Indicator	CCMP Objectives Addressed	Data Source	Coverage	Responsible Organization	Contact	Period of Record	Frequency	Notes
WATERSHED CONDITION								
Human Population Growth		Delaware Population Consortium http://stateplanning.delaware.gov/information/dpc_projections.shtml	Sussex County and Inland Bays watershed using Traffic Analysis Zone Population Projections	State of Delaware Office of State Planning Coordination	Constance Holland, AICP, State Planning Director 302-739-3090	2010 - 2040	Every 10 years with a mid point survey	Data are estimates made in 10 year increments. Data for watershed is derived from county data using an ArcGIS analysis
Land Use Change		Delaware First Map Land Use Land Cover Layer	All of Delaware	State of Delaware, Office of Management and Budget, Delaware Geographic Data Committee	N/A	1992 - 2012	Every 5 years	
Impervious Surface Cover		NOAA's C-CAP land use data	Inland Bays watershed	NOAA Coastal Services Center	Andrew Homsey, University of Delaware 302-831-4932	1992 - 2010	Every 4 to 5 years	Andrew Homsey did analysis on the NOAA data, Some data collected 4 years apart, others collected 5 years apart
Average Width of Buffers on Croplands	Managing Living Resources and Their Habitat: Objective 2, Action E	Delaware First Map Land Use Land Cover Layer, National Elevation Dataset, National Hydrography Dataset, Delaware Inland Bays watershed boundary	Inland Bays watershed	CIB	Andrew McGowan, Environmental Scientist 302-226-8105	1992 - 2012	Every 5 years	This data was derived from a tool built for the CIB and the data is generated using the new land use land cover dataset
Salt Marsh Acreage and Condition		Aerial photography, State of Delaware Wetland Maps, and Landsat Thematic Mapper satellite imagery	Inland Bays watershed	Center for Remote Sensing College of Marine and Earth Studies University of Delaware	Y. H. Jo, Center for Remote Sensing, College of Marine and Earth Studies University of Delaware	1938 - 2007	Special Report	This indicator was prepared using a special report written by the Center for Remote Sensing College of Marine and Earth Studies University of Delaware
Natural Habitat Protection and Restoration	Managing Living Resources and Their Habitat Objective 2 Action D.	EPA's National Estuary Program Online Reporting Tool (NEPORT) database: http://ofmdev1-epa-ow.attaincloud.com/pls/apex_owdev/f?p=132:1	Inland Bays watershed	EPA NEPORT (data reported from a variety of organizations)		2003-present	Every year	Reliant on partner input
Indian River Inlet Flushing		Coastal Planning Section, Army Corps of Engineers	Indian River Inlet	US Army Corps of Engineers	Jeff Gebert Coastal Planning Section, Army Corps of Engineers, Jeffrey.A.Gebert@usace.army.mil	1939 - 2004	No longer tracked	No future plans for data collection
MANAGING NUTRIENT POLLUTION								
Point Source Pollution		By FOIA request to DNREC Surface Water Discharges Section	Inland Bays watershed	DNREC Surface Water Discharges Section	Glenn Davis, Glenn.Davis@state.de.us 302-739-9946	1990 - present	Daily	
Atmospheric Deposition	Water Quality Management Objective 6 Action B.	National Atmospheric Deposition Program.: http://nadp.sws.uiuc.edu/data/sites/siteDetails.aspx?net=AIRMoN&id=DE02	Lewes, DE	National Atmospheric Deposition Program	Bill Ullman, University of Delaware ullman@udel.edu 302-645-4302	1992- 2015	Yearly	Bill Ullman performed original analysis to determine atmospheric deposition

Non Point Source Loads	Water Quality Management Objective 2 Action D. Water Quality Management Objective 6 Action B.	Upon request to DNREC's Division of Watershed Stewardship	Inland Bays watershed	DNREC Surface Water Discharges Section	Xia Xie, DNREC Surface Water Discharges Section Xia.Xie@state.de.us	1988 - present	Yearly	Yearly collection began in 2006
Agricultural Nutrient Management Practices								
Implement Nutrient Management Planning	Nutrient Management Action A.	Regulatory Action (Nutrient Management Act) administered through Delaware Department of Agriculture	Inland Bays Watershed	Delaware Department of Agriculture	Chris Brosch, Nutrient Management Program Administrator 302-698-4555	1999 Act was passed, all farms required to have a plan must be in place by 2007	N/A	Participation is required by law, therefore all parcels qualifying under law are assumed to have nutrient management plan. Form of tracking differs from Chesapeake tracking which verifyies farmers are implementing a plan.
Establishment of cover crops	Nutrient Management Action A.	Upon request to Sussex Conservation District	Inland Bays Watershed	Sussex Conservation District	Debbie Absher debbie.absher@de.nacdnet.net	*2008-present	Yearly	Participation in the cost share program. DNREC tillage survey also used to generate acres of cover crops not included in cost share program (Tyler Monteith)
Establishment of forested waterway buffers	Managing Living Resources and Their Habitat Objective 2 Action E.	Upon request to Natural Resources Conservation Service	Inland Bays Watershed	Natural Resources Conservation Service	Lynn T Manges (302)678-4253 Lynn.Manges@de.usda.gov	*2008 - present	Yearly, as farmers enroll	Reported through cost share CRP, CREP program. Farm Service Agency (for Delaware specifically)
Establishment of grassed waterway buffers	Managin Living Resources and Their Habitat Objective 2 Action E.	Upon request to Natural Resources Conservation Service	Inland Bays Watershed	Natural Resources Conservation Service	Lynn T Manges (302)678-4253 Lynn.Manges@de.usda.gov	*2008 - present	Yearly, as farmers enroll	Reported through cost share CRP, CREP program. Farm Service Agency (for Delaware specifically)
Restoration of wetlands on former cropland	Managing Living Resources and Their Habitat Objective 2 Action C.	Upon request to Natural Resources Conservation Service	Inland Bays Watershed	Natural Resources Conservation Service	Lynn T Manges (302)678-4253 Lynn.Manges@de.usda.gov	*2008 - present	Yearly, as farmers enroll	Reported through cost share CRP, CREP program. Farm Service Agency (for Delaware specifically)
Building poultry manure sheds or composters	Nutrient Management Action A.	Upon request to DNREC	Inland Bays Watershed	DNREC	Mark Hogan Mark.Hogan@state.de.us	*2008 - present	Yearly	
Relocation and alternative use of manure	Nutrient Management Action A.	Upon request to Delaware Department of Agriculture	Inland Bays Watershed	Delaware Department of Agriculture	Bob Coleman Robert.Coleman@state.de.us 302-698-4556	*2008 - present	Yearly	Perdue Ag recycle
Treatment of cropland with water control structures		Upon request to DNREC	Inland Bays Watershed	DNREC	Mark Hogan Mark.Hogan@state.de.us	*2008 - present	Yearly	
Retrofit of pre-1990 development with stormwater controls	Stormwater Management Action B.	Upon request to DNREC	Inland Bays Watershed	DNREC	Jessica Watson Jessica.Watson@state.de.us	Not Tracked	Not Tracked	Not Tracked
Septic System Conversion to Central Sewer		Upon request to DNREC Ground Water Discharges Section	Inland Bays Watershed	DNREC Ground Water Discharges Section	Kathleen Saunders Kathleen.Saunders@state.de.us 302-739-9340 or Jayne Ellen Dickerson 302-855-7719 jdickerson@sussexcountyde.gov	1971 - present	Yearly	Poorly tracked. (See Emily)
WATER QUALITY								

Algae	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Dave Wolanski DNREC, 302-739-9939 David.Wolanski@state.de.us ; and Edward Whereat CMP whereat@udel.edu	1998 - present	DNREC stations are monitored either every month, or on a rotating schedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored twice a month May through August, once a month rest of year	
DIN/DIP	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Dave Wolanski DNREC, 302-739-9939 David.Wolanski@state.de.us ; and Edward Whereat CMP whereat@udel.edu	1998 - present	DNREC stations are monitored either every month, or on a rotating shcedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored twice a month May through August, once a month rest of year	
Secchi Depth	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Dave Wolanski DNREC, 302-739-9939 David.Wolanski@state.de.us ; and Edward Whereat CMP whereat@udel.edu	1998 - present	DNREC stations are monitored either every month, or on a rotating schedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored weekly from May through September, twice a month for April and Oct, and monthly otherwise	Not all DNREC stations measure secchi depth

Water Quality Index	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Andrew McGowan, Environmental Scientist, environment@inlandbays.org 302-226-8105	1998 - present	DNREC stations are monitored either every month, or on a rotating schedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored twice a month May through August, once a month rest of year	Combination of above water quality parameters
Dissolved Oxygen	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Dave Wolanski DNREC, 302-739-9939 David.Wolanski@state.de.us ; and Edward Whereat CMP whereat@udel.edu	1998 - present	DNREC stations are monitored either every month, or on a rotating schedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored weekly from May through September, twice a month for April and Oct, and monthly otherwise	
Seaweed Abundance	Water Quality Management Objective 6 Action B. Managing Living Resources and Their Habitat Objective 1 Action B.	Upon request to DNREC Division of Water	Rehoboth and Indian River Bays	CIB	Robin Tyler DNREC 302-739-9942, Robin.Tyler@state.de.us or Andrew McGowan environment@inlandbays.org 302 - 226 - 8105	1999 - 2012	Irregularly. During sampling years data is collected once a month May through Septemeber	Data collection is being transferred from DNREC to the CIB beginning spring 2017
LIVING RESOURCES								
Bay grasses	Managing Living Resources and Their Habitat Objective 1 Action B.	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked
Eagle and Osprey Nesting		Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Fish and Wildlife Species Conservation and Research Program	Justyn Foth 302-735-3600 Justyn.forth@state.de.us	Eagle data: 1997 - present Osprey data 1991 - 2014	Eagle surveys are conducted annually with monthly sampling January through May. Osprey surveys are irregular, occuring roughly once every 5 years	
Hard Clam Landings	Managin Living Resources and Their Habitat Objective 5 Action C.	Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Fish and Wildlife Fisheries Section	Scott Newlin Scott.Newlin@state.de.us (302)739-4782	1943 - present	Annually	

Winter Waterfowl		Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Fish and Wildlife Species Conservation and Research Program	Joe Rogerson 302-735-3600 Joe.rogerson@state.de.us	1975 - present	Annually, 4 times a year October through January	
Blue Crab Abundance		Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Fish and Wildlife Fisheries Section	Michael Greco michael.greco@state.de.us	1986 - present	Annually, monthly from April through October	
Fish Abundance	Planning For Climate Change Objective 1 Action E.	Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Fish and Wildlife Fisheries Section	Michael Greco michael.greco@state.de.us	1986 - present	Annually, monthly from April through October	
Shorezone Fish	Planning For Climate Change Objective 1 Action E.	Upon request to CIB	Inland Bays watershed	CIB	Andrew McGowan, environment@inlandbays.org 302-226-8105	2011 - present	Annually, once in Arpil then twice a month May through October	
Fish Kills		Upon request to DNREC Division of Fish and Wildlife	Inland Bays watershed	DNREC Division of Fish and Wildlife Fisheries Section	John Clark Environmental Program Administrator 302-739-9914 John.Clark@state.de.us	1981 - present	As reported to DNREC	Data is based on public observation and calls to DNREC reporting observed kills
Recreational Fishing Data		Upon request to DNREC Division of Fish and Wildlife Fisheries Section	Inland Bays watershed	DNREC Division of Fish and Wildlife Fisheries Section and NOAA	Scott Newlin Scott.Newlin@state.de.us (302)739-4782	1990 - present	Annually	Data prior to 2004 was not back calculated to match the current MRIP method of data collection
HUMAN HEALTH RISKS								
Bacteria Pollution		EPA Storet datawarehouse https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria and the Citizen Monitoring Program http://www.citizen-monitoring.udel.edu/	Inland Bays Watershed	DNREC Division of Watershed Stewardship Watershed Assessement and Management, and University of Delaware Citizen Monitoring Program	Dave Wolanski DNREC, 302-739-9939 David.Wolanski@state.de.us ; and Edward Whereat CMP whereat@udel.edu	2004 - present	DNREC stations are monitored either every month, or on a rotating schedule of 6 times a year for 3 years then 12 times a year for 2 years. CMP stations are monitored twice a month May through August, once a month rest of year	
Shellfish Growing Waters	Managin Living Resources and Their Habitat Objective 5 Action A.	Delaware First Map Shellfish Approved Waters Layer	Inland Bays watershed	DNREC Division of Watershed Stewardship Shellfish Program	Michael Bott michael.bott@state.de.us	1962 - present	Approved waters are assessed annually	

Fish Consumption Advisories		DNREC Division of Watershed Stewardship http://www.dnrec.delaware.gov/fw/Fisheries/Documents/2016-Delaware-Fish-Consumption-Advisory-Table.pdf	Inland Bays watershed	DNREC Division of Watershed Stewardship	Dr. Richard Greene, DNREC Division of Watershed Stewardship, 302-739-9939	1986 - present	Annually or as needed	
CLIMATE								
Carbon Dioxide Concentration	Planning For Climate Change Objective 1 Action F.	NOAA http://www.esrl.noaa.gov/gmd/ccgg/trends/weekly.html	Hawaii	NOAA Mauna Loa Observatory		1958 - present	Annually	
Air Temperature	Planning For Climate Change Objective 1 Action F.	NOAA NCEI Dover Station https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00072730/detail	Dover DE	University of Delaware DEOS	Kevin Brinson, Associate State Climatologist kbrinson@udel.edu	1895 - present	Daily	Air temperature data is non continuous for Lewes DE and has less historical data, therefore Dover was used for it's longer period of record
Sea Level Rise	Planning For Climate Change Objective 1 Action F.	NOAA Tides and Currents. Lewes DE tide gauge measurements: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8557380	Lewes DE	NOAA Tides and Currents		1919 - present	Daily	[Note: 2011-2015 data are from DEOS Rehoboth station. The Lewes gauge was discontinued, but is expected to go back on line in 2016.]:

Growing Season Length	Planning For Climate Change Objective 1 Action F.	NOAA NCEI https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00075320/detail	Lewes DE	University of Delaware DEOS	Kevin Brinson, Associate State Climatologist kbrinson@udel.edu	1946 - 2011	Daily	Growing season length was calculated using air temperature data from Lewes DE station
Precipitation	Planning For Climate Change Objective 1 Action F.	NOAA NCEI Dover Station https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00072730/detail	Dover DE	University of Delaware DEOS	Kevin Brinson, Associate State Climatologist kbrinson@udel.edu	1895 - present	Daily	Precipitatin data is non continuous for Lewes DE and has less historical data, therefore Dover was used for it's longer period of record
Ocean Acidification	Planning For Climate Change Objective 1 Action F.	Hawaii Ocean Times Series Program http://hahana.soest.hawaii.edu/hot/products/products.html	Hawaii	Hawaii Ocean Time Series Program		1988 - 2015	Monthly	