Integrated Water Quality Monitoring and Assessment Results

October 2011

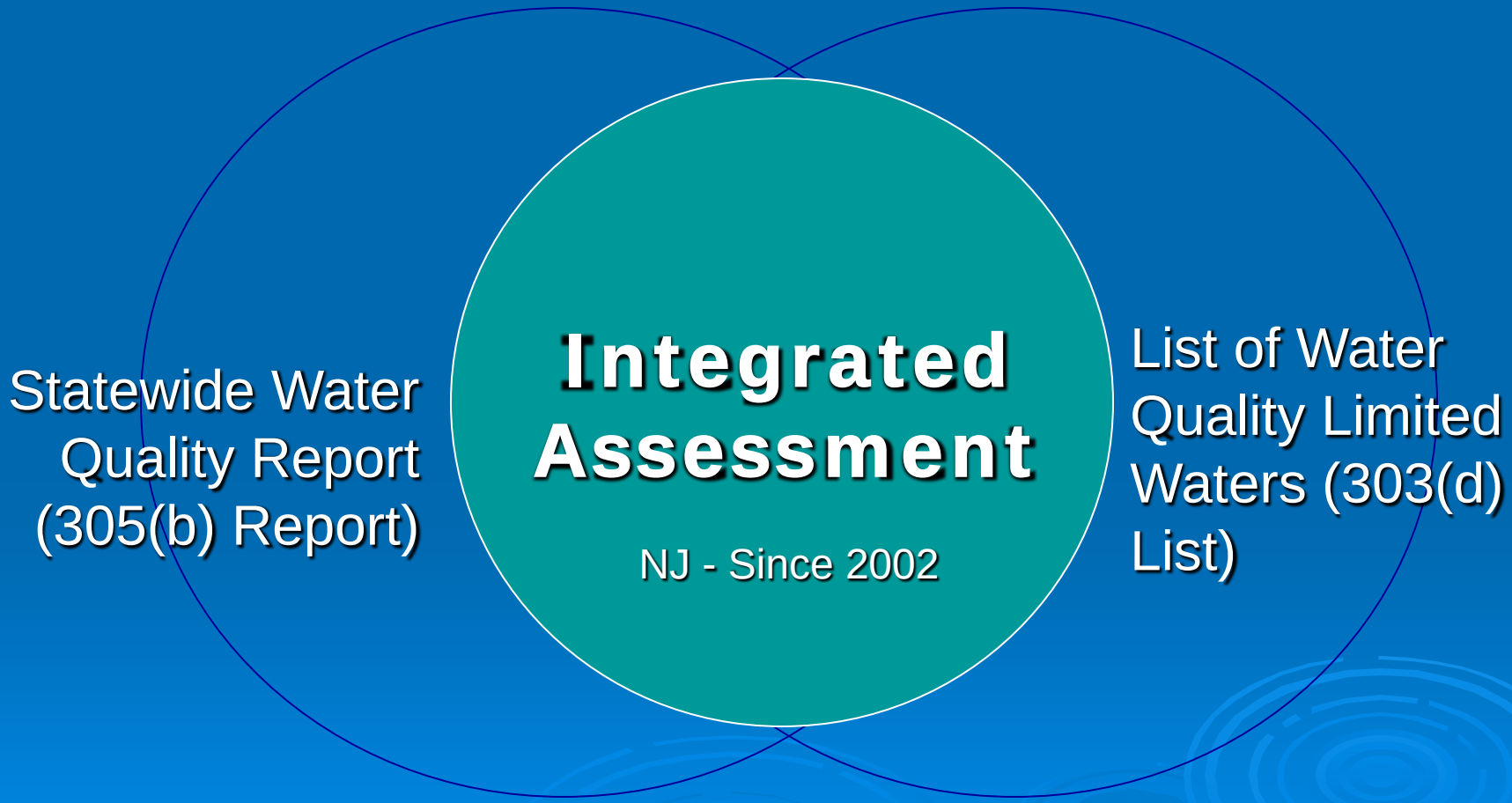
New Jersey Dept. of Environmental Protection
Division of Water Monitoring and Standards
Bureau of Water Quality Standards and Assessment
PO Box 409
Trenton, NJ 08625
www.nj.gov/dep/wms/bwqsa/

Role of Water Quality Assessment in Water Resource Management

Why Do We Assess Water Quality?

- Required under federal and state statutes:
  - Section 305(b) of Federal Clean Water Act
  - Section 303(d) of Federal Clean Water Act
  - Water Quality Planning Act (N.J.S.A. 59:11A)
- Necessary to determine appropriate regulatory, preventive, and restorative actions

Integrated Water Quality Assessment



How Do We Assess Water Quality?

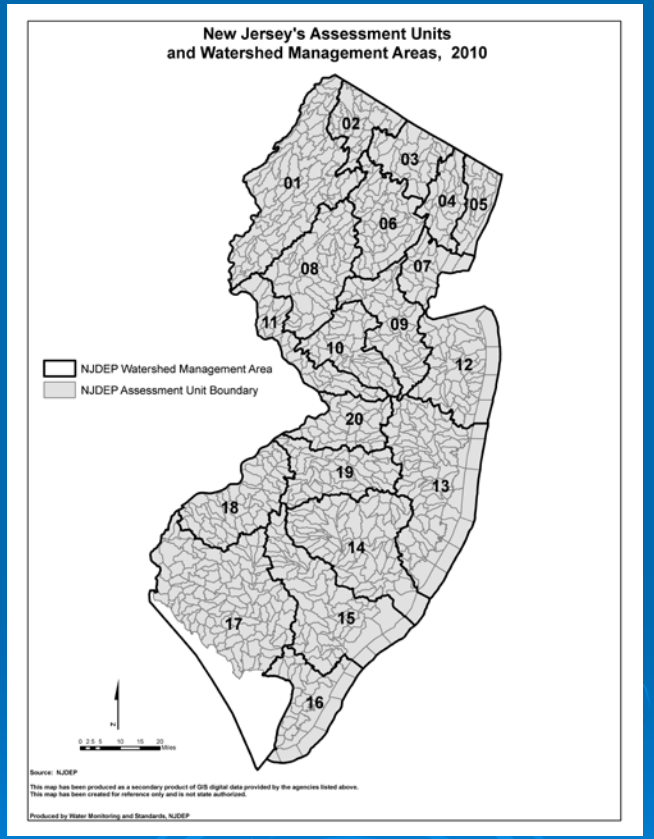
- Compare Data Results to Surface Water Quality Standards (SWQS)
  - Develop Scientific Methods for Sample Collection and Data Analysis
  - Collect and Compile Water Quality Data
  - Evaluate Data Quality
- Evaluate Data Trends:
  - Improving or declining water quality
  - Threatened Waters

What Data is assessed?

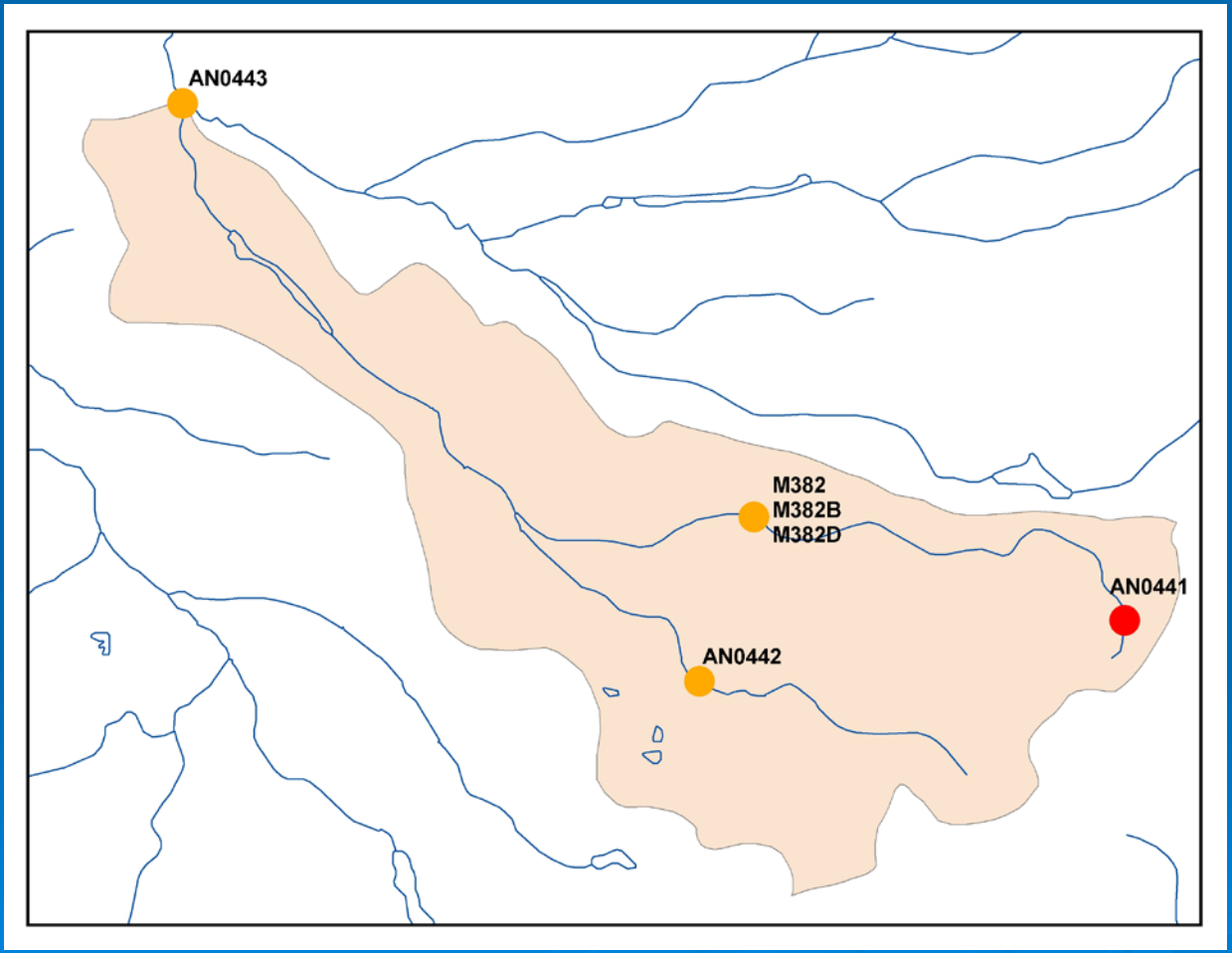
- Data From Over 5,000 Monitoring Stations:
- Agency-conducted (DEP and/or USGS) Monitoring Programs
  - Statewide, Regional, and Waterbody-specific
  - Chemical/physical Water Quality
  - Biological (macroinvertebrates, fish tissue)
- External Monitoring and Data Sources
  - USEPA, USGS
  - Counties
  - Volunteers and Other Monitoring Partners
  - Regulated Community (wastewater and water supply)

How are the assessment results presented?

- Establishment of Assessment Unit (AU) Scale and Boundaries
  - USGS HUC 14 Subwatersheds (revised January 2009)
  - DRBC-assessed waters not included
  - **New total: 952 AUs**



How is the data aggregated?



Each station evaluated individually

If any station in the HUC fails to meet standards the entire HUC listed as impaired

Assessment results presented based on stream miles, lake acres, and estuary – ocean square miles

Use Designations and Waterbody Classifications

Stream Classification	ALG	ALT	DWS	AWS	IWS	REC	FC	SF
FW1	X					X	X	
FW1 (TP, TM)	X	X				X	X	
PL	X		X	X		X	X	
PL(TM)	X	X	X	X		X	X	
FW2-NT	X		X	X	X	X	X	
FW2-TM	X	X	X	X	X	X	X	
FW2-TP	X	X	X	X	X	X	X	
SE1	X					X	X	X
SE2	X					X	X	
SE3	X					X	X	
SC	X					X	X	X
Total # Applicable AUs	952	203	794	815	665	952	952	151

Assessment Improvements Since 2002

- Integration & leveraging of monitoring, standards & assessment programs and expertise
- Transparent & defined methods
- Increased solicitation and use of external data
- Consistent & useful spatial assessment units – allows progress tracking over time
- Additional & more precise biological data
- More waters assessed overall

New for 2010

- Data submitted electronically via NJ Water Quality Data Exchange System (WQDE)
- Assessment results stored in and reported via USEPA Assessment Database (ADB)
- New Format for Integrated List of Waters
- New HUC 14 Boundaries and AU Total
- New SWQS criteria and/or assessment methods for:
  - Nutrients
  - Temperature
  - pH
  - Fish Consumption (fish tissue)

New Nutrient Assessment Methods

- Now Based Using Multiple Line Of Evidence
- Both Physical/Chemical and Biological Data Required
  - Biological index (macroinvertebrates)
  - Dissolved Oxygen
    - Evaluated against SWQS criteria (minimum DO level)
    - Diurnal DO flux (>3mg/l indicative of photosynthesis)
  - Periphyton Chlorophyll *a* data (seasonal average)

Final 2010 Water Quality Assessment Results

New Format: “Status of Designated Uses by Subwatershed”

Appendix B — **Status of Designated Uses by Subwatershed** — **2010 Integrated Report**

State: NJ — **06/13/2011** — **Cycle: 2010**

AU ID	AU Name		Water Type	Size	Location Description	
NJ02020007000010-01	Rutgers Creek tribs		RIVER	11.55 MILES	HUC14: 02020007000010	
Use	**Attainment**	**Threatened**	**Cause**	**Cycle First Listed**	**TMDL Status**	**Source**
Agricultural Water Supply	Insufficient Information	N				
Aquatic Life	Insufficient Information	N				
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Insufficient Information	N				
Primary Contact Recreation	Insufficient Information	N				
Public Water Supply	Insufficient Information	N				

AU ID	AU Name		Water Type	Size	Location Description	
NJ02020007010010-01	Wallkill R/Lake Mohawk(above Sparta Sta)		FRESHWATER LAKE RIVER	828.94 ACRES 19.04 MILES	01367625Wallkill A As of 2010 contains the following monitoring sites and associated SWQS Classification 01367625 FW2-NT AN0297 FW2-NT NJW04459-093-1 FW2-NT NJW04459-093-2 FW2-NT NJW04459-093-O FW2-NT NJW064 1 FW2-NT NJW064 OUTLE	
Use	**Attainment**	**Threatened**	**Cause**	**Cycle First Listed**	**TMDL Status**	**Source**
Agricultural Water Supply	Fully Supporting	N				• Urban Runoff/Storm Sewers
Aquatic Life	Fully Supporting	N				
Aquatic Life - Trout	Fully Supporting	N				
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Fully Supporting	N				
Primary Contact Recreation	Not Supporting	N	Fecal Coliform	2006	Completed	
Public Water Supply	Fully Supporting	N				

2010 Status of Designated Uses by Subwatershed

Assessment Unit ID

Assessment Unit Name

Publication Date of Status Report

Year report was submitted to USEPA

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Public Water Supply	Insufficient Information	N				

2010 Status of Designated Uses by Subwatershed

Use Assessment Results

Waterbody Information

AU ID	AU Name		Water Type	Size
NJ0202000[illegible]7010020-01	Wallkill R ([illegible]gdensburg to SpartaStation)		FRESHWATER LAKE RIVER	105.93 ACRES 20.66 MILES
Use	**Attainment**	**Threatened**	**Cause**	**Cycle First Listed**
Agricultural Water Supply	Fully Supporting	N		
Aquatic Life	Not Supporting	N	Cause Unknown	2007
Aquatic Life - Trout	Not Supporting	N	Temperature, water	2006
Fish Consumption	Insufficient Information	N		
Industrial Water Supply	Fully Supporting	N		
Primary Contact Recreation	Not Supporting	N	Fecal Coliform	2006
Public Water Supply	Fully Supporting	N		

2010 Status of Designated Uses by Subwatershed

Applicable Designated Uses

AU ID	AU Name	
NJ02020007010020-01	Wallkill R (Ogdensburg to SpartaStation)	
Use	**Attainment**	**Threatened**
Agricultural Water Supply	Fully Supporting	N
Aquatic Life	Not Supporting	N
Aquatic Life - Trout	Not Supporting	N
Fish Consumption	Insufficient Information	N
Industrial Water Supply	Fully Supporting	N
Primary Contact Recreation	Not Supporting	N
Public Water Supply	Fully Supporting	N

Use Assessment Results:

"Fully Supporting"

"Not Supporting"

"Insufficient Information" (Not Assessed)

2010 Status of Designated Uses by Subwatershed

Pollutant responsible for non-support of the associated use

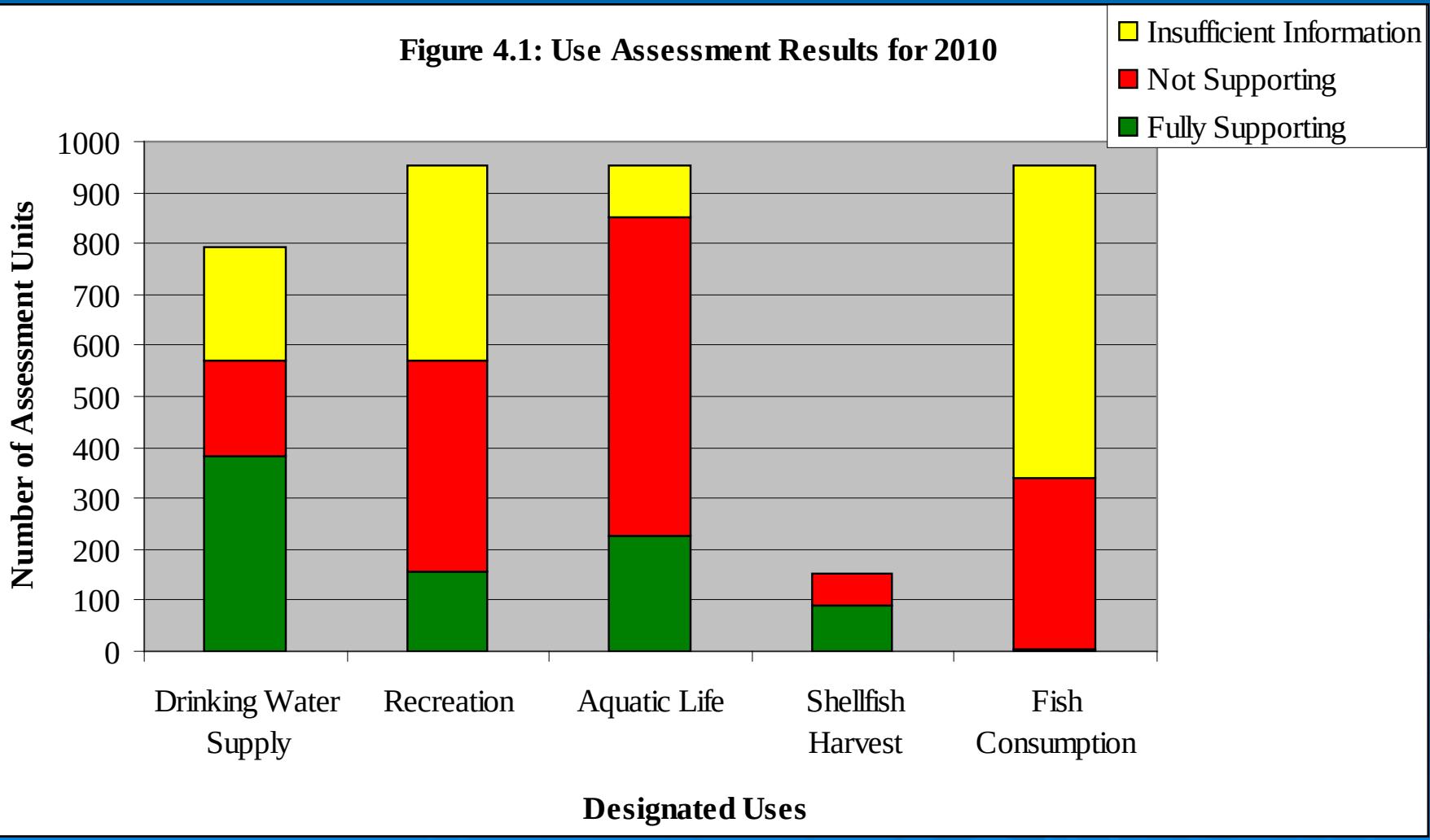
First time on 303(d) List

If delisted for TMDL:

Potential source of pollutant, if known

Water Type	Size	Location D cription	
FRESHWA RIVER	105.9 20.66 M	01367625W lkill A As of 2010 co following n itoring sites and assoc QS Classificati NJW186 1 FW2-NT NJ 2 FW2-NT N /186 3 FW2-NT	
Cause	**Cycle First Listed**	**TMDL Sta s**	**Source**
Cause Unknown	2007	Medium Pr ity	• Upstream Impoundments (e.g., Pl-566 NRCS Structures) • Urban Runoff/Storm Sewers
Temperature, water	2006	Medium Pr ity	
Fecal Coliform	2006	Completed	

2010 Final Use Assessment Results



2010 Final Use Assessment Results

- Approx 30 AUs (~3%) fully support all applicable uses
  - only one AU fully supported all applicable uses including FC
- Approx 65% of AUs do not support Aquatic Life Uses
- Approx 40 AUs (~4%) not assessed

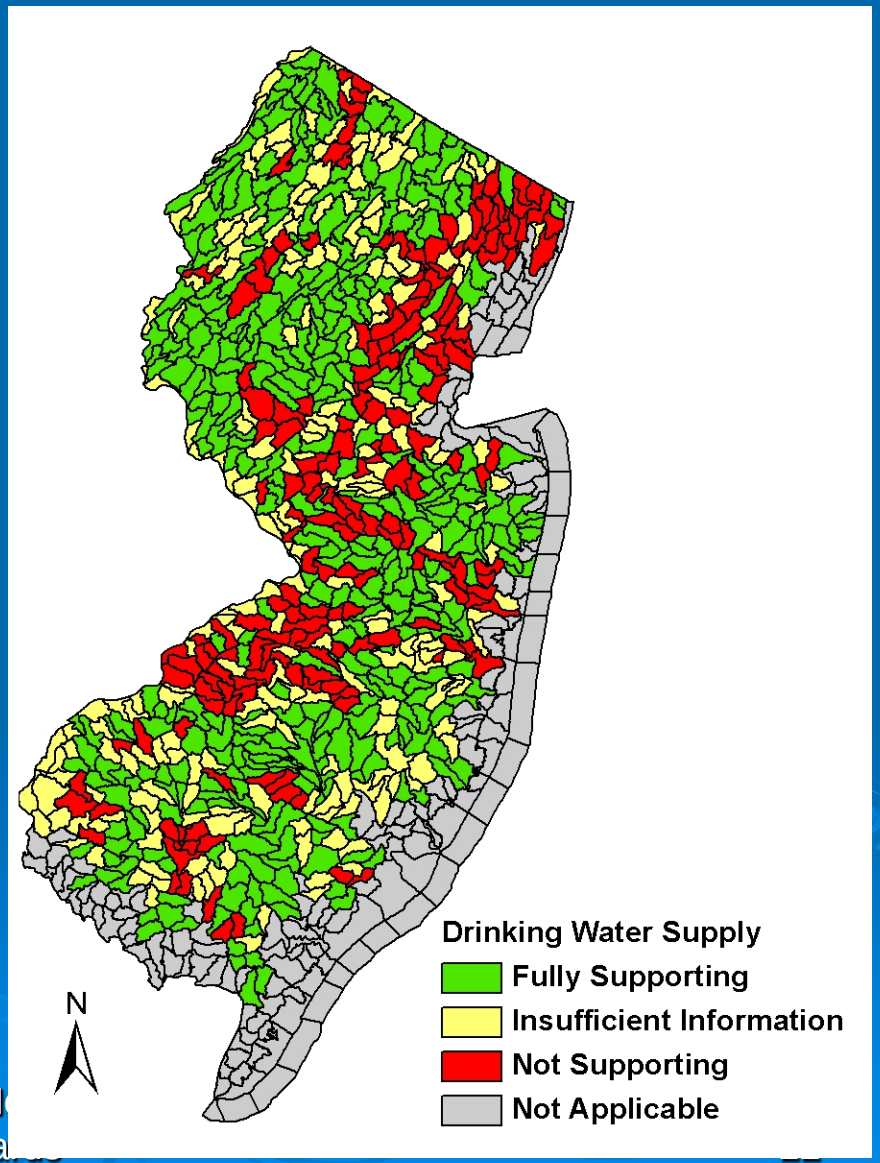
Big Flat Brook
NJ02040104140010-01

- Fully supports all applicable designated uses, including FC
- Located mostly within Stokes State Forest or High Point State Park
- Undeveloped and mostly forested
  - Trout production waters
  - Category One
  - Some FW-1 tribs

Drinking Water Supply Use

- 48% fully supporting
- 24% not supporting*
- 28% insufficient info

*Most of the waters that do not support this use do not contain potable water intakes and are not used for drinking water purposes.

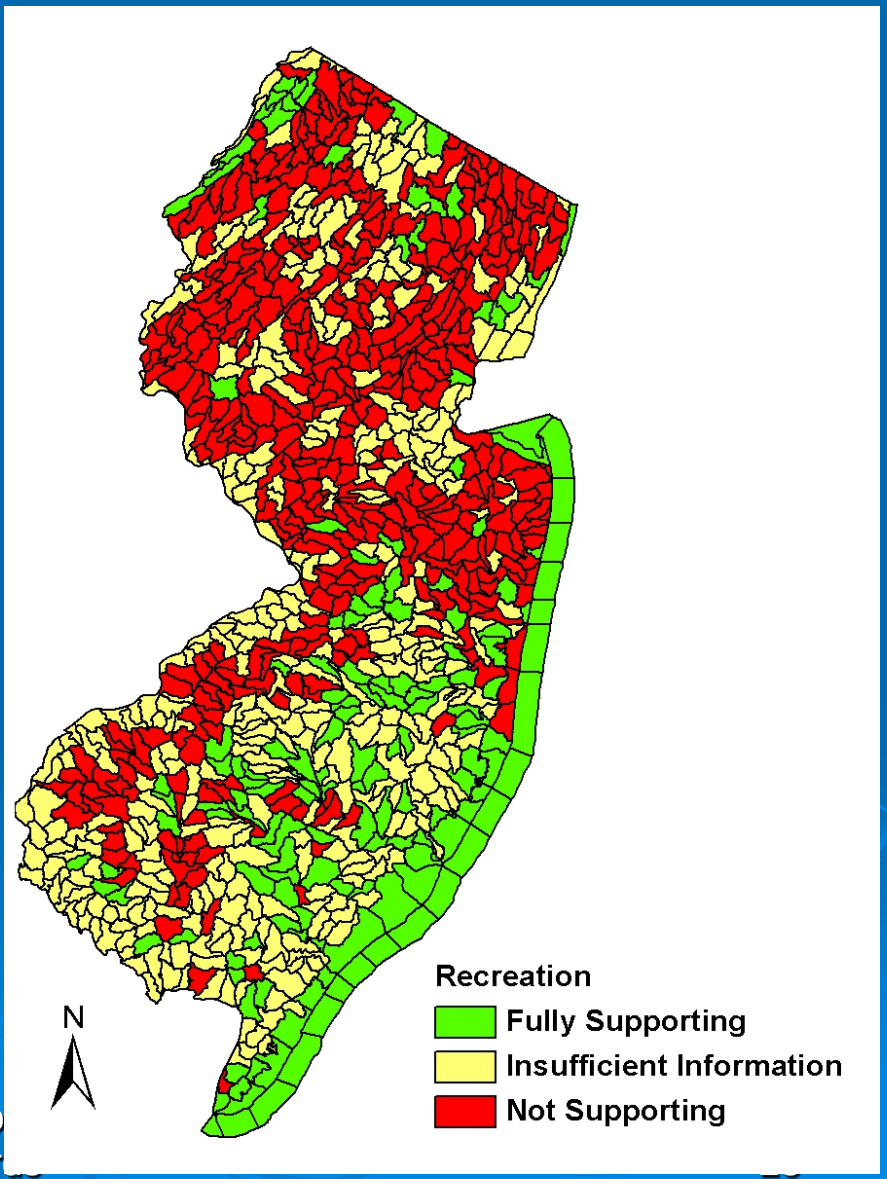


Recreational Use

- 16% fully supporting*
- 44% not supporting**
- 40% insufficient info

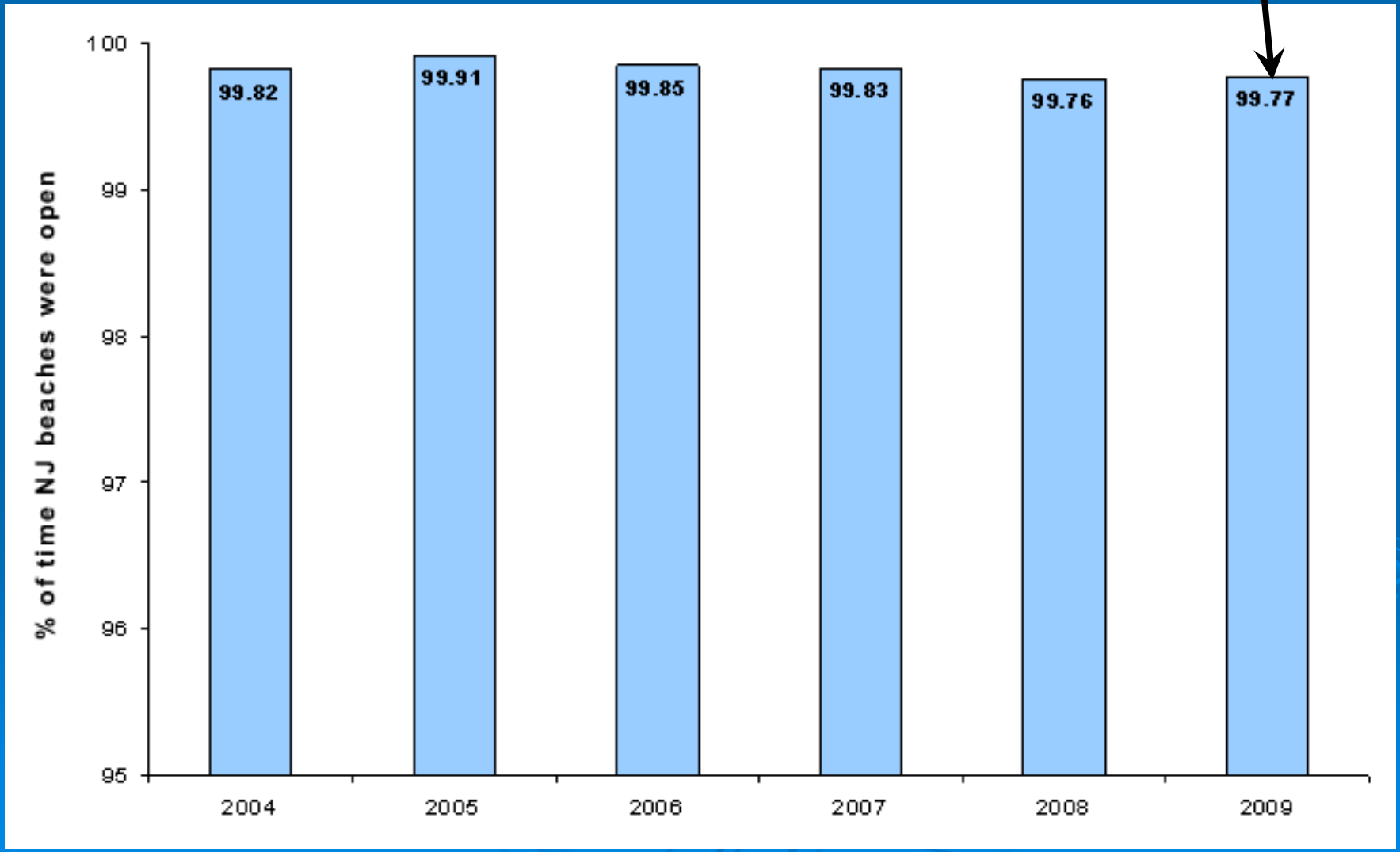
*Over 99% of ocean beaches are fully swimmable.

**TMDLs have been completed for most of waters impaired for pathogens (fecal coliform, Enterococcus, *E. Coli*).



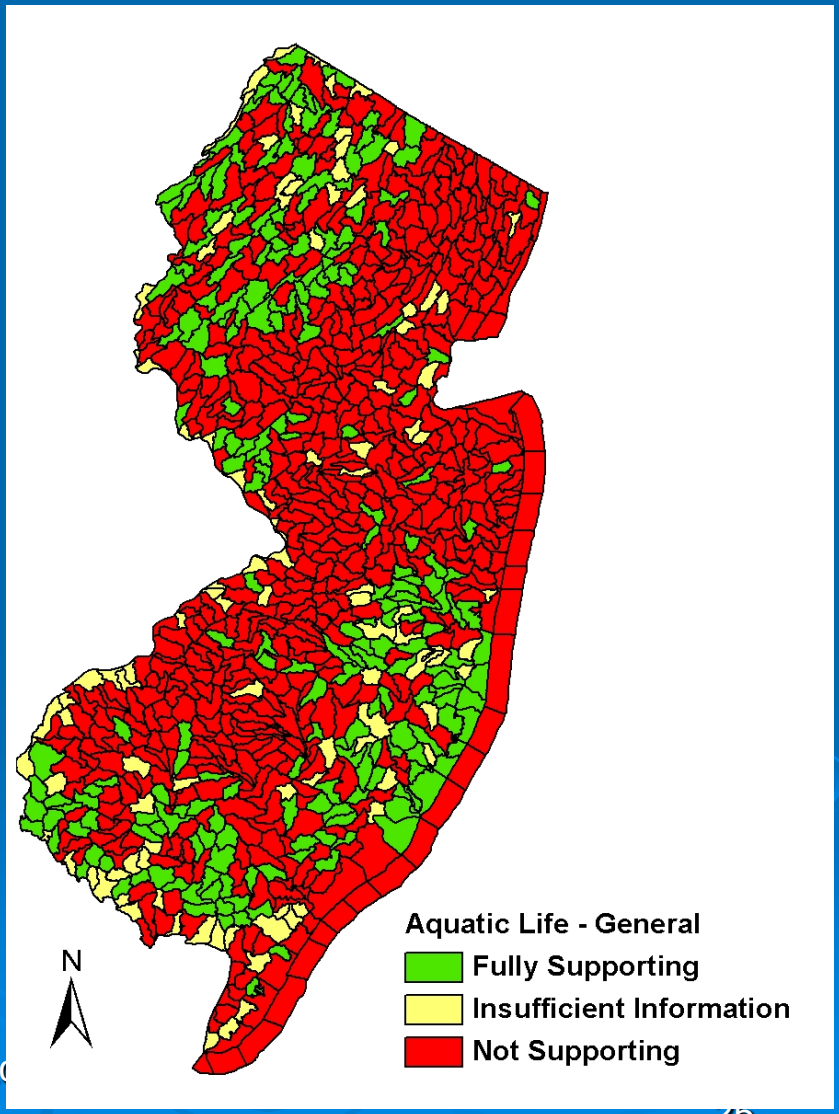
Beaches Open 2004-2009

99.77% open



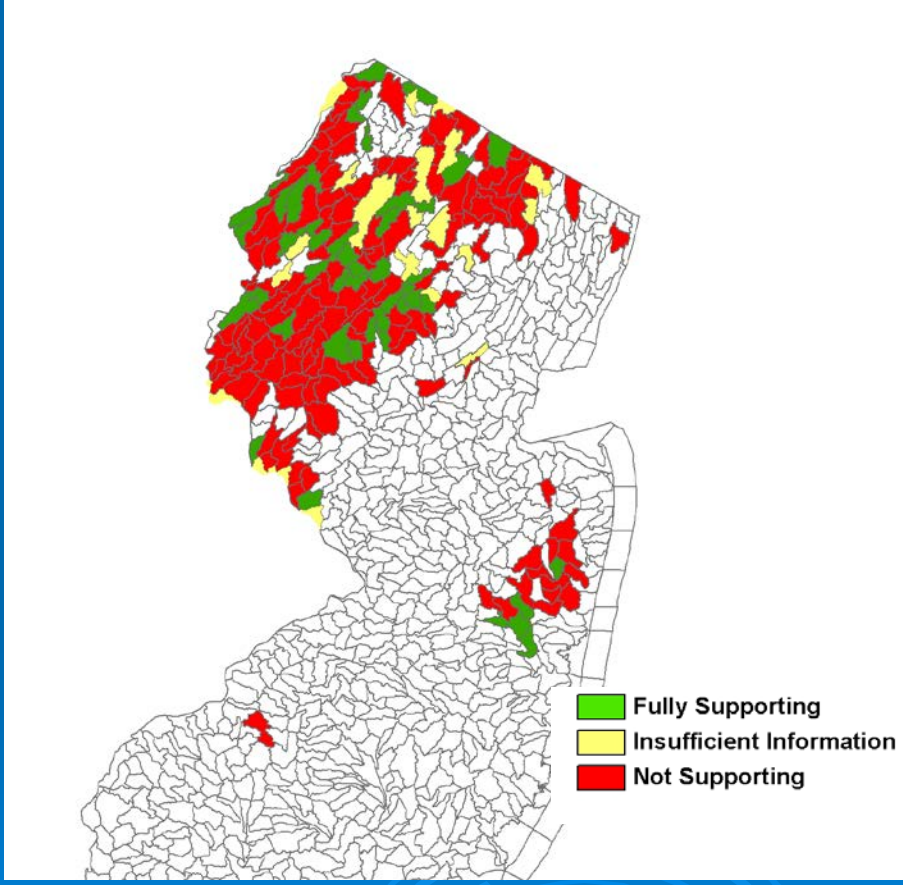
Aquatic Life Uses

- Aquatic Life - General
  - 24% fully supporting
  - 66% not supporting
  - 10% insufficient info



Aquatic Life Uses

- Aquatic Life – Trout
  - 22% fully supporting
  - 64% not supporting
  - 14% insufficient info

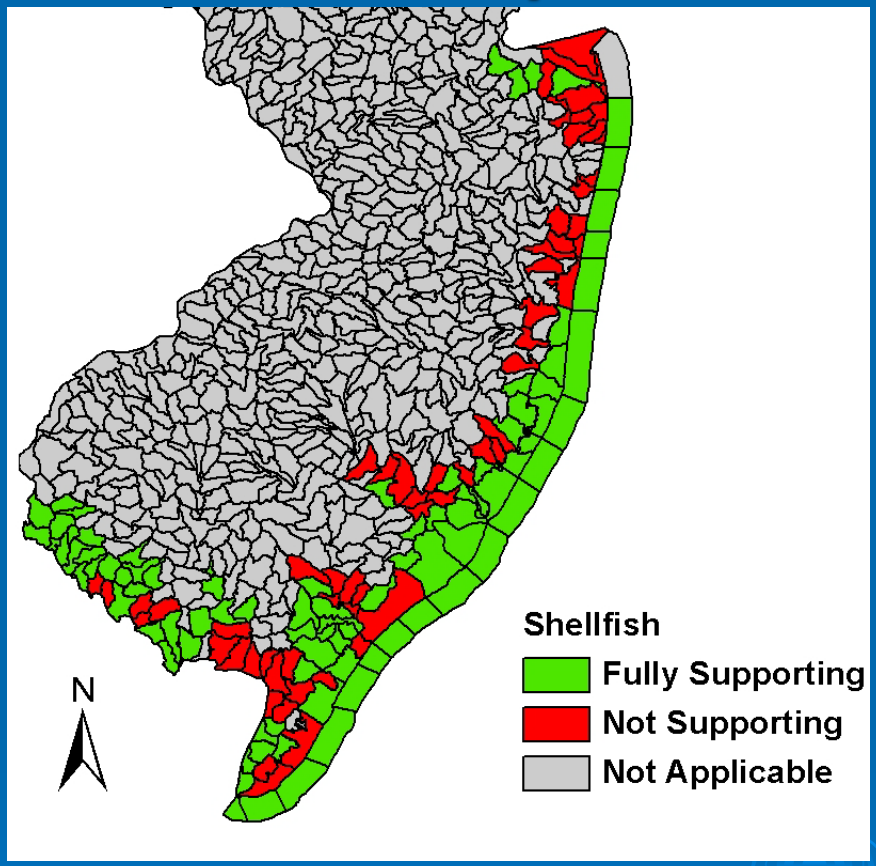


Shellfish Harvest for Consumption

- 60% fully supporting*
- 40% not supporting**

*Only waters classified as “Approved, no restrictions” are considered by USEPA to fully support the use.

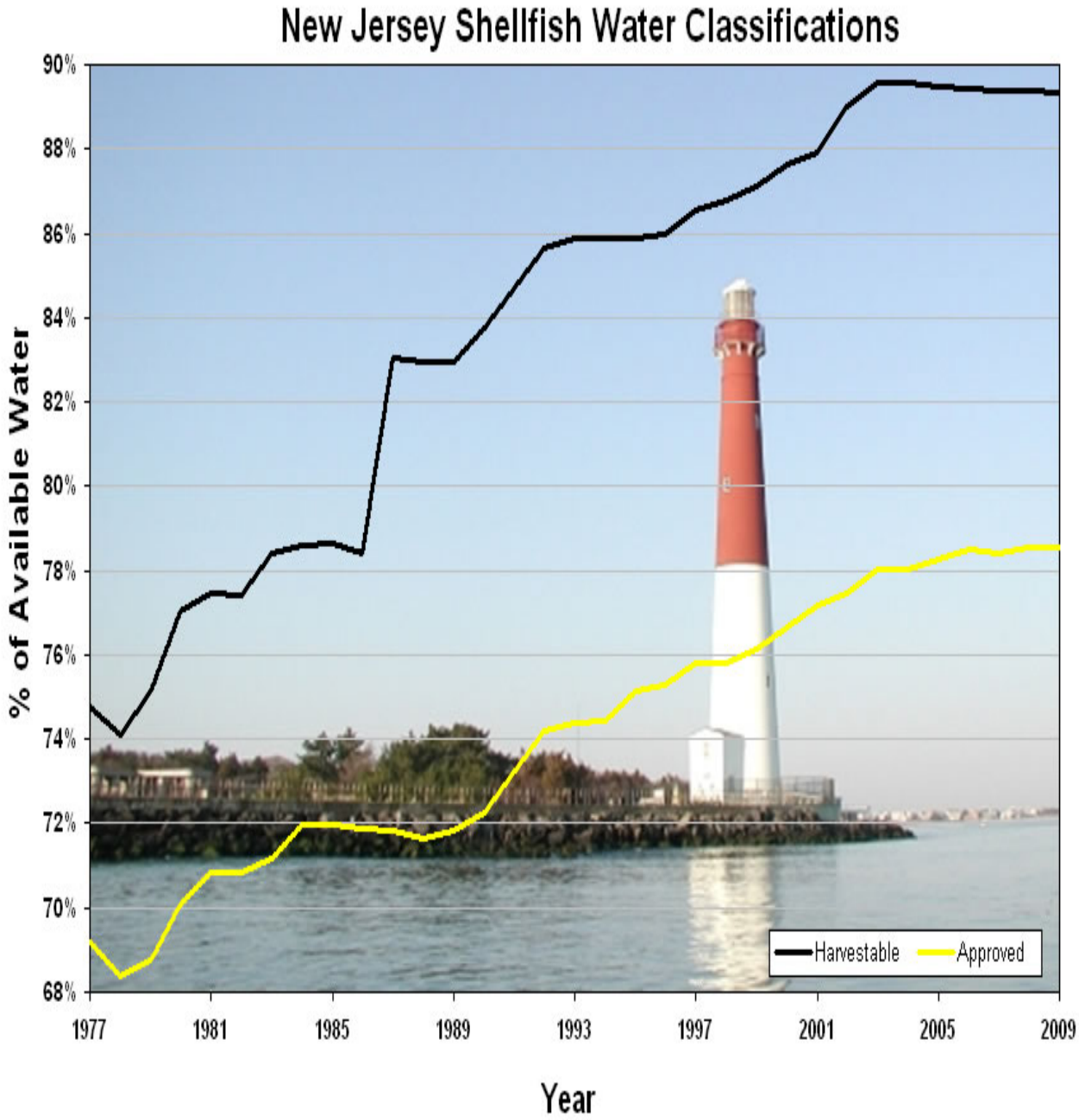
**TMDLs have been developed for 95% of shellfish waters not supporting the use.



Shellfish Classifications:

- Approved (80%)
- Seasonal harvest
- Special restrictions
- Prohibited

} Harvestable (90%)

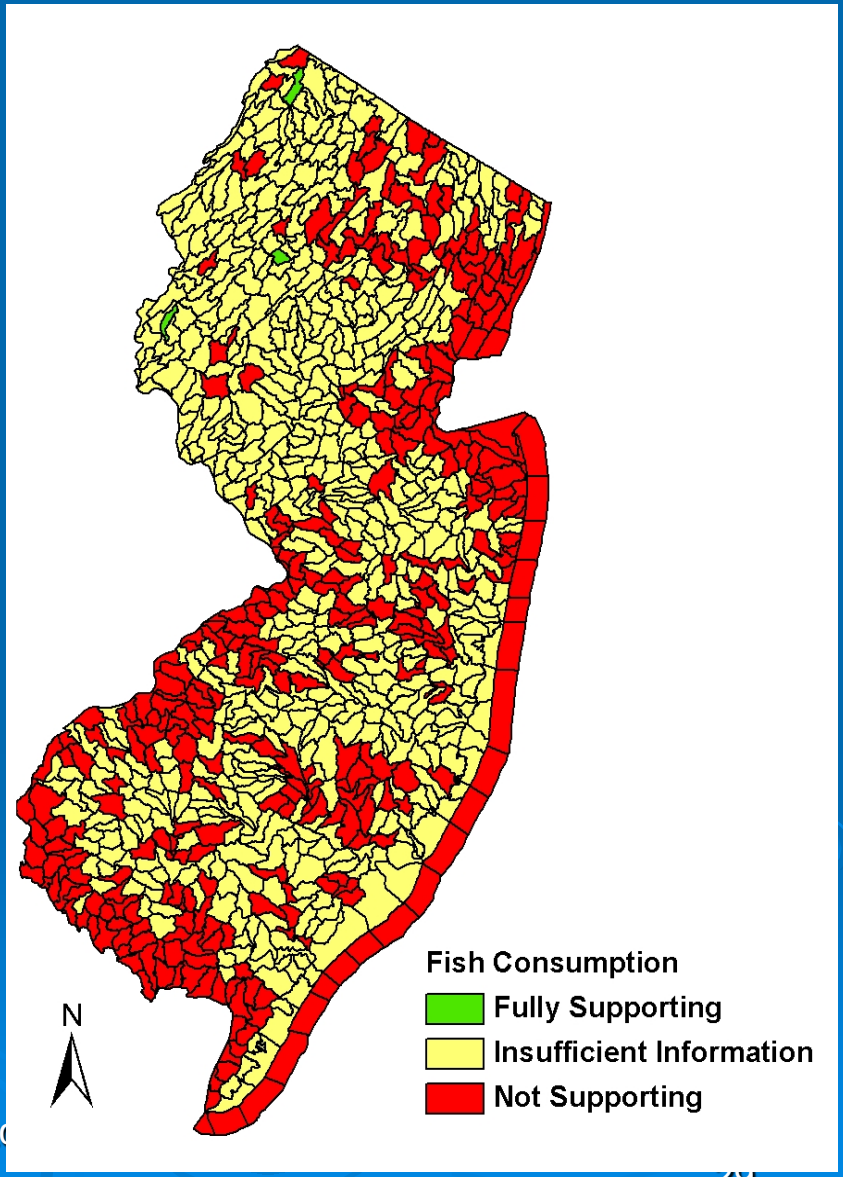


Source: NJDEP, Water Monitoring & Standards, Bureau of Marine Water Monitoring

Fish Consumption Use

- 0.3% fully supporting
- 35% not supporting*
- 65% not assessed

*Statewide TMDL for Mercury Impairments in Fish Tissue adopted June 2010 resulted in 104 delistings, including seven that met the TMDL water quality target for mercury.



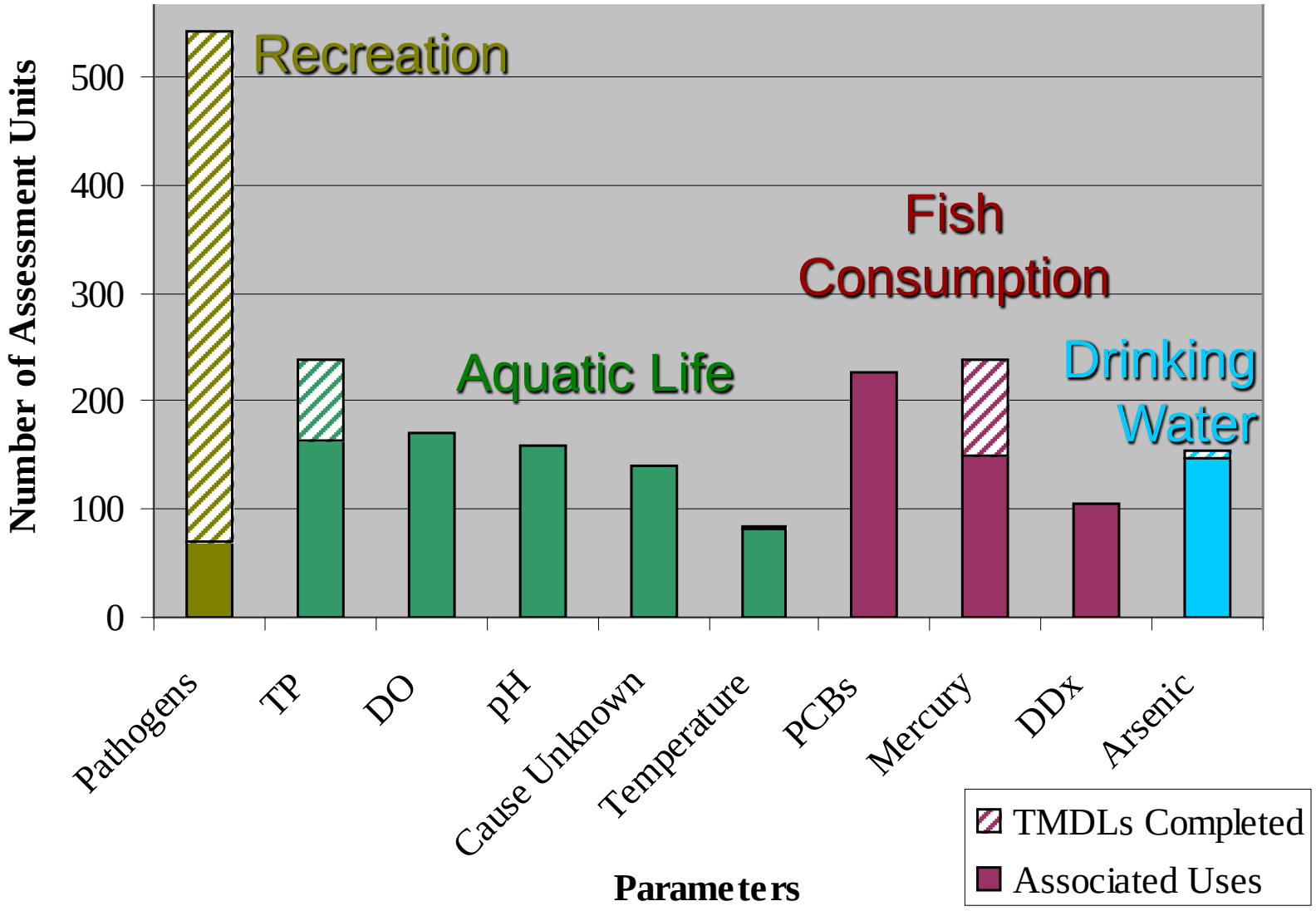
Mercury Target for TMDL

Advisories For <u>High Risk Population</u>	
Mercury Concentration In Fish Tissue (x):	Fish Consumption Advisory:
x > 0.54 µg/g (ppm)	Do Not Eat
0.54 > x < 0.18 µg/g (ppm)	One Meal Per Month
0.18 > x < 0.08 µg/g (ppm)	One Meal Per Week
x < 0.08 µg/g (ppm)	Unlimited Consumption*

Water Quality Target in Statewide Hg TMDL

*USEPA criterion for unlimited consumption for general population is 0.34 ug/g (ppm)

Top Ten Causes of Impairment



Final 2010 303(d) List

- This regulatory component of the Integrated Report:
  - Identifies AUs that do not support designated uses along with the pollutant cause and priority ranking for TMDL development
- 38 Pollutants and 1871 AU/pollutant combinations
- 248 Delistings (removed from 2008 303(d) List)

Trend Analysis Results

- USGS water quality trend analysis
  - 36 stations 1984-2004
  - 70 stations between 1998 and 2007
  - DO, pH, TDS, TP, NO2+NO3, N+NH4

Trend Analysis Results *(cont'd)*

Long term trend (1984-2004):

- Nutrient levels & DO conditions improved over time
  - Upgrade and regionalization of wastewater treatment plants statewide in late 1980's.

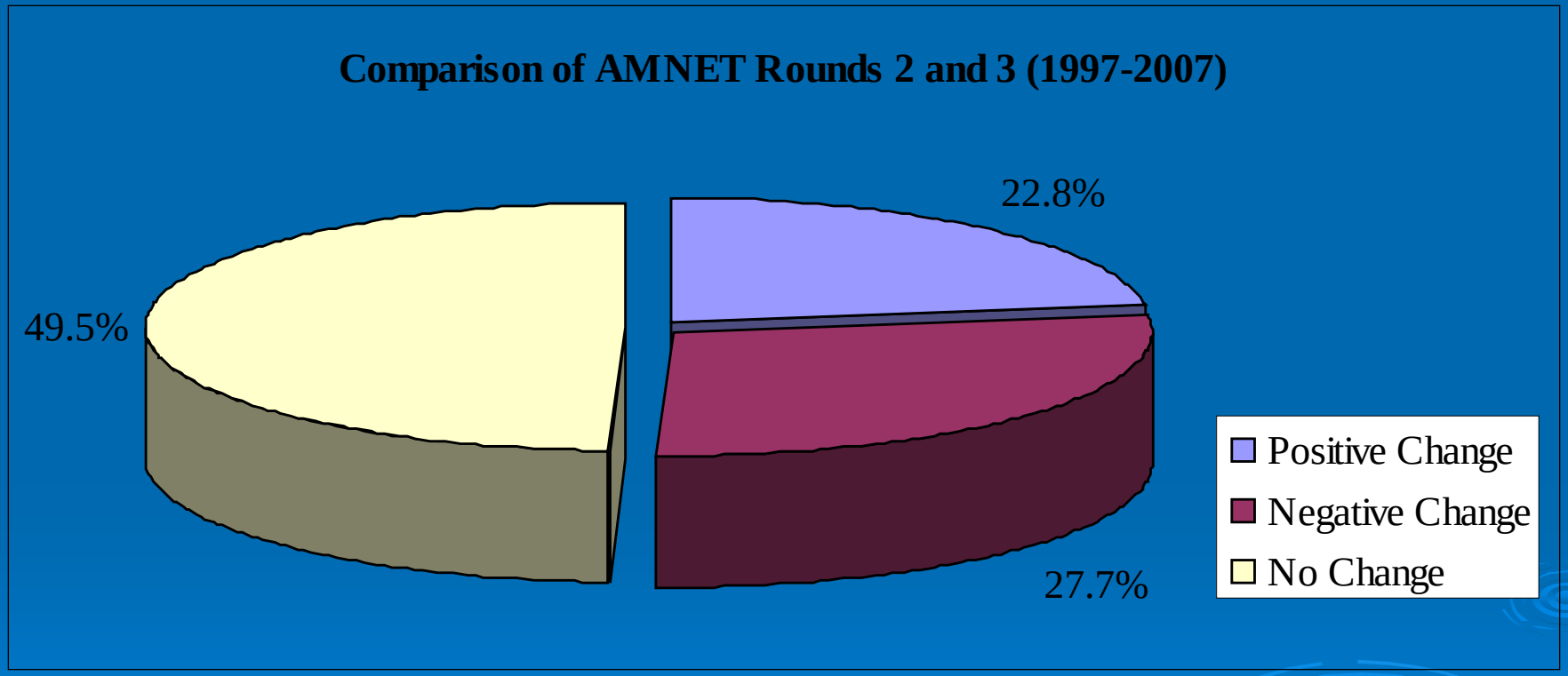
Trend Analysis Results *(cont'd)*

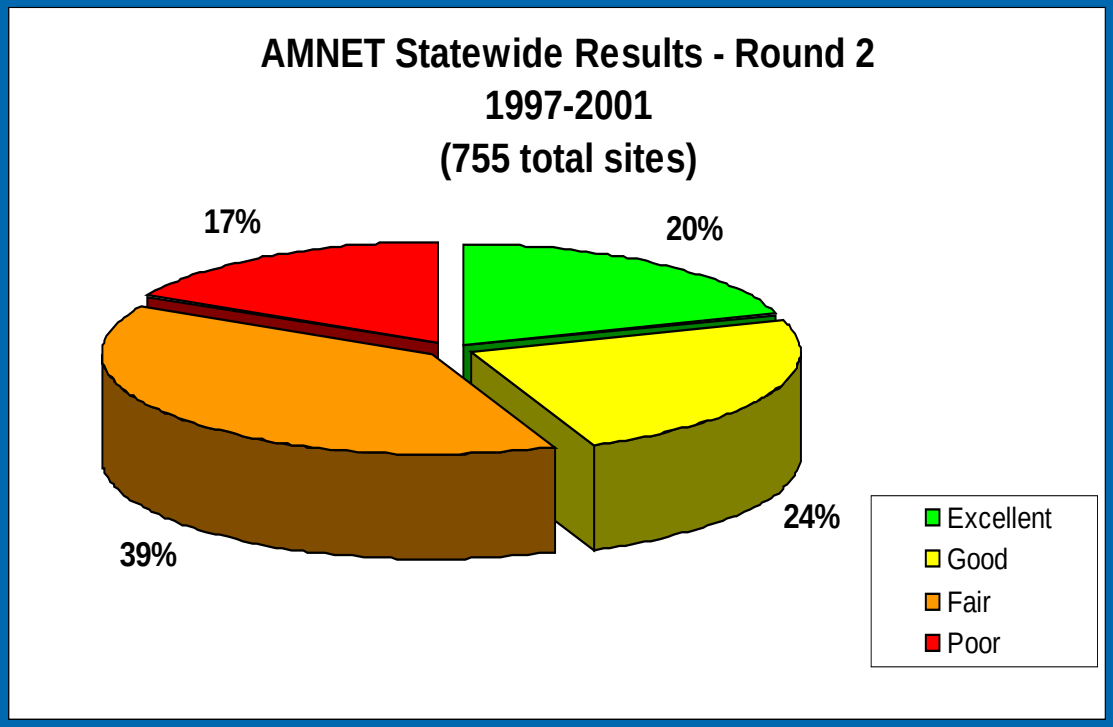
Shorter Term Trend analysis (1998-2007):

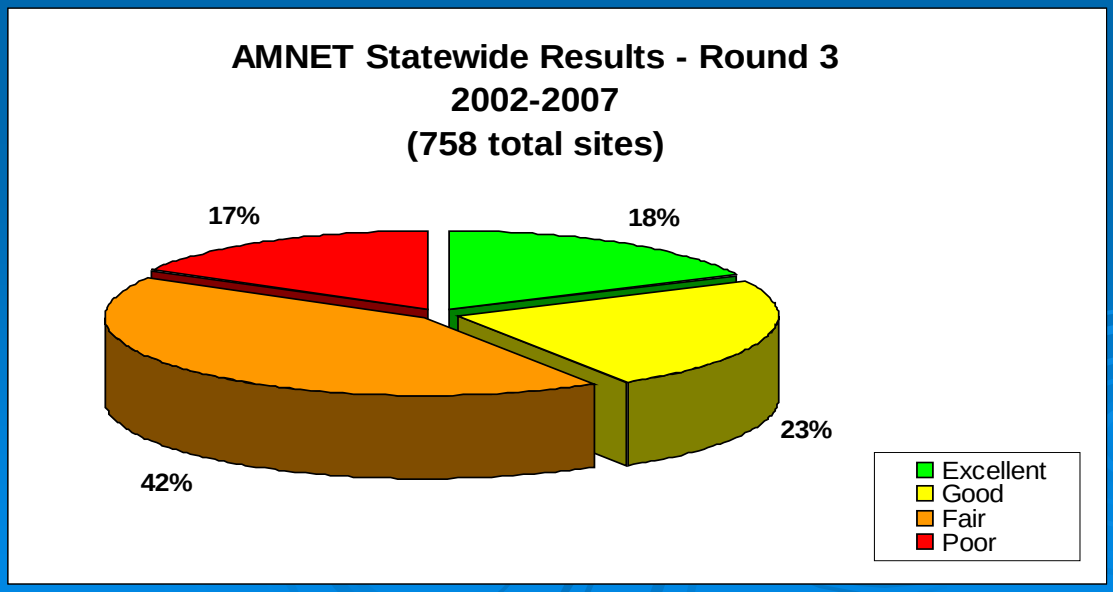
- 70 stations
- Declining conditions for TDS, nitrate
- Improving conditions for TP
- No discernable trend for other parameters
- Overall reflect more stable conditions

  - Need increased stormwater/NPS controls, targeted TMDLs, restoration activities, regional/national approaches
  - Continued impact of NPS (e.g., TDS) & legacy pollutants (PCB, DDX)

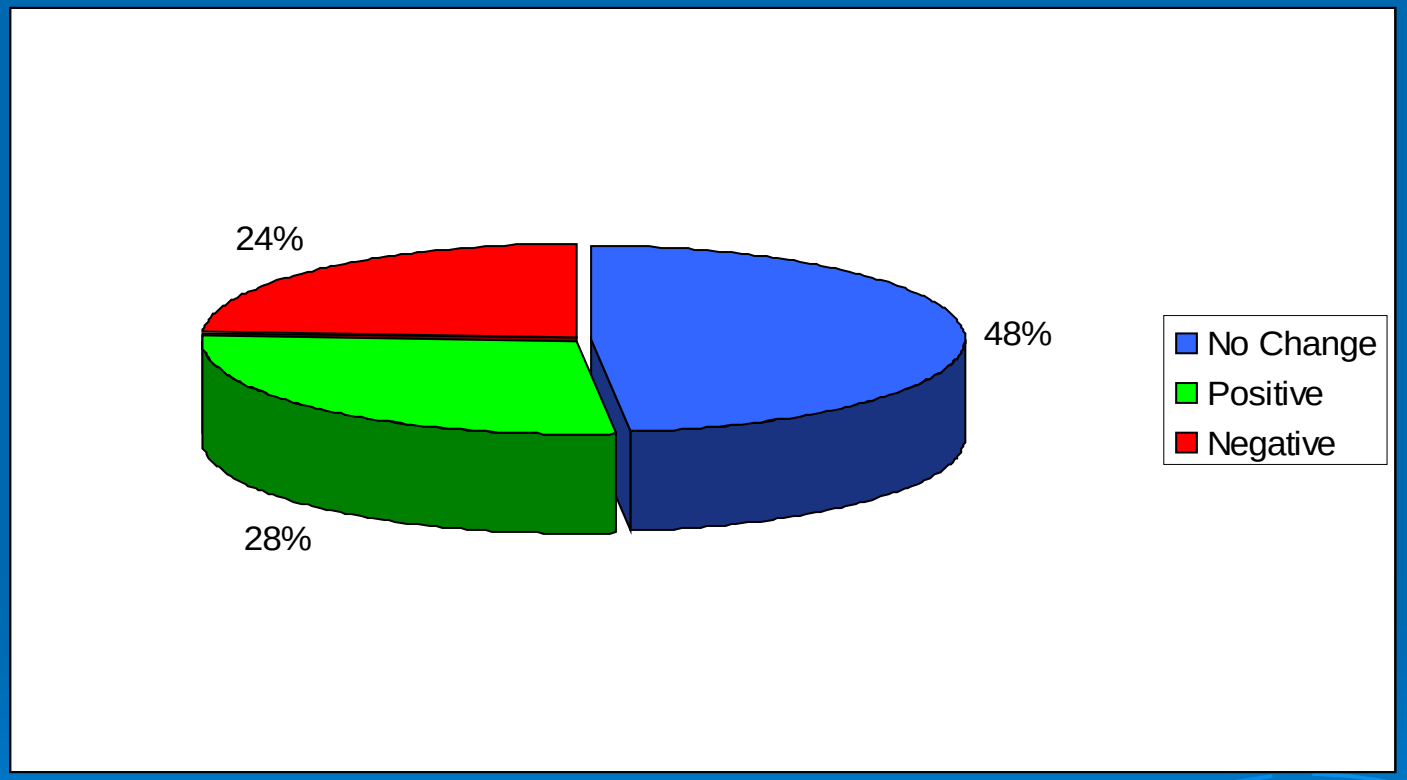
Trends in Biological Assessment



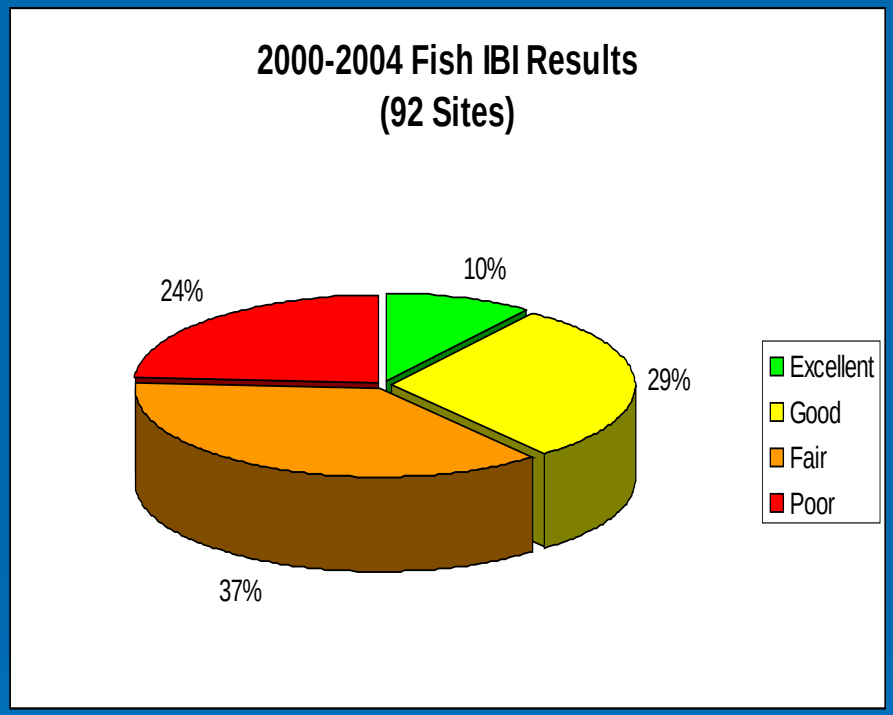

AMNET Statewide Results - Round 2
1997-2001
(755 total sites)
17%
20%
24%
39%
Excellent
Good
Fair
Poor

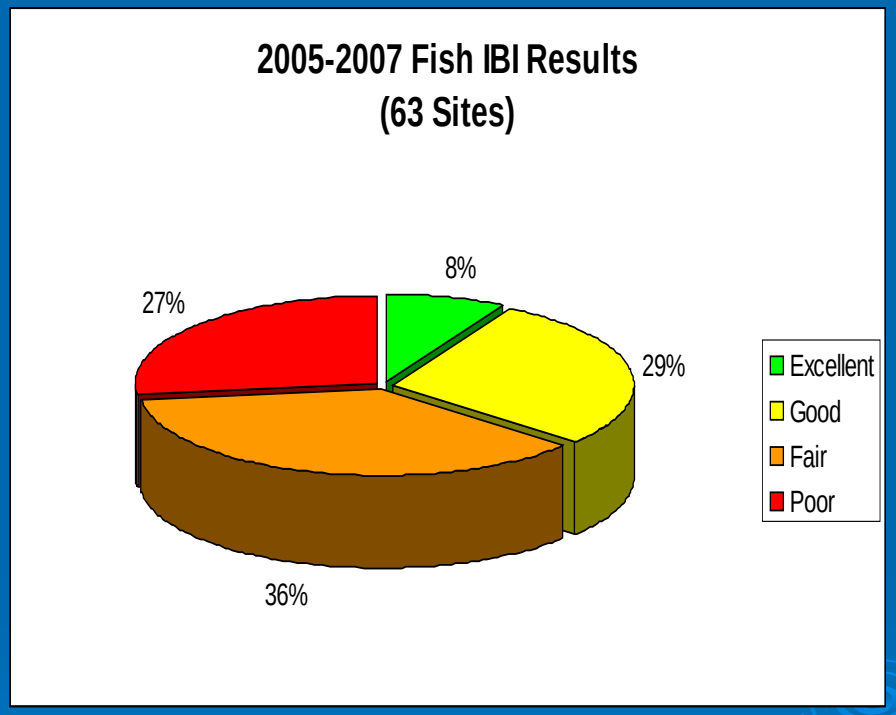

AMNET Statewide Results - Round 3
2002-2007
(758 total sites)
17%
18%
23%
42%
Excellent
Good
Fair
Poor

Comparison of FIBI Rounds 1 and 2 (2000-2007)



FIBI Results, Rounds 1 and 2





Conclusion

- Sources of pollutants causing water quality impairment in New Jersey waters are many and varied and represent the product of highly dynamic and interconnected systems.
- A regional or drainage basin approach may be required to successfully manage these complex systems, as illustrated by the new Barnegat Bay Initiative.
- Such an approach is needed to identify and manage all the sources contributing to water quality impairment (including point and nonpoint sources of pollution).

- Public participation and local commitment to a common goal of water quality restoration is needed to achieve fully supported uses in all waters of the State.
- The Barnegat Bay Initiative recognizes that all activities occurring within the Estuary are interrelated and have a cumulative impact on the quality of the Bay; therefore, these impacts must be addressed collectively if water quality in the Bay is to be restored.
- If successful, the Barnegat Bay Initiative will serve as a model for water quality restoration throughout the State of New Jersey.

Status of the 2010 Integrated Report

Still pending for 2010

DEP responding to EPA comments

EPA approval

Adoption as an amendment to the WQMP

Schedule for 2012 IR

- ✓ Data solicitation – April 2011
  - Data received from 16 organizations

NEXT STEPS

Methods Document	December 2011
Draft Integrated Report	April 2012
Final Integrated Report	August 2012

Where can I find NJ's assessment results?

- WM&S website: http://www.state.nj.us/dep/wms/bwqsa/2010_integrated_report.htm

- EPA website: http://www.epa.gov/waters/ir/

For More Information…

Debra Hammond

Division of Water Monitoring and Standards

Bureau of Water Quality Standards and Assessment

Debra.hammond@dep.state.nj.us

(609)777-1753

www.state.nj.us/dep/wms/bwqsa/generalinfo.htm

Questions?