EPA's Proposed Water Quality Standards for Florida's Lakes and Flowing Waters

Establishing Numeric Nutrient Criteria

January 14, 2010

Microcystis Bloom – Goodby's Creek at the St. Johns River, Jacksonville, FL – September 14, 2005

Erik Silldorff, DRBC

NJ Water Monitoring Council Meeting

Feb 3, 2010

DRBC excerpts & emphases from J.Keating presentation on 1/27/2010 to EPA-R3 states (13 slides of 33 orig)

Background

- The Florida Wildlife Federation (FWF) filed a lawsuit in 2008 seeking to require EPA to promulgate numeric nutrient water quality standards (WQS) for Florida waters.
- In consultation with the Florida Department of Environmental Protection (FDEP), EPA determined in January 2009 that numeric nutrient criteria are necessary for Florida to meet the requirements of the Clean Water Act. The Act requires EPA to "promptly" propose criteria after its determination.
- EPA entered into a Consent Decree with FWF in August 2009 to 1) propose numeric criteria for FL lakes and flowing waters by January 14, 2010 and finalize those criteria by October 15, 2010 and 2) propose numeric criteria for FL estuaries and coastal waters by January 14, 2011 and finalize those criteria by October 15, 2011.

(will not discuss "canals"; will also not give most of Background; only briefly touch on DPVs and Restoration)

Lakes Classification

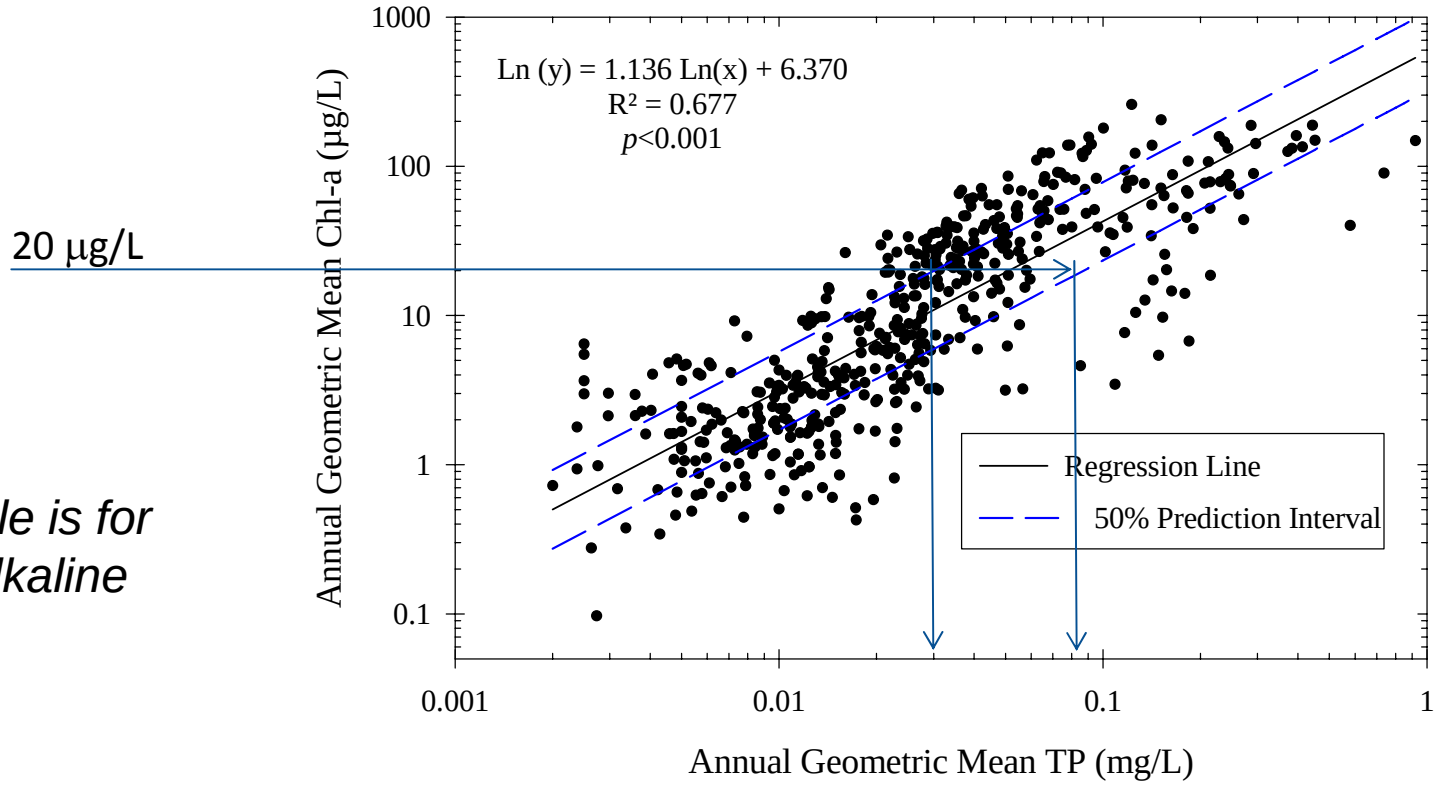
- Colored Lakes (presence of natural organic acids)
  - Measured as >40 Platinum Cobalt Units (PCU)
  - Higher natural nutrient loads/concentrations
  - More light limited than clear lakes
  - Mesotrophic expectation with 20 ug/L Chl a criterion*
- Clear Alkaline Lakes (limestone areas)
  - Measured as > 50 mg $CaCO_3$/L
  - Higher alkalinity and naturally elevated phosphorus
  - Less light limited than colored lakes; more responsive to nutrients
  - Mesotrophic expectation with 20 ug/L Chl a criterion*
- Clear Acidic Lakes (non-limestone areas)
  - Measured as < 50 mg $CaCO_3$/L
  - Sandy, naturally low nutrients, less alkaline
  - Less light limited than colored lakes; more responsive to nutrients
  - Oligotrophic expectation with 6 ug/L Chl a criterion*

*Supported by warmwater trophic status index (TSI) studies, paleolimnological evidence, reference condition studies, and morphoedaphic index (MEI) evaluations

Lakes Data Analysis

- TN and TP criterion concentrations interpolated from prediction interval of the regression with Chl *a*
- Lower value serves as the protective baseline criterion
- Range defines boundaries of modified criteria, available where Chl *a* target is met for at least 3 years

Example is for clear alkaline lakes:



Proposed Criteria for Lakes

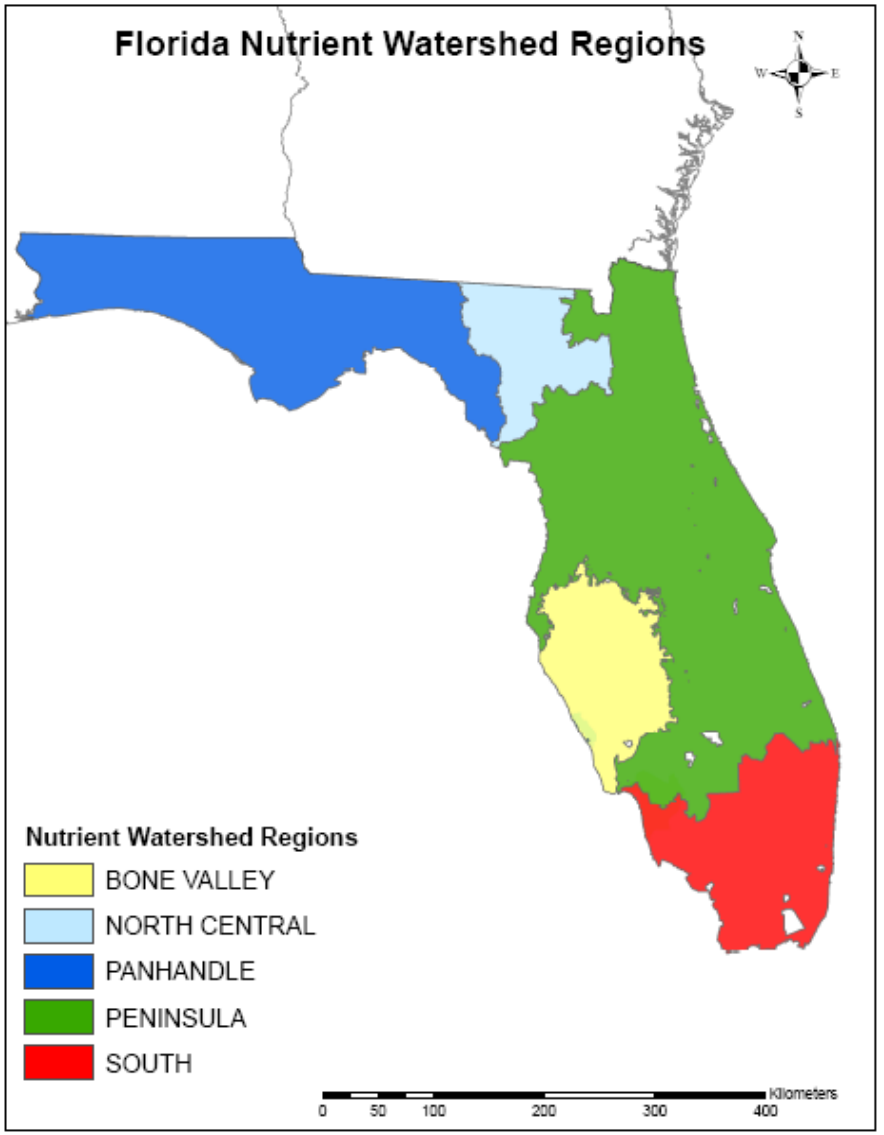
Proposed criteria for chlorophyll *a*, total nitrogen (TN), and total phosphorus (TP) for lakes within each category:

Three Lake Categories	Chlorophyll *a* (ug/L)	Baseline Criteria		Modified Criteria (within these bounds)	
		TP (ug/L)	TN (mg/L)	TP (ug/L)	TN (mg/L)
Colored Lakes	20	50	1.23	50-157	1.23-2.25
Clear, Alkaline Lakes	20	30	1.00	30-87	1.00-1.81
Clear, Acidic Lakes	6	10	0.500	10-30	0.500-0.900

(Duration = annual geometric mean; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

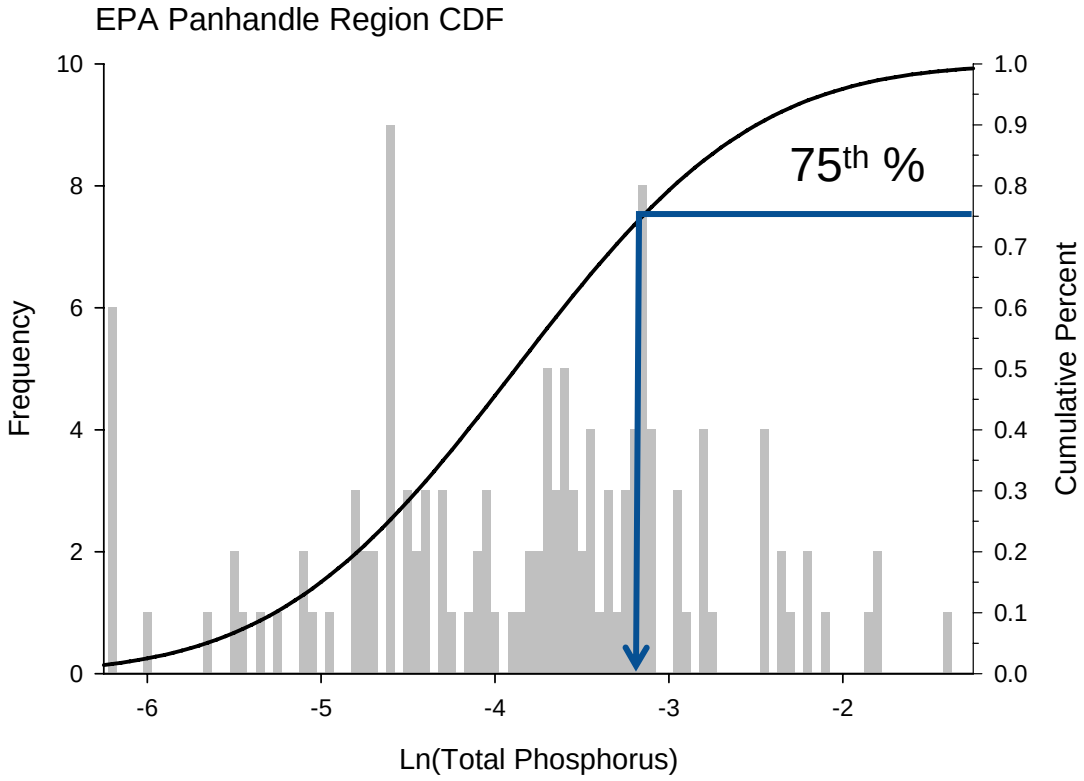
Streams Classification

- Panhandle and Peninsula are geographically distinct in their natural features
- Bone Valley and North Central have phosphorus enriched soil and rock deposits



Streams Data Analysis

- Select 75th percentile of each distribution of TP and TN as the criterion concentration
  - Represents a position that lies just above the vast majority of data
  - Avoids a middle point that would imply half of streams are impaired
  - Avoids high end value which may not reflect conditions in most biologically healthy streams



Streams

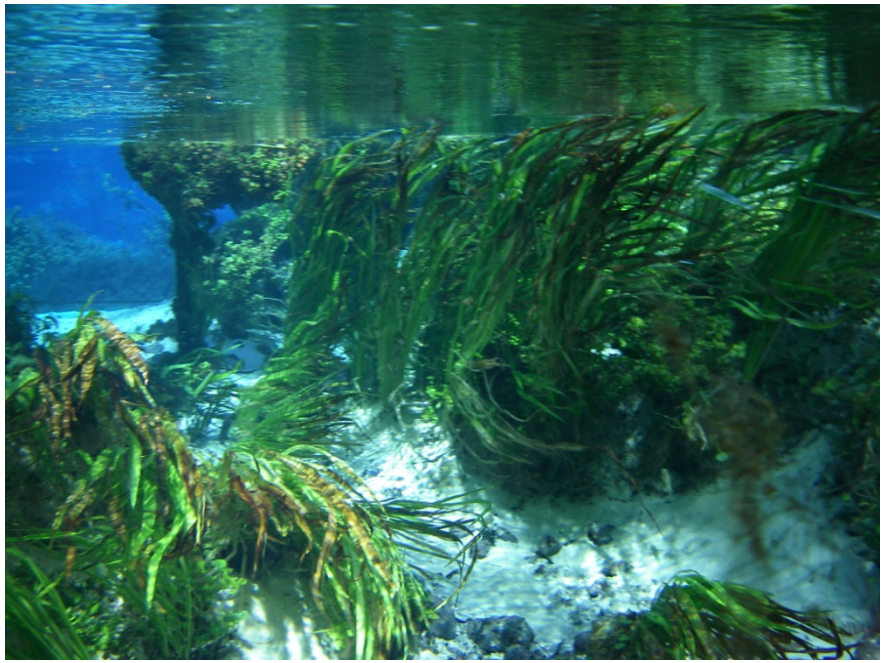
Proposed Criteria for Rivers and Streams

Proposed instream protection value (IPV) criteria for total nitrogen (TN) and total phosphorus (TP) for streams within each respective nutrient watershed region:

Nutrient Watershed Region	Instream Protection Value Criteria	
	TN (mg/L)	TP (ug/L)
Panhandle	0.824	43
Bone Valley	1.798	739
Peninsula	1.205	107
North Central	1.479	359

(Duration = annual geometric mean; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

Nutrient Pollution in Florida's Springs



Weeki Wachee Spring, 1950s (Nitrate < .1mg/L, Eel grass dominated) and, 2001 (Nitrate ~ .7mg/L, Lyngbya dominated) (Photos courtesy of Florida Archives and Agnieszka Pinowska)

Springs and Clear Streams Definition and Approach

- Definition:
  - "Spring" means the point where underground water emerges onto the Earth's surface, including its spring run.
  - "Clear stream" means a free-flowing water whose color is less than 40 platinum cobalt units.

- Approach:
  - EPA is proposing a nitrate-nitrite criterion of 0.35 mg/L for springs and clear streams based on experimental laboratory data and field evaluations that document the response of nuisance algae and periphyton to nitrate-nitrite concentrations.

Downstream Estuary Protection Considerations

- DPVs for TN tend to be lower than corresponding instream protection values (IPVs)
  - DPVs range from 0.34 to 0.95 mg/L in terminal reaches, rising as high as 1.41 mg/L in the upper watershed
- EPA proposed that DPVs can be re-calculated to reflect a different distribution of load across the watershed in a streamlined fashion
- EPA indicated in the proposal that it intends to go final with DPVs after proposal of estuary criteria (i.e., Oct 2011), although it could go final in Oct 2010
- EPA anticipates developing a comparable approach for TP once those data are released by USGS for the southeast U.S.
- Proposal uses a principle that numeric criteria should reflect downstream protection needs if sufficient data and scientifically defensible approaches are available to quantify them

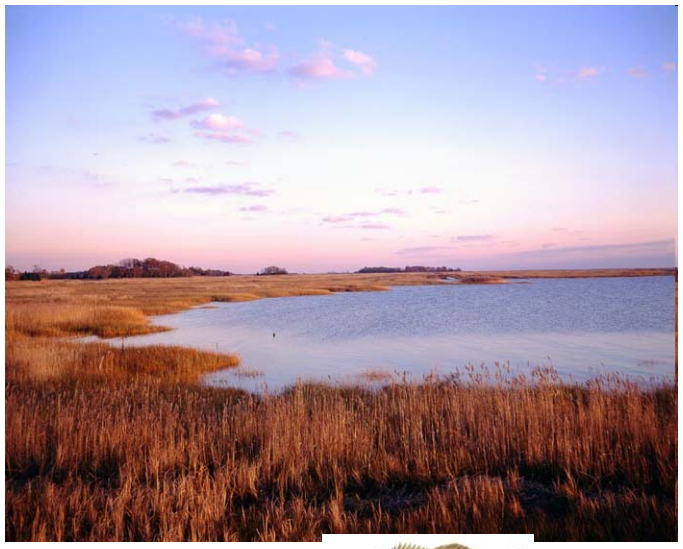
Downstream Lake Protection

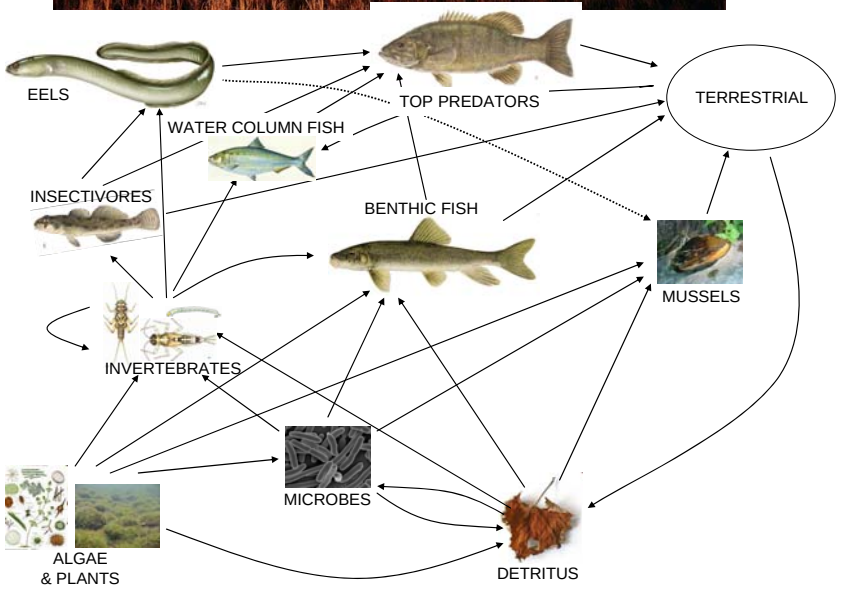
- EPA proposed a simple derivative of a Vollenweider equation to determine a concentration in streams that will achieve a downstream lake criterion for TP
- The equation requires input of the fraction of inflow from all streamflow and water residence time
  - Proposal includes preset values that can be changed with documented site-specific information
- The proposed applicable criterion for a stream is the lower of the stream IPV or the value for protection of the downstream lake
  - Using preset values, the stream criteria could be lowered to 25, 73, or 120 ug/L for a stream flowing into a clear acid, clear alkaline, or colored lake, respectively
- EPA intends to finalize provisions for downstream lake protection in Oct 2010.

FL Proposal for Restoration WQS

- A series of interim designated uses and numeric criteria representing feasible steps towards attainment of a CWA 101(a)(2) designated use
- To be utilized at the State's discretion
- Requires Use Attainability Analysis (UAA)
- Interim targets informed by UAA and implementation plan
- Requires State adoption and EPA approval as revised State WQS

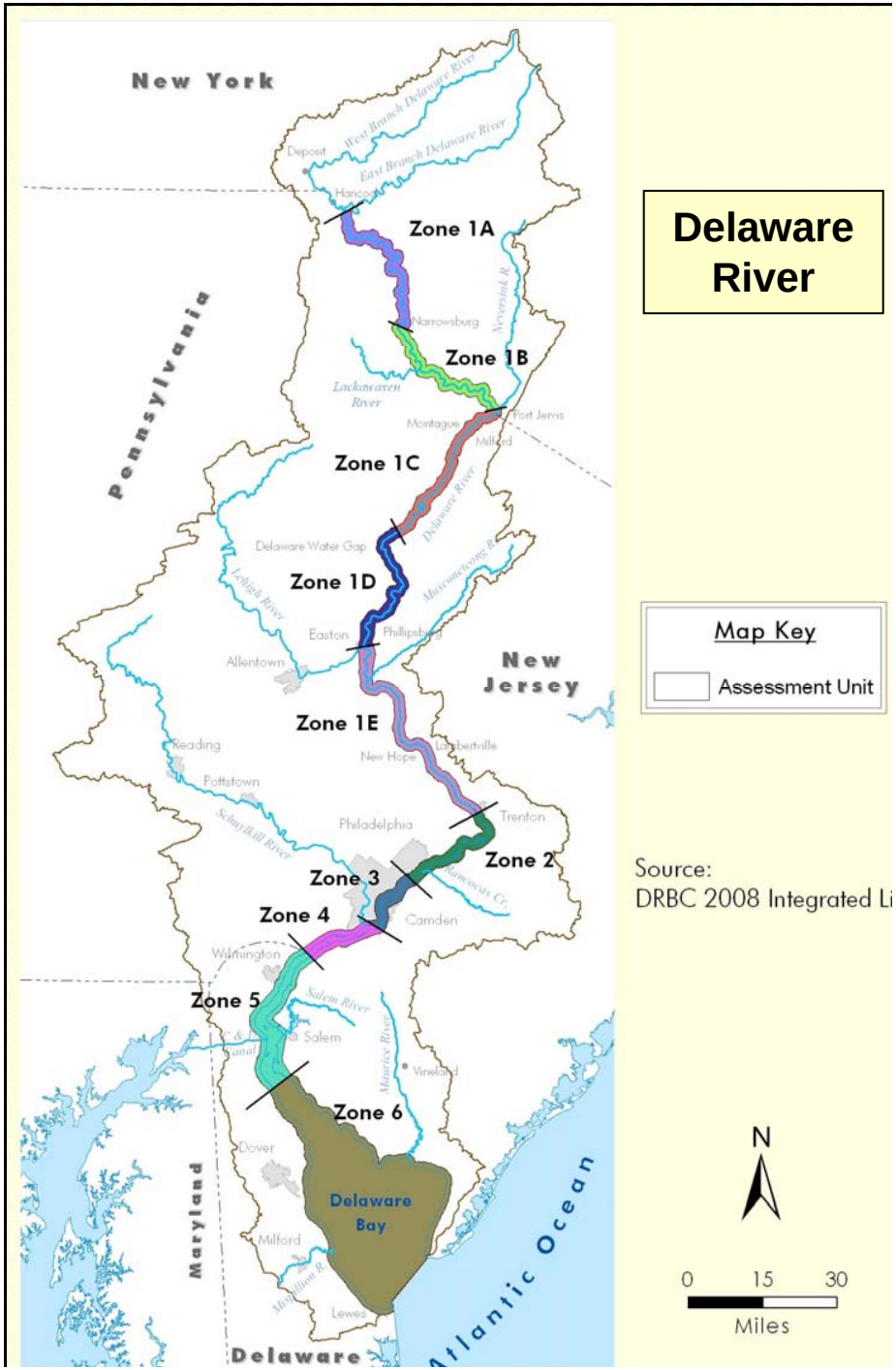
Nutrient Criteria Development – Delaware R. & Estuary





Delaware River Main-Stem
Interstate Water Quality Management Zones

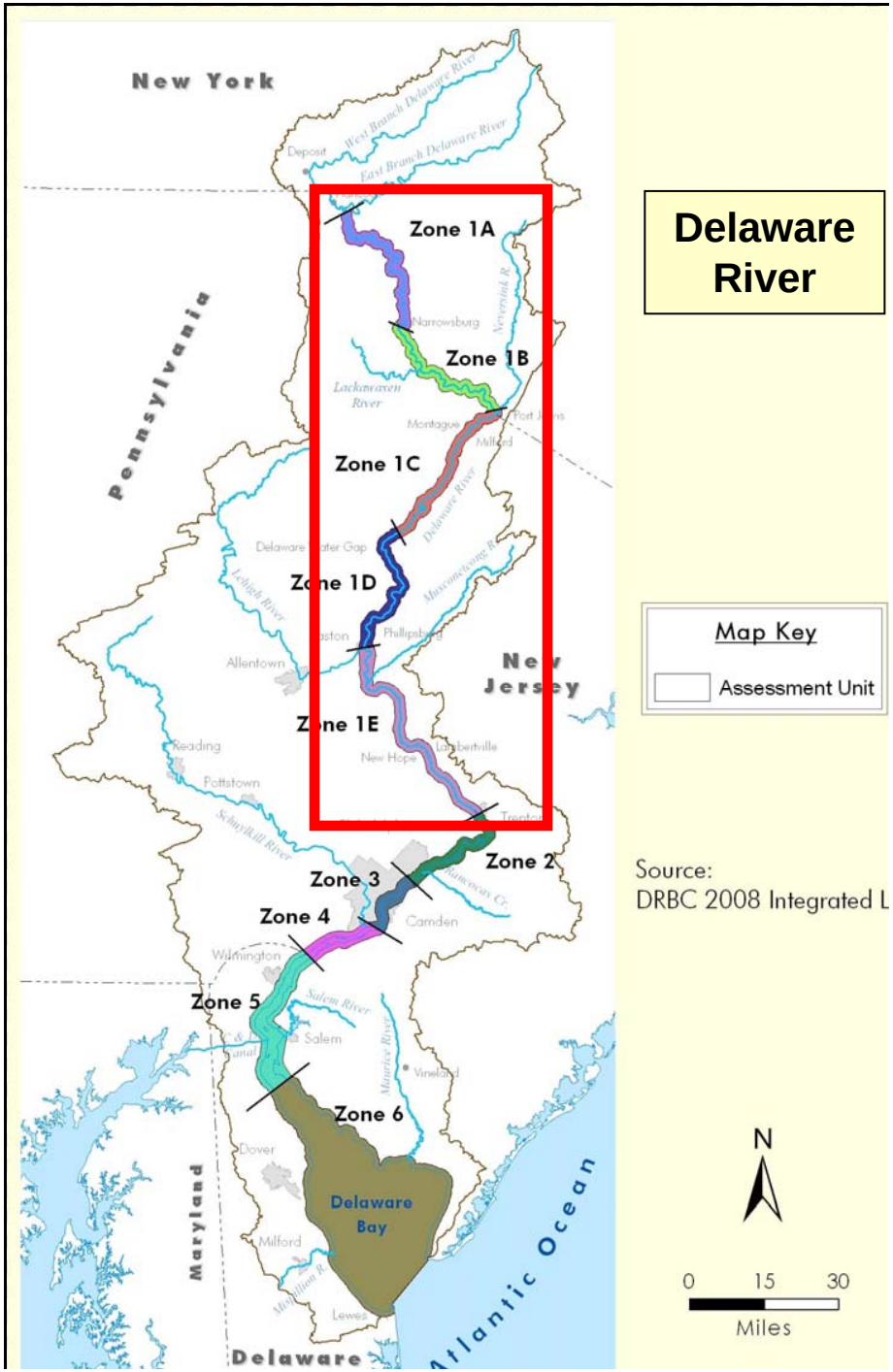
Water Quality Mgmt Zone	River Mile Location	Habitat
1A	330.7 – 289.9	non-tidal freshwater
1B	289.9 – 254.75	"
1C	254.75 – 217.0	"
1D	217.0 – 183.66	"
1E	183.66 – 133.4	"
2	133.4 – 108.4	tidal freshwater estuary
3	108.4 – 95.0	"
4	95.0 – 78.8	tidal transitional estuary (oligohaline in lower)
5	78.8 – 48.2	tidal oligo/mesohaline estuary
6	48.2 – 0.0	Delaware Bay (meso/polyhaline)



Non-Tidal River:
Nutrient Criteria Development

- Anti-Degradation protections (SPW)
- Nutrient Gradient: low to moderate
- Biocriteria development
- Nutrient-effects studies

(Nutrient Strategy needs revision, re-submission to EPA)



Delaware Estuary / Bay: Nutrient Criteria Development

- No nutrient protections existing
- High nutrients, but stable trends
- DRBC Subcommittee: 2008
- Interim Protective Measures: 2009
  - › Point-source monitoring
  - › Non-point source estimation
  - › Tech-based limits on new
  - › Anti-degradation program review
- Dissolved oxygen: 2-phase revision
- Ecosystem effects: long-term

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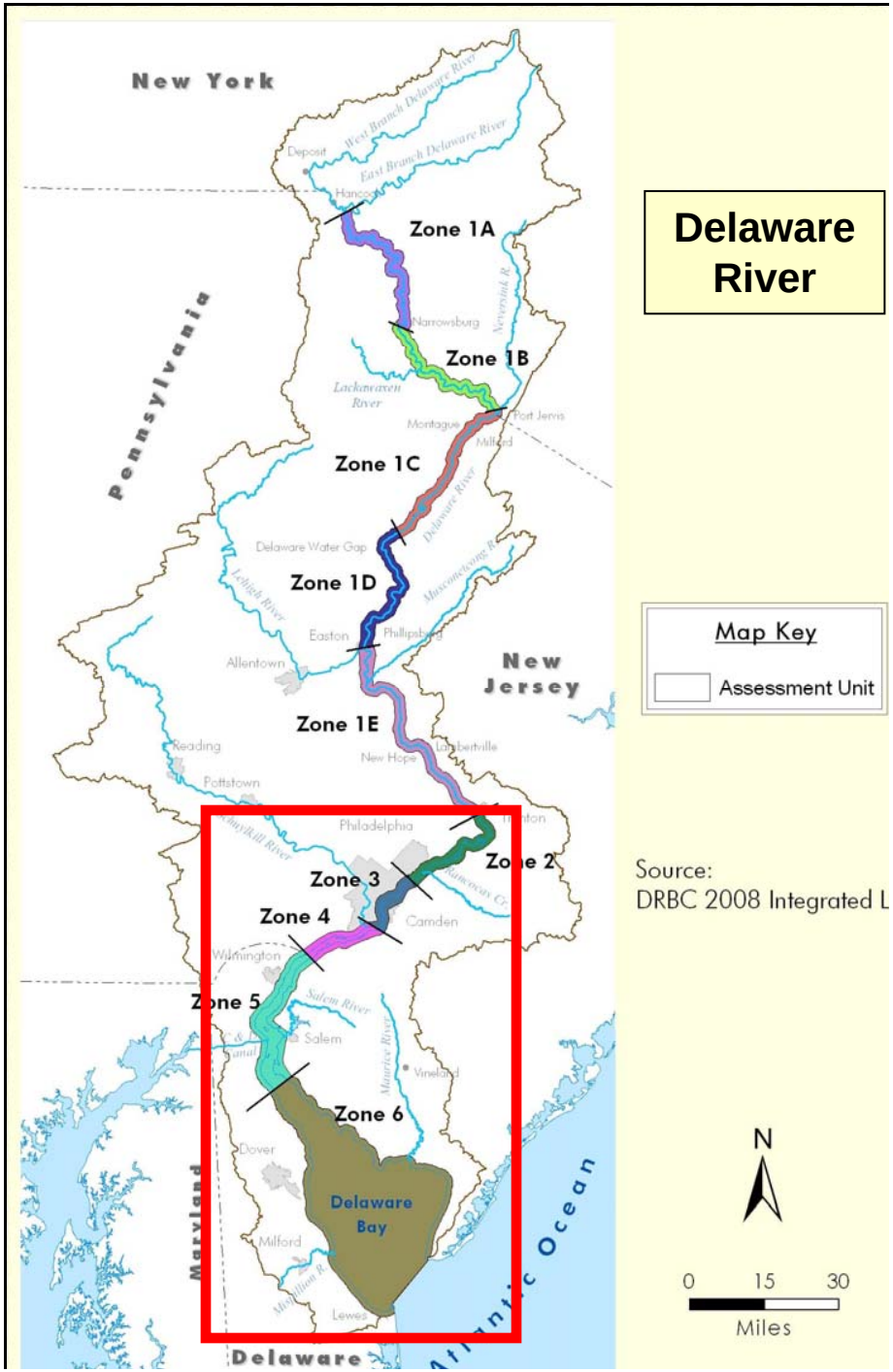
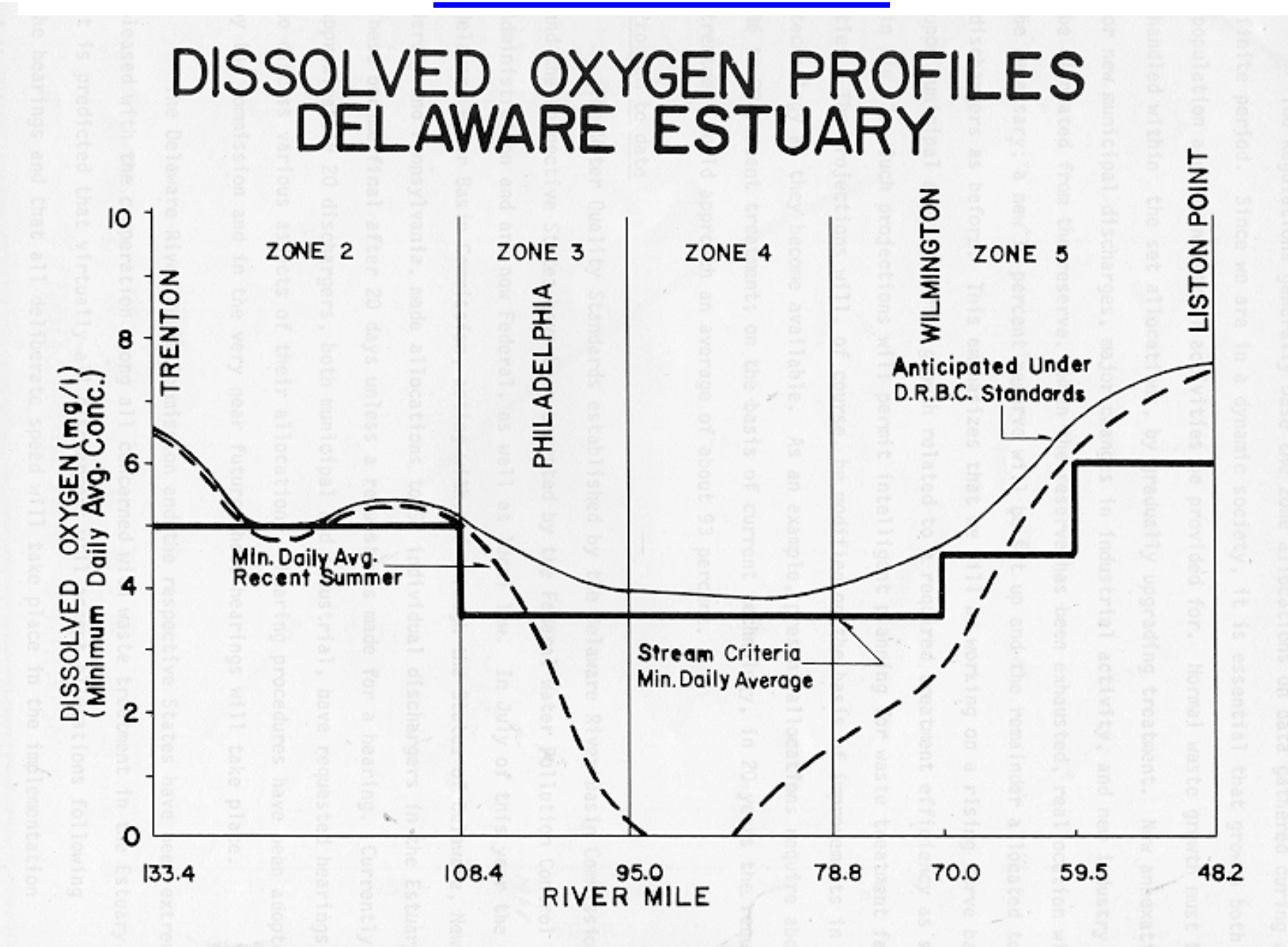


DRBC 1968 CBOD Assimilative Capacity Determination & Wasteload Allocation



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