

# Governor-Elect's Policy Objectives Related to Economic Development and Environment

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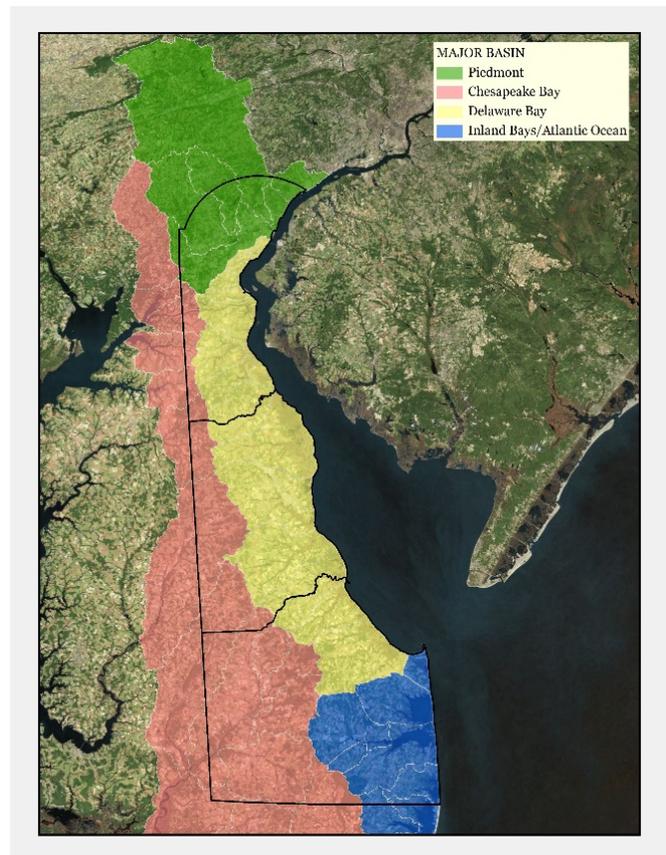
## Introduction

With the national election progressive states like Delaware will need to thrive (now more than ever) on thoughtful economic policies that depend on a clean environment. Fortuitous by geography and surrounded by water along the Eastern Seaboard, peninsular Delaware is rich in natural resources and habitat. This white paper recommends that the Governor-elect transition team focus on economic and work force development policies that depend on Delaware's most precious natural resource – water.

Although the second smallest state, Delaware has valuable water resources—25 miles of ocean coastline, 841 square miles of bay, 2,509 miles of rivers and streams, and 2,934 acres of lakes and ponds. The water, natural resources, and ecosystems contained in Delaware's watersheds are a valuable economic resource to the First State. Delaware is indeed a Water State.

Delaware's water supplies and natural resources constitute a substantial economic engine that contributes up to \$7 billion to the regional economy and supports more than 70,000 jobs with over \$2 billion in wages. The natural resources of Delaware's watersheds provide real economic benefits to the state and are worthy of investment in jobs to keep them healthy and productive. Delaware's watersheds provide significant economic value to the state and surrounding region in three distinct ways:

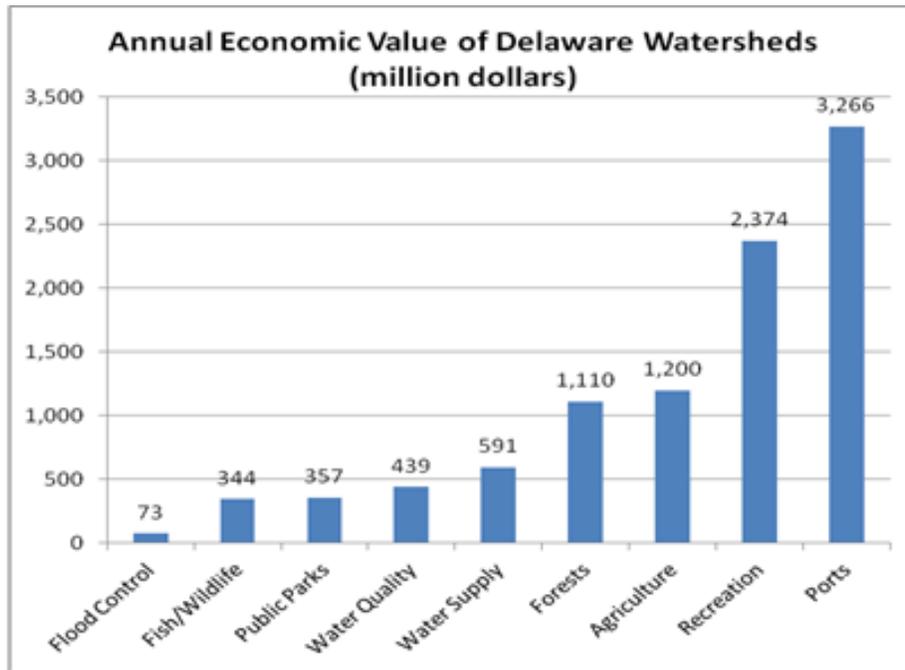
- **Economic value directly related to Delaware's water resources and habitats** – Delaware watersheds contribute over \$6 billion in annual economic activity from water quality, flood control, water supply, fishing and wildlife viewing, recreation, agriculture, ports, forests, and parks.
- **Value of the goods and services provided by Delaware's ecosystems** - Using ecosystem goods and services as a measure of value, Delaware ecosystems provide \$6.7 billion annually in goods and services in 2010 dollars, with a net present value of \$216.6 billion calculated over a 100-year period.
- **Employment related to Delaware's water resources and habitats** - Delaware's water resources and habitat directly and indirectly support over 70,000 jobs with over \$2 billion in wages annually. This does not include the thousands of jobs in companies and industries that rely on Delaware's waters for industrial and commercial processes nor does this include Federal/state income taxes from these jobs.



## Annual Economic Value

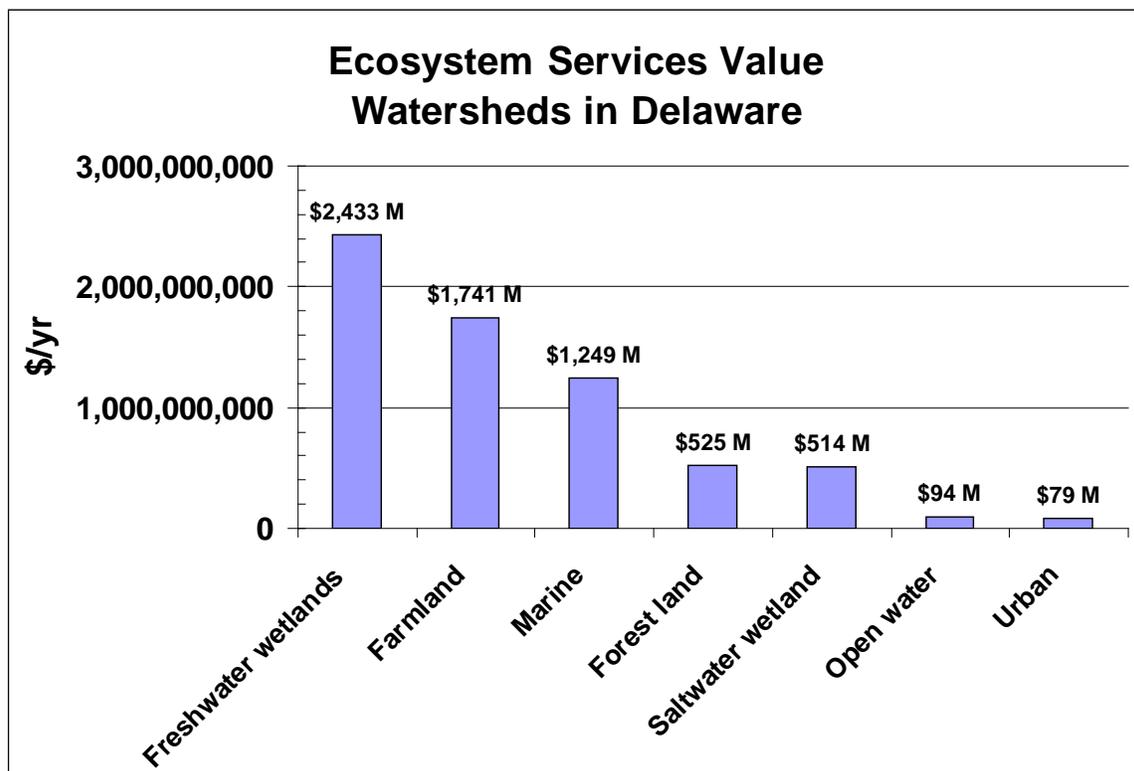
The economic value of Delaware watersheds is over \$6 billion in annual market and non-market value. Market value is determined by the sale/purchase of watershed goods, such as drinking water, fish, hunting supplies or powerboats. Non-market value is provided by ecosystems, such as pollution removal by forests, public willingness to pay for improved water quality, forest carbon-storage benefits, and health benefits of parks.

<b>Annual Economic Value of Delaware Watersheds</b>	<b>\$ mil</b>
<b>Water Quality</b>	
Increased Property Value (+6% over 20 years)	39
Water Treatment by Forests (\$41/mgd)	2
Wastewater Treatment	245
<b>Flood Control Benefits</b>	
Stormwater Detention (+2-5%)	105
<b>Water Supply</b>	
Drinking Water Supply (\$4.78/1,000 gallons)	518
Irrigation Water Supply (\$300/acre-foot)	24
Thermoelectric Power Water Supply (\$44/acre-foot)	41
Industrial Water Supply (\$200/acre-foot)	9
<b>Fish/Wildlife</b>	
Wetlands	6
National Wildlife Refuges	20
Commercial Fish Landings (\$0.60/lb)	9
Fishing (11-18 trips/angler, \$17-\$53/trip)	109
Hunting (16 trips/hunter, \$16-50/trip)	46
Wildlife/Bird-watching (8-13 trips/yr, \$15-\$27/trip)	147
<b>Recreation</b>	
Tourism	1,900
Power-Boating	344
<b>Agriculture</b>	
Crop, poultry, livestock value (\$1,800/acre)	1,200
<b>Ports</b>	
Navigation (\$15/acre-foot)	66
Port Activity	3,200
<b>Recreation</b>	
Swimming (\$13.40/trip)	1
Boating (\$30/trip)	6
Fishing (\$62.79/trip)	56
Wildlife/Bird watching (\$77.73/trip)	67
<b>Water Quality</b>	
Improved Stream Water Quality/Willingness to Pay	153
<b>Forests</b>	
Carbon Storage (\$827/acre)	220
Carbon Sequestration (\$29/acre)	8
Air-Pollution Removal (\$266/acre)	71
Building Energy Savings (\$56/acre)	15
Avoided Carbon Emissions (\$3/acre)	796
<b>Public Parks</b>	
Health Benefits (\$9,734/acre)	265
Community Cohesion (\$2,383/acre)	65
Stormwater Benefit (\$921/acre)	25
Air-Pollution Control (\$88/acre)	2
<b>Total</b>	<b>\$6.7 billion</b>



### Ecosystem Services

Ecosystem goods are benefits provided by the sale of watershed products, such as drinking water and fish. Ecosystem services are economic benefits provided to society by nature, such as water filtration, flood reduction, and carbon storage. The value of natural goods and services from ecosystems in Delaware watersheds is \$6.7 billion (in 2010 dollars) with net present value (NPV) of \$216.6 billion, using a discount rate of 3 percent over 100 years (Table E2).



<b>Ecosystem</b>	<b>Area (acres)</b>	<b>\$/acre/year 2010</b>	<b>\$/year 2010</b>	<b>NPV \$</b>
Freshwater wetlands	178,632	13,621	2,433,081,000	79,075,132,489
Marine	124,879	10,006	1,249,541,955	40,610,113,531
Farmland	590,150	2,949	1,740,640,688	56,570,822,374
Forest land	265,476	1,978	525,143,567	17,067,165,922
Saltwater wetlands	71,001	7,235	513,691,702	16,694,980,313
Barren land	6,459	0	0	0
Urban	229,827	342	78,511,742	2,551,631,623
Beach/dune	588	48,644	28,579,665	928,839,116
Open water	48,253	1,946	93,891,133	3,051,461,812
<b>Total</b>	<b>1,515,265</b>		<b>6,663,081,452</b>	<b>216,550,147,180</b>

## Jobs and Wages

Delaware watersheds support over 70,000 direct and indirect jobs with over \$2 billion in annual wages in the coastal, farm, ecotourism, watershed-organization, water supply/wastewater, recreation, and port industries (Table 39).

<b>Sector</b>	<b>Jobs</b>	<b>Wages (\$)</b>	<b>Data Source</b>
Direct Watershed-related	18,926	402,000,000	U.S. Bureau of Labor Statistics (2009)
Indirect Watershed-related	22,711	322,000,000	U.S. Census Bureau (2009)
Coastal	15,174	268,000,000	Nat'l Coastal Econ. Program (2009)
Farm	28,328	1,410,000,000	Awokuse et al. (2010)
Fishing/Hunting/Birding	9,248	304,000,000	U.S. Fish and Wildlife Service (2008)
National Wildlife Refuge	198	5,500,000	Carver and Caudill (2007)
Wetlands	584	19,300,000	NOAA Coastal Services Center (2011)
Watershed Organizations	115	5,520,000	WRA and DRBC (2010)
Ports	4,601	307,000,000	Martins Associates (2007))
Tourism	31,050	931,000,000	Delaware Tourism Office (2008)
Water Supply Utilities	275	15,000,000	WRA and DRBC (2010)
Wastewater Utilities	207	9,000,000	WRA and DRBC (2010)

## Recommendations

Develop economic and environmental policies that focus on developing jobs in Delaware's rich port, manufacturing, fish/wildlife/bird watching, marine boating, tourism, and agriculture sectors.