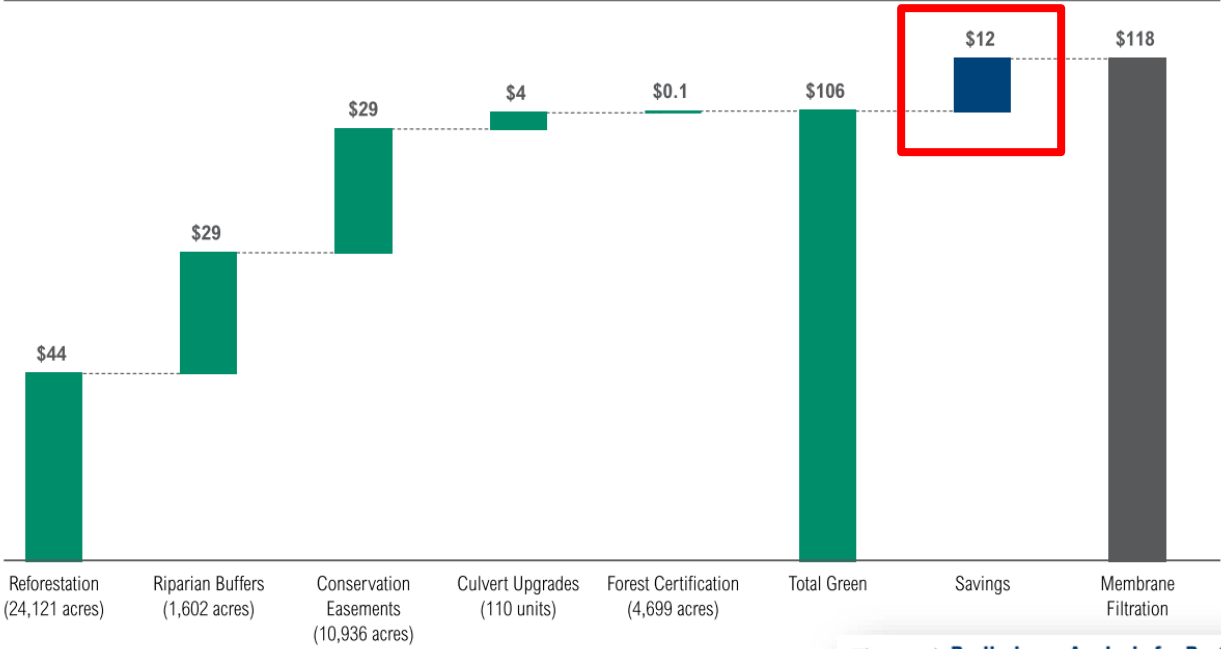
Western Foothills Land Trust



Cover aerial photo credit:  
Portland Water District



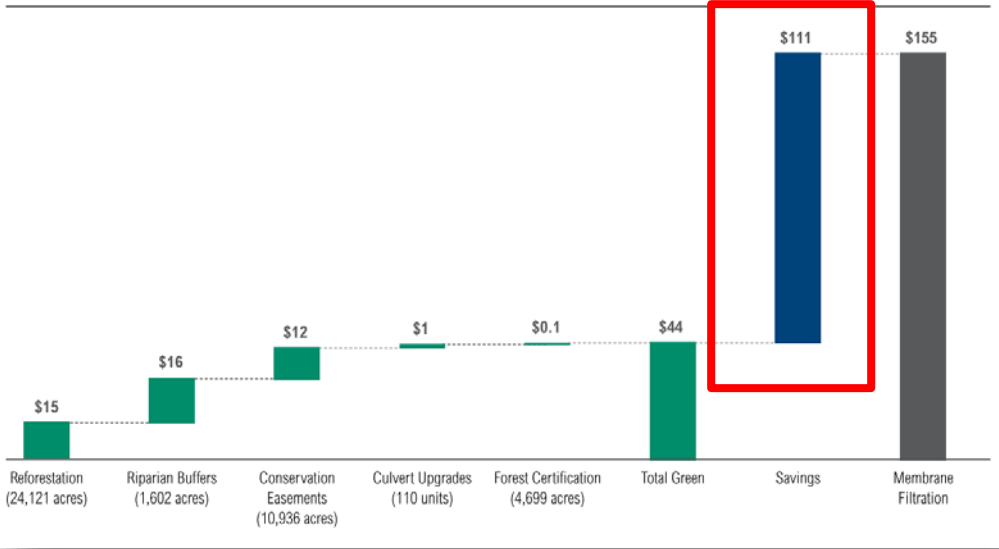
Figure 2 | Preliminary Analysis for Portland, Maine—Baseline Scenario (\$ millions)



Natural  
Infrastructure  
Savings

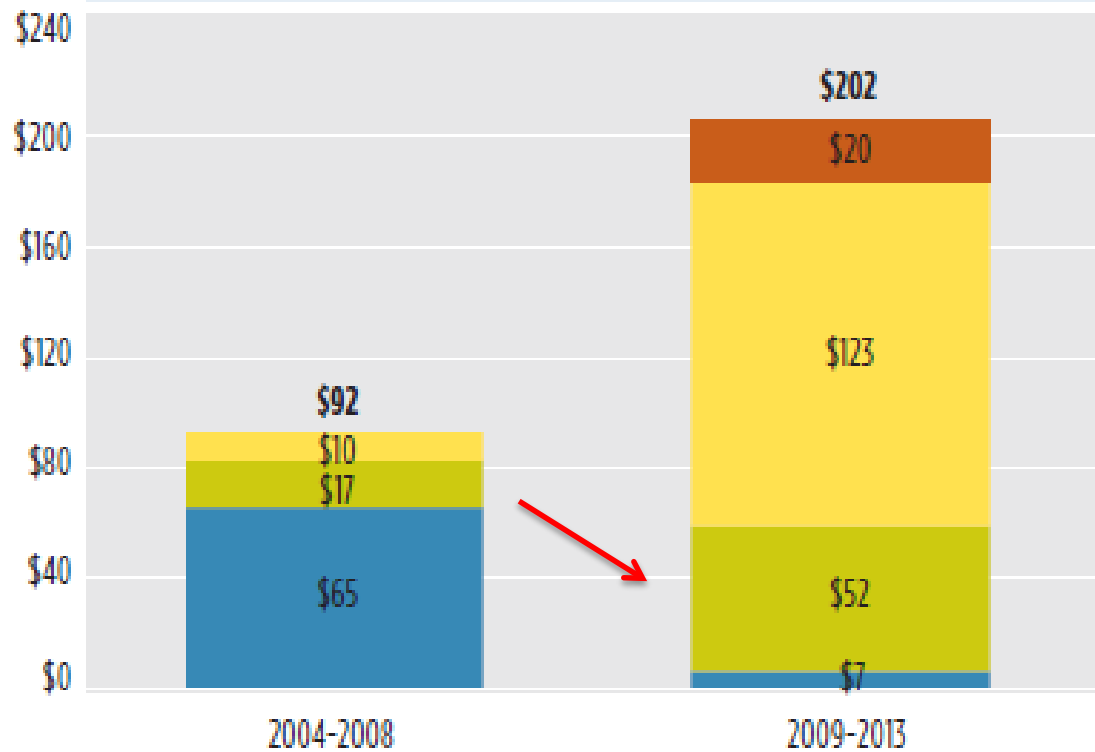


Figure 3 | Preliminary Analysis for Portland, Maine—Optimistic Scenario (\$ millions)



# Investors Protecting Water

Figure 7: Private committed capital by subsector, 2004-2008 vs. 2009-2013 – Water quantity & quality conservation (\$ millions)



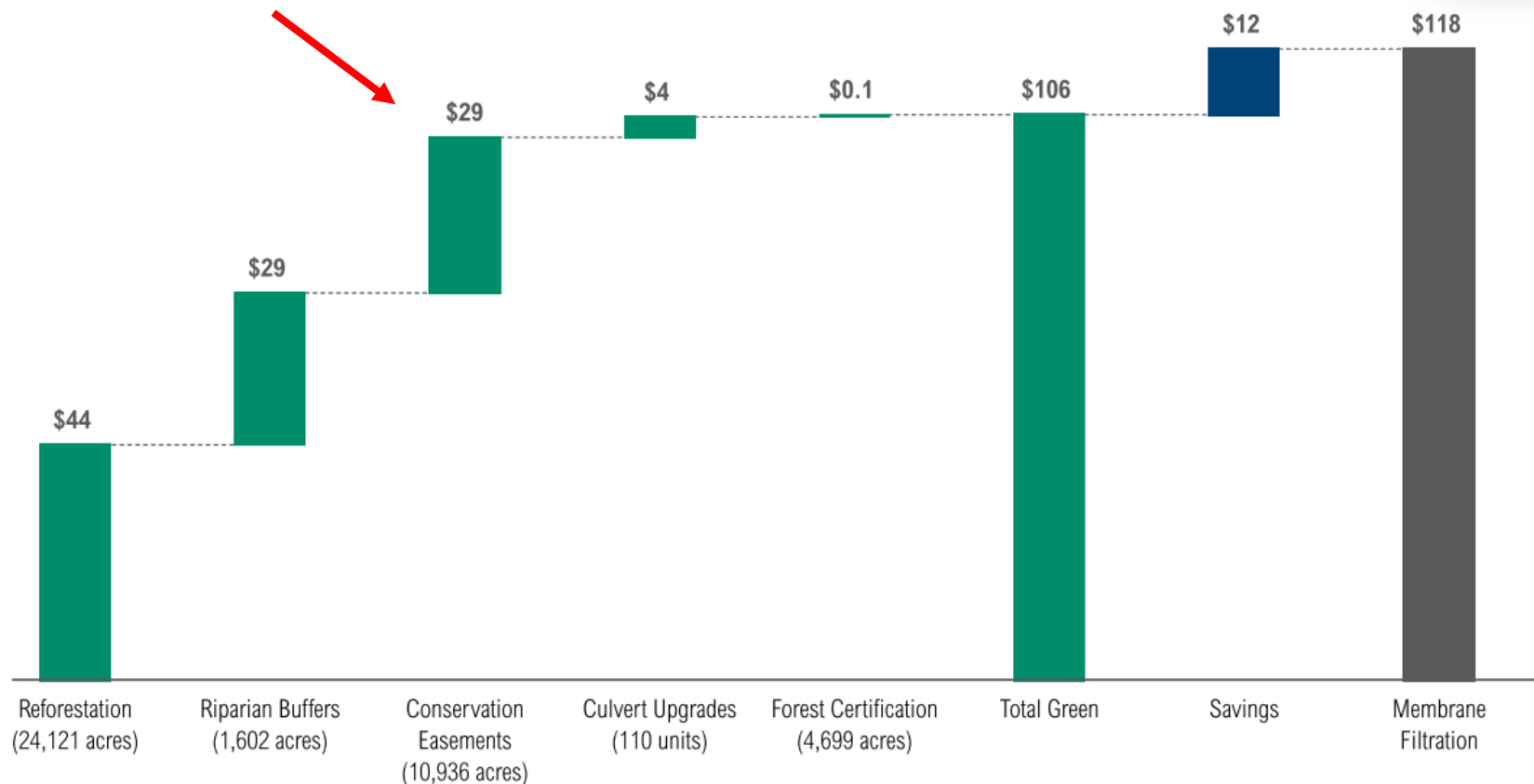
- Water credits trading (e.g., water temperature, quality)
- Water rights trading
- Watershed protection
- Other\*

(TNC, EKO, 2014)

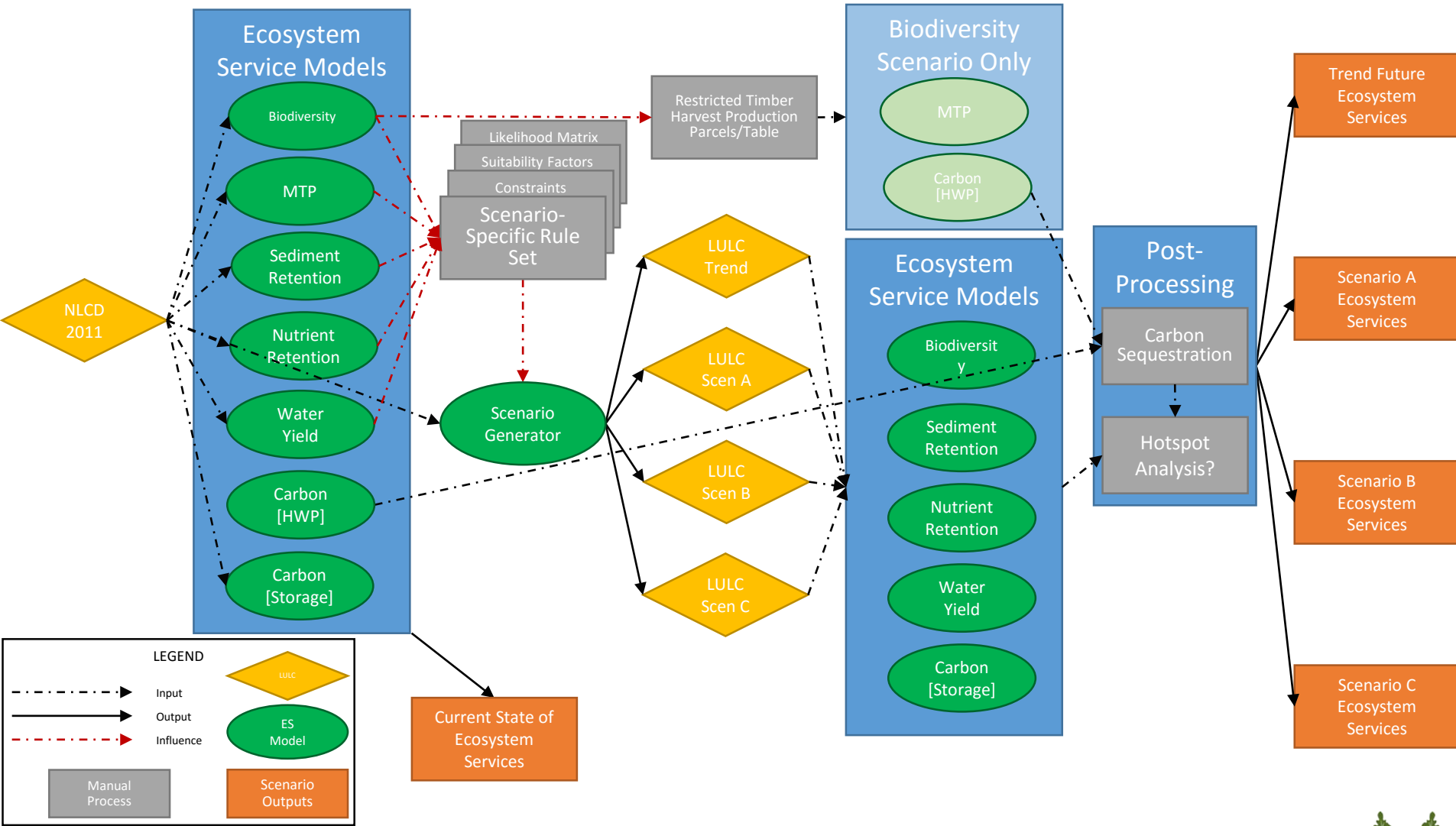
# Value of Protection



Figure 2 | **Preliminary Analysis for Portland, Maine—Baseline Scenario (\$ millions)**







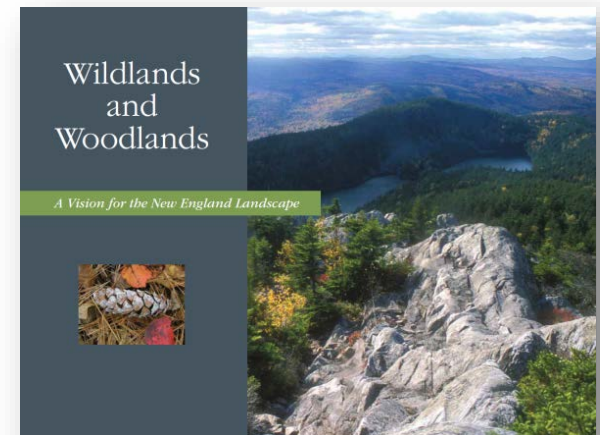
# Scenario Assumptions

- Based on protection trends over last 30 years and development patterns over 10 years.
- Watershed is ~9% protected now (24,000 ac)
- Low Budget scenario
  - 50% increase for 12,000 new ac
  - Yields 14% protected after 30 years
- High Budget scenario
  - 150% increase for 36,000 new ac
  - Yields ~25% protected after 30 years
- Monte Carlo land protection simulations (1,000x)
- 30-year projections with development and forest management-driven land cover change



# Wildlands and Woodlands Initiative

- Protect 70% of New England's forests by 2060
- As of 2015: 9.4 million acres protected (26%)
- 2004-2014 public funding
  - \$973 million of public funding was spent towards protecting 1.4 million ac  
(plus lots of unknown private money)
- Since 1990, average of about 2 new areas protected per day



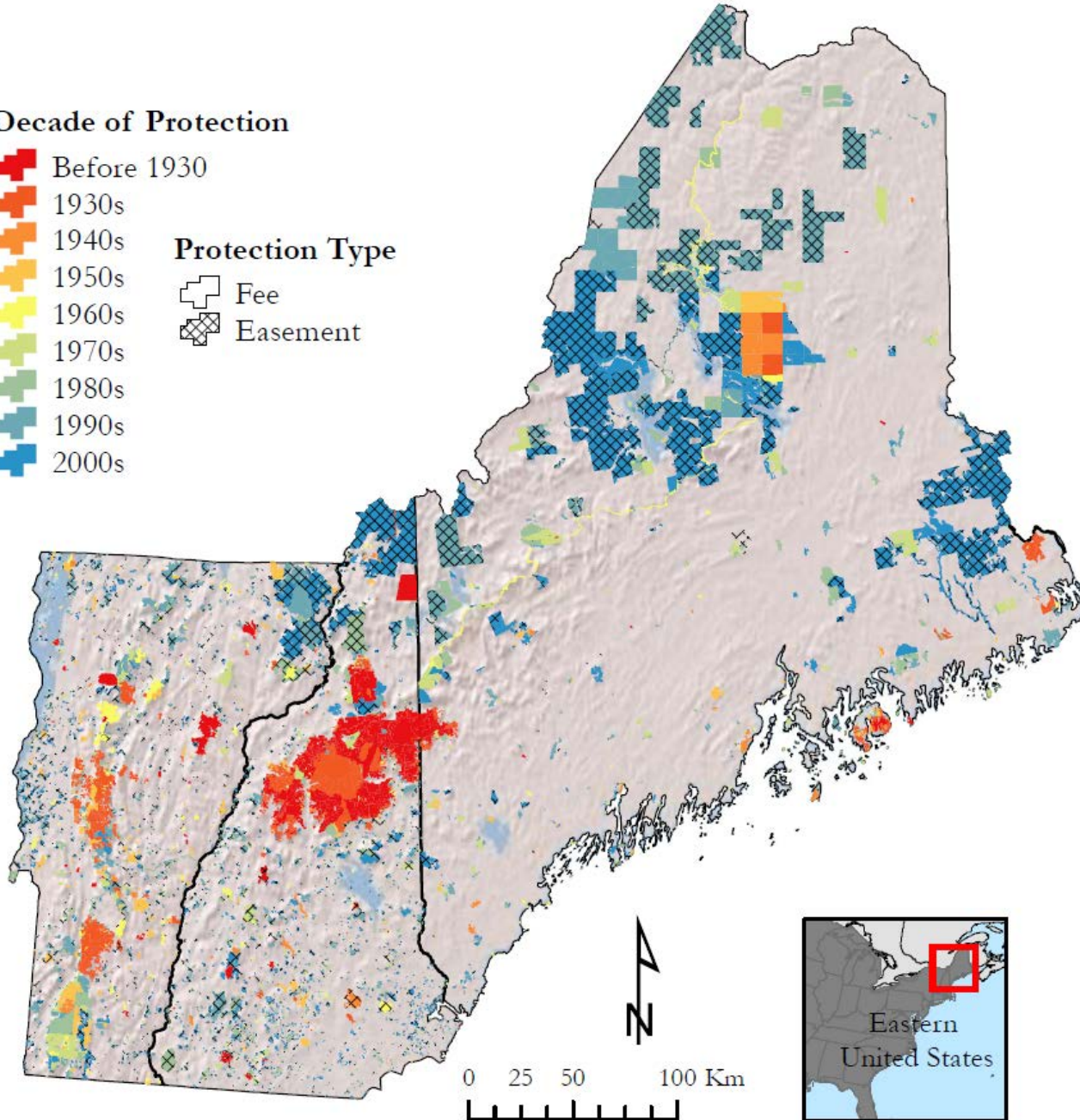


## Decade of Protection

- Before 1930
- 1930s
- 1940s
- 1950s
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s

## Protection Type

- Fee
- Easement



**Watershed Name**

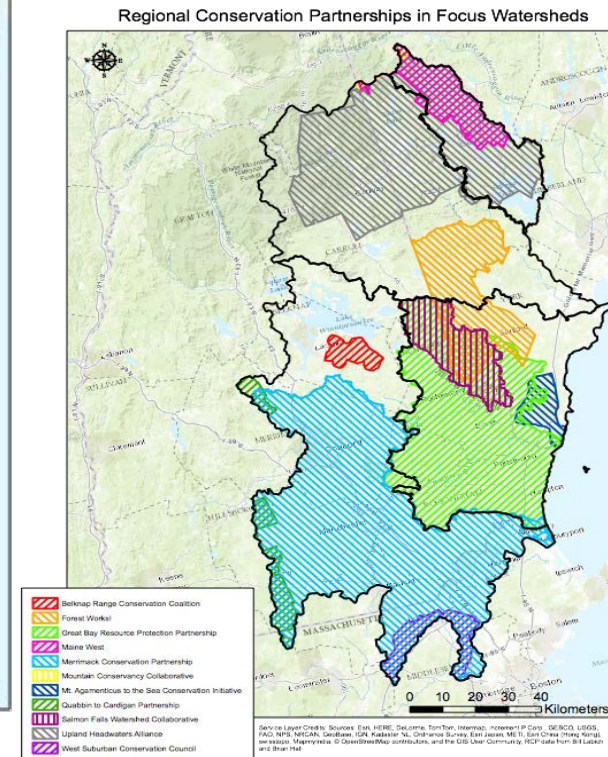
Watershed Name	% of Land Protected from Development
Merrimack	15.0
Piscataqua-Salmon Falls	13.1
Saco	34.7
Sebago Lake	8.5*

**Index of Forest Importance to Drinking Water**

0-1000 1000-2000 2000-3000 3000-4000 4000-5000 5000-6000 6000-7000 7000-8000 8000-9000 9000-10000

Protected Open Space

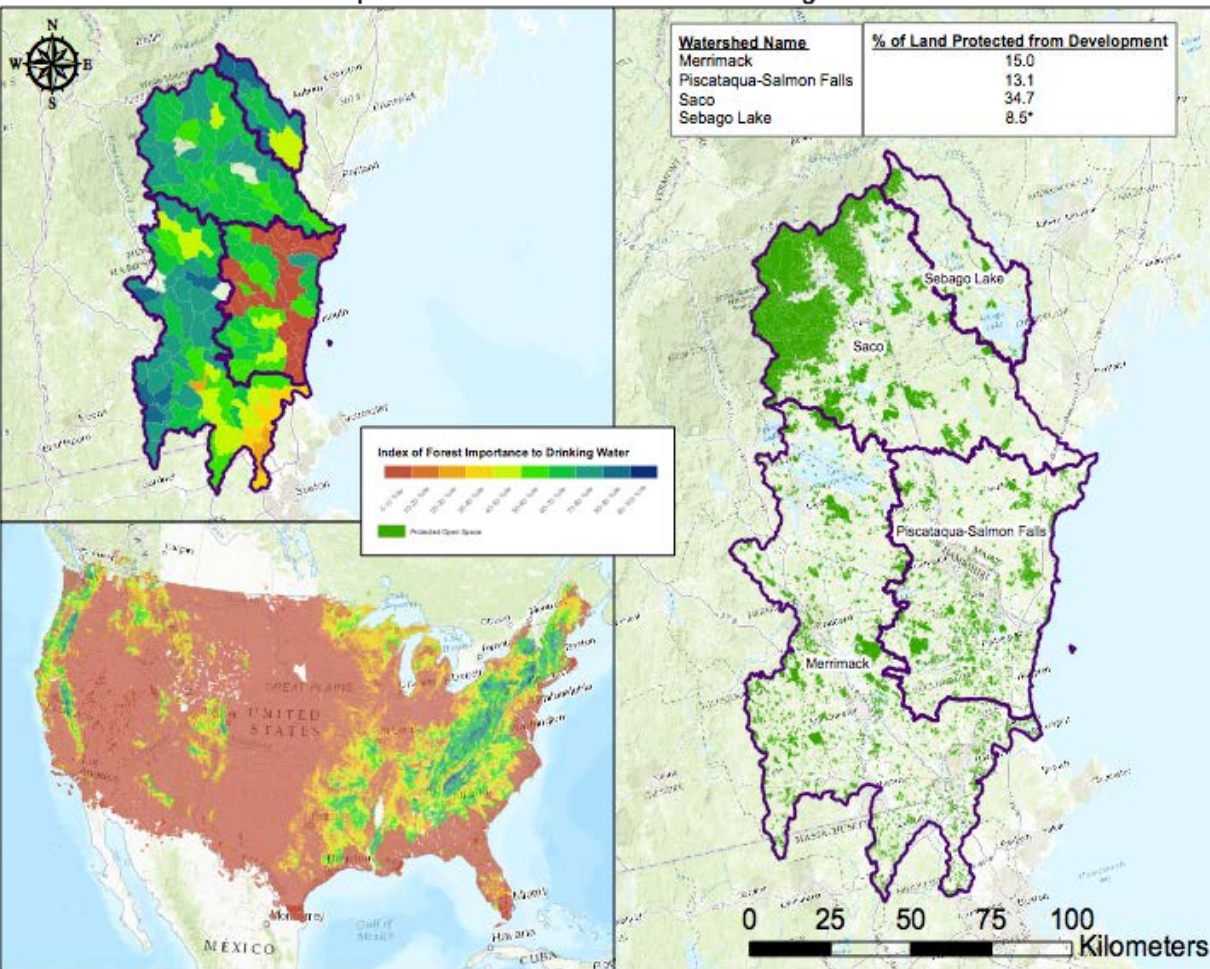
0 25 50 75 100 Kilometers



	Presumpscot	Saco	Piscataqua/ Salmon Falls	Merrimack
Impervious Surface	7.0%	1.2%	4.2%	7.3%
Developed	6.8%	5.5%	14.5%	19.6%
Conserved	8.5%	34.7%	13.1%	15.0%



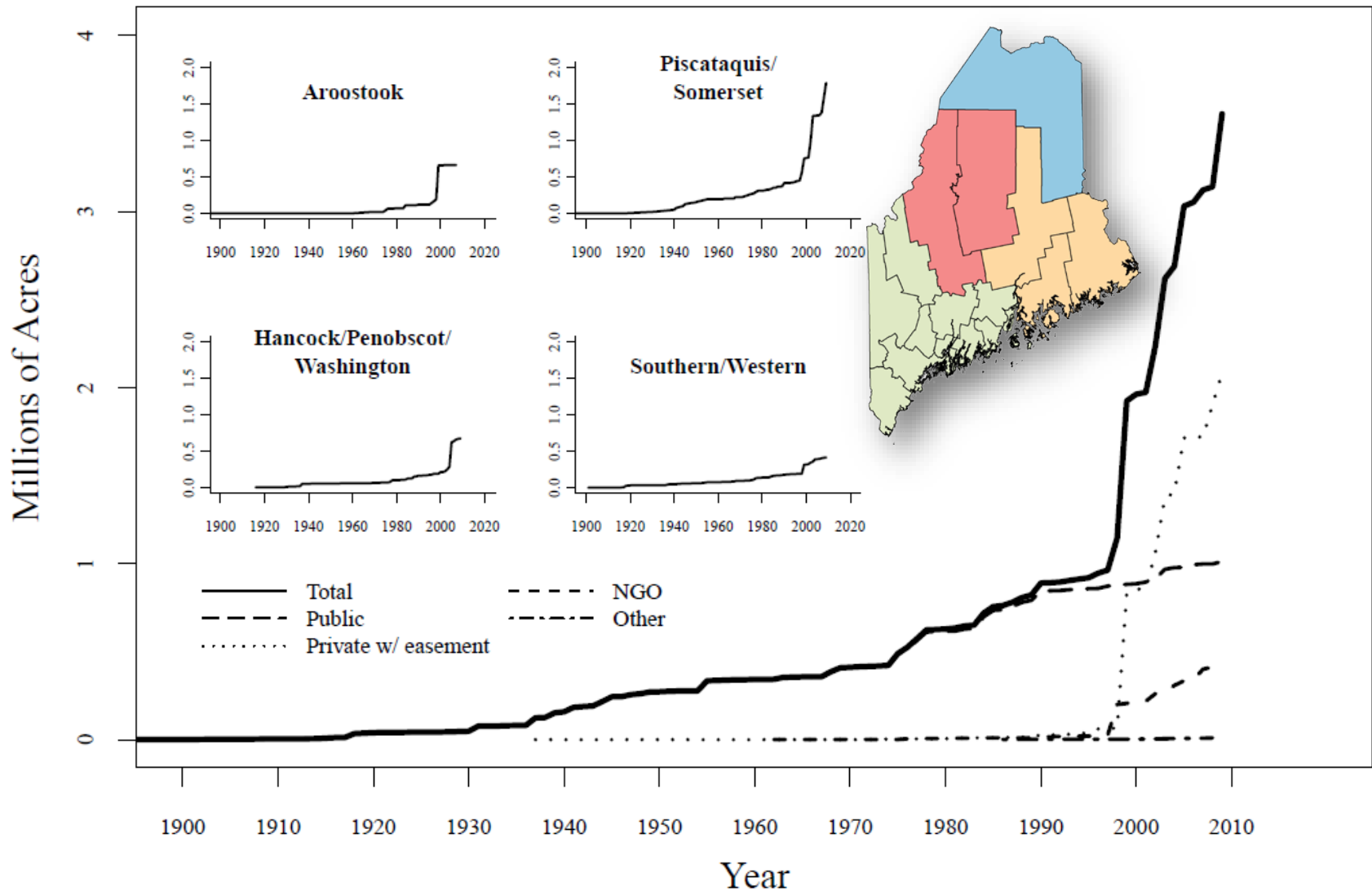
# Water Fund of Funds?



- Downstream water users rely on upstream producers: forest landowners
- Where are water utilities and conservation NGOs working together?
- Identified existing funding sources in these watersheds
- Identified conservation partners in each
- Identified existing funding sources in each
- Now identifying large water users in each (breweries, industrial, etc.)



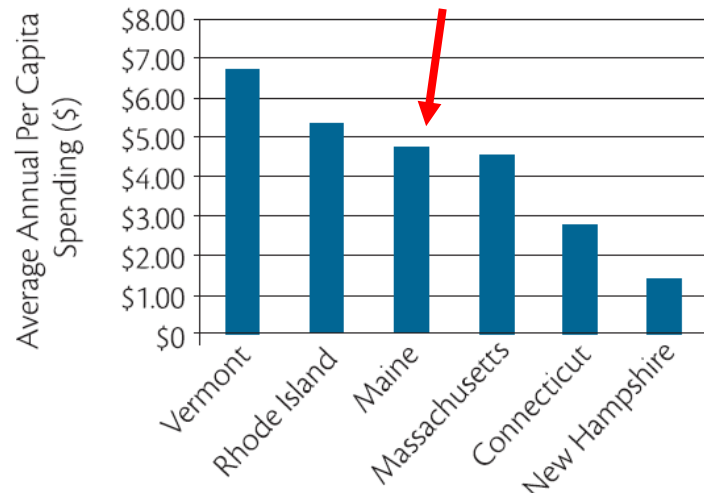
# Maine Protected Areas 1900-2010



*Excludes missing data for ~9% of acres.*



### Estimated Per Capita State-Level Conservation Spending in New England States, 2004-2014



### Land for Maine's Future Conservation Spending, 2004-2014

