DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER MONITORING AND STANDARDS

ADOPTION OF AMENDMENTS TO THE
NORTHEAST WATER QUALITY MANAGEMENT PLAN,

TO ESTABLISH 3 TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR PHOSPHORUS FOR:

LINCOLN PARK LAKES, HUDSON COUNTY; OVERPECK LAKE, BERGEN COUNTY; AND VERONA PARK LAKE, ESSEX COUNTY

AND

TO ESTABLISH 34 TMDLs FOR FECAL COLIFORM FOR STREAM SEGMENTS THAT EXTEND INTO BERGEN, ESSEX, MORRIS, PASSAIC, SOMERSET, SUSSEX, AND UNION COUNTIES, AS LISTED IN TABLE 2 OF THIS NOTICE.

Public Notice

Take notice that on 6/6/13 pursuant to the provisions of the New Jersey Water Quality Planning Act, (N.J.S.A. 58:11A-1 et seq.) and the Statewide Water Quality Management Planning Rules (N.J.A.C. 7:15-3.4), two amendments to the Northeast Water Quality Management Plan (WQMP) were adopted by the Department of Environmental Protection (Department). The first amendment establishes 34 TMDLs for fecal coliform for stream segments that extend into Bergen, Essex, Morris, Passaic, Somerset, Sussex and Union Counties, as listed in Table 2. The second amendment establishes TMDLs for phosphorus in three lakes: Lincoln Park Lakes, Hudson County; Overpeck Lake, Bergen County; and Verona Park Lake, Essex County.

A TMDL represents the assimilative or carrying capacity of a waterbody, taking into consideration point and nonpoint source of pollutants of concern, natural background and surface water withdrawals. A TMDL quantifies the amount of a pollutant a water body can assimilate without violating a state's water quality standards and allocates that load capacity to known point sources in the form of wasteload allocations (WLAs), nonpoint sources in the form of load allocations (LAs), margin of safety and, as applicable, reserve capacity.

A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting the load reductions for pollutants of concern as necessary to meet surface water quality standards (SWQS). TMDLs are required, under Section 303(d) of the Federal Clean Water Act, 33 U.S.C. 1313(d), to be developed for waterbodies that cannot meet water quality standards after the implementation of technology-based effluent limitations. TMDLs may also be established to help maintain or improve water quality in waters that are not impaired. Federal regulations concerning TMDLs are contained in the United States Environmental Protection Agency's (USEPA) Water Quality Planning and Management Regulations (40 CFR 130).

On September 16, 2002, the Department and USEPA Region 2 entered into a Memorandum of Agreement (MOA). Under the September 16, 2002 MOA, TMDLs for at least 100 pathogen-impaired streams were to be submitted to USEPA by June 30, 2003. This amendment adopts 3 of the required TMDLs for eutrophic lakes, and 20 of the 100 required TMDLs for pathogen-impaired streams. These TMDLS were submitted to USEPA on March 28, 2003. The lake TMDLs were approved by USEPA on September 29, 2003 and the TMDLs for pathogen-impaired streams were approved on July 29, 2003. These amendments implement the requirements of the USEPA Water Quality Planning and Management Regulations (40 CFR 130) to establish total maximum daily loads for all water quality impaired waterbodies. Follow-up monitoring and source track down monitoring has been completed as called for in the implementation section for fecal TMDLs. Approximately $4.7 million has been spent so far to improve conditions in the watersheds addressed in the TMDL document. This adoption will complement the efforts already made to clean up and advance the goal of delisting the addressed stream segments. For details on projects in the waterbodies addressed in these TMDLs go to http://iaspub.epa.gov/pls/grts/f?p=110:199:3333037287629152.

Fecal Coliform TMDLs in 34 Stream Segments

The State of New Jersey's *2002 Integrated Water Quality Monitoring and Assessment Report* (2002 Integrated List) (see 35 N.J.R. 470(a); January 21, 2003), identified several waterbodies in the Northeast Water Region as being impaired by pathogens, as evidenced by the presence of high fecal coliform concentrations. The *Integrated List* classifies waterbodies into five categories to convey water quality attainment status. When a TMDL is approved by USEPA, a waterbody which is not attaining the water quality standards is moved from Sublist 5 of the *Integrated List* (water quality standard is not attained, TMDL required) to Sublist 4A (TMDL has been completed). As a result of USEPA's 2003 approval of the TMDLs for these stream segments, these waterbodies were listed under Sublist 4A in the subsequent *Integrated Lists*.

There is a difference between the number of TMDLs adopted (34) and the number of TMDLs proposed (32) (January 21, 2003 at 35 N.J.R. 470(b)). While the actual water body segments included in the adopted TMDLs are identical to those included in the notice proposing these TMDLs, the names of stream segments included in the TMDL approved by USEPA differ in several respects from the list included in the preliminary notice (see 35 N.J.R. 470(b), January 21, 2003) for these TMDLs (see Table1).

The naming discrepancies occurred in part because the TMDLs were being developed concurrently with the *2002 Integrated List* in order to meet the deadlines agreed upon in the MOA between the Department and the USEPA. The names of the proposed TMDLs were based on the listings in the draft of the *2002 Integrated List*. When the final 2002 *Integrated List* was published, new data, taken at different sampling stations, was used for the listings. Stream segments were named for the sampling location. Therefore the stream segments were renamed based upon the new sampling stations. In addition, the proposal document inadvertently did not count one segment, and 4 names of stream segments as reflected in the proposal were replaced with 5 names and associated site codes as were used for the same areas on the 2002 New Jersey Clean Water Act Section 303(d) list.

The TMDL document was modified to be consistent with the segment delineation and nomenclature in the final *2002 Integrated List,* which was adopted after the submission of the TMDL to USEPA for approval.

Table 1. Changes in Naming of Stream Segments

Proposed TMDL segment name (sampling station number)	**Adopted TMDL Name (Sublist 5 segment name based on sampling station number)**
1)Wanaque River at Highland Avenue (01387010)	1)Wanaque River at Pompton Lakes (01387041)
2)Saddle River at Ridgewood (01390500)	2)Saddle River at Grove Street A/Ridgewood Avenue (01390518, 01390510) 3)Saddle River at Saddle River (01390470)
3)Passaic River below Pompton River at Two Bridges (01389005)	4)Passaic River at Singac (01389130)
4)Saddle River at Fairlawn/Rochelle Park (01391200)	5)Saddle River at Fairlawn (01391200) 6)Saddle River at Rochelle Park (01391490)
5)Rockaway River at Longwood Valley (01379680)	7)Rockaway River at Berkshire Valley (01379700)

In 2006, following USEPA recommendations, the Department promulgated criteria for E. coli and removed fecal coliform as the appropriate indicator of potential pathogen contamination in freshwater in the Surface Water Quality Standards. This TMDL was developed based on fecal coliform as the indicator organism. However, measures identified to reduce fecal coliform will also reduce E. coli and there is no need to revise the TMDL. For future Integrated Lists, the waters for which TMDLs were developed will remain on Sublist 4A until data indicate that the new indicator organism – E. coli - meets the SWQS.

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TMDLS, Load Allocations and Waste Load Allocations

The 34 TMDLs addressing pathogen indicator loads to the waterbodies are identified in Table 2.

Table 2. Pathogen indicator-impaired stream segments in the Northeast Water Region, identified in Sublist 5 of the 2002 *Integrated List*, and Sublist 4A of the 2004, 2006, 2008, 2010 and draft 2012 *Integrated Lists* for which TMDLs are being adopted

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	River Miles
1	3	Macopin River at Macopin Reservoir	01382450	Passaic	1.8
2	3	Wanaque River at Pompton Lakes	01387041	Passaic	1.5
3	3	Ramapo River Near Mahwah	01387500	Passaic and Bergen	17.7
4	4	WB Saddle River at Upper Saddle River	01390445	Bergen	2.4
5	4	Saddle River at Saddle River	01390470	Bergen	13.7
6*	4	Saddle River at Ridgewood Ave at Ridgewood	01390510	Bergen	10.5
	4	Saddle River at Grove Street	01390518	Bergen	
7	4	Ramsey Brook at Allendale	01390900	Bergen	6.4

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	River Miles
8	4	HoHoKus Brook at Mouth at Paramus	01391100	Bergen	6.2
9	4	Saddle River at Fairlawn	01391200	Bergen	5.0
10	4	Saddle River at Rochelle Park	01391490	Bergen	7.4
11	4	Saddle River at Lodi	01391500	Bergen	3.8
12	4	Passaic River at Singac	01389130	Passaic and Essex	1.8
13	4	Passaic River at Little Falls	01389500	Passaic and Essex	15.0
14	4	Preakness Brook Near Little Falls	01389080	Passaic	8.9
15	4	Peckman River at West Paterson	01389600	Passaic and Essex	7.7
16	4	Deepavaal Brook at Fairfield	01389138	Essex	6.3
17	4	Diamond Brook at Fair Lawn	01389860	Passaic and Essex	2.5
18	4	Goffle Brook at Hawthorne	01389850	Passaic and Bergen	10.5
19	5	Hackensack River at River Vale	01377000	Bergen	10.0
20	5	Musquapsink Brook at River Vale	01377499	Bergen	7.3
21	5	Pascack Brook at Westwood	01377500	Bergen	6.6
22	5	Tenakill Brook at Cedar Lane at Closter	01378387	Bergen	10.2

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	River Miles
23	5	Coles Brook at Hackensack	01378560	Bergen	11.1
24	6	Black Brook at Madison	01378855	Morris	2.4
25	6	Passaic River near Millington	01379000	Morris and Somerset	5.2
26	6	Dead River near Millington	01379200	Somerset	21.9
27	6	Passaic River near Chatham	01379500	Somerset, Union, Essex, and Morris	25.2
28	6	Canoe Brook near Summit	01379530	Essex	17.6
29	6	Rockaway River at Berkshire Valley	01379700	Sussex and Morris	11.6
30	6	Rockaway River at Blackwell Street	01379853	Morris	3.5
31	6	Beaver Brook at Rockaway	01380100	Morris	17.0
32	6	Stony Brook at Boonton	01380320	Morris	13.1
33	6	Rockaway River at Pine Brook	01381200	Morris	6.8
34	6	Passaic River at Two Bridges	01382000	Morris and Essex	14.1
Total river miles					312.7

*Note that the river segment that TMDL 6 describes includes two sampling stations that are close together, and so were included as one TMDL. Stream gage station # 01390500 was used in the TMDL report to refer to impaired segment due to two WQ stations #01390510 & #01390518 (these two stations are about 1 mile apart), The final TMDL document lists these two stations as one TMDL to replace the TMDL for station # 01390500 (note: No Fecal Coliform data for this station 01390500).

These thirty-four TMDLs provide the basis for management approaches and restoration plans aimed at identifying and reducing the sources of pathogen indicators in order to attain applicable surface water quality standards (SWQS). Approximately $4.7 million have been spent so far to improve conditions in the watersheds addressed in this document. This adoption will continue the efforts already made to clean up with an aim of delisting the addressed stream segments. For details on projects in the waterbodies addressed in these TMDLs go to http://iaspub.epa.gov/pls/grts/f?p=110:199:2879965558640695

The New Jersey Surface Water Quality Standards for FW2 waters, at the time of the development of these TMDLs stated "Fecal coliform levels shall not exceed a geometric average of 200/100 ml nor should more than 10 percent of the total samples taken during any 30-day period exceed 400/100 ml." The current standard (N.J.A.C. 7:9B-1.14(d)1 states: "E.coli should not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml." This TMDL was developed based on fecal coliform as the indicator organism. However, measures identified to reduce fecal coliform will also reduce E. coli and there is no need to revise the TMDL. For future Integrated Lists, the waters for which TMDLs were developed will remain on Sublist 4A until data indicate that the new indicator organism – E. coli - meets the SWQS.

Nonpoint and stormwater sources are the primary contributor to pathogen indicator loads in these streams and can include storm-driven loads transporting pathogen indicators from sources such as geese, farms and domestic pets to the receiving water. Nonpoint sources also include steady inputs from sources such as failing sewage conveyance systems and failing or inappropriately sized and/or located septic systems. Because the total source contribution from sewage treatment plants is an insignificant fraction of the total load, these TMDLs do not impose any change in current practices for sewage treatment plants and have not resulted in wasteload allocations or changes to existing effluent limits for these facilities.

Using ambient water quality data, summer and year-round geometric means were determined for each Sublist 5 listed segment based on water quality monitoring conducted during the water years (October 1-September 30) from 1994 to 2000. Given the two surface water quality criteria of 200 CFU/100 ml and 400 CFU/100 ml in FW2 waters, computations were necessary for both criteria and resulted in two values for percent reduction for each stream segment. The higher (more stringent) percent reduction value was selected as the TMDL and is applied to nonpoint and stormwater sources as a whole. Table 3 below lists the TMDLs for each stream segment along with LA s and WLAs.

Table 3. TMDLs for pathogen indicator-impaired stream segments in the Northeast Water Region as identified in Sublist 5 of the *2002 Integrated List.* The reductions reported in this table represent the higher, or more stringent, percent reduction required of the two fecal coliform criteria

TMDL No.	WMA	Station Name/Waterbody	Sublist 5 Segment	Summer Geometric Mean CFU/100 ml	MOS as a percent of the target conc.[1]	Percent Reduction (LA) without MOS	Percent Reduction (LA) with MOS	Wasteload Allocation (WLA) as a Percent Reduction, with MOS
1	3	Macopin R at Macopin Res	01382450	59	46%	-16%	37%	37%
2	3	Wanaque R at Pompton Lks	01387041	208	53%	67%	85%	85%
3	3	Ramapo River near Mahwah	01387500	431	44%	84%	91%	91%
4	4	W B Saddle R at Upper SR	01390445	1,144	30%	94%	96%	96%
5	4	Saddle River at Saddle River	01390470	1,144	30%	94%	96%	96%
6	4	Saddle R at Ridgewood Ave	01390510	1,144	30%	94%	96%	96%
6	4	Saddle R at Grove Street A	01390518	1,144	30%	94%	96%	96%
7	4	Ramsey Brook at Allendale	01390900	1,144	30%	94%	96%	96%
8	4	HoHoKus Bk at Mouth	01391100	1,144	30%	94%	96%	96%
9	4	Saddle River at Fairlawn	01391200	1,144	30%	94%	96%	96%
10	4	Saddle R at Rochelle Park	01391490	1,144	30%	94%	96%	96%
11	4	Saddle River at Lodi	01391500	1,144	30%	94%	96%	96%
12	4	Passaic River at Singac	01389130	652	30%	90%	93%	93%
13	4	Passaic River at Little Falls	01389500	652	30%	90%	93%	93%
14	4	Preakness Bk nr Little Falls	01389080	652	30%	90%	93%	93%
15	4	Peckman R at West Paterson	01389600	652	30%	90%	93%	93%

TMDL No.	WMA	Station Name/Waterbody	Sublist 5 Segment	Summer Geometric Mean CFU/100 ml	MOS as a percent of the target conc.[1]	Percent Reduction (LA) without MOS	Percent Reduction (LA) with MOS	Wasteload Allocation (WLA) as a Percent Reduction, with MOS
16	4	Deepavaal Brook at Fairfield	01389138	1,544	47%	96%	98%	98%
17	4	Diamond Brook at Fair Lawn	01389860					
18	4	Goffle Brook at Hawthorne	01389850					
19	5	Hackensack R at Rivervale	01377000	294	34%	77%	85%	85%
20	5	Musquapsink B at Rivervale	01377499	709	54%	90%	96%	96%
21	5	Pascack Brook at Westwood	01377500					
22	5	Tenakill Bk at Closter	01378387	159	91%	57%	96%	96%
23	5	Coles Brook at Hackensack	01378560	1,093	68%	94%	98%	98%
24	6	Black Brook at Madison	01378855	1,370	29%	95%	96%	96%
25	6	Passaic River near Millington	01379000					
26	6	Dead River Near Millington	01379200					
27	6	Passaic River near Chatham	01379500					
28	6	Canoe Brook near Summit	01379530					
29	6	Rockaway R at Berkshire Vlly	01379700	373	54%	82%	92%	92%
30	6	Rockaway R at Blackwell St	01379853					
31	6	Beaver Brook at Rockaway	01380100	362	43%	81%	89%	89%
32	6	Stony Brook at Boonton	01380320	214	32%	68%	78%	78%
33	6	Rockaway R at Pine Brook	01381200	571	28%	88%	91%	91%
34	6	Passaic River at Two Bridges	01382000	276	33%	75%	83%	83%

The TMDL report provides extensive information to assist with more specific identification of sources. Load duration curves, which are useful in identifying and differentiating between storm-driven and steady-input sources, are provided for stream segments for which stream flow gauge information is available. The Department, in collaboration with the Technical Advisory Committees of Watershed Management Areas 3-6, narrowed the potential primary sources of fecal contamination to the following:

Non-Human Sources of Fecal Contamination:

- Canada geese, pest waterfowl and other wildlife;
- Pet Waste;
- Stormwater basins which can act as accumulation points of fecal matter (from pets, waterfowl and wildlife);
- Direct stormwater discharges to waterbodies; and
- Farms, zoos.

Human Sources of Fecal Contamination:

- Malfunctioning or older improperly sized and/or located septic systems;
- Failing Sewerage Conveyance Systems; and
- Improper garbage storage and disposal.

Short-term management strategies include existing projects funded by the Department to address fecal impairments. These projects for the most part include stream bank restoration projects, ordinance development and catch basin cleanouts. Nonpoint Source Pollution Control and Management Implementation Grants have been awarded by the Department since 1995 to local and regional organizations for projects that implement management practices for nonpoint source control. To check on the status of projects go to http://iaspub.epa.gov/pls/grts/f?p=110:199:3333037287629152.

While short-term management measures have begun to reduce sources of fecal contamination in the Northeast Water Region, additional measures will be needed to verify and further reduce or eliminate these sources. Long-term management strategies are provided for each source category to articulate the accumulative action plan that is needed to address the specific source of fecal impairment for each stream segment. Long-term strategies include, for instance, the development of Stormwater Management Plans and Canada Goose Damage Management Plans.

Amendment to establish three phosphorus TMDLs to address eutrophic lakes

The State of New Jersey's *2002 Integrated List* identified several lakes in the Northeast Water Region as being eutrophic, as indicated by elevated total phosphorus (TP), elevated chlorophyll-*a*, and/or nuisance macrophyte density. The *Integrated List* classifies waterbodies into five categories to convey water quality attainment status. When a TMDL is approved by USEPA, a waterbody which is not attaining the water quality standards is moved from Sublist 5 of the *Integrated List* (water quality standard is not attained, TMDL required) to Sublist 4A (TMDL has been completed). As a result of USEPA's 2003 approval of the TMDLs for these lakes, these waterbodies are listed under sublist 4A in the 2004, 2006, 2008, 2010 and draft 2012 *Integrated Lists*. This amendment establishes total maximum daily loads (TMDLs) for TP that address eutrophication of the lakes listed in Table 4 below.

Table 4 Eutrophic Lakes for which Phosphorus TMDLs are Being Adopted

TMDL Number	Lake Name	Municipality
1	Lincoln Park Lakes	Jersey City, Hudson County
2	Overpeck Lake	Teaneck, Bergen County
3	Verona Park Lake	Verona, Essex County

A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting load reductions for pollutants of concern as necessary to meet the SWQS. The pollutant of concern for these TMDLs is phosphorus, since phosphorus is generally the nutrient responsible for excessive productivity of inland lakes leading to cultural eutrophication. The Department's Geographic Information System (GIS) was used extensively to describe the lakes and lakesheds (drainage basins of the lakes).

Phosphorus sources for each lake were characterized on an annual scale (kg TP/yr) for both point and nonpoint sources. Runoff from land surfaces comprises a substantial source of phosphorus into lakes. An empirical model developed by K.H. Reckhow, Ph.D. (1979), fully referenced and described in the TMDL report, was used to relate annual phosphorus load and steady-state in-lake concentration of total phosphorus. To achieve the TMDLs, overall load reductions were calculated for each of the source categories. The Department has initiated a lake montioing program that will help determine if implementation measures are successful. There are no point sources other than stormwater within the lakesheds of Lincoln Park Lake, Overpeck Lake, or Verona Park Lake. The TMDL identifies all the phosphorus contributions and establishes WLAs and LAs expressed as maximum annual loads for phosphorus necessary to meet surface water quality standards. WLAs were established for point sources of phosphorus, namely regulated stormwater runoff from medium/high density residential, low density/rural residential, commercial, industrial and mixed urban/other urban land uses. LAs were established for the major categories of nonpoint sources of phosphorus: runoff from nonurban land uses and air deposition onto lake surface. There is an implicit margin of safety included in the calculations. Table 5 lists load reductions to be required for each of the lakes.

Table 5 Current condition, reference condition, target condition and overall percent reduction for each lake

Lake	Current condition [TP] (mg/l)	Reference condition [TP] (mg/l))	Upper bound target condition [TP] (mg/l)	Target condition [TP] (mg/l)	% Overall TP load reduction
Lincoln Park Lakes	0.14	0.012	0.03	0.02	85%
Overpeck Lake	0.19	0.015	0.03	0.02	89%
Verona Park Lake	0.11	0.011	0.03	0.02	82%

Activities directed in the watersheds to reduce nutrient loadings may include a host of options, included, but not limited to, education projects that teach best management practices, projects funded by CWA Section 319 Nonpoint Source (NPS) Grants, municipal ordinances regarding feeding of wildlife, pooper-scooper laws, and stormwater control measures.

The amendments consist of detailed reports that provide the technical and regulatory basis for these TMDLs, and are available from the Department as described below.

These amendment proposals were noticed in the New Jersey Register on January 21, 2003 at 35 N.J.R. 470 (b). A public hearing was held on the TMDLs on February 24, 2003 and the public comment period was open through March 11, 2003. USEPA approved the Fecal Coliform TMDL documents on July 29, 2003 and the three Lake TMDLs on September 29, 2003.

The Department is publishing this notice of adoption of amendments to the Northeast Water Quality Management Plan pursuant to N.J.A.C. 7:15-3.4. All information related to these amendments is located at the Department, Division of Water Monitoring and Standards, PO Box 420, Mail code 401-04I , 401 East State Street, Trenton, New Jersey 08625-0409. If you wish to receive a copy of the Amendment to the Northeast Water Quality Management Plan Total Maximum Daily Loads for Phosphorus to Address 3 Eutrophic Lakes in the Northeast Water Region: Lincoln Park Lakes, Hudson County; Overpeck Lake, Bergen County; Verona Park Lake, Essex County; Watershed Management Area 4 (Lower Passaic & Saddle River Watersheds); Watershed Management Area 5 (Hackensack River, Hudson River, and Pascack Brook Watersheds) or the Amendment to the Northeast Water Quality Management Plan: Total Maximum Daily Loads for Fecal Coliform to Address 34 streams in the Northeast Water Region; Watershed Management Area 3 (Pompton, Pequannock, Wanaque, and Ramapo Rivers),Watershed Management Area 4 (Lower Passaic and Saddle Rivers), Watershed Management Area 5 (Hackensack River, Hudson River, and Pascack Brook) Watershed Management Area 6 (Upper & Middle Passaic, Whippany, and Rockaway Rivers) call the Division of Water Monitoring and Standards at (609) 633-1441 or download the file from: http://www.nj.gov/dep/wms/bear/tmdls.html

Summary of Public Comments and Agency Responses:

The following people submitted written and/or oral comments on the proposal:

1. USEPA Region II
2. Dr. Qizhong "George" Guo
   Rutgers University, Dept. of Civil & Environmental Engineering
3. Barbara Sachau, resident of Florham Park
4. Monique Purcell, NJ Department of Agriculture

A summary of comments on the proposal and the Department's Responses to those comments follow. The number(s) in brackets at the end of each comment corresponds to the commenter(s) listed above.

Stream Segments

1. Comment: Figure 6 should be clarified to state that it represents State-wide data and that each point represents a sampling station, not a sampling event. (1)

Response: This clarification has been added.

2. Comment: Figure 7, which demonstrates that fecal coliform values are consistently highest in summer months using water years (October 1 – September 30) 1994-2000, should reflect data only from pertinent water years that have year round data. Raw data should be depicted instead of geometric means. (1)

Response: Figure 7 has been revised to include water years in which monitoring was conducted throughout the year. Water years 1994-1997 were used given that modifications to monitor solely during the summer months were begun in water year

1998. Figure 7 has been amended to include raw data, number of data points, and geometric means to illustrate the trend.

3. Comment: A monitoring program should be developed to evaluate the effectiveness of BMP controls to reduce fecal loads and to provide data to refine loading estimates in the event of additional predictive modeling. (1)

Response: The Department's ambient monitoring program was identified as the means to assess attainment of water quality objectives. It should be noted that the approach used in the fecal coliform TMDLs is in terms of concentration, not load. As stated in the TMDL, modeling of fecal coliform loads to predict concentration is not a reliable means to target reductions needed to achieve water quality standards. Fecal coliform contributions to the environment are circumstantial, ephemeral, and transient. Models cannot account for the variables associated with the presence or absence of fecal material. Therefore, effective controls can be developed once the types of sources are identified. If follow-up monitoring indicates that objectives have not been met, then additional work on track down of sources and/or implementation of controls will be pursued, rather than predictive modeling.

4. Comment: The heading and data displayed are not consistent in Appendix B. This should be remedied. (1)

Response: The error was corrected. The table data array was revised so that it accurately reflects the heading and now lists major and minor municipal discharges in the Northeast Water Region.

5. Comment: The Department's efforts in developing a statewide technical approach to establish the fecal coliform TMDLs are applauded. Development of the sophisticated and innovative statistical approach to meet the 400 CFU/100 ml criterion is a remarkable technical accomplishment by the Department. (2)

Response: The Department acknowledges the commenter's support of this amendment.

6. Comment: The new Department statistical approach was used to recalculate the required level of fecal coliform load reduction for the Whippany River Watershed and compared to the fecal coliform TMDL that was established in 1999. This TMDL set a load reduction percent of 58.5 percent. The new method produced a required load reduction of 98 percent, using fecal coliform data from January 1989 to June 1997, which were available from the USGS monitoring station at Morristown (station number: 01381500). The difference in load reduction percent appears to be the result of different flow conditions under which the required levels of load reduction were quantified. The 1999 TMDL for the Whippany used a multi-pollutants-targeted mathematical model and data from 1988, which had a slightly below average annual flow rate. 1987 to 1989 data represent a wide range of flow conditions. An inspection of the load duration curves developed by the Department also reveals different ranges of stream flow rates at which the fecal coliform data were collected for different stream segments. Although the Department used the same data collection time period (from year 1994 to year 2000) for the different stream segments, different days of data collection and different levels of data availability within the same time period could have resulted in the Department's use of the fecal coliform data at different ranges of stream flow rates to develop the proposed TMDLs for different stream segments, leading to inconsistent levels of required fecal coliform load reduction. (2)

Response: The Whippany River Watershed model was developed to simulate nutrients as well as pathogen indicators. While the model was adequate for nonpoint source and stormwater TMDL calculations, the calibration and verification was better for nutrients and dissolved oxygen than for fecal coliform. Also, the fecal coliform TMDL for the Whippany River was based on a comparison of the simulated 30-day geometric mean with the 200 count/100ml criterion. Computed daily averages were used to compare against the 400 count/100ml criterion, and may have underrepresented the actual variability. The Department's analysis of extensive ambient monitoring data reveals that the 400 count/100ml criterion is exceeded when the geometric mean is above 68 count/100ml. Since ambient data are certainly more reliable than simulated results, the

Department's statistical approach is a substantial improvement over the modeling approach. Finally, it should be noted that the exact percentage reduction does not affect the implementation for these nonpoint source and stormwater TMDLs through appropriate management measures. More specific source identification and reduction strategies will be needed.

7. Comment: The Department should explicitly specify the flow condition under which each of the thirty-two fecal coliform TMDLs was proposed. Such a specification is necessary to achieve better consistency in the statewide approach and to better inform parties involved in the TMDL implementation about the protected flow conditions before they take high-cost measures to achieve the required high level of fecal coliform load reduction. A 98 percent watershed-wide reduction in stormwater-related fecal coliform load which would have been proposed for the Whippany River Watershed, if the new statistical method had been used instead of the model, would be very difficult to achieve even with a combination of sources control and structural BMPs. (2)

Response: The approach used in the fecal coliform TMDLs was to calculate the reductions needed in terms of concentration, not load. The reductions needed are therefore independent of flow. The load duration curves do relate flow and exceedances to account for the relative importance of steady state versus storm related sources of fecal coliform. There is insufficient data available to specify a percent reduction at each flow level. The approach taken by the Department yields a conservative result, as demonstrated by the comparison performed by the commenter. The suite of generic approaches to fecal coliform reduction required through the Phase II Municipal Stormwater Permitting program was the first step to achieving the needed fecal coliform reductions. The bacterial track down studies found that animals and birds are the main sources that require attention. Agricultural practices or concentrations of resident Canada geese need to be considered. The stormwater regulations will continue to reduce these sources and protect the waterways from further contamination.

8. Comment: Mathematical models should be used wherever possible to do TMDLs. In the case of the fecal coliform TMDLs, the Hydrologic Simulation Program-Fortran (HSPF) module of the BASINS (Better Assessment Science Integrating Point and Nonpoint Sources) model is appropriate. The commenter offered to share with the Department the results obtained from using a mathematical model to calculate the different flow conditions under which different levels of fecal coliform load reduction would be required, applying the HSPF model within NJWS, a New Jersey-customized version of USEPA's BASINS, to the Whippany River Watershed upstream of the USGS monitoring station at Morristown. The flow and fecal coliform data at the USGS monitoring station from October 1992 and June 1997 were used to calibrate the model (Li and Guo, 2003). The calibrated model was applied for the time period from October 1992 to October 1998 (May to September only) to test the effects of different levels of fecal coliform load reduction. Assumptions were: no further reduction in fecal coliform load from wastewater treatment plant effluents and 100 percent reduction in fecal coliform load from the failing septic tanks.

If 98 percent reduction in fecal coliform load from stormwater runoff into the stream is implemented, the stream fecal coliform criteria (both 200 CFU/100ml and 400 CFU/100 ml criteria) will be met for the stream flow rate under 106 cfs which was exceeded only during 9.9 percent of the days from 1921 to 1998. The 9.9 percent exceeding flow rate is very close to the 10 percent exceeding flow rate beyond which the Department characterizes as technically or economically not feasible for management.

If 60 percent reduction in fecal coliform load from stormwater runoff into the stream was implemented, the stream fecal coliform criteria (both 200 CFU/100ml and 400 CFU/100 ml criteria) will be met for the stream flow rate under 41.7 cfs which was exceeded only during 44 percent of the days from 1921 to 1998. (2)

Response: The Department disagrees with the premise that mathematical models should be used whenever possible to calculate TMDLs. Since fecal coliform loads and concentrations can vary many orders of magnitude over short distances and over time at a single location, dynamic models can be very difficult to calibrate. Additionally, the options available to control nonpoint sources of fecal coliform are not exact in their effectiveness. Finally, fecal coliform can be very high even though it may be caused by only a few sources; identifying and removing these sources will yield dramatic results. Given these considerations, detailed water quality modeling may not provide adequate insight or guidance toward the development of implementation plans for fecal coliform reductions. Therefore, the Department believes the resources that would be needed to perform detailed stream modeling for fecal coliform would be better used for specific source identification and that the level of complexity employed in these TMDLs is appropriate. The Department acknowledges that the results of the analysis performed by the commenter appear to support the reduction rates called for in the TMDLs.

LAKES:

9. Comment: The phosphorus loading coefficient used for agriculture is too high. The overall number should be 0.5 kg/ha, according to a consultant's report, instead of 1.5 kg/ha. The loadings vary by type of agricultural operation and crop type and this should be reflected in the TMDLs. Assistance is offered to generate site-specific information for TMDL development for agriculture. (4)

Response: The Department agrees that actual loading may vary depending on the agricultural practice and crop type, as well as whether or not conservation management plans have been developed and implemented at a given site. The Department welcomes any additional data regarding loading coefficients for agricultural land uses. With regard to the TMDLs, precision with regard to the loading coefficients does not have a material effect on the outcome of the TMDL. As stated in Section 10, Implementation, the next steps toward implementation are preparation of lake characterizations and lake restoration plans, where they have not already been developed. The plans will be developed as funding becomes available. In the development of these plans, the loads by source will be revised, as necessary, to reflect refinements in source contributions. It will be on the basis of refined source estimates that specific strategies for reduction will be developed. These will consider issues such as cost and feasibility when specifying the reduction target for any source or source type.

10. Comment: The Reckhow (1979) model was developed and calibrated for larger lakes of northern United States. New Jersey's small, shallow lakes have different phosphorus dynamics and warrant more appropriate models developed for or compatible with New Jersey's lakes. (4)

Response: The Reckhow (1979) model was selected from among many other empirical models considered by the Department because it has the broadest range of lake characteristics in its database, including smaller lakes, and because it includes an uncertainty estimate that was used to calculate a Margin of Safety. The model results need to be considered in light of the next steps for implementation, which include lake characterization and development of a more detailed restoration plan for each lake.

11. Comment: The Reckhow (1979) model employs an annual cycle so the standard should be computed on an annual average. (4)

Response: The phosphorus loads and target concentrations were determined based on an annual mean concentration of total phosphorus. This mean value of 0.03 mg/l was derived from the water quality standard, which is written as a not to exceed value of 0.05 mg/l of total phosphorus. This concentration, and loads that would achieve it, were selected to ensure that the standard would not be exceeded at any time throughout the year.

12. Comment: The target should be in terms of dissolved phosphorus, not total phosphorus, since algal blooms are triggered by a dissolved concentration of 0.5 mg/l. (4)

Response: Total phosphorus has been used as the basis for setting criteria for lake management and related modeling and is the form for which the water quality criterion has been set. Total phosphorus is more applicable in setting phosphorus targets for lake management than dissolved phosphorus or orthophosphorus because it accounts for the conversion of forms of phosphorus that are not bioavailable to bioavailable forms. Also, using dissolved phosphorus alone as an indicator would be ineffective, especially during the algal growth season where the uptake rate of orthophosphorus by algae and plants is very high. Under these conditions in-lake dissolved phosphorus concentrations will be extremely low, but not indicative of phosphorus load or impacts.

13. Comment: Because the Reckhow (1979) model includes a margin of safety (MOS), inclusion of any additional MOS should be eliminated. (4)

Response: The MOS used in the TMDLs was derived from the standard error of 0.128 associated with Reckhow's model; no additional MOS was added.

15. Comment: Phosphorus load basically consists of two components, the solid phase attached to soil particles and the liquid phase as dissolved phosphorus in runoff. Both of these components encounter many barriers and obstacles before they reach a waterbody. Conservation practices, including buffers, substantially reduce the off-site loading rate. The Department should account for these practices when determining the actual load to be allocated to agricultural lands in the watershed. Of the total phosphorus that eventually reaches the water body, only the dissolved portion of it will impact the eutrophication process. The solid phase remains inactive as sediment deposits and a small portion dissolves under normal circumstances. Therefore, only a reasonable fraction of the transported total phosphorus should be considered as effective load. (4)

Response: While it is true that phosphorus must be converted to dissolved reactive phosphorus before it can be taken up by algae and thereby stimulate eutrophication, storage, conversion and recycling mechanisms in the lake make use of a substantial portion of the total phosphorus that enters the system. Phosphorus deposited in the sediments will become sequestered under the right conditions, but that process is governed by the deposition rate. The model used to relate total phosphorus load to in-lake steady-state phosphorus concentration accounts for loss due to deposition by assuming a constant deposition rate. The model is quite robust and applies to total phosphorus. Furthermore, total phosphorus is the basis for the water quality criterion for lakes. It would be technically incorrect to apply an effective phosphorus load concept to an annual empirical model of total phosphorus. The Department recognizes that conservation management practices, such as buffers, can affect the loading rate from land uses. Lake characterization and restoration plans will refine estimates of source contributions and consider where practices are already in place in selecting management strategies for load reduction.

16. Comment: The Department's efforts in developing a statewide technical approach to establish the phosphorus TMDLs for lakes is applauded. Consideration of the uncertainty in the simple model that relates the phosphorus load to the lake phosphorus concentration is a clear indication of the Department's recognition of the recommendations from the National Research Council regarding the TMDL developments. (2)

Response: The Department acknowledges the support.

17. Comment: It appears that the uncertainty in the phosphorus load estimate was not considered or explicitly addressed. Estimates of the phosphorus load can be quite uncertain (Reckhow, 1979). Although the Department has made efforts in recent years in estimating the pollutant export/load coefficients specifically for the State of New Jersey, a local variability within the State is still expected. An underestimate or overestimate of the phosphorus load would have a direct impact on the required level of phosphorus load reduction. For example, for Lincoln Park Lakes, the Department proposed 85 percent reduction in the total phosphorus load. If the actual load is twice the amount estimated by the Department, the required total phosphorus load reduction would be 93 percent. However, if the actual load is only half the amount estimated by the Department, required total phosphorus load reduction would only be 71 percent. The proposed 85 percentage reduction in the stormwater-related total phosphorus load will be difficult to achieve. This makes it important to inform the parties involved in TMDL implementation regarding all the major uncertainties associated with the TMDL calculations. Using structural BMPs would probably only achieve about a 70 percent reduction. Further reduction could be obtained

with source controls as well as structural BMPs. It is suggested that the Department should have field data to back up the TMDL and make the load reductions more precise. The Department should explicitly address the uncertainty that was associated with the phosphorus load estimate used in proposing the phosphorus TMDLs for lakes. (2)

Response: The loading capacity for each TMDL is expressed in terms of annual load and does not depend on estimates of current phosphorus loads. Estimates of the current phosphorus load are provided in order to estimate the percent reductions that might be required in order to achieve the TMDL. However the TMDL does not depend on current load estimates. For this reason, it would not be appropriate to include the current load uncertainty in the Margin of Safety. The lake restoration plans required by the TMDLs will refine current load estimates as necessary in order to specify actual reduction measures. The restoration plans will consider the feasibility of reductions as well as in-lake measures that may need to be taken to augment watershed measures to reduce phosphorus loading.

Lakes and Stream Segments

18. Comment: The chief cause of pollution in our waterbodies is people and their activities, not geese. Implementation efforts should focus on: cleaning septic systems, outlawing fertilizers, regulating and reducing the amount of chemicals sold and used in New Jersey, requiring pet waste cleanup, and setting large monetary fines for failure to comply with these rules. If these measures are not effective, then the Department should consider reducing loads from geese. The Department should additionally consider use of vacuum systems to pick up feces of all kinds. (3)

Response: There are multiple sources of fecal coliform and phosphorus that result in the observed impairments in lakes and streams. These include the activities of people, their pets, agricultural operations, geese and other wildlife. Through bacterial source trackdown, the relative importance of fecal coliform contributions will be identified which will provide information for the development of effective strategies to reduce the inputs. The lake characterization/restoration plan development will similarly refine source information and guide development of management strategies for lake restoration, including phosphorus load reductions.

Jill Lipoti, Director

Division of Water Monitoring and Standards
Department of Environmental Protection

6/6/13

Date