**Executive Summary**

# Socioeconomic Value of the Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania

*The Delaware River Basin, an economic engine for over 400 years*

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# Executive Summary

What do the Guggenheim Museum, New York Yankees, Boeing, Sunoco, Campbell's Soup, DuPont, Wawa, Starbucks, Iron Hill Brewery, Philadelphia Phillies, Camelback Ski Area, Pt. Pleasant Canoe Livery, Salem Nuclear Power Plant, and United States Navy all have in common? They all depend on the waters of the Delaware River Basin to sustain their businesses.

The Delaware River Basin is an economic engine that supplies drinking water to the 1st (New York City) and 7th (Philadelphia) largest metropolitan economies in the United States and supports the largest freshwater port in the world. The Delaware Basin's water supplies, natural resources, and ecosystems in Delaware, New Jersey, New York, Pennsylvania and a small sliver of Maryland:

- Contribute $25 billion in annual economic activity from recreation, water quality, water supply, hunting/fishing, ecotourism, forest, agriculture, open space, potential Marcellus Shale natural gas, and port benefits.

- Provide ecosystem goods and services (natural capital) of $21 billion per year in 2010 dollars with net present value (NPV) of $683 billion discounted over 100 years.

- Are directly/indirectly responsible for 600,000 jobs with $10 billion in annual wages.

**The Basin**

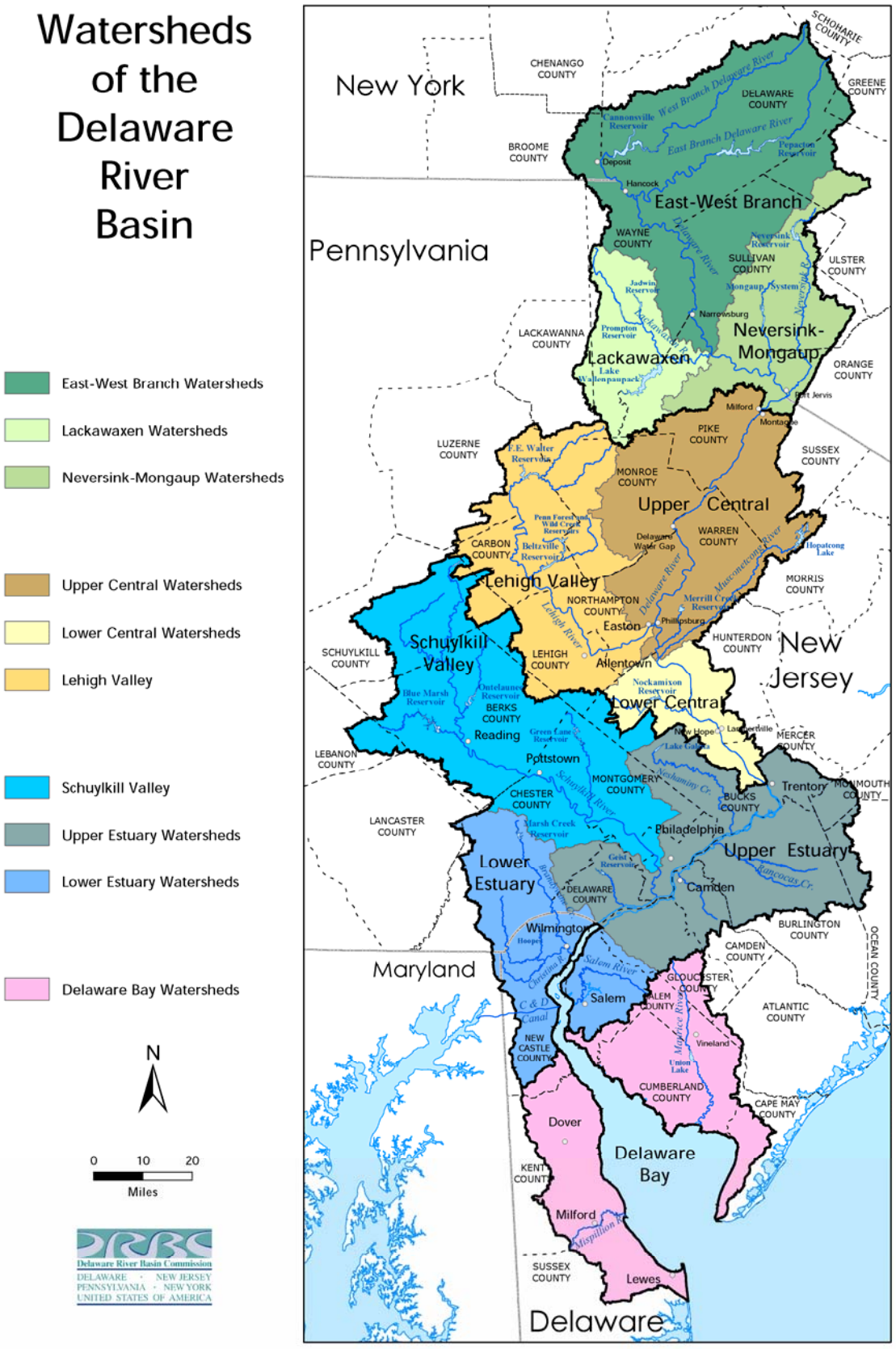
The Delaware River Basin occupies almost 13,000 sq mi (not including the river and bay) in Delaware, Maryland, New Jersey, New York, and Pennsylvania. In 2010, over 8.2 million residents lived in the basin including 654,000 people in Delaware, 2,300 in Maryland, 1,964,000 in New Jersey, 131,000 in New York, and 5,469,000 in Pennsylvania. Nearly 3,500,000 people work in the basin with 316,000 jobs in Delaware, 823,000 jobs in New Jersey, 70,000 jobs in New York, and 2,271,000 jobs in Pennsylvania. An additional 8 million people in New York City and northern New Jersey receive drinking water from the Delaware River via interbasin transfers. The Delaware Basin occupies just 0.4% of the continental U.S. yet supplies drinking water to 5% of the U.S. population.

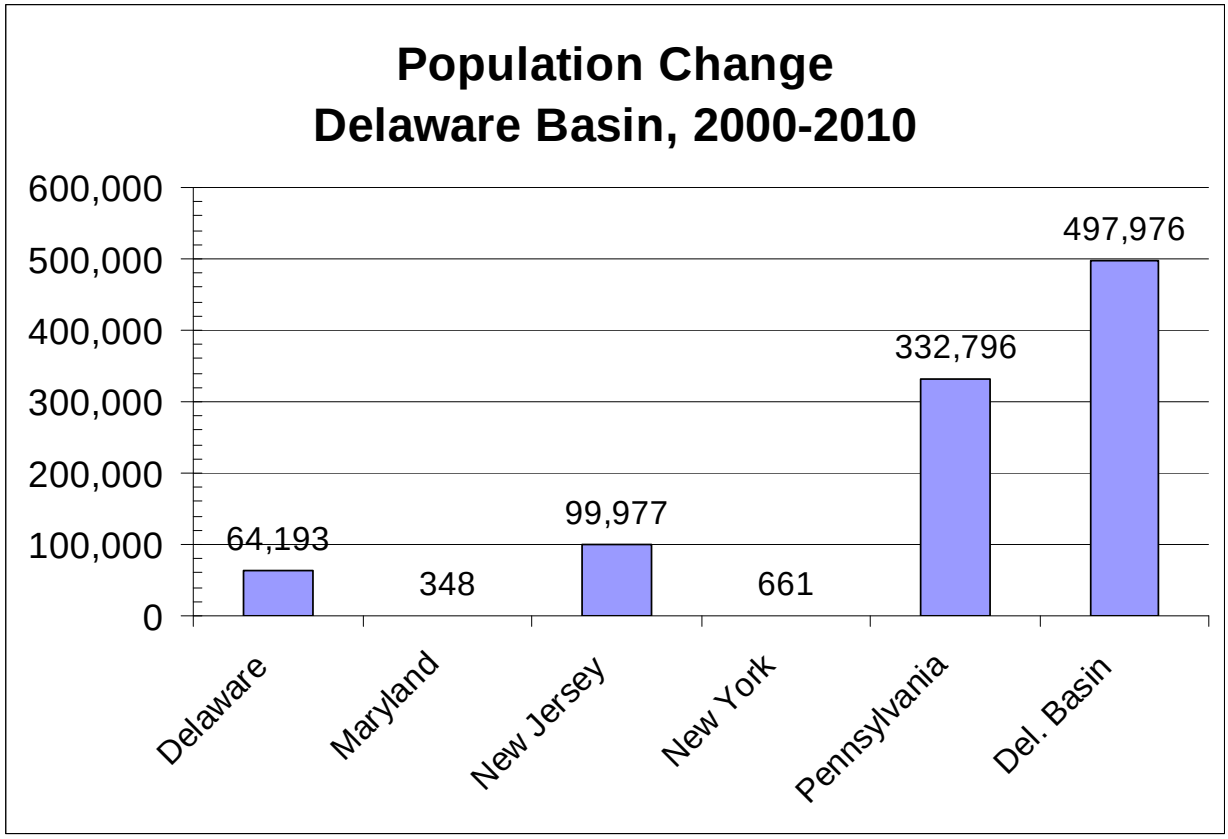
The Delaware Basin population exceeds 8.2 million which if counted together would be the 12th most populous state after New Jersey but ahead of Virginia. The Delaware Basin occupies:

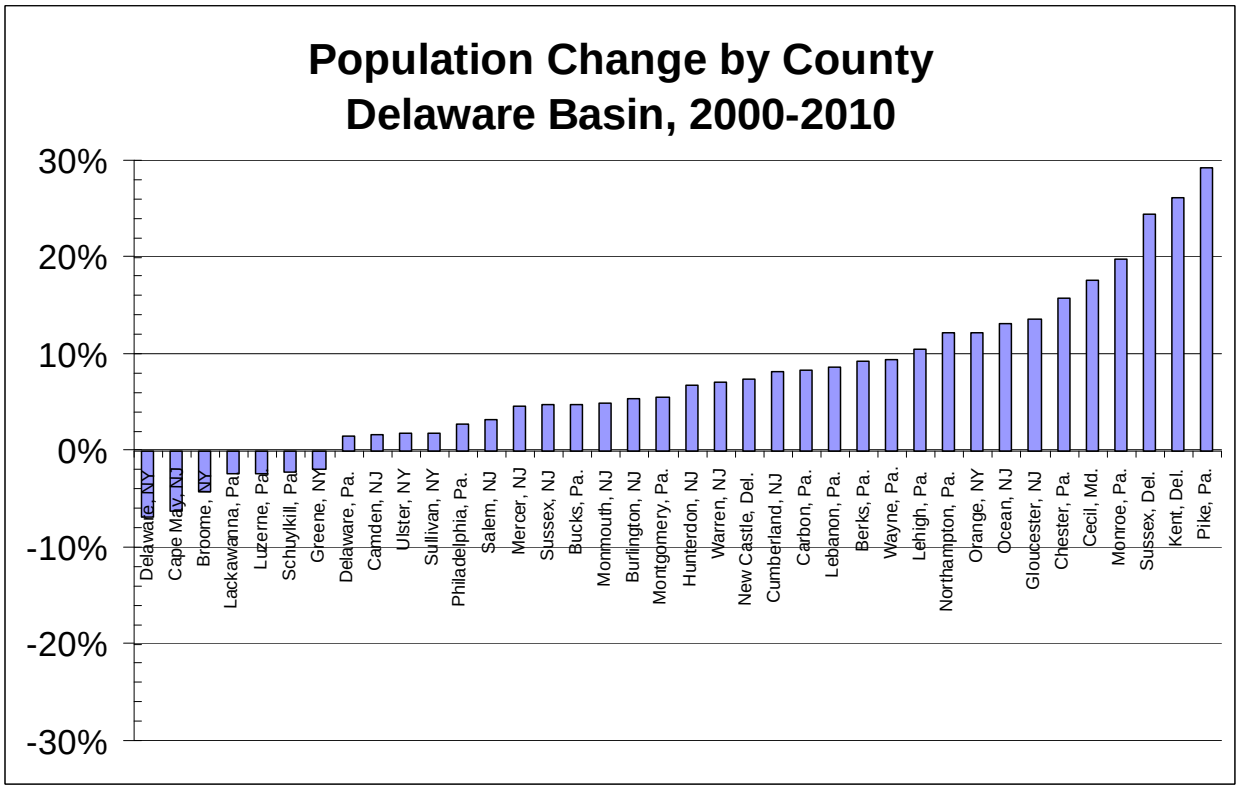
- Delaware (50% of the State's area and 74% of the First State's population)
- New Jersey (40% of the State's area and 22% of the Garden State's population)
- New York (5% of the State's area and 0.7% of the Empire State's population)
- Pennsylvania (14% of the State's area and 43% of the Keystone State's population.

Between 2000 and 2010, the population in the Delaware Basin increased by 6.1% or 472,066 people. Over the last decade, the population increased by 30% in Pike County, Pa.; by over 20% in Kent and Sussex counties, Del. and Monroe County, Pa.; and by over 10% in Gloucester and Ocean counties, NJ, Orange County, NY, and Chester, Lehigh, and Northampton counties, Pa. For the first time in two generations, Philadelphia gained population. Several counties in the basin lost population since 2000: Cape May, NJ; Broome, Delaware, and Greene counties, NY; and Lackawanna, Luzerne, and Schuylkill counties, Pa.

# Watersheds of the Delaware River Basin




Population Change
Delaware Basin, 2000-2010
600,000
500,000
400,000
300,000
200,000
100,000
0
64,193
348
99,977
661
332,796
497,976
Delaware
Maryland
New Jersey
New York
Pennsylvania
Del. Basin


Population Change by County
Delaware Basin, 2000-2010
30%
20%
10%
0%
-10%
-20%
-30%
Delaware, NY
Cape May, NJ
Broome, NY
Lackawanna, Pa.
Luzerne, Pa.
Schuylkill, Pa.
Greene, NY
Delaware, Pa.
Camden, NJ
Ulster, NY
Sullivan, NY
Philadelphia, Pa.
Salem, NJ
Mercer, NJ
Sussex, NJ
Bucks, Pa.
Monmouth, NJ
Burlington, NJ
Montgomery, Pa.
Hunterdon, NJ
Warren, NJ
New Castle, Del.
Cumberland, NJ
Carbon, Pa.
Lebanon, Pa.
Berks, Pa.
Wayne, Pa.
Lehigh, Pa.
Northampton, Pa.
Orange, NY
Ocean, NJ
Gloucester, NJ
Chester, Pa.
Cecil, Md.
Monroe, Pa.
Sussex, Del.
Kent, Del.
Pike, Pa.

**Annual Economic Activity**

The Delaware Basin contributes over $25 billion in annual market/non-market value to the regional economy from the following activities:

- Recreation $1.22 billion
- Fish and Wildlife $1.55 billion
- Public Parks $1.83 billion
- Water Quality $2.46 billion
- Navigation/Ports $2.62 billion
- Marcellus Shale Natural Gas (potential) $3.30 billion
- Agriculture $3.37 billion
- Water Supply $3.82 billion
- Forests $5.13 billion

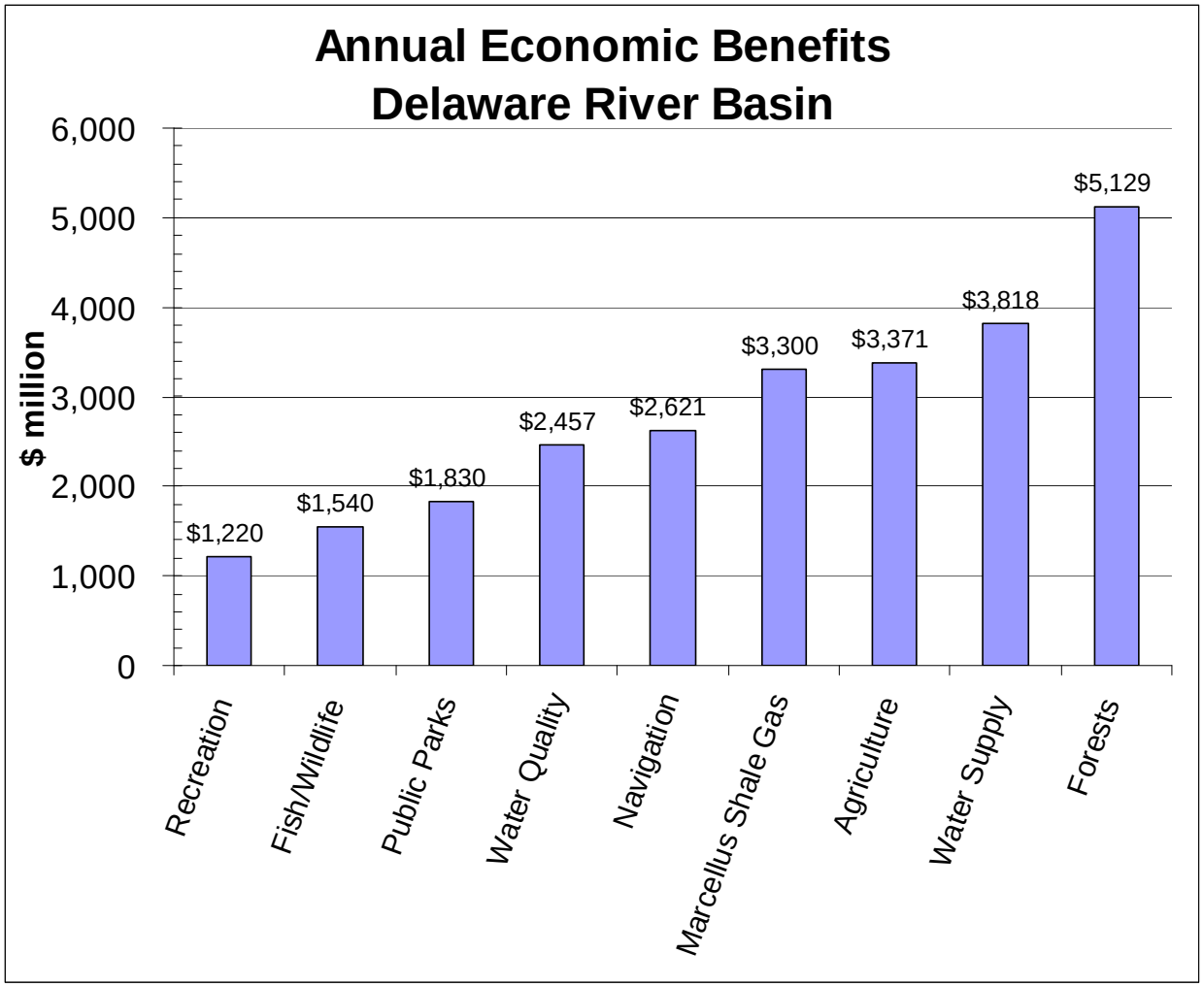


**Table E1**. Annual economic value supported by the Delaware River Basin.

| Market Value | 2010 ($ million) | Sources |
|---|---|---|
| **Recreation (Boating, Fishing, Swimming)** | | |
| Skiing (1.9 million ski-days @ $45/day) | 325 | Penna Ski Areas Association (2010 |
| Paddling-based Recreation (620,860 paddlers) | 362 | Outdoor Industry Association (2006) |
| Del. Water Gap River Recreation (267,000 visits) | 41 | U.S. Forest Service, Nat'l Park Service (1990) |
| Canoe/Kayak/Rafting (225,000 visits) | 9 | Canoe and Kayak Liveries (2010) |
| Powerboating (232,000 boat registrations) | 395 | National Marine Manufacturers Assoc. (2010) |
| **Water Quality** | | |
| Water Treatment by Forests ($96/mgd) | 63 | Trust for Public Land, AWWA (2004) |
| Wastewater Treatment ($4.00/1000 gal) | 1,722 | DRBC and USEPA |
| Increased Property Value (+8%, 2000 ft of river) | 13 | EPA (1973), Brookings Institute (2010) |
| **Water Supply** | | |
| Drinking Water Supply ($4.78/1000 gal) | 3,145 | UDWRA and DRBC (2010) |
| Reservoir Storage ($0.394/1000 gal) | 145 | UDWRA and DRBC (2010) |
| Irrigation Water Supply ($300/ac-ft) | 32 | Resources for Future (1996), USDA (2007) |
| Thermoelectric Power Water Supply ($44/ac-ft) | 297 | EIA (2002), NETL (2009) |
| Industrial Water Supply ($200/ac-ft) | 179 | Resources for Future (1996), DRBC (2010) |
| Hydropower Water Supply ($32/ac-ft) | 20 | Resources for Future (1996), DRBC (2010) |
| **Fish/Wildlife** | | |
| Commercial Fish Landings ($0.60/lb) | 34 | NMFS, Nat'l. Ocean Econ. Program (2007) |
| Fishing (11-18 trips/angler, $53/trip) | 576 | U. S. Fish and Wildlife Service (2001) |
| Hunting (16 trips/hunter, $50/trip) | 340 | U. S. Fish and Wildlife Service (2001) |
| Wildlife/Bird-watching (8-13 trips/yr, $27/trip) | 561 | U. S. Fish and Wildlife Service (2001) |
| Shad Fishing (63,000 trips, $102/trip) | 6 | Pennsylvania Fish & Boat Comm. (2011) |
| Wild Trout Fishing | 29 | Sportfishing Assn./Trout Unlimited (1998) |
| **Agriculture** | | |
| Crop, poultry, livestock value ($1,180/ac) | 3,371 | USDA Census of Agriculture 2007 (2009) |
| **Public Parks** | | |
| Del. Water Gap Natl. Rec. Area (4.9 million visits) | 100 | U.S. National Park Service (2002) |
| **Marcellus Shale** | | |
| Natural Gas (potential) | 3,300 | USGS (2011), EIA (2011) |
| **Maritime Transportation** | | |
| Navigation ($15/ac-ft) | 220 | Resources for the Future (1996) |
| Port Activity | 2,400 | Economy League of Greater Phila. (2008) |
| **Delaware Basin Market Value** | **≈ $17.7 billion** | |
| **Non-Market Value** | | |
| **Recreation (Boating, Fishing, Swimming)** | | |
| Clean Water Act Restoration | | |
| Viewing/Aesthetics ($0.58/person) | 5 | University of Delaware (2003) |
| Boating ($0.76/person) | 6 | University of Delaware (2003) |
| Fishing ($2.95/person) | 24 | University of Delaware (2003) |
| Swimming ($6.88/person) | 57 | University of Delaware (2003) |
| **Water Quality** | | |
| WTP for Clean Water ($38/nonuser-$121/user) | 659 | University of Maryland (1989) |
| **Forests** | | |
| Carbon Storage ($827/ac) | 3,592 | U.S. Forest Service, Del. Center Hort. (2008) |
| Carbon Sequestration ($29/ac) | 126 | U.S. Forest Service, Del. Center Hort. (2008) |
| Air Pollution Removal ($266/ac) | 1,155 | U.S. Forest Service, Del. Center Hort. (2008) |
| Building Energy Savings ($56/ac) | 243 | U.S. Forest Service, Del. Center Hort. (2008) |
| Avoided Carbon Emissions ($3/ac) | 13 | U.S. Forest Service, Del. Center Hort. (2008) |
| **Public Parks** | | |
| Health Benefits ($9,734/ac) | 1,283 | Trust for Public Land (2009) |
| Community Cohesion ($2,383/ac) | 314 | Trust for Public Land (2009) |
| Stormwater Benefit ($921/ac) | 121 | Trust for Public Land (2009) |
| Air Pollution ($88/ac) | 12 | Trust for Public Land (2009) |
| **Delaware Basin Non-Market Value** | **≈ $7.6 billion** | |

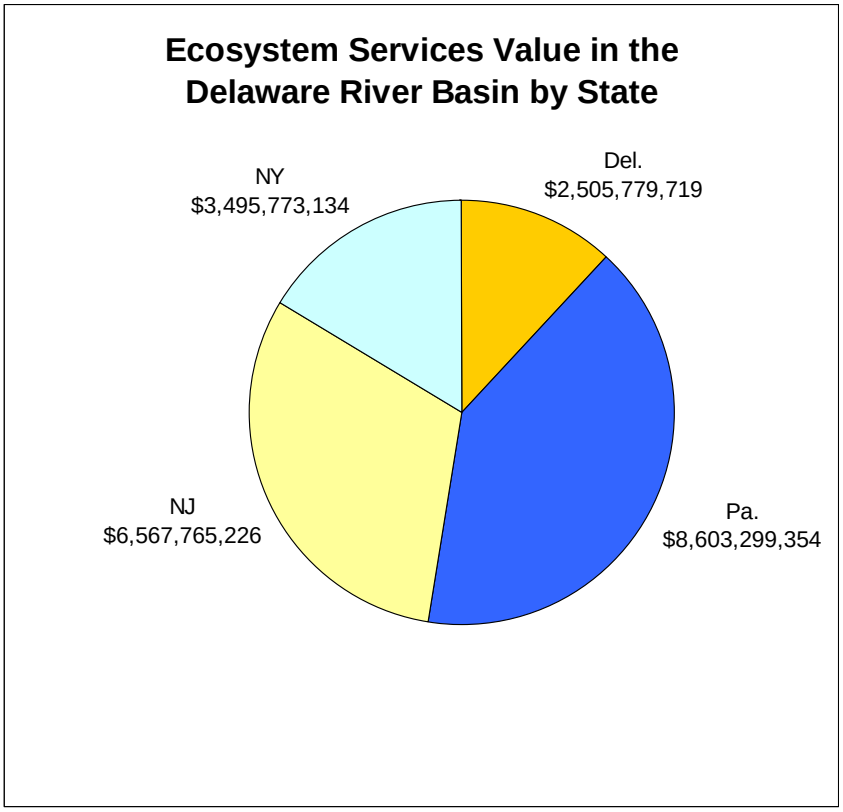
**Ecosystem Services**

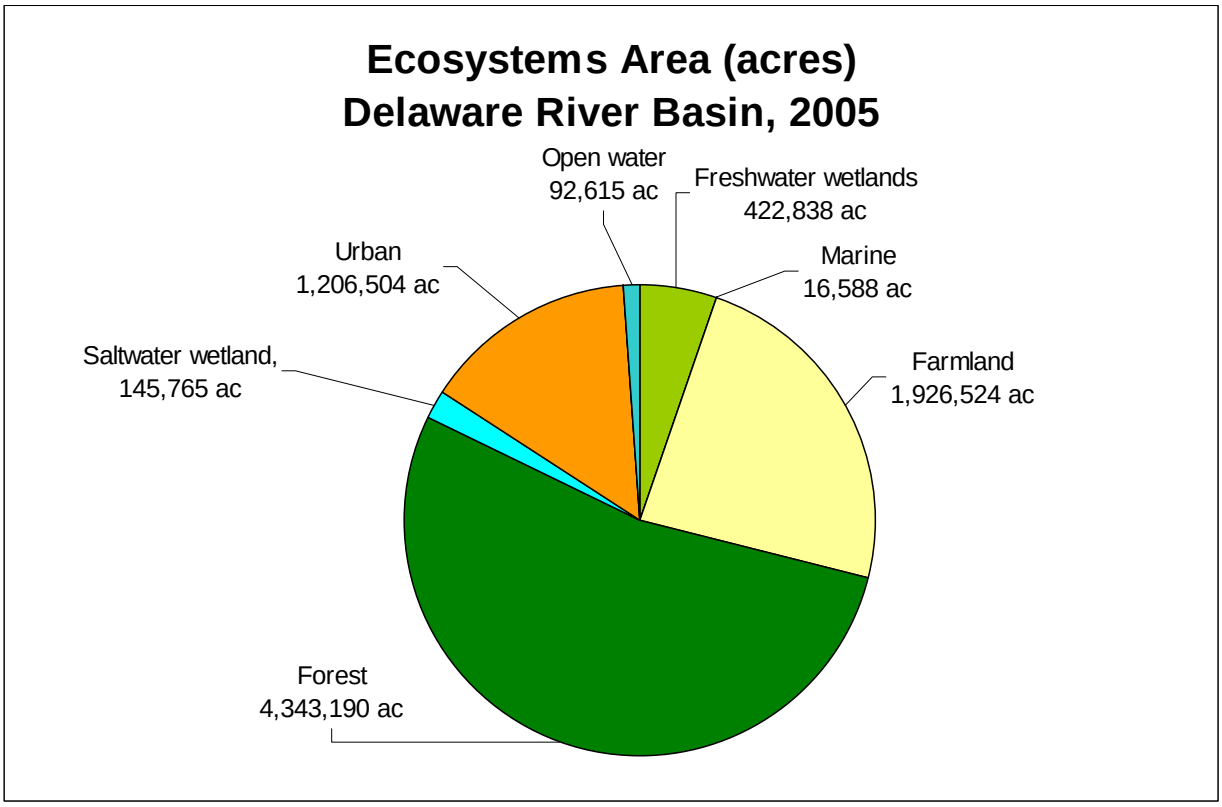
The value of natural goods and services from ecosystems in the Delaware Basin is $21 billion ($2010) with net present value (NPV) of $683 billion using a discount of 3% over 100 years. The contributions of ecosystem services by state include:

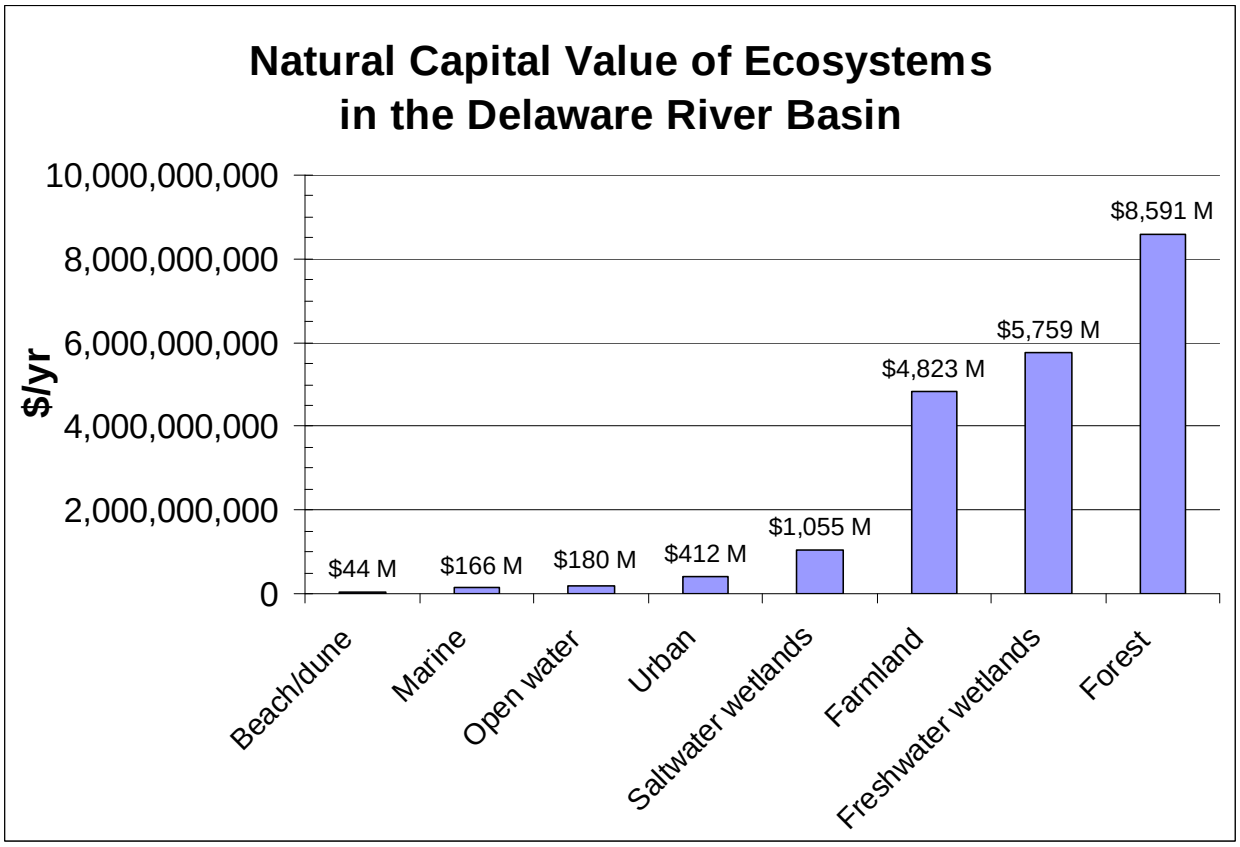
- Delaware ($2.5 billion, NPV $81.4 billion)
- New Jersey ($6.6 billion, NPV $213.4 billion)
- New York ($3.5 billion, NPV $113.6 billion)
- Pennsylvania ($8.6 billion, NPV $279.6 billion)

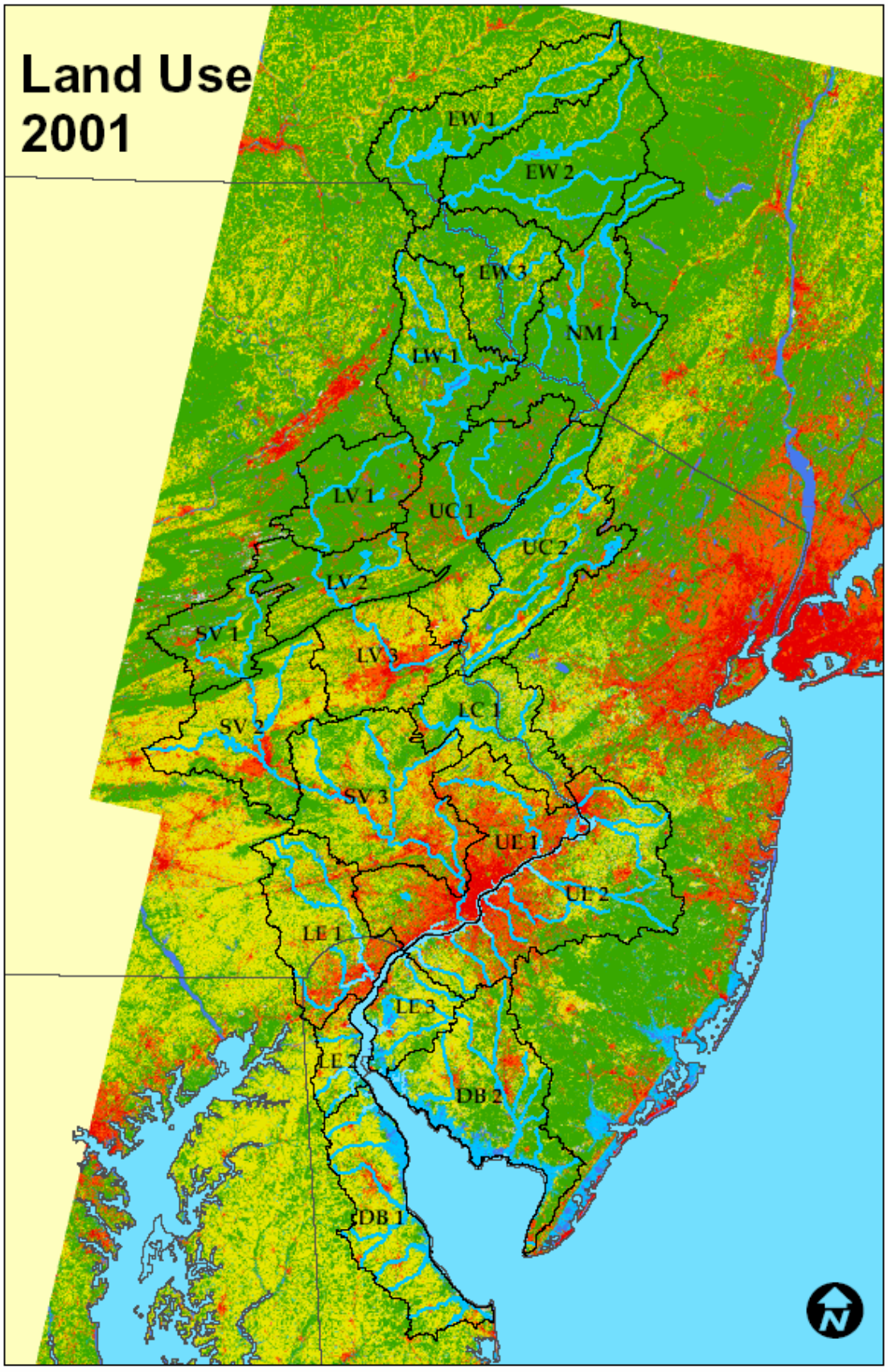
**Table E2.** Ecosystem goods and services provided by the Delaware River Basin

| Ecosystem | Area (ac) | $/ac/yr 2010 | $/yr 2010 | NPV $ |
|---|---|---|---|---|
| Freshwater wetlands | 422,838 | 13,621 | 5,759,329,048 | 187,178,194,067 |
| Marine | 16,588 | 10,006 | 165,982,947 | 5,394,445,767 |
| Farmland | 1,926,524 | 2,503 | 4,823,030,404 | 156,748,488,136 |
| Forest land | 4,343,190 | 1,978 | 8,591,367,360 | 279,219,439,184 |
| Saltwater wetland | 145,765 | 7,235 | 1,054,617,851 | 34,275,080,170 |
| Urban | 1,206,504 | 342 | 412,157,579 | 13,395,121,322 |
| Beach/dune | 900 | 48,644 | 43,758,633 | 1,422,155,566 |
| Open water | 92,615 | 1,946 | 180,210,703 | 5,856,847,857 |
| **Total** | **8,154,924** | | **$21,030,454,525** | **$683,489,772,069** |




Ecosystems Area (acres)
Delaware River Basin, 2005
Open water
92,615 ac
Freshwater wetlands
422,838 ac
Urban
1,206,504 ac
Marine
16,588 ac
Saltwater wetland,
145,765 ac
Farmland
1,926,524 ac
Forest
4,343,190 ac


Natural Capital Value of Ecosystems
in the Delaware River Basin
$/yr
10,000,000,000
8,000,000,000
6,000,000,000
4,000,000,000
2,000,000,000
0
$44 M
$166 M
$180 M
$412 M
$1,055 M
$4,823 M
$5,759 M
$8,591 M
Beach/dune
Marine
Open water
Urban
Saltwater wetlands
Farmland
Freshwater wetlands
Forest


Land Use
2001
EW 1
EW 2
EW 3
NM 1
LW 1
LV 1
UC 1
UC 2
LV 2
SV 1
LV 3
LC 1
SV 2
SV 3
UE 1
UE 2
LE 1
LE 3
LE 2
DB 2
DB 1
N

## Jobs and Wages

The Delaware River Basin is a jobs engine that supports 600,000 direct/indirect jobs with $10 billion in annual wages in the coastal, farm, ecotourism, water/wastewater, ports, and recreation industries.

**Table E3.** Jobs and wages directly and indirectly supported by the Delaware River Basin

| Sector | Jobs | Wages ($ million) | Source |
|---|---|---|---|
| Direct Basin Related | 240,621 | 4,900 | U.S. Bureau of Labor Statistics, 2009 |
| Indirect Basin Related | 288,745 | 4,000 | U.S. Census Bureau, 2009 |
| Coastal | 44,658 | 947 | National Coastal Economics Program, 2009 |
| Farm | 45,865 | 1,376 | USDA Census of Agriculture, 2007 |
| Fishing/Hunting/Birding | 44,941 | 1,476 | U.S. Fish and Wildlife Service, 2008 |
| Water Supply Utilities | 8,750 | 485 | UDWRA and DRBC, 2010 |
| Wastewater Utilities | 1,298 | 61 | UDWRA and DRBC, 2010 |
| Watershed Organizations | 201 | 10 | UDWRA and DRBC, 2010 |
| Ski Area Jobs | 1,753 | 88 | Penna. Ski Areas Association |
| Paddling-based Recreation | 4,226 | | Outdoor Industry Association (2006 |
| River Recreation | 448 | 9 | U. S. Forest Service/Nat'l. Park Service, 1990 |
| Canoe/Kayak/Rafting | 225 | | Canoe Liveries and UDWRA, 2010 |
| Wild Trout Fishing | 350 | 4 | Maharaj, McGurrin, and Carpenter, 1998 |
| Del. Water Gap Nat'l. Rec. Area | 7,563 | 101 | Stynes and Sun, 2002 |
| Port Jobs | 12,121 | 772 | Economy League of Greater Phila., 2008 |
| **Delaware Basin Total** | **> 600,000** | **>$10 billion** | |

Within the Delaware Basin are 3,480,483 jobs earning $172.6 billion in wages including:

- Delaware (316,014 jobs earning $16.5 billion in wages)
- New Jersey (823,294 jobs, $38.1 billion in wages)
- New York (69,858 jobs earning $2.5 billion in wages)
- Pennsylvania (2,271,317 jobs earning $115.5 billion in wages)

Jobs directly associated with the Delaware River Basin (such as water/sewer construction, water utilities, fishing, recreation, tourism, and ports) employ 240,621 with $4.9 billion in wages including:

- Delaware (15,737 jobs earning $340 million in wages)
- New Jersey (62,349 jobs earning $1.3 billion in wages)
- New York (32,171 jobs earning $550 million in wages)
- Pennsylvania (130,364 jobs earning $2.8 billion in wages)

Jobs indirectly related to the waters of the Delaware Basin (based on multipliers of 2.2 for jobs and 1.8 for salaries) employ 288,745 people with $4.0 billion in wages including:

- Delaware (18,884 jobs earning $270 million in wages)
- New Jersey (74,819 jobs earning $1.0 billion in wages)
- New York (38,605 jobs earning $400 million in wages)
- Pennsylvania (156,437 jobs earning $2.2 billion in wages)

According to the National Coastal Economy Report (2009), coastal employment sectors within the Delaware River Basin are responsible for 44,658 jobs earning $947 million in wages with contributions of $1.8 billion toward the GDP including:

- Delaware (12,139 jobs, $214 million in wages, $392 million toward the GDP)
- New Jersey (4,423 jobs, $140 million in wages, $235 million toward the GDP).
- Pennsylvania (28,096 jobs, $593 million in wages, $1.2 billion toward the GDP.

Over 21,800 farms provide 45,865 jobs with $1.9 billion in wages in the Delaware Basin including:

- Delaware (3,140 farm jobs earning $129 million in wages)
- New Jersey (14,305 farm jobs earning $587 million in wages)
- New York (2,410 farm jobs earning $99 million in wages)
- Pennsylvania (26,010 farm jobs earning $1.1 billion in wages)

Fishing, hunting, and bird watching/wildlife associated recreation employ 44,941 jobs with $1.5 billion in wages in the Delaware Basin including:

- Delaware (4,080 jobs earning $134 million in wages)
- New Jersey (17,477 jobs earning $574 million in wages)
- New York (4,872 jobs earning $160 million in wages)
- Pennsylvania (18,512 jobs earning $608 million in wages)
-

Public and private water utilities that withdraw drinking water from the Delaware River Basin employ 8,750 people with wages of $485 million including:

- Delaware (141 jobs earning $7.8 million in wages)
- New Jersey (823 jobs earning $46 million in wages)
- New York (5,600 jobs earning $310 million in wages)
- Pennsylvania (2,186 jobs earning $121 million in wages)

Wastewater utilities that treat and discharge wastewater to the Delaware River Basin employ 1,298 people with wages of $61 million including:

- Delaware (108 jobs earning $5 million in wages)
- New Jersey (257 jobs earning $12 million in wages)
- New York (20 jobs earning $1 million in wages)
- Pennsylvania (913 jobs earning $43 million in wages)

Over 100 nonprofit watershed and environmental organizations employ at least 200 staff who earn at least $9.5 million in wages to restore the watersheds in the Delaware River Basin.

In the Pocono Mountains of Pennsylvania, 9 ski resorts support 1,753 direct jobs in the Delaware Basin from aggregate annual revenues of $87,655,063 from 1,908,228 skier visits.

Paddling-based recreation in the Delaware Basin is responsible for 620,860 participants and 4,226 jobs according to data prorated from the Outdoor Industry Association (2006).

The U. S. Forest Service and U.S. National Park Service estimated river recreation along the Upper Delaware River and Delaware Water Gap was responsible for 448 jobs with wages of $8.8 million in $1986.

The 37 canoe/kayak liveries along the Delaware, Lehigh, and Schuylkill, and Brandywine Rivers have earnings of $9 million per year and employ 225 people to lease watercraft to 225,000 visitors.

Along the Beaverkill, East Branch, West Branch, and upper main stem of the Delaware River in New York, wild trout fishing provides for 350 jobs with $3.6 million in wages.

The Delaware Water Gap National Recreation Area recorded 4,867,272 recreation visits in 2001 that generated $106 million in sales and 7,563 direct/indirect jobs with $100 million in wages.

Delaware River ports from Wilmington to Philadelphia to Trenton are collectively the 5th largest port in the U.S. based on imports and the 20 largest U.S. port based on exports. These ports:

- Employ 4,056 workers who earn $326 million in wages.
- Provide port jobs that support an additional two jobs each in port activity and employee spending for a total of 12,121 port related jobs with $772 million in wages.
- Most of the 4,056 direct port jobs are in cargo handling and warehousing with petroleum port jobs adding up to less than 10% of employment
- Provides good jobs, the average salary of a port employee (with benefits) is over $80,000.

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